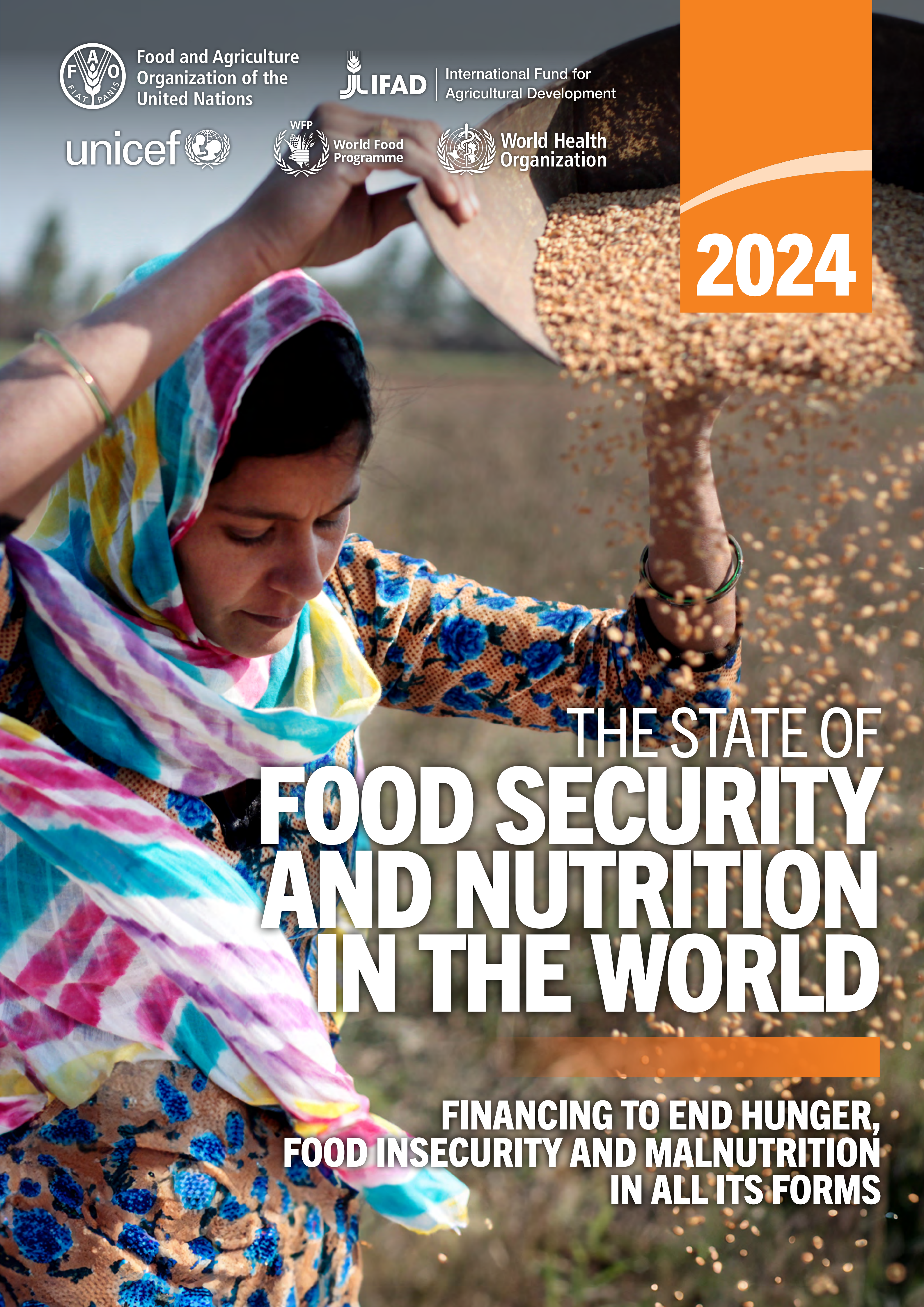

Food and Agriculture Organization of the United Nations
International Fund for Agricultural Development
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WFP World Food Programme
World Health Organization

2024

THE STATE OF FOOD SECURITY AND NUTRITION IN THE WORLD

FINANCING TO END HUNGER, FOOD INSECURITY AND MALNUTRITION IN ALL ITS FORMS

This flagship publication is part of **The State of the World** series of the Food and Agriculture Organization of the United Nations.

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INDIA. Winnowing wheat: scaling up financing flows will accelerate the vital transformation of agrifood systems.

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2024 THE STATE OF FOOD SECURITY AND NUTRITION IN THE WORLD

FINANCING TO END HUNGER, FOOD INSECURITY AND MALNUTRITION IN ALL ITS FORMS

Food and Agriculture Organization of the United Nations
International Fund for Agricultural Development | United Nations Children's Fund
World Food Programme | World Health Organization

Rome, 2024

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The supplementary material to *The State of Food Security and Nutrition in the World 2024* is available at:
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FOREWORD

Achieving the Sustainable Development Goals (SDGs) is the responsibility of all countries. Our five organizations support transformative efforts to progress towards a world free from hunger, food insecurity and malnutrition in all its forms by 2030. We are encouraged by the commitment of national governments, partners all over the world and the global community towards this common goal.

While we have made some progress, improvements have been uneven and insufficient. We have seen improvement in more populous countries with growing economies, but hunger, food insecurity and malnutrition continue to increase in many countries around the world. This is affecting millions of people especially in rural areas, where extreme poverty and food insecurity remain deeply entrenched. Vulnerable populations, particularly women, youth and Indigenous Peoples, are disproportionately affected. A continuation of the past trends means that by 2030, millions of people will still be undernourished, millions of children will still be affected by malnutrition in its different forms, and the world will still be falling short of reaching the global nutrition targets.

Conflict, climate variability and extremes, economic slowdowns and downturns, lack of access to and unaffordability of healthy diets, unhealthy food environments, and high and persistent inequality continue to drive food insecurity and malnutrition all over the world. The policies and investments needed to transform agrifood systems and address these drivers along the rural–urban continuum have been identified in previous editions of *The State of Food Security and Nutrition in the World*. In preparing for this year's report, we wanted to address the reasons why such policies and investments have not been implemented at scale.

A central reason is finance and financial inclusion, which are among the means of implementation of the SDGs and need more consistent political commitment. The countries with the highest levels of food insecurity and multiple forms of malnutrition, and affected by the major drivers of these problems, are the countries with the least access to financing.

Our five organizations are committed to taking comprehensive stock of how much financing for food security and nutrition is available globally, and how much more is needed to support the policies and investments necessary to address all the causes and the major drivers of food insecurity and malnutrition along the rural–urban continuum. This report provides a definition of financing for food security and nutrition and the guidance to implement it. To support such implementation, our five organizations commit to advocate for, and support, data development for a better global accounting system of financing for food security and nutrition.

Estimating the gap in financing for food security and nutrition and mobilizing innovative ways of financing to bridge it must be among our top priorities. Policies, legislation and interventions to end hunger and ensure all people have access to safe, nutritious and sufficient food (SDG Target 2.1), and to end all forms of malnutrition (SDG Target 2.2) need significant resource mobilization. They are not only an investment in the future, but our obligation. We strive to guarantee the right to adequate food and nutrition of current and future generations.

FOREWORD

In the run-up to the Summit of the Future 2024, and the Fourth International Conference on Financing for Development in 2025, the theme of this year's report is particularly timely. We hope that governments, partners and stakeholders will be inspired by, and act upon, the report's concrete recommendations on how to source, and make better use of, financing to achieve Zero Hunger. We also hope that the calls made in this report are noted and discussed in the relevant intergovernmental processes supporting the implementation of the 2030 Agenda in the High-Level Political Forum on Sustainable Development, including the Financing for Development Forum.

Qu Dongyu
FAO Director-General

Alvaro Lario
IFAD President

Catherine Russell
UNICEF Executive Director

Cindy Hensley McCain
WFP Executive Director

Tedros Adhanom Ghebreyesus
WHO Director-General

METHODOLOGY

The State of Food Security and Nutrition in the World 2024 has been prepared by the FAO Agrifood Economics and Policy Division in collaboration with the Statistics Division of the Economic and Social Development stream and a team of technical experts from the Food and Agriculture Organization of the United Nations (FAO), the International Fund for Agricultural Development (IFAD), the United Nations Children's Fund (UNICEF), the World Food Programme (WFP) and the World Health Organization (WHO).

A senior advisory team consisting of designated senior managers of the five United Nations publishing partners guided the production of the report. Led by FAO, this team decided on the outline of the report and defined its thematic focus. Further, it gave oversight to the technical writing team composed of experts from each of the five co-publishing agencies. Background technical papers were prepared to support the research and data analysis undertaken by the members of the writing team.

The writing team produced a number of interim outputs, including an annotated outline, first draft and final draft of the report. These were reviewed, validated and cleared by the senior advisory team at each stage in the preparation process. A Financial Technical Advisory Committee, formed by a group of external financial experts coordinated by the Shamba Centre for Food & Climate, provided overall guidance and reviewed the interim products. The final report underwent a rigorous technical review by senior management and technical experts from different divisions and departments within each of the five United Nations agencies, both at headquarters and in Decentralized Offices. Finally, the report underwent executive review and clearance by the heads of agency of the five co-publishing partners.

ACKNOWLEDGEMENTS

The State of Food Security and Nutrition in the World 2024 was jointly prepared by the Food and Agriculture Organization of the United Nations (FAO), the International Fund for Agricultural Development (IFAD), the United Nations Children's Fund (UNICEF), the World Food Programme (WFP) and the World Health Organization (WHO).

The publication was carried out under the direction of David Laborde, Marco V. Sánchez Cantillo and José Rosero Moncayo, with the overall coordination of Cindy Holleman, Editor of the report, and the overall guidance of Máximo Torero Cullen, all of whom are from the FAO Economic and Social Development stream. The development of the report was guided by a Steering Committee consisting of agency representatives from the five co-publishing partners: Marco V. Sánchez Cantillo (Chair), Sara Savastano (IFAD), Victor Aguayo (UNICEF), Arif Husain (WFP) and Francesco Branca (WHO). Tisorn Songsermsawas (IFAD), Mauro Brero and Chika Hayashi (UNICEF), Eric Branckaert (WFP), and Luz Maria De Regil and Katrina Lundberg (WHO) contributed to the coordination and provided technical support. Valuable comments and final approval of the report were provided by the executive heads and senior staff of the five co-authoring agencies.

Chapter 1 of the report was written by Cindy Holleman (FAO), with inputs from Anne Kepple, José Rosero Moncayo and Marco V. Sánchez Cantillo (FAO).

Chapter 2 of the report was coordinated by Anne Kepple (FAO). Section 2.1 was written by Carlo Cafiero, Anne Kepple, José Rosero Moncayo and Sara Viviani, with key inputs from Giles Hanley Cook, Simone Gie, Bridget Holmes, Adeeba Ishaq, Lynnette Neufeld and Firas Yassin (FAO). Section 2.2 was written by Valentina Conti, with inputs from Carlo Cafiero and Anne Kepple (FAO), and Yan Bai (World Bank). Olivier Lavagne d'Ortigue (FAO) provided data visualization and editorial support for Sections 2.1 and 2.2. Section 2.3 was written by Richard Kumapley, Ann Mizumoto and Elaine Borghi (WHO), with inputs from Monica Flores Urrutia, Lisa Rogers, Gretchen Stevens, Katrina Lundberg and Leanne Riley (WHO), Chika Hayashi and Mauro Brero (UNICEF), Saskia de Pee (WFP), and Trudy Wijnhoven and Anne Kepple (FAO). Olivier Lavagne d'Ortigue (FAO) provided data visualization for Section 2.3. José Rosero Moncayo provided technical guidance and editorial support to the sections of this chapter.

Chapter 3 of the report was written by Cindy Holleman (FAO), with inputs from Mali Eber-Rose, Kamal El Harty and Carin Smaller (Shamba Centre for Food & Climate); with further inputs from Giovanni Carrasco Azzini, Jérôme Camier, Lucia Latino, Yuan-Ting Meng, Valentina Pernechele, Clara Picanyol, Carine Tuyishime and Trudy Wijnhoven (FAO), Sarah Lowder, Jyotsna Puri and Alessandro Rosi (IFAD), Mauro Brero (UNICEF), Friederike Greb, Divya Mehra, Stefan Meyer and Trula Rael (WFP), Kaia Engesveen, Katrina Lundberg and Luz Maria De Regil (WHO), and Lysiane Lefebvre (Shamba Centre for Food & Climate). Marco V. Sánchez Cantillo provided technical guidance and editorial support to the sections of this chapter.

Chapter 4 of the report was written by Marco V. Sánchez Cantillo (FAO). Section 4.1 was written with inputs from Jérôme Camier, Brian Carisma, Hannah Gerits, Gary Jones, Atang Moletsane, Valentina Pernechele, Clara Picanyol, Carine Tuyishime and Trudy Wijnhoven (FAO), Mauro Brero (UNICEF), Jean-Sébastien Kouassi (WFP), Sarah Lowder, Mauro Martini, Tharani Mediwaka and Liliana Miro Quesada (IFAD), and Richard Kumapley and Katrina Lundberg (WHO). Section 4.2 was written with inputs from Jérôme Camier, Brian Carisma, Carola Fabi, Hannah Gerits, Eun-Jeong Lee, Christian Mongeau, Luis Silva e Silva and Pan Xueyao (FAO). Section 4.3 was written with inputs from Jérôme Camier and Trudy Wijnhoven (FAO), Mauro Brero (UNICEF), Jean-Sébastien Kouassi, Friederike Greb and Stefan Meyer (WFP), and Richard Kumapley and Katrina Lundberg (WHO).

Chapter 5 of the report was coordinated by Giovanni Carrasco Azzini (FAO). Section 5.1 was written by Giovanni Carrasco Azzini (FAO), with inputs from Cindy Holleman, Lucia Latino and Yuan-Ting Meng (FAO), Rahul Antao, Daniel Higgins, Martina Improta, Mariatu Kamara, Athur Mabiso, Emime Ndihokubwayo, Tamara Nicodeme, Robinson H. Toguem and Natalia Toschi (IFAD), Friederike Greb, Divya Mehra, Stefan Meyer and Trula Rael (WFP), Mauro Brero (UNICEF), Luz Maria De Regil and Katrina Lundberg (WHO), Asma Lateef (SDG2 Advocacy Hub/Alliance to End Hunger), Sarah Zoubek (Food FutureZ/North Carolina State University), and Kamal El Harty, Lysiane Lefebvre, Oshani Perera and Carin Smaller (Shamba Centre for Food & Climate). Section 5.2 was written by Giovanni Carrasco Azzini and Yuan-Ting Meng (FAO), with inputs from Niclas Benni, Azeta Cungu and Ilaria Sisto (FAO), Frew Behabtu, Roshan Cooke, Ilaria Firmian, Marup Hossain, Nirajan Khadka, Margherita Loddoni, Laura Mattioli, Vibhuti Mendiratta, Stella Okot, Claus Reiner, Pinreak Sous and Rick van der Kamp (IFAD), Friederike Greb, Divya Mehra, Stefan Meyer, Jean-Sébastien Kouassi and Trula Rael (WFP), Mauro Brero (UNICEF), Fahdi Dkhimi, Kaia Engesveen, Katrin Engelhardt, Luz Maria De Regil, Katrina Lundberg, Lina Mahy, Robyn Melville Landais and Angeli Rayner (WHO), Asma Lateef (SDG2 Advocacy Hub/Alliance to End Hunger), Sarah Zoubek (Food FutureZ/North Carolina State University), and Kamal El Harty, Lysiane Lefebvre, Oshani Perera and Carin Smaller (Shamba Centre for Food & Climate). Section 5.3 was written by Giovanni Carrasco Azzini (FAO), with inputs from Cindy Holleman and Yuan-Ting Meng (FAO), Nadine Gbossa, Francisco Gimbitzki Marques, João Manoel Dos Santos, Stefania Lenoci, Lucas Lindfors and Ricardo Rendon Cepeda (IFAD), Friederike Greb, Divya Mehra, Stefan Meyer and Trula Rael (WFP), Mauro Brero (UNICEF), Luz Maria De Regil, Katrina Lundberg and Lina Mahy (WHO), Asma Lateef (SDG2 Advocacy Hub/Alliance to End Hunger), Sarah Zoubek (Food FutureZ/North Carolina State University), and Kamal El Harty, Lysiane Lefebvre, Oshani Perera and Carin Smaller (Shamba Centre for Food & Climate). Marco V. Sánchez Cantillo provided technical guidance and editorial support to the sections of this chapter.

Chapter 6 of the report was written by Cindy Holleman and Marco V. Sánchez Cantillo (FAO), with inputs from Anne Kepple and José Rosero Moncayo (FAO).

Numerous colleagues from different technical units and departments across the five co-publishing agencies provided valuable technical comments and input to the report. An agency-wide technical clearance process facilitated a comprehensive review by many technical experts from the five co-authoring agencies. Listing each of the contributions would be challenging and furthermore increase the risk of important omissions.

Data inputs

Firas Yassin (FAO) was responsible for preparing undernourishment data in Section 2.1 and Annex 1A, with inputs from Amadou Ba, Filippo Gheri, Adeeba Ishaq, Talent Manyani, Ana Moltedo, Abdul Sattar and Sara Zakaryan, and under the supervision of Carlo Cafiero (FAO). The contribution of Vaishali Bansal (FAO) in the analysis of food consumption data to revise key parameters for prevalence of undernourishment estimation is especially acknowledged. Supporting data were provided by the Crops, Livestock and Food Statistics team, led by Piero Conforti, of the FAO Statistics Division. David Laborde prepared the 2030 projections of undernourishment (FAO). Sara Viviani (FAO) was responsible for preparing the food security data in Section 2.1 and Annex 1A, with inputs from Vaishali Bansal, Filippo Gheri, Adeeba Ishaq, María Rodríguez, Abdul Sattar, Firas Yassin and Sara Zakaryan (FAO). Adeeba Ishaq and Sara Viviani (FAO) were responsible for the analyses in Box 3, with inputs from Giles Hanley Cook, Simone Gie and Bridget Holmes (FAO) and inputs and data provided by Ty Beal (Global Alliance for Improved Nutrition), Anna Herforth (Harvard T. Chan School of Public Health) and Zacc Ritter (Gallup). Valentina Conti (FAO) was responsible for preparing the estimates of the cost and of the unaffordability of a healthy diet in Section 2.2 and Annex 1A, with inputs from Carlo Cafiero, David Laborde and José Rosero Moncayo (FAO), Yan Bai and Marko Olavi Rissanen (World Bank), Anna Herforth (Food Prices for Nutrition), and William A. Masters (Tufts University). Inputs provided by Amadou Ba, Adeeba Ishaq, Talent Manyani, Ana Moltedo, Abdul Sattar and Sara Zakaryan (FAO) for the analysis of household survey data are also acknowledged. Richard Kumapley, Gretchen Stevens and Ann Mizumoto (WHO) were responsible for the analyses in Section 2.3. Richard Kumapley (WHO) and Vrinda Mehra (UNICEF) were responsible for consolidating nutrition data in Annex 1A, with inputs from the UNICEF-WHO-WB Joint Child Malnutrition (JME) Group, Monica Flores Lisa Rogers, Gretchen Stevens and Leanne Riley (WHO), and Joel Conkle (UNICEF). Lucia Latino was responsible for conducting the data analysis of the countries affected by major drivers in Section 3.2. Updated agroclimate analyses were provided by Felix Rembold and Andrea Toreti (European Commission – Joint Research Centre), Michele Meroni (Seidor Consulting and under contract with the European Commission, Joint Research Centre) and Vojnović Petar (Fincons and under contract with the European Commission, Joint Research Centre), while updates to climatology indicators were provided by Pierre Kloppers, with inputs from Olivier Crespo, Christopher Jack and Mark Tadross (University of Cape Town). For Chapter 4, Jérôme Camier, Brian Carisma, Hannah Gerits, Gary Jones, Atang Moletsane, Valentina Pernechele, Clara Picanyol and Carine Tuyishime (FAO) contributed several data inputs, particularly on international development finance flows and public spending presented and analysed in Section 4.1. Mali Eber-Rose and Kamal El Harty and (Shamba Centre for Food & Climate) contributed to the comparison of modelling studies on the financing gap in Section 4.2, and Marco V. Sánchez Cantillo, Lucia Battaglia, Martin Cicowiez and Valentina Pernechele (FAO) contributed to the background paper on repurposing budget allocations which was used to develop Box 11 of Section 4.3. For Chapter 5, Asma Lateef (SDG2 Advocacy Hub/Alliance to End Hunger) and Sarah Zoubek (Food FutureZ/North Carolina State University) provided inputs based on rapid evidence assessment and qualitative data coming from the systematization of interviews with financial experts. In addition, the chapter received overall guidance and inputs from a Financial Technical Steering Committee, coordinated by the Shamba Centre for Food & Climate and composed of Danny Bradlow (University of Pretoria), Paul Clements Hunt (Mischon de Reya and Blended Capital Group), Sylvain Coutu (AXA Insurance), Mary D'Alimonte (Results for Development – R4D), Greg S. Garrett (Access to Nutrition Initiative), Hamid Hamirani (EHA Advisory and Food Systems for the Future), Daniel Hulls (AgDevCo), Agnes Johan (Rabobank), Oluwatoyin Oyekenu (Climate Bonds Initiative), Michael Kühn (Welthungerhilfe), John Mundy (One Acre Fund), Maurizio Navarra (Global Donor Platform for Rural Development), Tom Osborne (Skyline Partners), Liliana Rojas (IFPRI), Niraj Shah (International Finance Corporation), Meera Shekar (World Bank) and Jerry Skees (Global Parametrics).

Support for report production came from Christin Campbell (consulting editor) and Daniela Verona in the FAO Economic and Social Development stream.

The Language Branch of the FAO Governing Bodies Servicing Division carried out the translations, in addition to the contributors mentioned above. The translations of the report benefited from a technical review by Firas Yassin (Arabic), Juan Feng and Lan Li (Chinese), Olivier Lavagne d'Ortigue, Thibault Meilland and Aurelien Mellin (French), Evgeniya Koroleva (Russian), and Verónica Boero, Giovanni Carrasco Azzini and Eduardo Nakasone Uechi (Spanish), all of whom are from FAO.

The Publications and Library Branch of the FAO Office of Communications provided editorial support, design and layout, as well as production coordination, for editions in all six official languages.

ABBREVIATIONS

3FS	Financial Flows to Food Systems
AARR	average annual rate of reduction
ADER	average dietary energy requirement
AfDB	African Development Bank
AFSI	L'Aquila Food Security Initiative
AGRA	Alliance for a Green Revolution in Africa
AI	artificial intelligence
ARCAFIM	Africa Rural Climate Adaptation Finance Mechanism
ARIMAX	Autoregressive Integrated Moving Average with External Explanatory Variable
ASAP	Anomaly hot Spots of Agriculture Production
ASF	animal source food
ASIS	Agriculture Stress Index System
AYII	Area Yield Index Insurance
BMI	body mass index
BRD	Development Bank of Rwanda
CGE	computable general equilibrium
CIT	corporate income tax
CNF	Child Nutrition Fund
CoAHD	cost and affordability of a healthy diet
COFOG	Classification of the Functions of Government
CoHD	cost of a healthy diet
COP	Conference of the Parties to the United Nations Framework Convention on Climate Change
CPI	consumer price index
CRS	Creditor Reporting System
CV	coefficient of variation
CV|r	CV due to energy requirements
CV|y	CV due to income
DAC	Development Assistance Committee
DAI	Digital Adoption Index
DBM	double burden of malnutrition
DEC	dietary energy consumption
DEGURBA	Degree of Urbanization
DES	dietary energy supply
DFI	development finance institution
DHS	Demographic and Health Survey
DQQ	Diet Quality Questionnaire
DSF	Debt Sustainability Framework
DSSI	Debt Service Suspension Initiative
ENE	estimates of national expenditure
ESG	environmental, social and governance practices
EUROSTAT	Statistical Office of the European Union
FAO	Food and Agriculture Organization of the United Nations
FBDGs	food-based dietary guidelines
FBS	Food Balance Sheet
FDI	foreign direct investment
FIES	Food Insecurity Experience Scale
FIES-SM	Food Insecurity Experience Scale Survey Module
$FI_{mod+sev}$	prevalence of moderate or severe food insecurity
FI_{sev}	prevalence of severe food insecurity
FPO	farmer producer organization
GDP	gross domestic product
GEA	government expenditure on agriculture
GFS	Government Finance Statistics
GHG	greenhouse gas

ABBREVIATIONS

GSSS	green, social, sustainability and sustainability-linked bonds
GWP	Gallup© World Poll
HDB	Healthy Diet Basket
HIC	high-income country
ICP	International Comparison Program
IDA	International Development Association
IDB	Inter-American Development Bank
IFA	iron and folic acid
IFAD	International Fund for Agricultural Development
IFI	international financial institution
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
IPAF	Indigenous Peoples Assistance Facility
IPC/CH	Integrated Food Security Phase Classification/Cadre Harmonisé
JME	Joint Child Malnutrition Estimates
KNOMAD	Global Knowledge Partnership on Migration and Development
LDC	least developed country
LIC	low-income country
LIC DSF	Debt Sustainability Framework for Low-Income Countries
LMIC	lower-middle-income country
LSMS	Living Standards Measurement Study
M&A	mergers and acquisitions
MACC	marginal abasement cost curve
MAC-SRDSF	Sovereign Risk and Debt Sustainability Framework for Market Access Countries
MAFAP	Monitoring and Analysing Food and Agricultural Policies
MCMC	Markov Chain Monte Carlo
MDAs	ministries, departments and agencies
MDB	multilateral development bank
MDD-W	Minimum Dietary Diversity for Women
MDER	minimum dietary energy requirement
MFI	Multilateral Financial Institution
MIC	middle-income country
MNE	multinational enterprise
N3F	Nutritious Foods Financing Facility
NCD	non-communicable disease
NoU	number of undernourished
NUA	number of people unable to afford a healthy diet
ODA	official development assistance
OECD	Organisation for Economic Co-operation and Development
OOF	other official flows
PAL	physical activity level
PIP	Poverty and Inequality Platform
PoU	prevalence of undernourishment
PPP	purchasing power parity
PPPs	public–private partnerships
PRGT	Poverty Reduction and Growth Trust
PUA	prevalence of unaffordability
R&D	research and development
RBF	results-based financing
RST	Resilience and Sustainability Trust
SALW	small arms and light weapons
SD	standard deviation
SDI	sociodemographic index
SDGs	Sustainable Development Goals

SDR	special drawing right
SMART	Standardized Monitoring and Assessment of Relief and Transition
SME	small and medium enterprise
SSB	sugar-sweetened beverage
STD	sexually transmitted disease
SUAS	Unified Social Assistance System
TOSSD	Total Official Support for Sustainable Development
UID	unique identifier
UMIC	upper-middle-income country
UNCTAD	United Nations Trade and Development
UN DESA	United Nations Department of Economic and Social Affairs
UNGA	United Nations General Assembly
UN-Habitat	United Nations Human Settlements Programme
UNICEF	United Nations Children's Fund
VMNIS	Vitamin and Mineral Nutrition Information System
WDI	world development indicators
WFP	World Food Programme
WGI	Worldwide Governance Indicators
WHA	World Health Assembly
WHO	World Health Organization
ZEF	Center for Development Research of the University of Bonn
ZVF	zero vegetable or fruit

KEY MESSAGES

➔ The world is still far off track to achieve Sustainable Development Goal (SDG) 2, Zero Hunger, with the global prevalence of undernourishment persisting at nearly the same level for three consecutive years after having risen sharply in the wake of the COVID-19 pandemic. Between 713 and 757 million people may have faced hunger in 2023 – one out of 11 people in the world, and one out of every five in Africa. Hunger is still on the rise in Africa, but it has remained relatively unchanged in Asia, while notable progress has been made in the Latin American and Caribbean region.

➔ Progress towards the broader goal of ensuring regular access to adequate food for all has also stalled; the prevalence of moderate or severe food insecurity has remained unchanged for three consecutive years at the global level, although it is important to highlight progress in Latin America. In 2023, an estimated 28.9 percent of the global population – 2.33 billion people – were moderately or severely food insecure.

➔ Focusing on economic access to nutritious foods, updated and improved estimates show that more than one-third of people in the world – about 2.8 billion – could not afford a healthy diet in 2022. Inequalities are evident, with low-income countries having the largest percentage of the population that is unable to afford a healthy diet (71.5 percent) compared with lower-middle-income countries (52.6 percent), upper-middle-income countries (21.5 percent) and high-income countries (6.3 percent).

➔ The lack of improvement in food security and the uneven progress in the economic access to healthy diets cast a shadow over the possibility of achieving Zero Hunger in the world, six years away from the 2030 deadline. It is projected that 582 million people will be chronically undernourished at the end of the decade, more than half of them in Africa. There is the need to accelerate the transformation of our agrifood systems to strengthen their resilience to the major drivers and address inequalities to ensure that healthy diets are affordable for and available to all.

➔ There has been some progress towards the goal of ending all forms of malnutrition, with improvements in the global prevalence of stunting and wasting among children under five years of age and of exclusive breastfeeding among infants under six months of age. The global prevalence of low birthweight and that of childhood overweight have been stagnant, while anaemia in women aged 15 to 49 years has increased. The world is not on track to reach any of the seven global nutrition targets by 2030.

➔ Improvements in stunting, wasting and exclusive breastfeeding lay the groundwork for children to achieve their full potential for growth and development, but rising rates of obesity – exacerbating the double burden of malnutrition – foreshadow major challenges for the health and well-being of all age groups. Double-duty actions are needed which simultaneously tackle undernutrition, micronutrient deficiencies, overweight and obesity by leveraging the common drivers shared by all forms of malnutrition.

➔ Meeting SDG Targets 2.1 and 2.2 to end hunger, food insecurity and malnutrition requires increased and more cost-effective financing, but there is currently no clear picture of the financing for food security and nutrition – neither that available nor that additionally needed – for meeting these targets.

➔ The wide range of definitions of financing for food security and nutrition, and the differences among them, lead to inconsistent estimates, causing issues in identifying underfinanced areas, ensuring accountability, and tracking intervention impacts. Therefore, both a common definition and mapping of financing for food security and nutrition are urgently needed, as current efforts lack adequate attention and clarity.

➔ This report defines financing for food security and nutrition as the public and private financial resources, both domestic and foreign, that are directed towards eradicating hunger, food insecurity and all forms of malnutrition. They are targeted to ensure the availability, access, utilization and stability of nutritious and safe foods, and practices that favour healthy diets, as well as health, education and social protection services that enable these, and they include the financial resources that are directed towards strengthening the resilience of agrifood systems to the major drivers and underlying structural factors of hunger, food insecurity and malnutrition.

➔ The universal adoption of a new definition and a standardized approach to mapping financing flows oriented to meet SDG Targets 2.1 and 2.2 – as provided in this report – must capture the multidimensional nature of food security and nutrition, shifting away from the typical sector-defined boundaries that are common to these definitions.

➔ A robust number for the total financing available and additionally needed to support all the efforts towards meeting SDG Targets 2.1 and 2.2 is not yet quantifiable. Financing for food security and nutrition is mostly trackable for public and official flows, but not for several private flows.

➔ Public spending on food security and nutrition mostly targets food consumption, especially to support food availability and access, based on data for ten low- and middle-income countries. Governments in low-income countries appear to have low spending capacity to address the major drivers of food insecurity and malnutrition.

➔ Food security and nutrition take less than a quarter of total official development assistance and other official flows. In the period from 2017 to 2021, these flows amounted to USD 76 billion per year, of which only 34 percent helped address the major drivers of food insecurity and malnutrition. These flows overwhelmingly grew more for Africa (across regions) and for lower-middle-income countries (across income groups).

➔ Private financing from philanthropy, cross-border remittances from migrants invested in agrifood systems, and foreign direct investment may reach a combined total of USD 95 billion per year over the period from 2017 to 2022. Blended finance accounts for modest amounts, and net banking loans to agriculture, forestry and fishing show an almost continuous decline.

➔ Irrespective of what the exact amount of financing needed might be to make the necessary progress towards SDG Targets 2.1 and 2.2, the financing gap could amount to several trillion USD. Not bridging this gap will result in social, economic and environmental consequences requiring solutions that will also cost several trillion USD. More effective use of existing financing will help reduce the financing gap.

➔ Innovative, inclusive and equitable solutions are needed to scale up financing for food security and nutrition in countries with high levels of hunger and malnutrition. However, many low- and middle-income countries face significant constraints in accessing affordable financing flows.

➔ Countries with limited or moderate ability to access financing flows show, on average, a higher prevalence of undernourishment and stunting in children below five years of age, whereas a higher average of childhood overweight is observed in countries with high ability to access financing flows. Most of these countries are affected by one or more major drivers of food insecurity and malnutrition, with climate extremes the most common at all levels of ability to access financing flows.

➔ For countries with limited ability to access financing flows, grants and concessional loans are the most suitable options, while countries with moderate ability can increase domestic tax revenues, linking taxation to food security and nutrition outcomes. Fostering of collaborative financing partnerships following a blended finance approach is essential, as the level of financial risk can make other sources of financing too expensive. Countries with a high ability to access financing can embed food security and nutrition objectives in instruments such as green, social, sustainable and sustainability-linked bonds.

➔ The current food security and nutrition financing architecture is highly fragmented and needs a shift from a siloed approach to a more holistic perspective. Enhanced coordination among actors is needed on what is essential considering national and local policy priorities. To that aim, transparency and harmonizing data collection are crucial for improving coordination and targeting financing effectively.

➔ Donors and other international actors need to increase their risk tolerance and be more involved in de-risking activities, while governments must fill the gaps not addressed by private commercial actors by investing in public goods, reducing corruption and tax evasion, increasing food security and nutrition expenditure and considering repurposing policy support.

EXECUTIVE SUMMARY

The reverse in progress and the persistently high levels of hunger, food insecurity and malnutrition in recent years have put the world off track to meet Sustainable Development Goal (SDG) Targets 2.1 and 2.2 – to end hunger, food insecurity and all forms of malnutrition by 2030. Previous editions of this report have repeatedly highlighted the intensification of several major drivers of food insecurity and malnutrition, specifically conflict, climate variability and extremes, and economic slowdowns and downturns, combined with the well-established underlying factors that contribute to food insecurity and malnutrition, such as lack of access to and unaffordability of healthy diets, unhealthy food environments, and high and persistent inequality. Not only are these major drivers increasing in frequency and intensity, they are occurring concurrently more often, and in combination with the underlying factors, resulting in increasing numbers of hungry and food-insecure people. Depending on the major driver or combination of drivers affecting food security and nutrition in a country, addressing them will require a portfolio of policies across six transformative pathways, as outlined in detail in *The State of Food Security and Nutrition in the World 2021*.

To attain the scale of actions needed, sufficient levels of and equal access to financing to address food security and nutrition challenges are essential. The theme of this year's report focuses on the financing to meet SDG Targets 2.1 and 2.2 – financing to end hunger, food insecurity and malnutrition in all its forms.

FOOD SECURITY AND NUTRITION AROUND THE WORLD

Food security indicators: latest updates and progress towards ending hunger and ensuring food security

The assessment of global hunger in 2023, measured by the prevalence of undernourishment (PoU) (SDG Indicator 2.1.1) reveals a continuing lack of progress towards the goal of Zero Hunger. After rising sharply from 2019 to 2021, the proportion of the world population facing hunger persisted at virtually the same level for three consecutive years, with the latest estimates indicating a global PoU of 9.1 percent in 2023. In terms of population, between 713 and 757 million people (8.9 and 9.4 percent of the global population, respectively) were estimated to be undernourished in 2023. Considering the mid-range estimate (733 million), about 152 million more people may have faced hunger in 2023 compared to 2019.

Africa is the region with the largest percentage of the population facing hunger – 20.4 percent, compared with 8.1 percent in Asia, 6.2 percent in Latin America and the Caribbean, and 7.3 percent in Oceania. However, Asia is still home to the largest number: 384.5 million, or more than half of all those facing hunger in the world. In Africa, 298.4 million people may have faced hunger in 2023, compared with 41.0 million in Latin America and the Caribbean, and 3.3 million in Oceania. There is a clear trend of rising PoU in Africa, whereas progress is being made in Latin America and the Caribbean, and it is relatively unchanged in Asia. In all regions, the PoU is still above pre-COVID-19 pandemic levels.

Updated projections show that 582 million people will be chronically undernourished in 2030, pointing to the immense challenge of achieving SDG 2 (Zero Hunger). This is about 130 million more undernourished people than in a scenario that reflected the world economy before the COVID-19 pandemic. By 2030, 53 percent of the global population facing hunger will be concentrated in Africa.

Going beyond hunger, the global prevalence of moderate or severe food insecurity (SDG Indicator 2.1.2) also remains far above pre-pandemic levels, with little change in four years, after the sharp increase from 2019 to 2020 during the pandemic. In 2023, an estimated

28.9 percent of the global population – 2.33 billion people – were moderately or severely food insecure, meaning they did not have regular access to adequate food. These estimates include 10.7 percent of the population – or more than 864 million people – who were severely food insecure, meaning they had run out of food at times during the year and, at worst, gone an entire day or more without eating. The prevalence of severe food insecurity at the global level rose from 9.1 percent in 2019 to 10.6 percent in 2020 and has remained stubbornly unchanged since then.

The prevalence of moderate or severe food insecurity in Africa (58.0 percent) is nearly double the global average, whereas in Latin America and the Caribbean, Asia and Oceania, it is closer to the global estimate – 28.2, 24.8 and 26.8 percent, respectively.

One guiding principle of the vision put forth by the 2030 Agenda is to ensure that no one will be left behind. More detailed information about the food insecurity of different population groups helps monitor progress towards the realization of this vision. Results for 2023 show a pattern of decreasing food insecurity with an increasing degree of urbanization at the global level. The prevalence of moderate or severe food insecurity was 31.9 percent in rural areas compared with 29.9 percent in peri-urban areas and 25.5 percent in urban areas. A comparison of the food-insecurity status of men and women shows that the prevalence of food insecurity has remained consistently higher among women than among men, globally and in all regions, since data first became available in 2015, although the gender gap has narrowed in most regions in the last two years.

Cost and affordability of a healthy diet

The cost of a healthy diet (CoHD) indicator provides national-level estimates of the cost of acquiring the cheapest possible healthy diet in a country, defined as a diet comprising a variety of locally available foods that meet energy and nutritional requirements. The CoHD is then compared with national income distributions to estimate the prevalence of unaffordability and the number of people unable to afford a healthy diet. In this year's edition of the report, the indicators are updated to 2022.[a] New food price data and methodological improvements have resulted in updated estimates of the cost and more accurate estimates of the affordability of a healthy diet, leading to a revision of the entire series of both sets of indicators.

The CoHD has risen worldwide since 2017 (the first year for which FAO disseminates estimates) and continued to rise in 2022, peaking at an average of 3.96 PPP dollars per person per day in 2022. This represents a surge in the global average CoHD, from a 6 percent increase between 2020 and 2021 to an 11 percent increase the following year.

When compared across regions in 2022, the CoHD was highest in Latin America and the Caribbean (4.56 PPP dollars) followed by Asia (4.20 PPP dollars), Africa (3.74 PPP dollars), Northern America and Europe (3.57 PPP dollars), and Oceania (3.46 PPP dollars).

Despite the increase in the CoHD, the number of people in the world unable to afford a healthy diet fell for two consecutive years, from 2020 to 2022. Worldwide, an estimated 35.5 percent of people in the world (2.83 billion) were unable to afford a healthy diet in 2022, compared with 36.5 percent (2.88 billion) in 2021.

a Estimates for 2023 are not provided due to the lack of updated income distribution data, detailed food prices, and purchasing power parity (PPP) conversion factors at the country level.

However, the recovery has been uneven across regions. The number of people unable to afford a healthy diet dropped below pre-pandemic levels in Asia, and Northern America and Europe, while increasing substantially in Africa, where it rose to 924.8 million in 2022, up by 24.6 million from 2021, and by 73.4 million from 2019. A comparison across country income groups shows that the recovery path has been slower for low-income countries, where a healthy diet was out of reach for 503.2 million people in 2022 – the highest number since 2017.

The lack of improvement in food security and the uneven progress in the economic access to healthy diets cast a shadow over the possibility of achieving Zero Hunger in the world, six years away from the 2030 deadline. There is the need to accelerate the transformation of our agrifood systems to strengthen their resilience to the major drivers and address inequalities to ensure that healthy diets are affordable for and available to all.

The state of nutrition: progress towards global nutrition targets

Turning to the trends for the seven global nutrition targets, virtually no progress has been made for low birthweight among newborns, with a prevalence of 15 percent in 2012 and 14.7 percent in 2020. It is projected that 14.2 percent of newborns will have low birthweight in 2030, falling short of the 2030 global target of a reduction of 30 percent.

Progress has been made in increasing the global exclusive breastfeeding rate among infants under six months of age, rising from 37.1 percent in 2012 to 48 percent in 2022. However, the world is off track to achieve the 2030 target rate of 70 percent.

Among children under five years of age, the global stunting prevalence declined from 26.3 percent in 2012 to 22.3 percent in 2022. It is projected that 19.5 percent of all children under five will be stunted in 2030. The global wasting prevalence declined from 7.5 percent in 2012 to 6.8 percent in 2022. With 6.2 percent of children under five projected to be wasted in 2030 – more than double the 3 percent global target – the world remains off track for this indicator. The global prevalence of overweight has stagnated and stood at 5.6 percent in 2022. By 2030, 5.7 percent of children under five are projected to be overweight – almost double the 2030 global target of 3 percent.

Globally, the prevalence of anaemia in women aged 15 to 49 years increased from 28.5 percent in 2012 to 29.9 percent in 2019 and is projected to reach 32.3 percent by 2030 – far from the 2030 target of a 50 percent reduction.

New estimates of adult obesity show a steady increase over the last decade, from 12.1 percent in 2012 to 15.8 percent in 2022. The world is off track to achieve the 2030 global target to halt the rise, with more than 1.2 billion obese adults projected for 2030.

More countries are off track than on track for most of the seven 2030 global nutrition targets.

Compared with the global estimates, least developed countries have much higher levels of stunting in children under age five and of anaemia in women aged 15 to 49 years, and the same worrying rise in adult obesity.

The double burden of malnutrition – the co-existence of undernutrition together with overweight and obesity – has surged globally across all age groups. Thinness and underweight have declined in the last two decades, while obesity has risen sharply. Double-duty actions will simultaneously tackle undernutrition, overweight and obesity by leveraging the common drivers shared by all forms of malnutrition.

A NEW DEFINITION OF FINANCING FOR FOOD SECURITY AND NUTRITION

A wide range of estimates of the cost of meeting SDG Targets 2.1 and 2.2 exist. However, there is no coherent picture of the total amount of financial resources being spent on food security and nutrition and its decomposition, nor of the cost of meeting SDG Targets 2.1 and 2.2, in part due to the absence of an agreed upon definition of financing for food security and nutrition. Without a standardized definition, it will not be possible to assess adequately the existing levels and gaps in financing for food security and nutrition.

Challenges in defining and measuring financing for food security and nutrition

Currently, several definitions of financing for food security and nutrition are applied, leading to stark differences in estimations of the current levels of financing. For example, even in the case of official development assistance (ODA), which is the most advanced in terms of having a global tracking system and a standardized common aid database, there is no standard definition of, nor gauge for, the measurement of financing going to support food security and nutrition. This void results in vastly divergent estimates of how much money is being spent, and where and with what efficiency it is spent, on food security and nutrition, negatively impacting the subsequent analysis of trends and outcomes needed to assess the path towards meeting SDG Targets 2.1 and 2.2.

Disentangling what constitutes financing for food security and nutrition remains a non-trivial and challenging exercise. This predicament poses a multitude of challenges, not only in tracking the current levels of financing going to food security and nutrition, but also in identifying under-financed areas, ensuring accountability of institutions, and tracking the impact of interventions financed.

Food security and nutrition are complex multidimensional concepts that do not neatly fit into sector-defined frameworks. Interventions to achieve food security and nutrition span various sectors and dimensions of economic, health, social and environmental development, among others. However, financing flows and budgets are normally defined and classified by sector and, within each sector, by purpose. In shifting from a sector-based classification system to an outcome-based measure, complex issues arise regarding the contribution of sector-based resources to food security and positive nutrition outcomes.

There is now a broadened understanding of food security and nutrition and how they are critically linked, despite the limited consensus on the scope of interventions that contribute to food security and nutrition. Healthy diets and health status are main determinants of nutritional status, but multiple factors related to food security (e.g. availability and affordability of nutritious foods), practices (e.g. related to food and feeding, care, and health seeking) and services (e.g. clean water, health, education and social protection) all influence the ability and mechanisms through which individuals can achieve healthy diets and adequate health. However, to date there have been limited efforts to include this range of interventions in comprehensive measures of financing for food security and nutrition.

Importantly, the current definitions do not include the financing of interventions more specifically designed to address the major drivers behind the trends in hunger, food insecurity and malnutrition that have been identified in past editions of this report – conflict, climate variability and extremes, and economic slowdowns and downturns, combined with structural underlying factors: lack of access to and unaffordability of nutritious foods, unhealthy food environments, and high and persistent inequality.

A new definition of financing for food security and nutrition

Financing is the process of providing funds for the public and private sector to engage in economic activities, make purchases or carry out investments. Financial resources may be provided by one or a combination of four sources: i) public domestic, ii) public foreign, iii) private domestic, and iv) private foreign. Each source may provide financing through a range of financial instruments to finance short-term and long-term interventions on commercial or concessional terms (e.g. grants or loans below market rates).

The new definition of financing for food security and nutrition presented in this report comprises core and extended definitions. The core definition includes the financing flows that support efforts addressing the main determinants of food security and nutrition. The extended definition builds on this, to include financing flows that contribute to addressing the major drivers and underlying structural factors behind recent increases in food insecurity and malnutrition.

Financing for food security and nutrition refers to the process of providing or obtaining financial resources to ensure that all people, at all times, have stable, physical, social and economic access to sufficient, safe and nutritious foods that meet their dietary needs and food preferences for an active and healthy life, and suitable food preparation and handling, feeding, caring, and health-seeking practices, and access to health, water and sanitation services to ensure a continued adequate nutritional status. Additionally, it covers expenditures and investments that aim to ensure that all individuals are protected against short-term or long-term instability in food security and nutrition, caused by various climatic, economic, social, commercial and political factors. Financing therefore encompasses all the interventions aligned with the six transformative policy pathways designed to strengthen the resilience of agrifood systems to the major drivers behind hunger, food insecurity and malnutrition – namely conflict, climate variability and extremes, and economic slowdowns and downturns – and address the underlying structural factors: lack of access to and unaffordability of nutritious foods, unhealthy food environments, and high and persistent inequality.

To generate a framework for increased financing and improved finance targeting, it is imperative to gain an understanding of the major drivers of food insecurity and malnutrition, and of the countries affected by these major drivers. In the last ten years, the frequency and intensity of conflict, climate extremes and economic downturns have increased, undermining food security and nutrition around the world. Furthermore, high levels of income inequality exacerbate the effects of these drivers.

While each of these major drivers is unique, they often interact to create multiple compounding impacts transmitted through agrifood systems to the detriment of food security and nutrition. As a result, all dimensions of food security are likely to be affected, including food availability, access, utilization and stability, as well as the other determinants of nutrition, specifically practices (e.g. caring, feeding, health-seeking and intra-household resource allocations), and health services and environmental health (e.g. immunization, water and sanitation, and availability and affordability of, and access to health services). This is corroborated by the association found between the occurrence of these drivers and the food security and nutrition indicators.

Alarmingly, the majority of low- and middle-income countries are affected by at least one of the major drivers, and where there are multiple drivers occurring, the compounding impacts lead to the highest increases in hunger and food insecurity.

To move from the definition of financing for food security and nutrition to an application of this definition to measure levels of financing for food security and nutrition requires an understanding of how financing flows are categorized and reported, and then the development of guidelines for mapping these flows to the definition. For this report, initial mapping and guidance have been developed and applied to arrive at partial estimates of financing for food security and nutrition and their patterns.

Data to apply the new definition of financing for food security and nutrition exist only for some of the financing flows; hence, it is not possible to take a realistic stock of how much financing is available, let alone calculate the financing gap to support efforts to meet SDG Targets 2.1 and 2.2. Therefore, data sources and methodologies must be advanced to ensure there are better data for evidence-based decisions on financing for food security and nutrition. This report thus also calls for universal adoption and transparency in the use of a standardized approach for operationalizing the new definition in its mapping and application to financial data.

CURRENT LEVELS OF AND GAPS IN FINANCING TO END HUNGER, FOOD INSECURITY AND MALNUTRITION

Available data mostly allow for tracking only public spending flows, official development assistance (ODA) and other official flows (OOF). Private financing flows are generally more difficult to track.

Irrespective of exactly how much financing is needed to meet SDG Targets 2.1 and 2.2, the cost of not mobilizing it can be significant and detrimental.

Tracking current levels of funding for food security and nutrition

General domestic government expenditure on agriculture per rural inhabitant at the global level barely changed between 2010 and 2021 in low-income countries (LICs) and only saw a very slight increase in lower-middle-income countries (LMICs) towards the last years of the period. In these two country income groups, public spending on agriculture was only USD 8 and USD 37, respectively, per rural inhabitant, on average, in the period from 2010 to 2019. It was much higher in upper-middle income countries (UMICs) and high-income countries (HICs) and it increased systematically only in UMICs.

Public spending data are not readily available for all countries to enable application of the core and extended definitions of financing for food security and nutrition.

In two LICs, Benin and Uganda, public spending on food security and nutrition seems to have been growing. On average over the periods of analysis, 65 percent of the total public spending on food security and nutrition in Benin and 73 percent in Uganda was allocated to food consumption and health status; the remaining share addressed the major drivers behind recent increases in hunger, food insecurity and malnutrition.

Eight MICs also show an absolute increase in their public spending on food security and nutrition. The share of public spending on food security and nutrition that goes to the major drivers of food insecurity and malnutrition tends to be on average higher for these MICs.

Global ODA and OOF flows for food security and nutrition amounted to USD 77 billion in 2021, of which the majority corresponds to ODA. Not even a quarter of these flows for all aid sectors were allocated to food security and nutrition between 2017 and 2021.

The composition of ODA and OOF flows for food security and nutrition is, by and large, very stable over time and, by 2021, most resources were flowing to food consumption (USD 35 billion out of USD 77 billion), and fewer were allocated to addressing the major drivers of food insecurity and malnutrition (USD 27 billion), and even fewer to health status (USD 15 billion).

On a per capita basis, on average, over the period from 2017 to 2021, ODA and OOF flows amounted to USD 30 in LICs, compared with USD 10 in LMICs and USD 8 in UMICs. Official development assistance and other official flows for food security and nutrition, from 2017 to 2021, overwhelmingly grew more for Africa across regions and for LMICs across income groups.

Under "private sector", non-commercial private financing and commercial private financing are lumped together.

Philanthropic flows to food security and nutrition amounted to only USD 4 billion per year on average between 2017 and 2021, mostly to support food consumption and health. Cross-border remittances are estimated at USD 735 billion on average over the period from 2017 to 2022 (at current prices). Of these flows, nearly half were allocated to uses that likely contributed to food security and nutrition. Most of this sum was used for food consumption, rather than investments in agriculture and other food systems activities.

According to United Nations Trade and Development, between 2017 and 2022, foreign direct investment amounted to an average of USD 19 billon for "food and agriculture". The 2023 edition of *State of Blended Finance* estimates that, on average over the period from 2020 to 2022, 26 percent of blended finance transactions, amounting to USD 1.2 billion per year, were "aligned" with SDG 2. Net banking loans amounted to an average of USD 10 billion between 2017 and 2021, and exhibit an almost continuous decline.

The cost of policies and interventions to end hunger and malnutrition by 2030

Due to existing data gaps, economic models are often used to estimate the necessary additional investments, mostly to reduce hunger, but also to address nutrition concerns.

Studies provide different cost estimates. The findings are that policies and interventions to get on track towards meeting SDG Targets 2.1 and 2.2 would require additional resources from now until 2030 ranging from USD 176 billion to USD 3 975 billion to eradicate undernourishment, plus an additional USD 90 billion to meet selected global undernutrition targets. Estimates jump sharply to USD 15.4 trillion when adding the types of transformational policies that would require financing in order to increase the affordability of healthy diets for millions while still reducing undernourishment.

The cost of inaction or slow action

The cost of not bridging the financing gap is that millions of people, by 2030 and beyond, will still be hungry, food insecure, malnourished and unable to afford a healthy diet, with medium- to long-term socioeconomic and health repercussions.

Acute and chronic food insecurity are affecting the people in most need of food assistance. Failing to fund this assistance will have negative consequences for individuals, local communities and donor countries. Furthermore, failing to finance the actions that will address the structural drivers of food insecurity and malnutrition will result in higher social, economic and environmental costs.

The double burden of malnutrition confers a serious and negative economic impact on individuals and populations. Severe levels of this double burden are shifting towards the poorest countries.

Although transformative policies may cost billions of USD, the cost of not financing them would easily be in the trillions of USD. The Food and Land Use Coalition's Global Consultation Report estimated that current food and land-use systems generate worldwide health, nutrition and environmental costs amounting to USD 12 trillion a year in 2018 prices. The 2020 edition of this report provided evidence that under current food consumption patterns, diet-related health costs linked to mortality and non-communicable diseases are projected to exceed USD 1.3 trillion per year by 2030. *The State of Food and Agriculture 2023* found that the global quantified hidden costs of agrifood systems amount to USD 10 trillion or more, with the dominant quantified hidden costs arising from dietary patterns that increase the risk of diseases and may lead to lower labour productivity.

Governments in many countries find it difficult to execute the budgets they have funded. Some of the financing available may not be utilized in the most cost-effective, equitable and environmentally sustainable manner.

The 2022 edition of this report showed that repurposing some of the worldwide support to food and agriculture, which accounted for almost USD 630 billion per year, on average over the period from 2013 to 2018, can result in making a healthy diet less costly and more affordable, globally and particularly in MICs.

A study developed for six sub-Saharan African countries shows that the opportunity of achieving higher agrifood output, creating thousands of off-farm jobs in rural areas and allowing millions of people to get out of poverty and afford a healthy diet will be lost unless these countries' governments optimize the way in which they allocate their budget across the agriculture and livestock sectors.

WHAT IS NEEDED TO CATALYSE SCALABLE FINANCING TO FILL THE GAP?

Scaling up financing flows to food security and nutrition

Sixty-three percent of the low- and middle-income countries analysed (119 in total) have limited or moderate ability to access financing, while the minority (37 percent) have high ability to access financing. The prevalence of undernourishment (PoU) is, on average, much higher in countries with limited ability to access financing (23.1 percent) compared to countries with moderate (10.4 percent) and high (6.9 percent) ability to access financing. A similar trend is observed for stunting in children below five years of age, although the stunting average of countries with limited and moderate access to financing is much closer (23.9 and 20.9 percent, respectively).

On the other hand, 74 percent of all countries analysed are affected by one or multiple major drivers, and 66 percent of these countries have limited or moderate ability to access financing (most of them limited, 42 percent). The high proportion of countries affected by at least one major driver builds the case for mainstreaming food security and nutrition objectives across other sector financing where the priorities do not always include meeting SDG Targets 2.1 and 2.2.

However, in most cases, countries that are the most in need, in terms of both hunger and food insecurity levels, as well as in terms of how they are affected by the major drivers, are facing structural limitations to increase financing for food security and nutrition options. Even if, formally speaking, all countries have access to most of the existing options for financing, their ability to access financing is driven by levels of perceived financial risk and the associated costs. The obvious risk aversion of all financial stakeholders, especially private, commerce-oriented ones, renders their engagement practically impossible in the most financially risky countries.

Therefore, countries with limited ability to access financing may rely only on grants or low- to no-interest loans from international development flows (e.g. ODA), as other financial instruments may not be available – or, more precisely, financial stakeholders may not be interested due to the country's high financial risk profile.

Mobilizing domestic tax revenues is more feasible in countries with moderate ability to access financing. The potential expansion of tax revenues has income as a strong determinant (the higher the GDP per capita, the higher the tax potential), in addition to other factors such as the composition and formalization of national economies, and institutional and governance mechanisms.

As financial risk decreases, more financing flows are available for countries. Countries with a high ability to access financing will tap into equity investments, commercial rate loans and bonds from private financing flows such as company investments, banking systems and capital markets, with many fewer de-risking activities needed from donors or the public sector.

Innovative financing approaches and tools to bridge the financing gap for SDG Targets 2.1 and 2.2

While grants and low- or no-interest loans are certainly among the most traditional concessional finance instruments, they can be designed in more innovative ways to collaborate with de-risking initiatives to increase private financing flows, as part of blended finance strategies. Grants and/or loans, jointly implemented with technical assistance, can be leveraged to address the main limitations for accessing private financing flows – poor bankability and lack of operational readiness to access finance – often faced by food security and nutrition initiatives.

Blended finance is a de-risking tool for private investors, used when there is a high perception of risk by private investors, thereby channelling financial resources that can take on more risk and a longer horizon on return for their investment. Especially when there is a substantial development benefit, actors such as governments and donors can use blended finance as a vehicle to channel the needed financing flows to achieve that outcome. The objective is that, over time, the risk perception will diminish due to the initial support of the more risk-tolerant capital, and that commercial finance can then replace the grants or concessional financing which played a crucial and catalytic role in the initial stage.

Green, social, sustainability and sustainability-linked bonds are debt instruments that can be issued by governments, multilateral development banks (MDBs), commercial banks and local corporates; they are linked with development goals, and can be especially relevant for targeting financing for countries that are affected by some of the major drivers of food insecurity and malnutrition, such as climate extremes and/or economic downturns.

Even if, through the innovative instruments described above, financing for food security and nutrition could be scaled up, within countries there are population groups that have historically faced important constraints in accessing financial services.

Increasing women's access to financial services would contribute not only to women's social and economic empowerment, but also to improving the overall livelihoods of their households and communities, including food security and nutrition outcomes. From a macro perspective, women's inclusion would bring overall positive economic growth effects, which could increase the country's resilience to economic slowdowns and downturns.

Despite the wide recognition that Indigenous Peoples are indispensable partners for reaching the targets of the Paris Agreement, the Global Biodiversity Framework and the 2030 Agenda, the corresponding funding strategies do not necessarily reflect their crucial role. The lack of access to financial services can also diminish the potential contribution of smallholder farmers and small and medium agrifood enterprises to achieving food security and improving nutrition, for instance, by limiting their capacities to offer safe and nutritious foods. Despite their vital role in agrifood systems, they are often underserved, as investors are hesitant to finance local market producers in local currencies, preferring to avoid the risks associated with exchange rates and serve more export-oriented producers instead.

How to achieve better alignment with and synergies in different sources of financing

The current financing architecture for food security and nutrition is highly fragmented: The lack of consensus about what should be financed and the different objectives among stakeholders have led to a proliferation of actors that often step outside their mandates instead of collaborating with each other. This results in many small, uncoordinated aid activities, driven principally by bilateral donors.

Increased coordination between large, medium and small stakeholders should be encouraged, as sometimes large donors do not coordinate with or co-finance activities led by other minor actors, since there are no incentives to do so. In addition, there is a crucial need for donors and philanthropic foundations to align their spending priorities with countries' priorities: Since the current architecture is extremely dominated by HICs and large development agencies, the priorities of recipient countries and communities are not always considered.

Certainly, this increased coordination would require stronger and more solid national governments, which, however, face several challenges. Political economy issues and unpredictable government decision-making can affect the capacity of alignment between the sources of financing flows and a country's priorities and create a perception of higher risk for private investors. The absorptive capacity and technical efficiency of expenditure are important, but good governance and strong national institutions are also necessary.

Finally, lack of data, transparency and accountability is another key characteristic of the current financial landscape, and it actually increases the perception of financial risk. Making financial data more reliable and widely available can reinforce the "investment case" for food security and nutrition interventions, as is already happening in areas such as regenerative agriculture.

Even before making structural changes in the financing architecture for food security and nutrition, one essential initial step for scaling up financing for food security and nutrition is to make the objective of meeting SDG Targets 2.1 and 2.2 a priority in the international policy agenda. Adopting a food security and nutrition lens, considering its intersectoral nature and highlighting the short- and long-term returns of investing in areas such as nutrition are essential conditions for a successful reform of the financing architecture for food security and nutrition.

The term "food security and nutrition" has been used to emphasize the achievement of the four dimensions of food security and its tight link with the achievement of nutrition security, as well as the need to adopt complementary actions to achieve food security and nutrition. Nevertheless, it might be the case to recognize the overall objective of achieving "food and nutrition security" as a single indivisible policy goal.

One essential step for effective coordination is putting national and local actors and their priorities in the "driver's seat". However, this is not always a straightforward task, considering power and capability imbalances among actors, lack of donor coordination at the global level that does not adequately support coordination efforts at national levels, and the data gap that might make it difficult to build the case for shifting donors' priorities, among other challenges.

In addition to enhancing coordination, financial stakeholders should take steps towards improving their role for scaling up financing for food security and nutrition. Development partners such as donors, including international financial institutions, multilateral development banks and development finance institutions, should take the lead in de-risking activities, for instance, increasing the allocation of ODA oriented to mobilizing private investments, through blended finance or other financial instruments.

An open question is the inclusion of the private sector in improved food security and nutrition financing architecture. Private actors must incorporate health, environmental and social risks into their financial decision-making, to shift financing flows from potentially harmful investments to others that work towards the achievement of health, environmental and social outcomes.

National governments can further mobilize domestic tax revenues, increase priority sector expenditures on food security and nutrition and consider repurposing policy support. Countries that already have a higher ability to access financing must enact stronger controls on tax havens and money laundering, which often allow tax evasion from countries with limited access to financing.

Finally, filling the information gap will require bold steps from the international community; otherwise, the likelihood of achieving development goals cannot be realistically estimated and projected.

THE WAY FORWARD

While global levels of hunger and food insecurity have essentially not changed for two years, there has been encouraging progress in many subregions of the world. With respect to nutrition, the rising trends in adult obesity and anaemia among women aged 15 to 49 years are worrying, yet in many countries, fewer children are affected by stunting and wasting, increasing their chances of achieving their full potential for growth and development. This is the potential we need to harness: the potential for positive change and the full realization of the right to adequate food and a standard of living that guarantees the dignity, health and well-being of all people, especially future generations.

A serious problem is the lack of a common definition or standard for measuring financing for food security and nutrition. It is hard – if not impossible – to manage what cannot be adequately measured. In the case of financing for food security and nutrition, it is not possible to adequately assess the existing levels and gaps, let alone monitor progress or setbacks in financing efforts to meet SDG Targets 2.1 and 2.2.

This report has taken an important step forward by advancing a definition of financing for food security and nutrition together with detailed guidance to implement it. This is a very important step; yet, the report has starkly shown that the current structure and availability of financial data impede the application of the newly proposed definition and its protocols to the public and private financing flows globally available for food security and nutrition. In other words, due to serious data constraints, it is not possible to arrive at the global measurement of the financing for food security and nutrition that is currently available and of the financing gap that must be bridged to support efforts towards meeting SDG Targets 2.1 and 2.2. Addressing this gap must be a top priority, and this report sends a strong and urgent call for global and national actions to address this problem as part of the SDG global agenda for action.

Ending hunger, food insecurity and all forms of malnutrition is also unnecessarily in competition with many other development objectives. Considering the complex and multisectoral nature of food security and nutrition, the financing landscape must shift from a siloed approach towards a more holistic perspective, in which financial stakeholders can streamline food security and nutrition objectives into broader financing flows and investments.

It is hoped that this report's calls to action will inform the sustainable development and financing discussions at the Summit of the Future in September 2024 and all the upcoming SDG global discussions, including the political processes of the Fourth International Conference on Financing for Development in 2025. A world without hunger, food insecurity and malnutrition is a world worth saving, and a world worth financing and investing in. ■

COUNTRY NOT SPECIFIED
Fruits and vegetables on a farmers' market: improved access to nutritious foods is vital for food security and nutrition.

CHAPTER 1
INTRODUCTION

The reverse in progress and the persistently high levels of hunger, food insecurity and malnutrition in recent years have taken the world off track to achieve Sustainable Development Goal (SDG) Targets 2.1 and 2.2 – end hunger, food insecurity and all forms of malnutrition by 2030. Progress to address many drivers has been slow, and the increasing occurrence and intensity of several of these drivers will keep us on a worsening trajectory unless the risks are firmly addressed.

Previous editions of this report have repeatedly highlighted the intensification of several major drivers of food insecurity and malnutrition, specifically conflict, climate variability and extremes, and economic slowdowns and downturns, combined with the well-established underlying factors that contribute to food insecurity and malnutrition, such as lack of access to and unaffordability of nutritious foods, unhealthy food environments, and high and persistent inequality.[1–4] Not only are the major drivers increasing in frequency and intensity, they are occurring concurrently more often, and in combination with the underlying factors, resulting in increasing numbers of hungry and food-insecure people (see **Chapter 3**).[5] In this report, these known and intensifying factors, and the complex combinations of them that are behind persistently high levels of hunger, food insecurity and malnutrition, are referred to as "major drivers", unless specified otherwise in the text.

Drivers external to agrifood systems (e.g. conflict, climate extremes) and internal (e.g. low productivity and inadequate supply of nutritious foods, notably fruits and vegetables, and excessive offer of cheap, highly processed energy-dense foods, high in fats, sugars and/or salt) are driving up the cost of nutritious foods, increasing the unaffordability of healthy diets.[5, 6] This cost increase is challenging food security and nutrition not only in rural areas, but also across the rural–urban continuum, as is shown in last year's edition of this report.[6] Depending on the major driver or combination of drivers affecting food security and nutrition in a country, addressing them will require a portfolio of policies across six transformative pathways, as outlined in detail in *The State of Food Security and Nutrition in the World 2021*.[5]

To attain the scale of actions needed, sufficient levels of and equal access to financing to address food security and nutrition challenges are essential. As highlighted in the 2022 edition of this report, repurposing current food and agricultural policy support is essential to be more cost effective and efficient and to align with the goal of ending hunger, food insecurity and all forms of malnutrition.[7] Much of the food and agriculture support is not always aligned to this goal and sometimes inadvertently undermines food security and nutrition and related health outcomes. Repurposing current public budgets alone is not enough to reach SDG 2 Targets 2.1 and 2.2. Mobilizing, allocating and safeguarding finance to address the main determinants of food security and nutrition and the major drivers behind recent trends is critical.

The theme of this year's report focuses on the financing to achieve SDG Targets 2.1 and 2.2 – financing to end hunger, food insecurity and malnutrition in all its forms. After providing the latest estimates of food security and various nutrition indicators around the world in **Chapter 2**, the report tries to answer urgent questions related to the current state of financing to achieve food security and address all forms of malnutrition. Despite having a commonly agreed upon definition of food security and nutrition, there are stark differences in the estimates of its current levels of financing. In **Chapter 3,** the report explores the reasons for these discrepancies and proposes a new definition and methodology for measuring financing for food security and nutrition. This new definition and methodology address the main determinants and major drivers of hunger, food insecurity and malnutrition in all its forms.

Applying this new definition and methodology, **Chapter 4** provides estimates of the current levels of financing for food security and nutrition and outlines the financing gap to achieve SDG Targets 2.1 and 2.2. Closing this sizeable financing gap will require innovative, inclusive and scalable financing options targeting the main determinants and major drivers of hunger, food insecurity and malnutrition in all its forms. **Chapter 5** takes a deep dive into the options for innovative and synergetic scalable financing based on a typology of countries defined by their food security and nutrition situation and ability to obtain financing. It also looks at how to achieve better alignment and synergies between different sources of financing to achieve SDG Targets 2.1 and 2.2, including climate finances, emergency funding and development finances, and the changes needed in the current financing architecture to achieve the scalable and innovative financing needed to achieve food security and address all forms of malnutrition. ■

VIET NAM
Farmers working on rice terraces: reducing climate-related risks.
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CHAPTER 2
FOOD SECURITY AND NUTRITION AROUND THE WORLD

This chapter presents an updated global assessment of food security and nutrition up to the year 2023 and a report on progress towards meeting SDG Targets 2.1 and 2.2 – ending hunger and ensuring access to safe, nutritious and sufficient food for all people all year round and eradicating all forms of malnutrition by 2030.

Section 2.1 presents an updated assessment of the state of food security and progress towards achieving the hunger and food insecurity target (SDG Target 2.1). It includes global, regional and subregional estimates of the two SDG Target 2.1 indicators updated to 2023: the prevalence of undernourishment (PoU) and the prevalence of moderate or severe food insecurity based on the Food Insecurity Experience Scale (FIES). Updated global and regional estimates of the prevalence of food insecurity by sex and by degree of urbanization are also provided. **Section 2.2** presents improved estimates of the cost and of the affordability of a healthy diet, covering 2017 to 2022, contributing information about economic access to diverse, nutritious foods globally. This year's assessment reflects the latest food price data released by the International Comparison Program (ICP) and the methodological refinements to improve the estimates of affordability. **Section 2.3** presents analyses of the state of nutrition in the world and progress towards the global nutrition targets that were defined by the World Health Assembly (WHA) in 2012 and the 2030 Agenda for Sustainable Development (SDG Target 2.2). Updates are provided this year for exclusive breastfeeding and adult obesity. The section also includes spotlights on progress in the least developed countries and on the double burden of malnutrition.

2.1 FOOD SECURITY INDICATORS – LATEST UPDATES AND PROGRESS TOWARDS ENDING HUNGER AND ENSURING FOOD SECURITY

KEY MESSAGES

➔ After rising sharply from 2019 to 2021, global hunger, measured by the prevalence of undernourishment (PoU), has persisted at nearly the same level for three consecutive years, still affecting 9.1 percent of the population in 2023 compared with 7.5 percent in 2019.

➔ It is estimated that between 713 and 757 million people, corresponding to 8.9 and 9.4 percent of the global population, respectively, may have faced hunger in 2023. Considering the mid-range (733 million), this is about 152 million more people than in 2019.

➔ Trends at the regional level differ considerably. While hunger is still on the rise in Africa, it has remained relatively unchanged in Asia, and there is notable progress in Latin America. From 2022 to 2023, hunger increased in Western Asia, the Caribbean and in most subregions of Africa.

➔ Africa remains the region with the largest estimated proportion of the population facing hunger – 20.4 percent, compared with 8.1 percent in Asia, 6.2 percent in Latin America and the Caribbean, and 7.3 percent in Oceania. However, Asia is still home to more than half of all those facing hunger in the world, about 385 million people. Hunger also affected almost 300 million people in Africa, over 40 million in Latin America and the Caribbean, and more than 3 million in Oceania in 2023.

➔ It is projected that 582 million people will be chronically undernourished at the end of the decade and that more than half of them will be in Africa. This is about 130 million more undernourished people than in a scenario reflecting the world economy before the COVID-19 pandemic.

➔ Going beyond hunger, the prevalence of moderate or severe food insecurity remains above pre-pandemic levels, with little change in four years. In 2023, an estimated 28.9 percent of the global population – 2.33 billion people – were moderately or severely food insecure, meaning they did not have regular access to adequate food. These estimates include 10.7 percent of the population – 864 million people – who were food insecure at severe levels, posing grave risks to their health and well-being.

➔ In 2023, the prevalence of moderate or severe food insecurity in Africa (58.0 percent) was nearly double the global average, whereas in Asia, Latin America and the Caribbean, and Oceania, the prevalence is closer to the global estimate – 24.8, 28.2 and 26.8 percent, respectively.

➔ The prevalence of moderate or severe food insecurity remained virtually unchanged in Africa, Asia, and Northern America and Europe from 2022 to 2023, and it worsened in Oceania. In contrast, notable progress occurred in Latin America.

➔ Food insecurity affects women more than men, although the gender gap, which widened sharply from 2019 to 2021, began to narrow in 2022 and continued to grow smaller in 2023. Globally, the percentage-point difference in the prevalence of moderate or severe food insecurity between men and women fell from 3.6 in 2021 to 2.3 in 2022 and narrowed further to 1.3 in 2023.

➔ Globally and in all regions except Northern America and Europe, the prevalence of food insecurity is consistently higher in rural areas than in urban areas, while the prevalence in peri-urban areas compared to rural areas differs among regions.

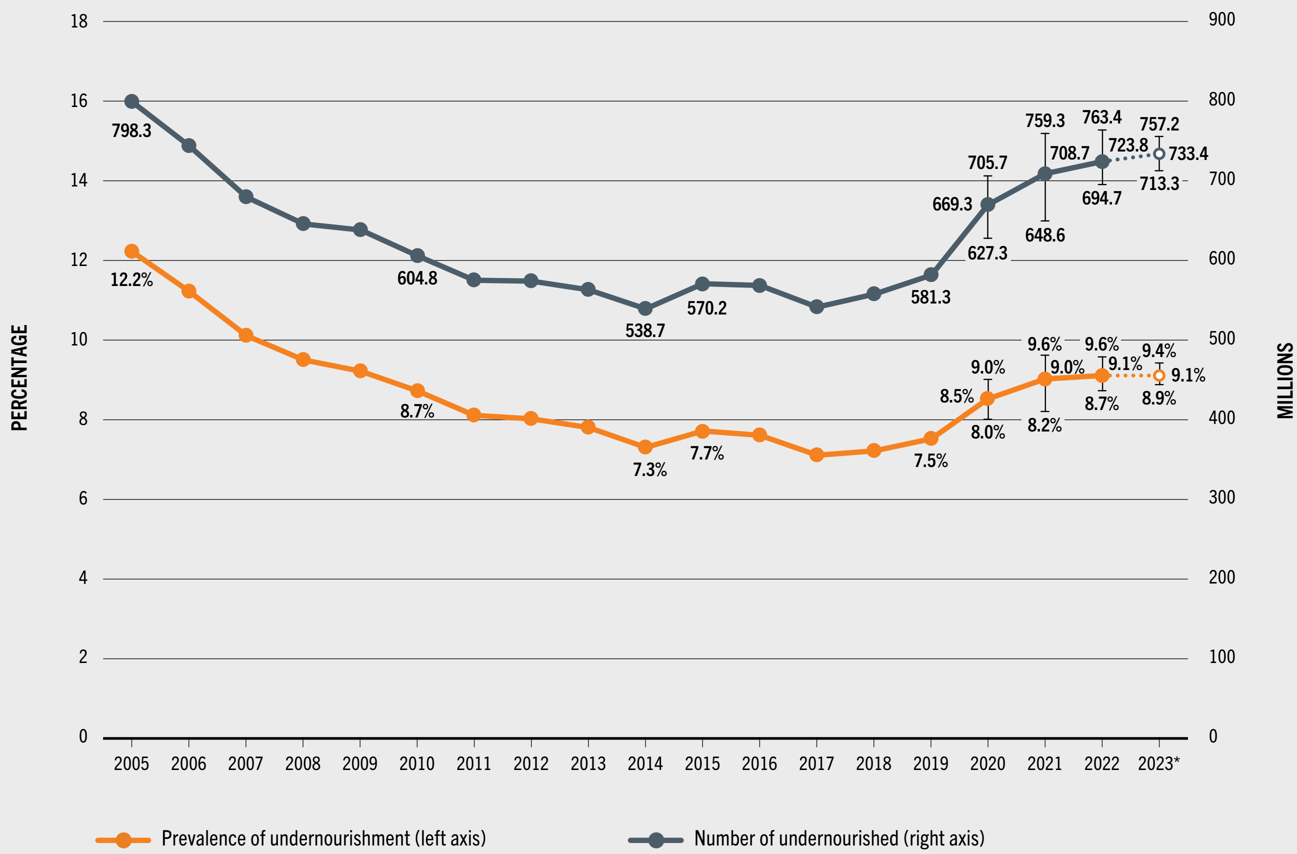
SDG Indicator 2.1.1 Prevalence of undernourishment

The assessment of global hunger in 2023, measured by the prevalence of undernourishment (PoU) (SDG Indicator 2.1.1), reveals a continuing lack of progress towards the goal of Zero Hunger. Inflationary pressures, in particular increases in the relative prices of food, continue to erode economic gains for many people's access to food in many countries, as the world is still struggling to recover from the global pandemic, hampered by a growing number of conflicts and extreme weather events.

After rising sharply from 2019 to 2021, the proportion of the world population facing hunger persisted at virtually the same level for three consecutive years, with the latest estimates indicating a global PoU of 9.1 percent in 2023 (Figure 1) (see Box 1). In terms of population, between about 713 and 757 million people (8.9 and 9.4 percent of the global population, respectively) were estimated to be undernourished in 2023. Considering the mid-range estimate (733 million), about 152 million more people may have faced hunger in 2023 compared to 2019.

Africa is the region with the largest PoU – 20.4 percent, compared with 8.1 percent in Asia, 6.2 percent in Latin America and the Caribbean, and 7.3 percent in Oceania (Table 1). However, Asia is still home to the largest number: 384.5 million, or more than half of all those facing hunger in the world. In Africa, 298.4 million people may have faced hunger in 2023, compared with 41.0 million in Latin America and the Caribbean and 3.3 million in Oceania (Table 2).

FIGURE 1 GLOBAL HUNGER ROSE SHARPLY FROM 2019 TO 2021 AND PERSISTED AT THE SAME LEVEL TO 2023



NOTES: Bars show lower and upper bounds of the estimated range. * Projections based on nowcasts for 2023 are illustrated by dotted lines.
SOURCE: FAO. 2024. *FAOSTAT: Suite of Food Security Indicators*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/FS.

https://doi.org/10.4060/cd1254en-fig01

While there was no change in the prevalence of hunger at the global level, the trends across and within regions varied. The PoU for Africa increased continuously from 2015 to 2023, whereas hunger has been on the decline in Latin America and the Caribbean since 2021 and remained relatively unchanged in Asia in the same period (Table 1, Table 2 and Figure 2).

In **Africa**, hunger has been rising steadily since 2015. More than one person out of five living in Africa may have faced hunger in 2023. Hunger increased in most subregions of Africa from 2022 to 2023, with the exception of Eastern Africa and Southern Africa. After having risen steadily since 2015, the PoU in Eastern Africa fell by 1 percentage point in 2023 to 28.6 percent (138.5 million people). Still, nearly half of the people facing hunger in Africa in 2023 live in this subregion. In Southern Africa, the PoU remained relatively unchanged from 2022 to 2023 after three consecutive years of increases. In Middle Africa, on the other hand, the PoU rose sharply from 2022 to 2023, increasing by 3.3 percentage points – the largest percentage-point increase in any subregion of the world – to reach 30.8 percent (62.2 million people) in 2023. The situation also deteriorated in Western Africa, where the PoU

BOX 1 UPDATES IN THE SERIES OF PREVALENCE OF UNDERNOURISHMENT ESTIMATES

As in every edition of this report, rather than just adding a new data point to the existing series, the entire series of prevalence of undernourishment (PoU) estimates from 2000 has been revised to reflect revised or additional data and information FAO has received since last year's publication. In some cases, the new information pertains to past years, a reason why the entire series must be revised, and readers are urged to avoid comparing figures across different editions of the report.

In this edition, the major revision entailed reflecting revised estimates of the degree of inequality in food access within national populations, as captured by the coefficient of variation due to income (CV|y) parameter that enters into the formula to compute the PoU. Since the last edition of this report, FAO's Statistics Division has gained access to the full microdata sets of 14 surveys from 13 countries, which have been processed to update the CV|y for the following country/year combinations: Armenia (2022), Costa Rica (2019), Côte d'Ivoire (2022), India (2011/12 and 2022/23), Jordan (2017), Kazakhstan (2022), Maldives (2016), Mali (2022), Mexico (2022), Niger (2022), Republic of Moldova (2022), Senegal (2022) and Timor-Leste (2015).

The newly estimated CV|y parameters replaced previous values for those countries and years, which may have been based on interpolation or on modelling. This often also requires a revision of the same parameter in the same country for the preceding and subsequent years, in order to reconcile the old and the new information through consistent interpolations and extrapolations (see **Annex 1B**).

In addition to the revision of the PoU series for the countries where new survey data are available and the corresponding revisions of the underlying regional and global aggregates, one very visible effect of the availability of new data from nine surveys conducted after 2021 is the reduction in the uncertainty that surrounds the estimates of the PoU for 2022 and 2023. This is so, given the introduction in the analysis of direct evidence on the degree of inequality in food access for those countries. In previous editions of this report, the relatively higher level of uncertainty induced by the lack of national data to reflect the effects of the pandemic resulted in the need to introduce upper and lower bounds to the series in 2020, 2021 and 2022 (see Supplementary material to Chapter 2). While the uncertainty around what the real situation was in those years will never disappear, we hope that access to more frequent information on food consumption from more countries will continue to be available in the future, to make our assessments of the state of food insecurity in the world always more reliable.

rose sharply from 2019 to 2020 followed by a smaller increase in 2021, and then rose faster again for two consecutive years, reaching 16.0 percent (70.4 million people) in 2023. Hunger also increased, albeit more slowly, in the subregion with the lowest PoU in the continent, Northern Africa, affecting 7.8 percent of the population (20.7 million people) in 2023.

The trend in hunger in **Asia** mirrored that at the global level, characterized by a sharp increase from 2019 to 2021, followed by two years of virtually no change, with 8.1 percent of the population still facing hunger in 2023.

In Central Asia, following an increase from 2.6 percent in 2019 to 3.2 percent in 2020, the PoU decreased slightly in subsequent years to 3.0 percent in 2023. In South-eastern Asia, the PoU increased slowly from 5.5 percent in 2019 to 6.1 percent in 2022 and remained unchanged in 2023. In Southern Asia, encouraging progress was seen for two years in a row. Following a sharp rise from 2019 to 2021, the PoU decreased from 14.5 percent in 2021 to 13.9 percent in 2023 – the equivalent of 7.7 million fewer people facing hunger. In contrast, the situation continued to deteriorate in Western Asia, where hunger has been on the rise since 2015, reaching 12.4 percent in 2023.

In **Latin America and the Caribbean**, the two-year rise in hunger in the wake of the COVID-19 pandemic mirrored the global

TABLE 1 PREVALENCE OF UNDERNOURISHMENT, 2005–2023

	Prevalence of undernourishment									
	2005	2010	2015	2017	2018	2019	2020*	2021*	2022*	2023*
	(%)									
WORLD	**12.2**	**8.7**	**7.7**	**7.1**	**7.2**	**7.5**	**8.5**	**9.0**	**9.1**	**9.1**
AFRICA	**19.9**	**15.9**	**16.0**	**16.7**	**17.1**	**17.4**	**18.8**	**19.3**	**19.9**	**20.4**
Northern Africa	7.8	6.2	5.6	6.2	6.2	6.0	6.2	7.1	7.4	7.8
Sub-Saharan Africa	23.0	18.2	18.4	19.2	19.6	20.0	21.7	22.1	22.7	23.2
Eastern Africa	32.2	24.4	24.5	26.3	26.5	27.4	28.5	29.0	29.6	28.6
Middle Africa	33.7	22.7	23.3	23.8	24.5	25.1	27.8	28.2	27.5	30.8
Southern Africa	4.7	7.1	8.3	6.9	7.0	7.1	8.1	9.1	9.5	9.6
Western Africa	12.2	11.6	11.5	11.5	12.0	11.8	13.7	13.8	15.0	16.0
ASIA	**13.9**	**9.3**	**7.5**	**6.3**	**6.3**	**6.6**	**7.8**	**8.2**	**8.2**	**8.1**
Central Asia	13.8	6.4	3.9	3.4	2.9	2.6	3.2	3.2	3.1	3.0
Eastern Asia	6.9	2.7	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
South-eastern Asia	17.0	11.6	7.8	5.9	5.7	5.5	5.6	5.8	6.1	6.1
Southern Asia	20.2	14.9	12.7	10.2	10.2	11.1	13.6	14.5	14.2	13.9
Western Asia	8.7	6.8	9.3	10.2	10.6	10.7	11.0	11.4	12.1	12.4
Western Asia and Northern Africa	*8.3*	*6.5*	*7.6*	*8.3*	*8.6*	*8.5*	*8.8*	*9.4*	*9.9*	*10.3*
LATIN AMERICA AND THE CARIBBEAN	**8.9**	**6.1**	**5.2**	**5.7**	**5.9**	**5.6**	**6.5**	**6.9**	**6.6**	**6.2**
Caribbean	18.1	14.3	12.8	12.9	13.7	13.8	15.5	15.4	16.8	17.2
Latin America	8.2	5.5	4.6	5.2	5.3	5.0	5.8	6.3	5.9	5.4
Central America	7.7	6.4	6.4	6.0	6.0	5.6	5.6	5.8	5.9	5.8
South America	8.4	5.1	3.9	4.9	5.0	4.8	5.9	6.5	5.9	5.2
OCEANIA	**6.9**	**7.3**	**6.9**	**6.8**	**7.1**	**7.0**	**6.7**	**7.5**	**7.1**	**7.3**
NORTHERN AMERICA AND EUROPE	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**	**<2.5**

NOTES: For country compositions of each regional/subregional aggregate, see Notes on geographic regions in statistical tables at the end of the report. * Values are based on the point estimates; the values of upper and lower bounds of the estimated ranges for 2020 to 2023 can be found in the Supplementary material to Chapter 2.

SOURCE: FAO. 2024. *FAOSTAT: Suite of Food Security Indicators*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/FS. Licence: CC-BY-4.0.

trend, but the recovery has been considerably stronger. After increasing from 5.6 percent in 2019 to 6.9 percent in 2021, the PoU fell for two consecutive years, reaching 6.2 percent in 2023 – a decrease equivalent to 4.3 million people in two years, driven mainly by improvements in South America. The progress is encouraging, although the PoU is still far above pre-pandemic levels.

At the same time, there is a notable disparity in progress at the subregional level, with hunger affecting a much larger proportion of the population, and rising, in the Caribbean. The PoU in the Caribbean was more than three times that in Latin America in 2023, and it showed a marked increase from 15.4 percent in 2021 to 17.2 percent in 2023. This contrasts with the trend in Central America, where the PoU increased only slightly from 5.6 percent in 2019 to 5.9 percent in 2022, and then showed a marginal decline in 2023. The most progress has been made in South America, where the PoU fell for two consecutive years by a total of 1.3 percentage points, down to 5.2 percent in 2023, after increasing sharply from 4.8 percent

TABLE 2 NUMBER OF UNDERNOURISHED PEOPLE, 2005–2023

	Number of undernourished									
	2005	2010	2015	2017	2018	2019	2020*	2021*	2022*	2023*
	(millions)									
WORLD	**798.3**	**604.8**	**570.2**	**541.3**	**557.0**	**581.3**	**669.3**	**708.7**	**723.8**	**733.4**
AFRICA	**184.4**	**167.4**	**192.1**	**211.6**	**221.2**	**231.0**	**256.5**	**269.6**	**284.1**	**298.4**
Northern Africa	14.7	12.8	12.7	14.7	15.0	14.8	15.7	18.3	19.3	20.7
Sub-Saharan Africa	169.7	154.6	179.4	196.9	206.2	216.2	240.8	251.4	264.8	277.7
Eastern Africa	95.7	83.7	96.3	109.0	112.7	119.7	128.1	133.7	139.8	138.5
Middle Africa	38.3	30.4	36.6	40.0	42.5	44.9	51.3	53.7	54.0	62.2
Southern Africa	2.6	4.2	5.3	4.5	4.6	4.7	5.5	6.2	6.5	6.6
Western Africa	33.1	36.4	41.1	43.4	46.5	46.9	56.0	57.8	64.5	70.4
ASIA	**552.6**	**391.4**	**336.3**	**284.9**	**289.6**	**305.7**	**361.7**	**384.6**	**386.5**	**384.5**
Central Asia	8.2	4.1	2.7	2.4	2.1	1.9	2.4	2.5	2.4	2.3
Eastern Asia	105.4	42.8	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
South-eastern Asia	95.7	69.8	49.5	38.5	37.7	36.6	37.3	39.0	41.6	41.7
Southern Asia	325.2	258.4	236.1	194.6	197.3	216.9	268.3	288.6	284.9	280.9
Western Asia	18.2	16.2	24.7	28.0	29.6	30.2	31.5	33.0	35.5	37.1
Western Asia and Northern Africa	*32.9*	*29.0*	*37.3*	*42.7*	*44.6*	*44.9*	*47.2*	*51.3*	*54.8*	*57.8*
LATIN AMERICA AND THE CARIBBEAN	**49.8**	**36.0**	**32.5**	**36.3**	**37.6**	**36.3**	**42.2**	**45.3**	**43.9**	**41.0**
Caribbean	7.2	5.9	5.5	5.6	6.0	6.0	6.8	6.8	7.5	7.7
Latin America	42.6	30.1	27.0	30.7	31.7	30.3	35.4	38.5	36.4	33.3
Central America	11.2	10.0	10.7	10.2	10.4	9.7	9.9	10.3	10.6	10.5
South America	31.4	20.1	16.3	20.5	21.2	20.6	25.4	28.2	25.8	22.8
OCEANIA	**2.3**	**2.7**	**2.8**	**2.8**	**3.0**	**3.1**	**2.9**	**3.3**	**3.2**	**3.3**
NORTHERN AMERICA AND EUROPE	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**

NOTES: n.r. = not reported, as the prevalence is less than 2.5 percent. Regional totals may differ from the sum of subregions, due to rounding and non-reported values. For country compositions of each regional/subregional aggregate, see Notes on geographic regions in statistical tables at the end of the report. * Values are based on the point estimates; the values of upper and lower bounds of the estimated ranges for 2020 to 2024 can be found in the Supplementary material to Chapter 2.

SOURCE: FAO. 2024. *FAOSTAT: Suite of Food Security Indicators*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/FS.

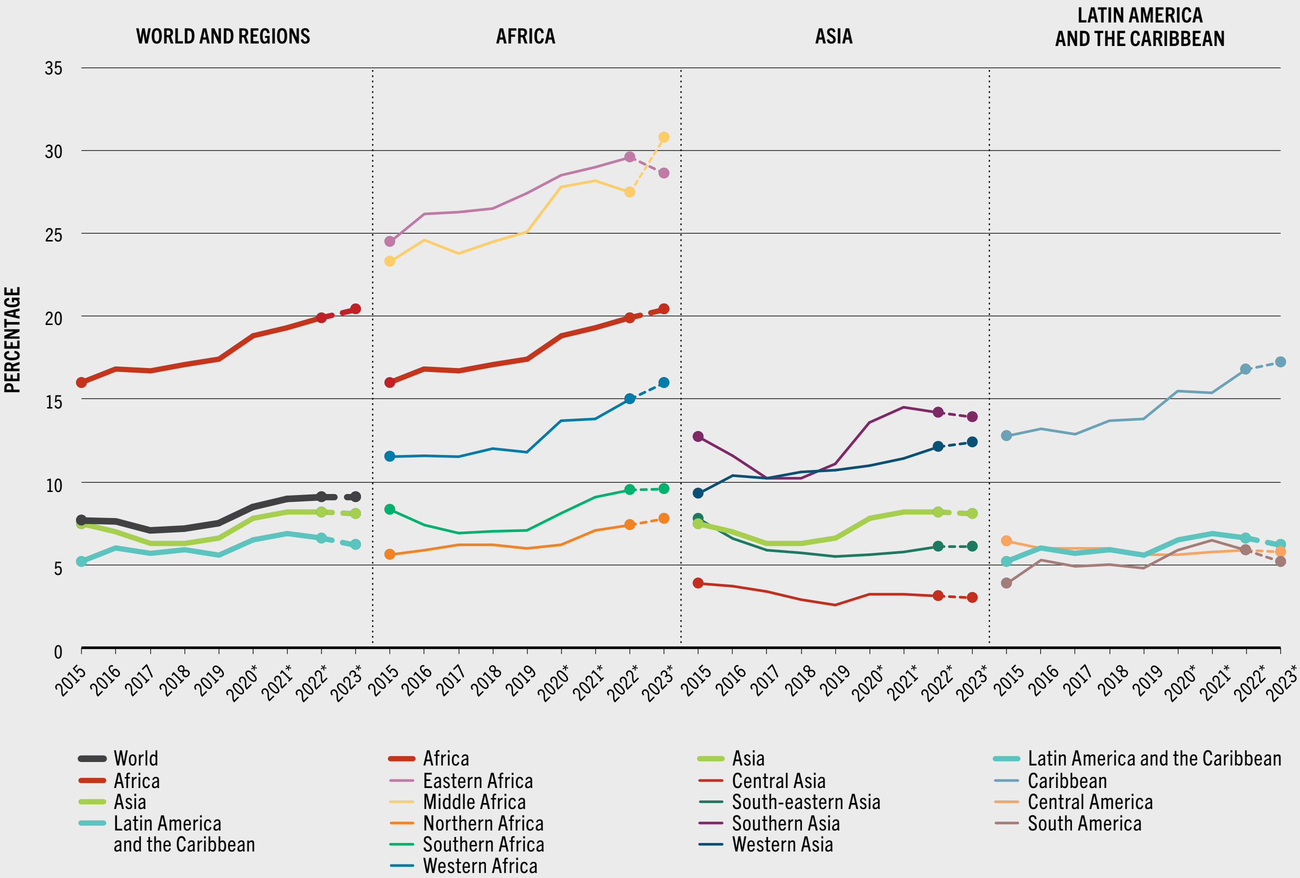
in 2019 to 6.5 percent in 2021, in the wake of the pandemic. That amounts to 5.4 million fewer people facing hunger in South America in 2023 compared to 2021.

When considering these results, it is also important to keep in mind the deteriorating food insecurity situation in countries affected by evolving humanitarian crises which may not be fully reflected in the PoU nowcast for 2023 (see Box 2).

Towards ending hunger (SDG Target 2.1): projections to 2030

As in previous editions of this report, an exercise was conducted to project how many people may be facing hunger in 2030 based on what can be inferred from available forecasts of fundamental demographic, agricultural productivity and economic variables. The projections were obtained by separately projecting each of the parameters that inform the model used to estimate the PoU (see Supplementary material to Chapter 2).

FIGURE 2 PROGRESS WAS MADE TOWARDS REDUCING HUNGER IN SOME SUBREGIONS OF ASIA AND IN LATIN AMERICA, BUT HUNGER IS STILL ON THE RISE IN WESTERN ASIA, THE CARIBBEAN AND MOST SUBREGIONS OF AFRICA



NOTES: Only regions for which data were available for all the subregions and the prevalence of undernourishment (PoU) was greater than 2.5 percent are shown. Eastern Asia is not shown because the PoU has been consistently below 2.5 percent since 2010. * Values are based on the projected mid-ranges. The full ranges of the 2020 to 2023 values can be found in the Supplementary material to Chapter 2.

SOURCE: FAO. 2024. *FAOSTAT: Suite of Food Security Indicators*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/FS.

https://doi.org/10.4060/cd1254en-fig02

Trajectories are presented under two scenarios: "current prospects", which aims to capture current projections of the PoU in 2030 based on the world economic prospects presented in the April 2024 edition of the International Monetary Fund World Economic Outlook database;[5] and "projections before COVID-19 pandemic", calibrated to reflect the situation of the world economy before the pandemic, as described by the *World Economic Outlook* published in October 2019.[6]

The current scenario shows that 582 million people, or 6.8 percent of the global population, will be chronically undernourished in 2030, pointing to the immense challenge of achieving SDG 2 (Zero Hunger) (Figure 3). This is about 130 million more undernourished people than in the "projections before COVID-19 pandemic" scenario.

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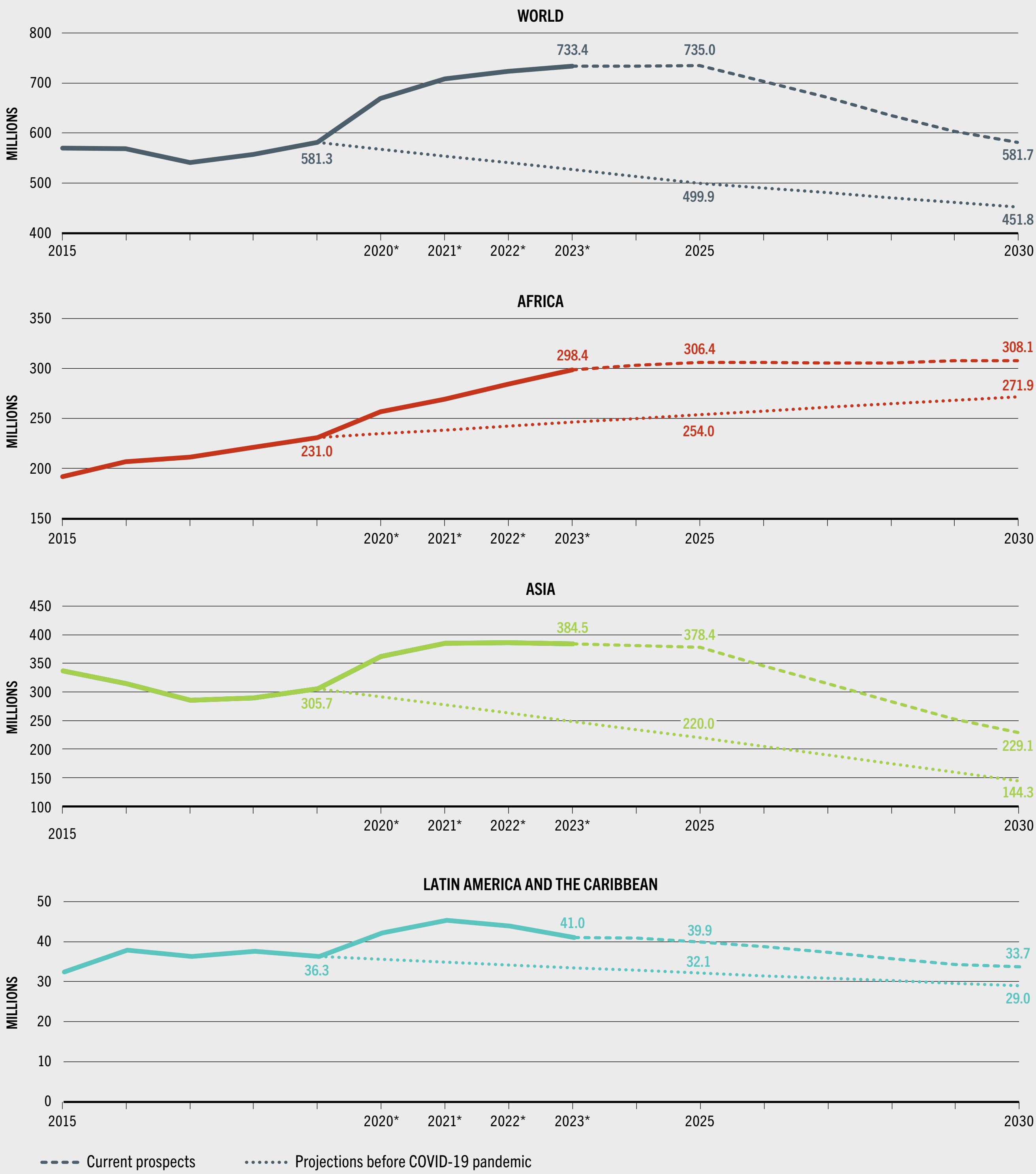
FIGURE 3 PROJECTED NUMBERS OF UNDERNOURISHED INDICATE THAT THE WORLD IS FAR OFF TRACK TO ACHIEVE ZERO HUNGER BY 2030



NOTES: Only regions for which data were available for all the subregions and the prevalence of undernourishment was above 2.5 percent are shown.
* Values are based on the projected mid-ranges.

SOURCE: Authors' (FAO) own elaboration.

https://doi.org/10.4060/cd1254en-fig03

BOX 2 DEEPENING HUMANITARIAN CRISES INCREASE ACUTE FOOD INSECURITY AND THREATEN THE RIGHT TO ADEQUATE FOOD IN MANY PLACES IN THE WORLD

During the preparation of this edition of *The State of Food Security and Nutrition in the World*, deepening humanitarian crises continued to seriously erode food security and the realization of the right to adequate food in many countries. To inform decision-makers about this evolving situation, the *Global Report on Food Crises*[1] details the acute food insecurity in a set of countries that are currently exposed to food crisis situations. Both *The State of Food Security and Nutrition in the World* and the *Global Report on Food Crises* are multipartnership efforts that provide international analyses of food security, but readers should be aware of their different objectives and geographical scope, as well as their reliance on distinctly different data and methodologies for their analyses.

One important distinction is that, by reporting on SDG 2 indicators, *The State of Food Security and Nutrition in the World* has the broad objective of monitoring *chronic food insecurity* – defined as food insecurity that persists over time, largely due to structural causes – in all countries, on a regular basis. The focus of the *Global Report on Food Crises*, on the other hand, is on *acute food insecurity*, which refers to any manifestation of food insecurity at a specific point in time that is of a severity that threatens lives, livelihoods or both, regardless of the causes, context or duration. Analyses of acute food insecurity reported in the *Global Report on Food Crises* are based mainly on the Integrated Food Security Phase Classification/Cadre Harmonisé (IPC/CH), and they differ considerably from those that inform the SDG indicators.[2] Since timeliness is of the essence in crisis situations, IPC/CH rapid assessments are conducted by local teams of analysts through a consultative process among the main food security partners in the country, including government counterparts, aimed at finding convergence among all pieces of sometimes partial available evidence, including data from official and non-official sources commonly collected and used by the international humanitarian community.

According to the *Global Report on Food Crises 2024*, nearly 282 million people faced high levels of acute food insecurity in the 59 food-crisis countries/territories that were included in the analysis in 2023.* The five countries with the largest numbers of people facing high levels of acute food insecurity were, in descending order, the Democratic Republic of the Congo, Nigeria, the Sudan, Afghanistan and Ethiopia, while the countries with the largest share of the analysed population facing high levels of acute food insecurity were Palestine (Gaza Strip), South Sudan, Yemen, the Syrian Arab Republic and Haiti. One hundred percent of the population of the Gaza Strip faced high levels of acute food insecurity, as did more than half of the people living in South Sudan, Yemen and the Syrian Arab Republic, and nearly half the population of Haiti.

Over 705 000 people in five countries/territories** were projected to be facing Catastrophe (IPC/CH Phase 5) levels of acute food insecurity in 2023, most of them (576 000) in the Gaza Strip. The Gaza Strip became the most severe food crisis since IPC assessments were first conducted. By late 2023, the entire population of 2.2 million was classified as facing Crisis conditions or worse (IPC Phase 3 or above), and 80 percent of the population was internally displaced. An IPC Special Brief on Gaza[3] dated 18 March 2024 warned of an imminent risk of famine, with more than a quarter of the population facing Catastrophe (IPC Phase 5) levels of acute food insecurity, which at that time was projected to expand to threaten half the population – 1.1 million people – by July 2024 if hostilities and restricted access to humanitarian aid continued.

A surge in conflict in the Sudan also contributed to extraordinarily high levels of acute food insecurity, with more than 20 million people facing Crisis conditions or worse (IPC Phase 3 or above) during the lean season in June–September in 2023. The Sudan became the world's largest internal displacement crisis and had the largest number of people in the world facing Emergency (IPC Phase 4) levels of acute food insecurity – 6.3 million.

Escalating conflict, violence and internal displacement also fuelled a worsening food crisis in Haiti, where nearly 5 million people, or half the population, faced Crisis levels of acute food insecurity or worse (IPC Phase 3 or above), including 1.8 million facing Emergency (IPC Phase 4) levels during the lean season in March–June 2023.

In South Sudan, an estimated 7.8 million people – 63 percent of the population – were facing high levels of acute food insecurity (IPC Phase 3 or above) during the lean season in April–July 2023, including 2.9 million in Emergency (IPC Phase 4) and 43 000 in Catastrophe (IPC Phase 5) categories. Nearly 13 million people in the Syrian Arab Republic and 18 million in Yemen faced high levels of acute food insecurity.

These are some of the most serious humanitarian crises in the world that are posing daunting challenges for the realization of the right to adequate food. Humanitarian aid, including in the form of emergency agriculture, nutrition and food assistance, is urgently needed, together with an end to the hostilities, access to populations in need, and rebuilding of essential infrastructure and institutions crucial for guaranteeing people's livelihoods and access to basic necessities. The seeds of future peace, food security and shared prosperity must be planted today.

NOTES: * High levels of acute food insecurity are those that correspond to IPC Phase 3 ("Crisis") or worse. See the IPC Manual for further details.[4] The *Global Report on Food Crises* defines a food crisis as a situation where acute food insecurity requires urgent action to protect and save lives and livelihoods at local or national levels and exceeds the local resources and capacities to respond. ** Burkina Faso, Palestine (Gaza Strip), Mali, Somalia and South Sudan.

» Figure 3 also shows how the situation is currently expected to evolve in Asia, Africa, and Latin America and the Caribbean. The different trajectories are evident, demonstrating that practically all progress in the fight against hunger is expected to be made in Asia, with a strong recovery in the second half of the decade, where the number of undernourished is projected to fall from the current 385 million to 229 million people by 2030, nearly halving the prevalence of undernourishment (4.8 percent by 2030). Latin America and the Caribbean will reduce chronic hunger at a slower pace, by 8 million people, and will bring the prevalence of undernourishment below 5 percent by 2030. These two regions contrast sharply with Africa, where it is projected that 10 million more people (18 percent of the population) will be facing chronic hunger by 2030. Without accelerated efforts and increased resource mobilization, under current prospects, the continent will only manage to stabilize the situation at the high level of hunger inherited from the last few years.

SDG Indicator 2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale

SDG Target 2.1 aims for a world free from hunger, but it also goes much further; it presents a vision of a world in which all people have access to safe, nutritious and sufficient food all year round. SDG Indicator 2.1.2 – the prevalence of moderate or severe food insecurity in the population, based on the FIES – tracks progress towards this more ambitious goal, which in essence is the realization of the right to adequate food for all.

New estimates show that the global prevalence of moderate or severe food insecurity based on the FIES still remains far above pre-COVID-19 pandemic levels, with little change in four years (Figure 4). Since a sharp increase in food insecurity from 2019 to 2020 during the pandemic, levels have remained virtually unchanged. In 2023, an estimated 28.9 percent of the global population – 2.33 billion people – were moderately or severely food insecure, meaning they did not have regular access to adequate food. While the prevalence remained virtually unchanged from 2020 to 2023, the number of people facing moderate or severe food insecurity in the world nevertheless increased by more than 65 million, as the global population grew during that period (Table 3 and Table 4).

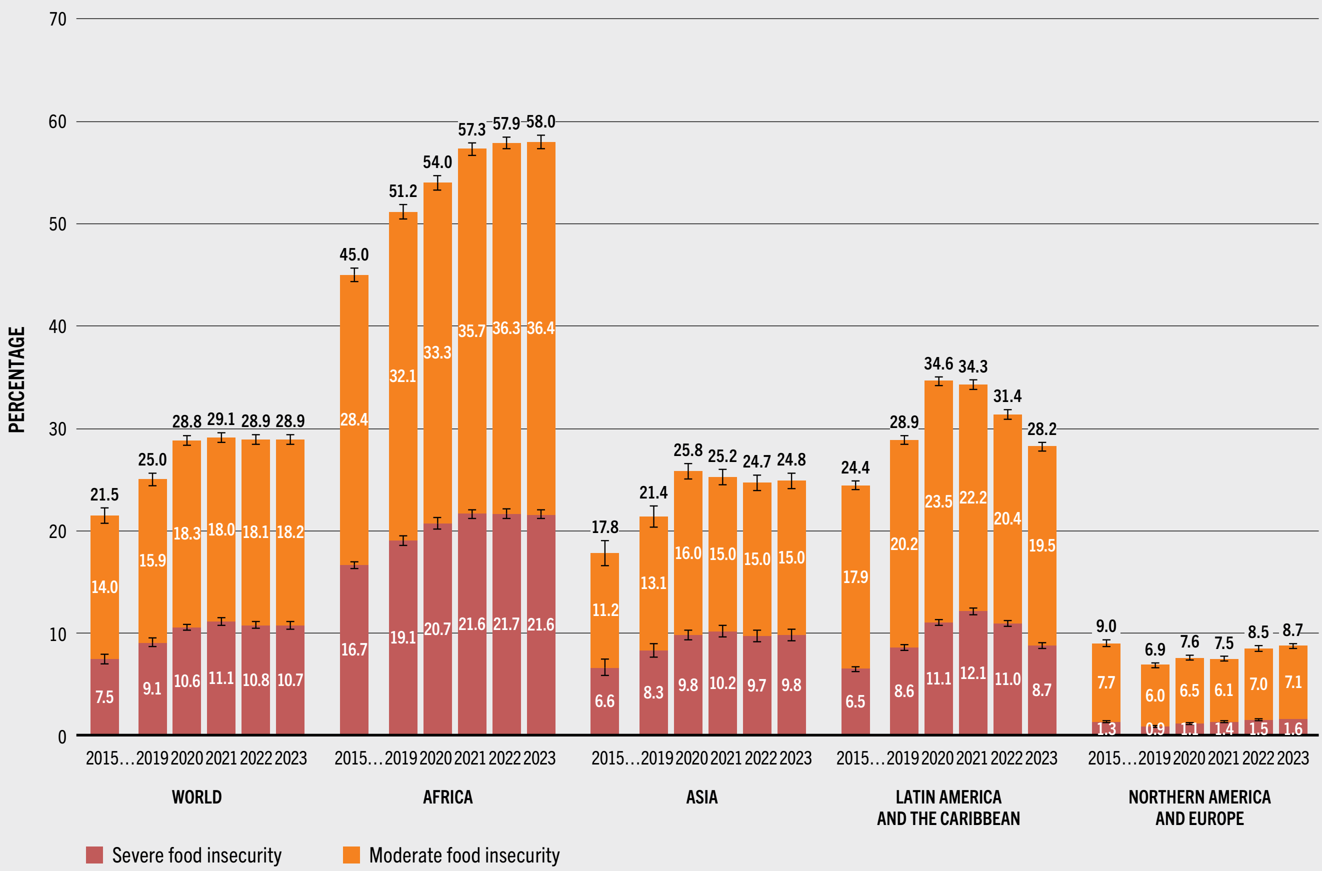
These estimates include 10.7 percent of the population – or more than 864 million people – who were severely food insecure, meaning they had run out of food at times during the year and, at worst, gone an entire day or more without eating. The prevalence of severe food insecurity at the global level rose from 9.1 percent in 2019 to 10.6 percent in 2020 and has remained stubbornly unchanged since then.

Comparing situations in the different regions of the world in 2023, Africa remains the region with the largest proportion of the population facing food insecurity. The prevalence of moderate or severe food insecurity in Africa (58.0 percent) is nearly double the global average, whereas in Asia, Latin America and the Caribbean, and Oceania, the prevalence is closer to and slightly below the global estimate – 24.8, 28.2 and 26.8 percent, respectively. From 2022 to 2023, food insecurity at moderate or severe levels remained virtually unchanged in Africa and Asia, while it worsened in Oceania and, to a lesser extent, in Northern America and Europe. In contrast, notable progress was made in the Latin American and Caribbean region (Table 3, Table 4 and Figure 4).

In **Africa**, 58.0 percent of the population was moderately or severely food insecure in 2023, and 21.6 percent faced severe food insecurity, although the differences between subregions were notable. Middle Africa had the highest prevalence of moderate or severe food insecurity (77.7 percent, or 157 million people), making it the subregion with the highest level in the world. It is followed by Eastern Africa (64.5 percent, or 313 million people) and Western Africa (61.4 percent, or 270 million people). One-quarter of the population of Southern Africa (17.3 million people) and more than one-third of Northern Africans (89.4 million people) were affected by moderate or severe food insecurity in 2023.

Middle Africa is also the subregion with the highest level of severe food insecurity in Africa and in the world – 38.0 percent in 2023. In Eastern Africa, 24.2 percent of the population is severely

FIGURE 4 FOOD INSECURITY LEVELS REMAINED VIRTUALLY UNCHANGED GLOBALLY FROM 2022 TO 2023, WITH LATIN AMERICA AND THE CARIBBEAN BEING THE ONLY REGION SHOWING NOTABLE REDUCTION



NOTES: Differences in totals are due to rounding of figures to the nearest decimal point. Only regions for which data were available for all the subregions are shown.

SOURCE: FAO. 2024. *FAOSTAT: Suite of Food Security Indicators*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/FS.

https://doi.org/10.4060/cd1254en-fig04

» food insecure, followed by Western Africa (18.8 percent), Northern Africa (11.9 percent) and Southern Africa (10.9 percent).

From 2022 to 2023, the proportion of the population experiencing moderate or severe food insecurity increased at least marginally in most subregions of Africa, especially in Southern Africa, where it increased by 2.1 percentage points. However, improvements were seen in Eastern Africa – one of the most affected subregions – with a 2.6 percentage-point decrease from 2022 to 2023. That is equivalent to more than 4 million fewer people facing moderate or severe food insecurity in Eastern Africa in one year.

Focusing on severe food insecurity only, the prevalence remained relatively unchanged from 2022 to 2023 in Northern Africa, Middle Africa and Southern Africa, although it should be noted that, due to data availability, the trend in Northern Africa may not fully capture the impact of the rapidly deteriorating situation in the Sudan resulting from the conflict that erupted in April »

TABLE 3 PREVALENCE OF FOOD INSECURITY AT SEVERE LEVEL ONLY, AND AT MODERATE OR SEVERE LEVEL, BASED ON THE FOOD INSECURITY EXPERIENCE SCALE, 2015–2023

	Prevalence of severe food insecurity							Prevalence of moderate or severe food insecurity						
	2015	...	2019	2020	2021	2022	2023	2015	...	2019	2020	2021	2022	2023
	(%)							(%)						
WORLD	**7.5**	**...**	**9.1**	**10.6**	**11.1**	**10.8**	**10.7**	**21.5**	**...**	**25.0**	**28.8**	**29.1**	**28.9**	**28.9**
AFRICA	**16.7**	**...**	**19.1**	**20.7**	**21.6**	**21.7**	**21.6**	**45.0**	**...**	**51.2**	**54.0**	**57.3**	**57.9**	**58.0**
Northern Africa	9.0	...	8.7	9.5	11.2	12.0	11.9	26.2	...	28.8	30.2	34.0	32.4	33.8
Sub-Saharan Africa	18.5	...	21.4	23.3	24.0	23.8	23.8	49.4	...	56.3	59.4	62.5	63.6	63.3
Eastern Africa	20.8	...	23.6	26.3	26.7	25.8	24.2	56.3	...	62.8	65.1	64.7	67.1	64.5
Middle Africa	n.a.	...	n.a.	35.6	37.1	37.8	38.0	n.a.	...	n.a.	69.9	75.1	77.1	77.7
Southern Africa	9.1	...	9.2	11.0	11.0	10.9	10.9	21.5	...	21.9	24.6	24.6	22.8	24.9
Western Africa	11.0	...	14.5	16.4	17.1	17.3	18.8	39.3	...	48.7	54.1	60.6	60.1	61.4
ASIA	**6.6**	**...**	**8.3**	**9.8**	**10.2**	**9.7**	**9.8**	**17.8**	**...**	**21.4**	**25.8**	**25.2**	**24.7**	**24.8**
Central Asia	1.4	...	2.3	4.8	5.0	4.6	3.4	9.1	...	13.5	17.8	20.1	17.4	16.6
Eastern Asia	0.8	...	1.3	2.0	1.0	1.0	1.0	5.9	...	7.4	7.8	6.1	6.2	6.3
South-eastern Asia	1.9	...	1.8	2.1	2.6	2.6	2.9	14.6	...	14.5	15.6	17.0	16.9	17.1
Southern Asia	13.2	...	16.3	18.8	20.2	19.0	19.1	27.7	...	34.3	43.1	41.9	41.0	41.1
Western Asia	9.7	...	11.0	12.2	13.2	13.8	13.3	32.0	...	32.4	37.5	41.0	38.3	37.5
Western Asia and Northern Africa	*9.3*	...	*9.9*	*10.9*	*12.3*	*13.0*	*12.6*	*29.3*	...	*30.7*	*34.1*	*37.7*	*35.6*	*35.8*
LATIN AMERICA AND THE CARIBBEAN	**6.5**	**...**	**8.6**	**11.1**	**12.1**	**11.0**	**8.7**	**24.4**	**...**	**28.9**	**34.6**	**34.3**	**31.4**	**28.2**
Caribbean	n.a.	...	n.a.	32.3	25.7	28.1	28.6	n.a.	...	n.a.	65.3	59.4	60.5	58.8
Latin America	4.7	...	7.1	9.5	11.1	9.7	7.3	21.8	...	26.6	32.4	32.5	29.3	26.0
Central America	6.4	...	7.2	7.3	7.8	8.1	7.6	28.9	...	29.9	34.2	31.2	28.6	28.2
South America	4.0	...	7.0	10.5	12.5	10.4	7.2	18.9	...	25.3	31.7	33.0	29.6	25.1
OCEANIA	**8.4**	**...**	**9.5**	**8.6**	**10.1**	**9.3**	**10.4**	**21.3**	**...**	**24.3**	**23.2**	**24.0**	**24.1**	**26.8**
NORTHERN AMERICA AND EUROPE	**1.3**	**...**	**0.9**	**1.1**	**1.4**	**1.5**	**1.6**	**9.0**	**...**	**6.9**	**7.6**	**7.5**	**8.5**	**8.7**
Europe	1.5	...	0.9	1.3	1.7	1.8	2.0	8.4	...	6.5	7.3	7.5	7.9	8.2
Eastern Europe	1.5	...	0.8	1.4	1.7	1.9	1.9	11.7	...	8.3	10.2	10.5	10.6	10.8
Northern Europe	1.8	...	0.9	1.2	1.8	2.0	3.0	6.8	...	5.1	4.2	4.5	6.6	7.7
Southern Europe	1.4	...	1.3	2.0	1.7	1.4	1.3	7.4	...	6.9	8.0	6.9	6.4	6.2
Western Europe	1.4	...	0.7	0.8	1.7	1.8	2.0	5.0	...	4.3	3.9	4.9	5.7	6.1
Northern America	1.0	...	0.8	0.7	0.7	0.9	1.0	10.3	...	7.6	8.3	7.5	9.7	9.8

NOTES: n.a. = not available, as data are available only for a limited number of countries, representing less than 50 percent of the population in the region. The estimates for Latin America and the Caribbean from 2014 to 2019 include Caribbean countries whose combined populations represent only 30 percent of the population of that subregion, while the estimates from 2020 to 2023 include Caribbean countries whose combined populations represent between 60 and 65 percent of the subregional population. The countries included in the 2023 estimate for the Caribbean subregion are: Antigua and Barbuda, Bahamas, Barbados, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago.

SOURCE: FAO. 2024. *FAOSTAT: Suite of Food Security Indicators*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/FS. Licence: CC-BY-4.0.

TABLE 4 NUMBER OF PEOPLE EXPERIENCING FOOD INSECURITY AT SEVERE LEVEL ONLY, AND AT MODERATE OR SEVERE LEVEL, BASED ON THE FOOD INSECURITY EXPERIENCE SCALE, 2015–2023

	Number of severely food-insecure people (millions)							Number of moderately or severely food-insecure people (millions)						
	2015	…	2019	2020	2021	2022	2023	2015	…	2019	2020	2021	2022	2023
WORLD	**554.1**	**…**	**706.1**	**827.9**	**880.0**	**861.7**	**864.1**	**1 595.2**	**…**	**1 942.6**	**2 259.9**	**2 302.9**	**2 306.6**	**2 325.5**
AFRICA	**200.0**	**…**	**253.0**	**282.0**	**301.5**	**309.0**	**315.5**	**540.6**	**…**	**679.3**	**734.8**	**798.7**	**826.3**	**846.6**
Northern Africa	20.5	…	21.5	23.8	28.7	31.1	31.4	59.9	…	71.2	75.9	86.9	84.3	89.4
Sub-Saharan Africa	179.6	…	231.5	258.2	272.8	277.9	284.2	480.7	…	608.1	659.0	711.8	742.0	757.3
Eastern Africa	81.8	…	103.2	118.2	123.0	122.1	117.2	221.3	…	274.7	292.5	298.3	317.2	313.0
Middle Africa	n.a.	…	n.a.	65.7	70.6	74.0	76.8	n.a.	…	n.a.	128.9	142.9	151.2	157.0
Southern Africa	5.8	…	6.1	7.4	7.5	7.5	7.6	13.7	…	14.6	16.6	16.7	15.6	17.3
Western Africa	39.5	…	57.9	66.9	71.7	74.3	82.6	140.9	…	193.7	220.9	253.8	257.9	270.0
ASIA	**295.6**	**…**	**383.4**	**457.2**	**479.1**	**459.2**	**467.3**	**794.4**	**…**	**989.2**	**1 204.1**	**1 184.7**	**1 167.0**	**1 181.0**
Central Asia	1.0	…	1.7	3.6	3.8	3.5	2.7	6.3	…	9.9	13.3	15.3	13.4	12.9
Eastern Asia	12.4	…	21.4	33.4	17.0	16.0	17.2	95.7	…	123.0	129.0	102.3	103.4	105.2
South-eastern Asia	12.0	…	12.3	14.0	17.8	17.9	20.1	92.9	…	96.5	104.5	114.7	115.1	117.7
Southern Asia	244.7	…	316.9	371.3	402.1	381.1	387.7	514.7	…	668.1	849.8	833.8	822.5	833.4
Western Asia	25.6	…	31.2	35.1	38.4	40.6	39.7	84.8	…	91.6	107.5	118.7	112.5	111.9
Western Asia and Northern Africa	*46.1*	…	*52.7*	*58.9*	*67.1*	*71.8*	*71.1*	*144.7*	…	*162.8*	*183.4*	*205.6*	*196.9*	*201.2*
LATIN AMERICA AND THE CARIBBEAN	**40.4**	**…**	**55.7**	**72.2**	**79.6**	**72.5**	**58.1**	**152.2**	**…**	**186.7**	**225.7**	**224.9**	**207.3**	**187.6**
Caribbean	n.a.	…	n.a.	14.2	11.4	12.5	12.8	n.a.	…	n.a.	28.7	26.2	26.9	26.3
Latin America	27.1	…	42.5	58.0	68.2	60.0	45.4	126.4	…	160.4	197.0	198.7	180.4	161.4
Central America	10.6	…	12.5	12.9	13.8	14.5	13.8	48.4	…	52.2	60.3	55.4	51.3	51.0
South America	16.4	…	30.0	45.2	54.4	45.4	31.6	78.0	…	108.2	136.7	143.3	129.1	110.4
OCEANIA	**3.4**	**…**	**4.1**	**3.8**	**4.5**	**4.2**	**4.7**	**8.6**	**…**	**10.5**	**10.2**	**10.7**	**10.9**	**12.2**
NORTHERN AMERICA AND EUROPE	**14.7**	**…**	**9.9**	**12.7**	**15.3**	**16.9**	**18.3**	**99.4**	**…**	**77.0**	**85.1**	**83.8**	**95.3**	**98.0**
Europe	11.2	…	6.8	9.9	12.6	13.3	14.6	62.2	…	48.6	54.2	55.5	58.7	60.7
Eastern Europe	4.5	…	2.4	4.0	4.9	5.5	5.5	34.3	…	24.4	29.9	30.6	30.7	31.1
Northern Europe	1.9	…	1.0	1.3	1.9	2.1	3.3	7.0	…	5.4	4.4	4.7	7.1	8.3
Southern Europe	2.1	…	2.0	3.0	2.6	2.1	1.9	11.3	…	10.5	12.2	10.6	9.7	9.4
Western Europe	2.7	…	1.4	1.6	3.2	3.6	3.9	9.6	…	8.3	7.7	9.6	11.2	12.0
Northern America	3.5	…	3.0	2.7	2.7	3.5	3.7	37.2	…	28.4	30.9	28.3	36.6	37.2

NOTES: n.a. = not available, as data are available only for a limited number of countries, representing less than 50 percent of the population in the region. The estimates for Latin America and the Caribbean from 2014 to 2019 include Caribbean countries whose combined populations represent only 30 percent of the population of that subregion, while the estimates from 2020 to 2023 include Caribbean countries whose combined populations represent between 60 and 65 percent of the subregional population. The countries included in the 2023 estimate for the Caribbean subregion are: Antigua and Barbuda, Bahamas, Barbados, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago.

SOURCE: FAO. 2024. *FAOSTAT: Suite of Food Security Indicators*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/FS.

» 2023 (see Box 2). Severe food insecurity decreased marginally in Eastern Africa in the same period, by 1.6 percentage points, while it rose slightly in Western Africa.

Turning to **Asia**, 24.8 percent of the population (1.18 billion people) were moderately or severely food insecure in 2023, and 9.8 percent (467.3 million) faced severe food insecurity. The majority live in Southern Asia, where 41.1 percent of the population, or 833.4 million people, faced moderate or severe food insecurity, close to half of whom were severely food insecure (387.7 million people, or 19.1 percent of the population in that subregion). In Western Asia, 37.5 percent (111.9 million) were moderately or severely food insecure and 13.3 percent (39.7 million) faced severe food insecurity. The prevalence of moderate or severe food insecurity was comparatively lower in Central Asia (16.6 percent, or 12.9 million people) and South-eastern Asia (17.1 percent, or 117.7 million people) and lowest in Eastern Asia (6.3 percent, equivalent to 105.2 million people). The proportion of the population facing severe food insecurity in these subregions was also much lower: 3.4 percent, 2.9 percent and 1.0 percent in Central Asia, South-eastern Asia and Eastern Asia, respectively.

Trends at the subregional level in Asia differ. In Eastern Asia, food insecurity levels remained virtually unchanged from 2021. In Southern Asia and South-eastern Asia, the prevalence of food insecurity at both levels of severity remained about the same from 2022 to 2023. There were signs of progress in Western Asia in the same period, although the prevalence of severe food insecurity was slightly higher in 2023 compared to 2021. Central Asia is the only subregion that has shown consistent progress since 2021, with food insecurity at both levels of severity decreasing for two years in a row; 2.4 million fewer people faced moderate or severe food insecurity in Central Asia in 2023 compared to 2021, and more than 1 million fewer people faced severe food insecurity.

Latin America and the Caribbean is the only region that made progress from 2022 to 2023 towards achieving SDG Target 2.1. The regional prevalence of food insecurity in the region decreased notably for the second year in a row, from 31.4 percent in 2022 to 28.2 percent in 2023 for moderate or severe food insecurity, and from 11.0 percent to 8.7 percent for severe food insecurity. That is equivalent to nearly 20 million fewer people facing moderate or severe food insecurity in 2023 compared to 2022, including more than 14 million fewer people facing severe food insecurity.

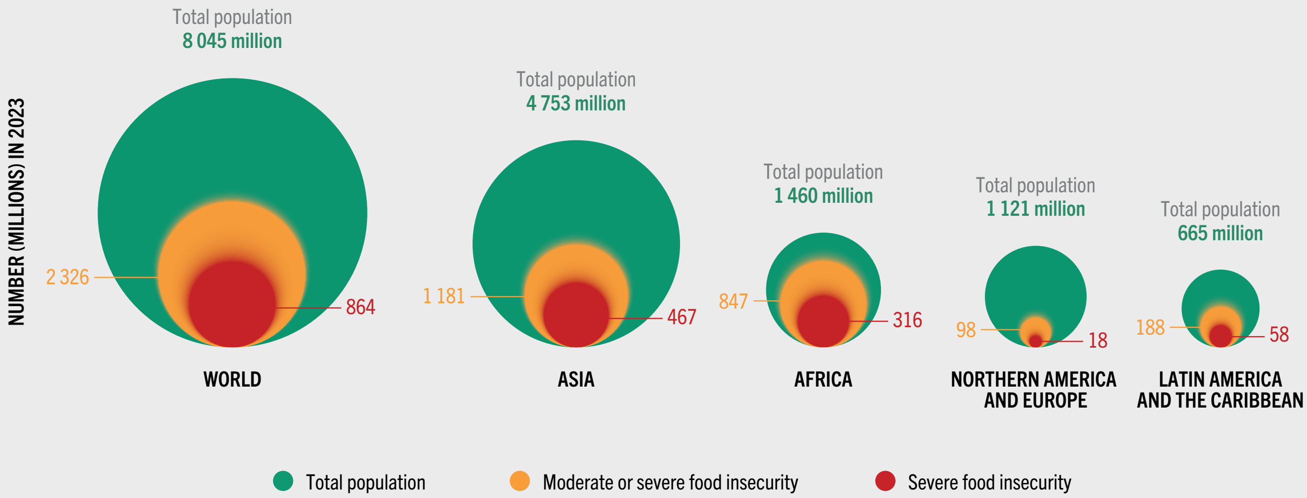
There are important subregional differences, however. In 2023, the prevalence of moderate or severe food insecurity in the Caribbean (58.8 percent) was more than double that of Central America (28.2 percent) and South America (25.1 percent). Changes from 2022 to 2023 were only marginal in Central America and in the Caribbean, although severe food insecurity rose marginally in the Caribbean since 2021. In contrast, encouraging progress was seen in South America. The prevalence of moderate or severe food insecurity fell for the second consecutive year, from 29.6 percent in 2022 to 25.1 percent in 2023 – the equivalent of 18.7 million fewer people facing moderate or severe food insecurity. The prevalence of severe food insecurity in South America also decreased markedly, from 10.4 percent in 2022 to 7.2 percent in 2023 – the equivalent of nearly 14 million fewer people.

Food insecurity appears to be on the rise in **Oceania**. Moderate or severe food insecurity rose steadily from 23.2 percent in 2020 to 26.8 percent in 2023, with a 2.7 percentage-point increase in the last year alone. The prevalence of severe food insecurity also increased marginally in the last year, from 9.3 percent in 2022 to 10.4 percent in 2023.

Food insecurity worsened slightly in **Northern America and Europe** between 2022 and 2023, though the difference remains within statistical margins of error. The prevalence of moderate or severe food insecurity in 2023 was 8.2 percent in Europe and 9.8 percent in Northern America, while 2.0 percent and 1.0 percent of the populations, respectively, faced food insecurity at severe levels.

Figure 5 presents a comparative overview of the scale and proportions of food insecurity globally

FIGURE 5 THE CONCENTRATION AND DISTRIBUTION OF FOOD INSECURITY BY SEVERITY IN 2023 DIFFERED GREATLY ACROSS THE REGIONS OF THE WORLD



NOTE: Only regions for which data were available for all the subregions are shown.
SOURCE: FAO. 2024. *FAOSTAT: Suite of Food Security Indicators*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/FS.

https://doi.org/10.4060/cd1254en-fig05

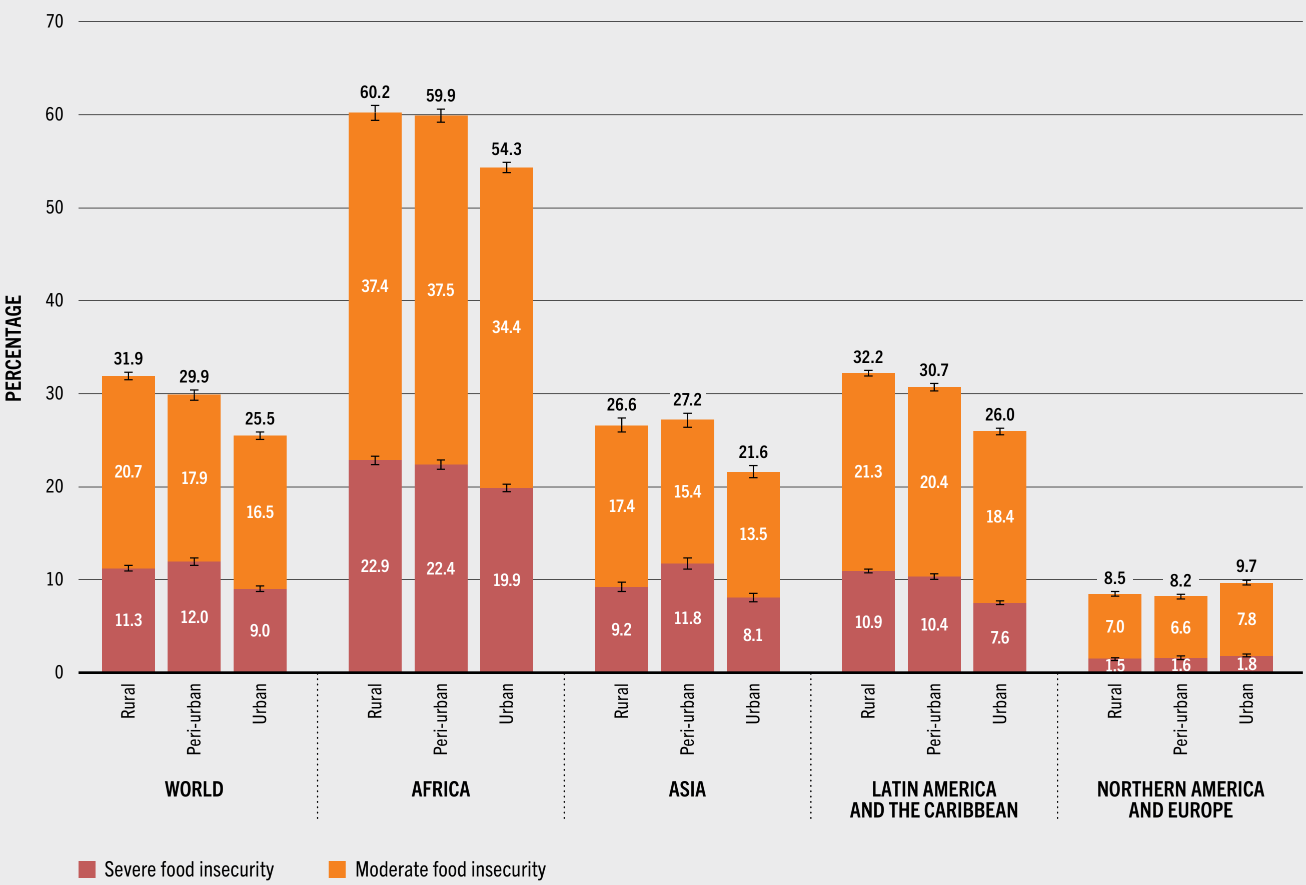
and in the regions. Though the prevalence of moderate or severe food insecurity in Asia is about half that of Africa, Asia accounts for a larger share of the number of food-insecure people in the world – 1.18 billion in Asia compared with 847 million in Africa. In 2023, half of the 2.33 billion food-insecure people in the world lived in Asia, more than one-third in Africa, about 8 percent (188 million) in Latin America and the Caribbean, and about 4 percent (98 million) in Northern America and Europe. Some differences in the proportion of the food-insecure population that is facing food insecurity at severe levels are also evident. Severely food-insecure people account for the largest proportion of the total number of moderately or severely food insecure in Asia (about 40 percent), followed by Africa (37 percent), Latin America and the Caribbean (31 percent), and Northern America and Europe (18 percent).

Differences in food insecurity across rural, peri-urban and urban areas and between men and women

One guiding principle of the vision put forth by the 2030 Agenda for Sustainable Development is to ensure that no one will be left behind. More detailed information about the food insecurity of different population groups helps monitor progress towards the realization of this vision. In this respect, FIES data collected by FAO can be used to produce relevant, disaggregated information on the food insecurity of specific population groups. First, as the data are georeferenced, differences among people living in rural, peri-urban and urban areas can also be analysed. Second, as the data are collected from individuals, it is possible to look at differences in food insecurity severity between men and women.

Georeferenced FIES data became available to FAO for the 2023 edition of this report when it was possible to present the first comparison of **food insecurity in rural, peri-urban and urban populations** at the global, regional and

FIGURE 6 GLOBALLY AND IN MOST REGIONS, THE PREVALENCE OF FOOD INSECURITY IS HIGHER IN RURAL AREAS THAN IN URBAN AREAS



NOTE: Only regions for which data were available for all the subregions are shown.

SOURCE: FAO. 2024. *FAOSTAT: Suite of Food Security Indicators*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/FS.

https://doi.org/10.4060/cd1254en-fig06

subregional levels.[b] FAO uses the Degree of Urbanization (DEGURBA) classification, an international standard, to distinguish among populations living in: i) rural areas; ii) towns and semi-dense areas (peri-urban areas); and iii) cities (urban areas), based on population density and size, in a globally comparable way.[c, 7]

Just as for 2022, results for 2023 show a pattern of decreasing food insecurity with an increasing degree of urbanization at the global level (Figure 6).[d] The prevalence of moderate or severe food insecurity was 31.9 percent in rural areas compared with 29.9 percent in peri-urban areas and 25.5 percent in urban areas. Globally and in all regions except Northern America and Europe, the prevalence of food insecurity, at both levels of severity, is consistently higher in rural areas than in urban areas. However, the prevalence in peri-urban areas relative to that in rural areas differs among the regions. In Africa and

b See Supplementary material to Chapter 2 for details on the methods used to obtain disaggregated estimates.

c The DEGURBA classification[7] was developed by the Statistical Office of the European Union (EUROSTAT), the International Labour Organization (ILO), FAO, the Organisation for Economic Co-operation and Development (OECD), the United Nations Human Settlements Programme (UN-Habitat) and the World Bank and was approved at the 51st session of the United Nations Statistical Commission in March 2020.

d See Table A1.3 in **Annex 1A** for prevalence of moderate or severe food insecurity, and severe food insecurity only, by degree of urbanization in 2023 by region and subregion.

FIGURE 7 THE GENDER GAP NARROWED IN MOST REGIONS FOR TWO YEARS IN A ROW, BUT THE PREVALENCE OF FOOD INSECURITY HAS REMAINED CONSISTENTLY HIGHER AMONG WOMEN THAN AMONG MEN, GLOBALLY AND IN ALL REGIONS

NOTE: Only regions for which data were available for all the subregions are shown.
SOURCE: FAO. 2024. *FAOSTAT: Suite of Food Security Indicators*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/FS.

https://doi.org/10.4060/cd1254en-fig07

Asia, the prevalence of moderate or severe food insecurity is the same in peri-urban areas as in rural areas, and in Asia, severe food insecurity is slightly more prevalent in peri-urban areas. Northern America and Europe, considered together for this analysis, is the only region where people living in urban areas are more food insecure than those living in rural areas.

A comparison of the **food insecurity status of men and women** shows that the prevalence of food insecurity has remained consistently higher among women than among men, globally and in all regions, since data first became available in 2015. The gender gap widened considerably at the global level and in every region except Africa between 2019 and 2021 in the wake of the global COVID-19 pandemic, largely due to the disproportionate impact on women's jobs and incomes and their larger burden of unpaid caregiving for out-of-school children and sick family members.[8–10] At the global level, the gender gap in moderate or severe food insecurity jumped from a 1.4 percentage-point difference between men and women in 2019 to 3.6 percentage points in 2021, and for severe food insecurity, from a 0.6 percentage-point difference to 2.3 percentage points in the same period (Figure 7).[e]

»

e See Table A1.4 in **Annex 1A** for prevalence of moderate or severe food insecurity, and severe food insecurity only, by sex in 2023 by region and subregion.

BOX 3 IS FOOD INSECURITY SEVERITY ASSOCIATED WITH THE PROPERTIES OF A HEALTHY DIET? PRELIMINARY EVIDENCE FROM 28 COUNTRIES

Healthy diets are achieved by consuming a **diversity** of foods that provide **adequate nutrients** and bioactive compounds important for health, a **balanced** intake of macronutrients, and a **moderation** of foods and beverages that increase the risk of diet-related non-communicable diseases (NCDs), including those that are high in unhealthy fats, free sugars and/or salt and/or which contain non-sugar sweeteners, and which are often highly processed.[13–19] Although the concepts of food security and healthy diets are intimately linked, the relationship between them is not straightforward.

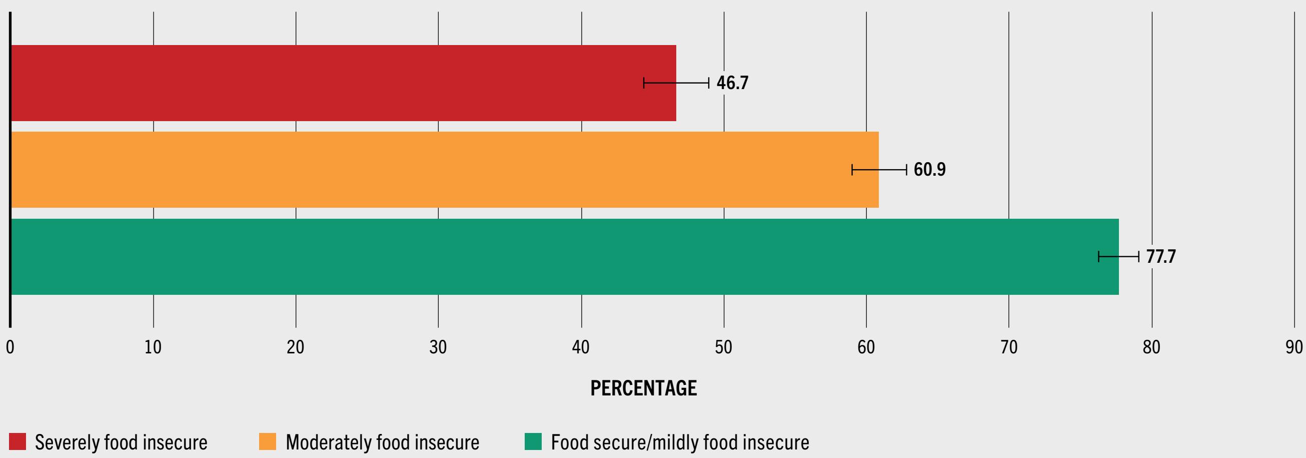
While it might seem intuitive that food-insecure people are less likely to achieve a healthy diet, this link is not straightforward because of a plethora of factors that differ across contexts, such as those related to food environments, consumer behaviour, and the cost and affordability of a healthy diet. For example, food insecurity has been found to be associated with lower consumption of all types of foods and higher share of dietary energy from staple foods in some contexts, while in others it has been found to be associated with lower consumption of nutritious foods and higher consumption of energy-dense foods high in unhealthy fats, sugars and salt.[20]

Food insecurity, therefore, may affect diets in a variety of ways that could potentially contribute to several forms of malnutrition including undernutrition (stunting, wasting and micronutrient deficiencies) but also to overweight and obesity.[11, 21] However, because most studies collect food insecurity and dietary intake data using different samples, data collection modalities and analysis approaches, thus hampering comparison of the results, it has been difficult to explore the associations between the severity of food insecurity and the healthiness of diets across countries.

FAO has been collecting food security data annually using the Food Insecurity Experience Scale (FIES) since 2014 through the Gallup© World Poll (GWP). Beginning in 2021, new data on diet quality have also been collected in the GWP in a growing number of countries using the Diet Quality Questionnaire (DQQ), providing an opportunity to explore the associations between food insecurity and properties of a healthy diet in a comparable way across countries. The DQQ and several novel dietary metrics were developed by the Global Diet Quality Project, a collaborative effort of Gallup©, Harvard University and the Global Alliance for Improved Nutrition.[22]

A well-established indicator that can be derived from DQQ data is the proportion of women aged 15 to 49 years who have achieved “Minimum Dietary Diversity for Women” (MDD-W), meaning they consumed foods from at least five out of ten food groups (indicating a minimally acceptable level of dietary **diversity**).[23]

FIGURE A THE PERCENTAGE OF THE POPULATION OF WOMEN AGED 15 TO 49 YEARS IN 28 COUNTRIES ACHIEVING MINIMUM DIETARY DIVERSITY FOR WOMEN BY FOOD SECURITY STATUS



SOURCES: Authors' (FAO) own elaboration based on Food Insecurity Experience Scale data collected by FAO and Diet Quality Questionnaire data collected by the Global Diet Quality Project, both in the Gallup© World Poll in 2021 and 2022.

https://doi.org/10.4060/cd1254en-figB03-A

BOX 3 (Continued)

Data collected using the DQQ also include a novel measure that aims to reflect the dietary principle of **moderation**, namely through the "NCD-Risk" indicator.* Additionally, the DQQ permits the exploration of the consumption of specific food groups, such as zero vegetable or fruit (ZVF) and animal-source food (ASF), as well as a measure of the consumption of food groups related to lower risks of diet-related NCDs ("NCD-Protect" indicator*).

Both the FIES survey module and the DQQ were implemented in the GWP, with both types of data collected from the same respondents aged 15 years and above, in 28 countries in 2021 and 2022.** Pooled data from these 28 countries were used to examine the association*** between the severity of food insecurity, based on the FIES, and adherence to the properties of a healthy diet, based on MDD-W and novel metrics derived from the DQQ.

Greater severity of food insecurity was associated with lower dietary diversity among women aged 15 to 49 years in these 28 countries (Figure A). Less than 50 percent of severely food-insecure women achieved MDD-W, while over 77 percent who were food secure or mildly food insecure achieved MDD-W. This association held after controlling for income level, education, gender, urban–rural residence and country of residence of the respondents.

Expanding the analysis to the entire adult population (both men and women) in the 28 countries, and controlling for the same respondent characteristics mentioned above,*** greater severity of food insecurity was associated with lower odds of consuming ASF and higher odds of consuming ZVF. It was also associated with lower odds of consuming a diet that protects against NCDs (based on the NCD-Protect indicator) as well as lower odds of consuming foods linked with greater risk of NCDs (based on the NCD-Risk indicator). That is, the more food insecure men and women were, the fewer healthy and unhealthy food groups they consumed. In isolation, the finding that greater food insecurity was associated with lower consumption of unhealthy food groups may give the impression that food insecurity was associated with better adherence to dietary **moderation**. However, in this pooled sample of data from 28 countries, 21 of which were low- or lower-middle-income countries, greater severity of food insecurity suggested a general lack of access to (or availability of) *all* food groups, healthy as well as unhealthy.

Some UN agencies are already routinely collecting both FIES and MDD-W data in the same surveys. Since 2022, the International Fund for Agricultural Development (IFAD) has been collecting MDD-W data through surveys in several countries, including Cameroon, Cabo Verde, Nepal and Türkiye, for project reporting. In addition, FIES data are used for the Impact Assessment Corporate Reporting Programme to measure the attributable impact of IFAD's investment projects in each replenishment period.

Healthy diets and the SDGs

Ensuring healthy diets is key to achieving SDG 2 and a prerequisite for achieving many other goals. However, diets are not currently captured by any of the SDG 2 indicators that monitor the prevalence of undernourishment (hunger), moderate or severe food insecurity based on FIES, and four indicators of nutritional status (stunting, wasting and overweight among children under five years of age, and anaemia among women aged 15 to 49 years).[24] The absence of an indicator of diet quality in the SDG indicator framework therefore represents a gap in the monitoring of progress towards the 2030 Agenda for Sustainable Development.

To address this issue, a group of Member States (Bangladesh, Brazil, Malawi and Switzerland), with the support of FAO, IFAD, UNICEF, WFP and WHO have recommended that the "Prevalence of Minimum Dietary Diversity" (among women and children) be included as an SDG 2 indicator through the 2025 Comprehensive Review. The inclusion of an indicator on diets would help close this important gap in the final stretch to 2030 and help inform the actions needed not just to deliver Zero Hunger, but to ensure the good nutrition, health, and development of populations on which all SDGs rely.

NOTES: * The indicators are derived from the percentage of respondents achieving a given value of the scores. ** The 28 countries included 16 countries in Africa, seven in Asia, three in Latin America and one each from Northern America and Europe. Of these, 21 are low- or lower-middle-income countries and seven are upper-middle-income or high-income countries. DQQ and FIES data were collected in the GWP in 19 countries in 2021 and 10 countries in 2022. One of the countries was surveyed twice in separate years. *** In this box, the association is studied using both correlation and regression models, with the latter used to also control for the effect of other variables. Association does not necessarily imply causality. See the methodological note on the analysis in the Supplementary material to Chapter 2.

» The gender gap narrowed markedly in 2022 as the pandemic and its unprecedented disruptions eased, and new data indicate that it continued to grow smaller in 2023. Globally, the percentage-point difference in the prevalence of moderate or severe food insecurity between men and women fell to 2.3 in 2022 and narrowed further to 1.3 in 2023. For severe food insecurity, the gap narrowed to 1 percentage point in 2022 and remained about the same in 2023.

It should be noted, however, that the shrinking gender gap is partially due to decreasing food insecurity among women concomitantly with rising levels among men for two consecutive years in Asia and in Northern America and Europe, driving the global trend.

The differences between men and women have grown smaller over the past two years in most regions. The gender gap for moderate or severe food insecurity in 2023 was close to 1 percentage point in all regions except Latin America and the Caribbean, where it was 5.2 percentage points – 30.3 percent of women were moderately or severely food insecure compared with 25.1 percent of men. For severe food insecurity, the gap was 1.4 percentage points for Latin America and the Caribbean compared with about 1 percentage point or less in the other regions.

Research based on FIES data collected by FAO has shown that women are more affected by food insecurity even when taking income, education level and demographic factors into account, suggesting that prevailing gender norms and women's limited access to resources are key factors.[10]

This analysis, based on data collected using the FIES, shows the importance of collecting food security data in surveys designed to provide disaggregated information on the food insecurity of different population groups of interest. In the same way, when FIES data are collected in the same survey together with other relevant information, the results can also shed light on the potential causes and consequences of food insecurity. For example, past editions of this report have presented analyses of the association between food insecurity and different forms of malnutrition[11] as well as diet.[12] There are multiple pathways whereby the experience of food insecurity may contribute to various forms of malnutrition, but the main ones pass through diet.[11] For this reason, it is important to enhance our understanding of how food insecurity, including moderate levels of severity, may be associated with diets. However, the collection of food consumption data in a way that allows for the comparison of diets across countries and cultures is a daunting challenge, and several initiatives are currently underway to meet this challenge. One such initiative is collecting dietary data in many of the same surveys that collect FIES data, providing the unique opportunity to examine the association between food insecurity and diet (Box 3).

The lack of improvement in food security and the uneven progress in the economic access to healthy diets cast a shadow over the possibilities of achieving Zero Hunger in the world, six years away from the 2030 deadline. There is the need to accelerate the transformation of our agrifood systems with greater resilience to the major drivers, addressing inequalities to ensure that healthy diets are affordable and available to all. ■

2.2 COST AND AFFORDABILITY OF A HEALTHY DIET

KEY MESSAGES

➔ New food price data and methodological improvements have resulted in updated estimates of the cost and more accurate estimates of the affordability of a healthy diet, leading to a revision of the entire series of both sets of indicators.

➔ Food prices rose throughout 2022, pushing up the average cost of a healthy diet globally to 3.96 purchasing power parity (PPP) dollars per person per day, up from 3.56 PPP dollars in 2021. Disruptions from the COVID-19 pandemic and the war in Ukraine contributed to significant increases in international food and energy prices, exacerbating inflationary pressures.

➔ Despite the increase in food prices over 2022, the number of people unable to afford a healthy diet in the world fell back to pre-pandemic levels in the same year (2.83 billion people), fuelled by an economic recovery from the pandemic that has, nevertheless, been uneven across regions and country income groups.

➔ The number of people unable to afford a healthy diet dropped below pre-pandemic levels in Asia and in Northern America and Europe, while increasing substantially in Africa, where the number rose to 924.8 million in 2022, up by 24.6 million from 2021, and by 73.4 million from 2019.

➔ The unequal recovery is even more evident across country income groups. In 2022, the number of people unable to afford a healthy diet dropped below pre-pandemic levels in the group of upper-middle- and high-income countries as a whole, while the group of low-income countries had the highest levels since 2017, the first year for which FAO published estimates. This suggests that limited fiscal capacity in low-income countries provided only partial protection from the negative impacts of these crises.

➔ Of the people in the world who were unable to afford a healthy diet in 2022, 1.68 billion, or 59 percent, lived in lower-middle-income countries. However, low-income countries had the largest percentage of the population that could not afford a healthy diet (71.5 percent) compared with lower-middle-income countries (52.6 percent), upper-middle-income countries (21.5 percent) and high-income countries (6.3 percent).

Monitoring economic access to a healthy diet is essential for informing policies aimed at improving food security and nutritional outcomes, thereby contributing to the achievement of SDG Targets 2.1 and 2.2. A healthy diet comprises four key aspects: diversity (within and across food groups), adequacy (sufficiency of all essential nutrients compared to requirements), moderation (foods and nutrients that are related to poor health outcomes) and balance (energy and macronutrient intake).

The cost of a healthy diet (CoHD) indicator provides national level estimates of the cost of acquiring the cheapest possible healthy diet in a country, defined as a diet comprising a variety of locally available foods that meet energy and nutritional requirements.[25]

The CoHD is then compared with national income distributions, after careful consideration of the portion of income required for essential non-food goods and services, to estimate the prevalence of unaffordability (PUA) and the number of people unable to afford a healthy diet (NUA) indicators. These are measures of the proportion of the population and of the number of people in each country who are unable to afford even the least-cost option of a healthy diet. Together, the PUA and NUA serve as critical indicators for monitoring the inability of agrifood systems to deliver a least-cost healthy diet that is accessible for all, given existing levels of income inequality within countries.

In this year's edition of the report, the indicators of the cost and of the affordability of a healthy diet are updated to 2022.[f] FAO, in collaboration with the World Bank, systematically monitors these indicators and disseminates the series in the FAOSTAT database and in the World Bank Databank. The entire series for both indicators have been revised as a result of the introduction of three significant updates in the calculation of the indicators (see Supplementary material to Chapter 2).

First, the CoHD estimates for 2017 to 2022 were calculated using updated retail food prices for the year 2021 from a new round of the International Comparison Program[26] released by the World Bank, replacing the 2017 ICP round adopted in previous editions of this report.[27]

Second, in this year's edition, the prevalence and number of people unable to afford a healthy diet at global, regional and country income group levels have been imputed for the first time for countries with missing information (see **Annex 1B**).[g]

Third, we are introducing an important revision in the methods used to compute the PUA and NUA indicators. Specifically, in establishing an appropriate cost threshold to compare with

f Estimates for 2023 are not provided due to the lack of updated income distribution data, detailed food prices, and purchasing power parity (PPP) conversion factors at the country level.

g If a similar imputation had been applied to last year's assessment, the total number of people unable to afford a healthy diet globally in 2021 would have been estimated at 3.29 billion, rather than 3.14 billion.

country-specific income distributions, it is essential to identify the cost of basic non-food needs as well as the cost of a healthy diet. A new method to determine the cost of basic non-food goods and services is introduced, which allows for a more accurate reflection of how this cost varies for countries that belong to different income groups (see Box 4 and **Annex 1B**).

All of this has resulted in a recalibration of the whole series of PUA and NUA estimates to levels that are significantly lower than those published in previous editions of this report.

The cost of a healthy diet in 2022

Food prices continued to rise in 2022 compared to the period from 2017 to 2021, pushing up the average cost of a healthy diet (CoHD) globally and in all regions of the world. The FAO Food Price Index climbed by 52 percent between 2019 and 2022, with prices for cereals increasing by 60 percent, dairy products by 45 percent, meat by 19 percent, and oils by a remarkable 125 percent compared to pre-COVID-19 pandemic levels.[33]

This inflationary pressure is reflected in the trend of the CoHD indicator, which has risen worldwide since 2017 (the first year for which FAO disseminates estimates), peaking at an average of 3.96 PPP dollars per person per day in 2022 (Table 5). Between 2020 and 2021, the CoHD rose 6 percent, from 3.35 to 3.56 PPP dollars, while the following year, it increased by 11 percent, from 3.56 PPP dollars in 2021 to 3.96 PPP dollars in 2022.

The cost of a healthy diet across regions in 2022, is found to be highest in Latin America and the Caribbean (an average of 4.56 PPP dollars), with an increase of nearly 12 percent in only one year. In Asia, the average CoHD rose from 3.84 PPP dollars in 2021 to 4.20 PPP dollars, with Eastern Asia and Southern Asia recording the highest average CoHD at 5.34 PPP dollars and 4.28 PPP dollars, respectively, in the region. Africa saw a 10 percent increase in CoHD from 3.41 PPP dollars in 2021 to 3.74 PPP dollars in 2022, with Western Africa experiencing the largest surge, 11 percent between 2021 and 2022, followed by Eastern Africa (8.6 percent). Northern Africa was the only subregion where the average CoHD decreased between 2019 and 2020; it rose by 10 percent from 2021 to 2022. Compared to the other regions, Northern America and Europe showed a moderate increase in the average cost of a healthy diet during the COVID-19 pandemic (from 2.95 PPP dollars in 2019 to 3.12 PPP dollars in 2021), but experienced a substantial increase of 14 percent from 2021 to 2022, reaching 3.57 PPP dollars. In Oceania, the CoHD averaged 3.46 PPP dollars in 2022. Broken down by income group, lower- and upper-middle-income countries recorded the highest average cost of a healthy diet in 2022 at 4.20 PPP dollars per day. This was followed by high-income countries at 3.78 PPP dollars, and low-income countries at 3.48 PPP dollars. In low-income countries, the average cost of a healthy diet increased by nearly 5 percent between 2021 and 2022, following a 10 percent surge in the cost from 2020 and 2021.

The prevalence and number of people unable to afford a healthy diet in 2022

The 2023 edition of this report pointed to a slight turnaround in the number of people unable to afford a healthy diet in 2021, when it declined compared to 2020, although it was still higher than it was at pre-pandemic levels in 2019. Despite the increase in food prices over 2022, this year's edition confirms the continuation of a declining trend in the number of people unable to afford a healthy diet in 2022, largely due to the path of economic growth since the pandemic. Worldwide, an estimated 35.4 percent of people (2.83 billion) were unable to afford a healthy diet in 2022, compared with 36.4 percent (2.88 billion) in 2021, equivalent to a decrease of 50.1 million people in one year (Figure 8 and Table 6). After declining by 238 million people, from 3.06 billion in 2017 to 2.82 billion in 2019, the number of people unable to afford a healthy diet rose to 2.97 billion people in 2020, coinciding with the COVID-19 pandemic period. This was followed by a two-year declining trend in the prevalence and the number of people unable to afford a healthy diet.

However, the recovery has been uneven across regions. The unaffordability of a healthy diet dropped below pre-pandemic levels in Asia and in Northern America and Europe, while increasing substantially in Africa, where the NUA rose to 924.8 million in 2022, up by 24.6 million »

TABLE 5 THE AVERAGE COST OF A HEALTHY DIET, 2017–2022

	Cost of a healthy diet					
	2017	2018	2019	2020	2021	2022
	(PPP dollars)					
WORLD	**3.13**	**3.17**	**3.25**	**3.35**	**3.56**	**3.96**
AFRICA	**3.07**	**3.09**	**3.12**	**3.18**	**3.41**	**3.74**
Northern Africa	3.33	3.42	3.48	3.42	3.44	3.78
Sub-Saharan Africa	3.04	3.05	3.07	3.15	3.41	3.73
Eastern Africa	3.08	3.03	3.04	3.13	3.49	3.79
Middle Africa	3.14	3.12	3.12	3.17	3.33	3.67
Southern Africa	3.27	3.28	3.34	3.45	3.66	3.97
Western Africa	2.88	2.96	2.99	3.08	3.28	3.65
ASIA	**3.23**	**3.29**	**3.38**	**3.54**	**3.84**	**4.20**
Central Asia	3.14	3.19	3.31	3.52	3.78	4.14
Eastern Asia	4.12	4.29	4.37	4.59	4.87	5.34
South-eastern Asia	3.53	3.62	3.70	3.83	4.02	4.35
Southern Asia	3.28	3.35	3.45	3.59	3.84	4.28
Western Asia	2.67	2.74	2.82	2.98	3.37	3.70
LATIN AMERICA AND THE CARIBBEAN	**3.61**	**3.68**	**3.76**	**3.87**	**4.08**	**4.56**
Caribbean	4.03	4.16	4.27	4.41	4.63	5.16
Latin America	3.35	3.38	3.46	3.54	3.74	4.20
Central America	3.24	3.30	3.37	3.42	3.60	4.05
South America	3.42	3.44	3.52	3.61	3.84	4.29
OCEANIA	**2.74**	**2.74**	**2.85**	**2.95**	**3.12**	**3.46**
NORTHERN AMERICA AND EUROPE	**2.77**	**2.82**	**2.95**	**3.02**	**3.12**	**3.57**
Europe	2.77	2.83	2.97	3.04	3.15	3.61
Eastern Europe	2.83	2.90	3.04	3.15	3.26	3.75
Northern Europe	2.62	2.66	2.77	2.84	2.90	3.28
Southern Europe	3.11	3.18	3.35	3.39	3.55	4.15
Western Europe	2.33	2.42	2.52	2.60	2.68	3.01
Northern America	2.73	2.69	2.72	2.77	2.77	2.96
COUNTRY INCOME GROUP						
Low-income countries	2.94	2.93	2.95	3.02	3.33	3.48
Lower-middle-income countries	3.23	3.29	3.35	3.49	3.77	4.20
Upper-middle-income countries	3.30	3.36	3.46	3.54	3.74	4.20
High-income countries	3.01	3.07	3.16	3.26	3.41	3.78

NOTES: The cost of a healthy diet (CoHD) is expressed in purchasing power parity (PPP) dollars per person per day. It is reported as the arithmetic mean of the CoHD for the countries in the groups reported above.

SOURCE: FAO. 2024. *FAOSTAT: Cost and Affordability of a Healthy Diet (CoAHD)*. [Accessed on 24 July 2024]. www.fao.org/faostat/en/#data/CAHD.

BOX 4 ONGOING IMPROVEMENTS IN THE METHOD TO ASSESS THE AFFORDABILITY OF A HEALTHY DIET

Establishing new indicators for global assessments like those presented in this section is always a daunting task. Since they were first introduced in the 2020 edition of this report, the indicators of the unaffordability of a healthy diet (prevalence and number) at the global, regional and country levels have been continuously refined to reflect both newly available information and a more thorough understanding of some of the subtlety involved in the underlying statistical inferential process.

In addition to the normal practice of updating them based on more recent data, the series presented in this edition of the report reflects a more substantial revision of the method, replacing the one used in the past.

As far as data are concerned, the main aspect to note this year is that all estimates of the cost of a healthy diet (CoHD) at country level have been revised to reflect the 2021 food price recently released in the 2024 edition of the International Comparison Program.[26] As prices have been added for new food items that were not included in previous releases, this entailed reviewing, as necessary, the composition of the reference Healthy Diet Basket.[28]

In terms of methods, while the general principle on which the indicators are based remains unchanged, the way in which it has been operationalized to compute the estimates has been revised. Affordability means that people can devote enough money to food to purchase locally all the least expensive food items needed to consume a healthy diet. This excludes the possibility of consuming expensive food items if a nutritionally equivalent, lower-cost option is available.

When determining how much of a household's total disposable income can be reasonably devoted to food, it is important to consider the minimum amount that people must reserve to purchase the *non-food* basic goods and services needed to conduct a dignified life. In past editions of this report, this amount was roughly approximated by a fixed proportion (48 percent) of the household's total disposable income.[29] The same percentage was applied to all countries, justified by the observation that, on average, people in low-income countries spend 52 percent of their income on food. Furthermore, it was assumed that using this average proportion would not introduce a systematic bias, despite the expectation that poor people must devote relatively more of their income, and wealthier people relatively less, to basic food needs. In hindsight, the assumption that the implicit misclassification errors would cancel out, in the aggregate, was incorrect.

This year FAO, in collaboration with the World Bank, began implementing a change to the methodology to reflect the fact that the amount needed to purchase non-food basic goods and services varies across households in ways that are not simply proportional to their income.

The ideal approach would entail determining, for each country separately, the cost of a normatively defined bundle of such goods and services, based on market prices (similarly to what we do to price the cost of a healthy diet). Unfortunately, such an approach is not feasible as it would require deciding what is to be included in the bundle of essential goods and services and having access to detailed prices on those goods and services.

Due to the lack of country-specific information needed to determine the cost of basic non-food goods and services, this edition employs a feasible approach based on the World Bank's country classifications by income. The approach defines non-food spending as the daily cost evaluated at the country income group's international poverty line and assigns non-food spending shares related to each group.* The new method involves multiplying country income group-specific international poverty lines by the non-food expenditure shares for each country income group to calculate the daily cost of basic non-foods in a country, as illustrated in Table A.

For each country a threshold is computed that combines the least-cost healthy diet of the country (i) and the income group-specific cost of non-food basic needs (j):

$$\textit{Cost Threshold}_i = \textit{CoHD}_i + (\textit{IntlPovLine}_j \times \textit{NonfoodExpShare Income}_j)$$

Finally, this threshold is compared with the country-specific income distribution sourced by the World Bank Poverty and Inequality Platform to estimate the percentage of the population whose income is below that threshold. In this way, it is recognized that the cost to achieve a minimally adequate standard of living

TABLE A CALCULATION OF THE COST OF NON-FOOD BASIC GOODS AND SERVICES

	International poverty line (a)	Non-food expenditure share (b)	Cost of non-food basics (a) × (b)
	(2017 PPP dollars per person per day)		
Low-income countries	2.15	0.37	0.80
Lower-middle-income countries	3.65	0.44	1.61
Upper-middle-income countries	6.85	0.54	3.70
High-income countries	24.36	0.54	13.20

SOURCE: Bai, Y., Herforth, A., Cafiero, C., Conti, V., Rissanen, M.O., Masters, W.A. & Rosero Moncayo, J. (forthcoming). *Methods for monitoring the affordability of a healthy diet.* FAO Statistics Division Working Paper. Rome, FAO.

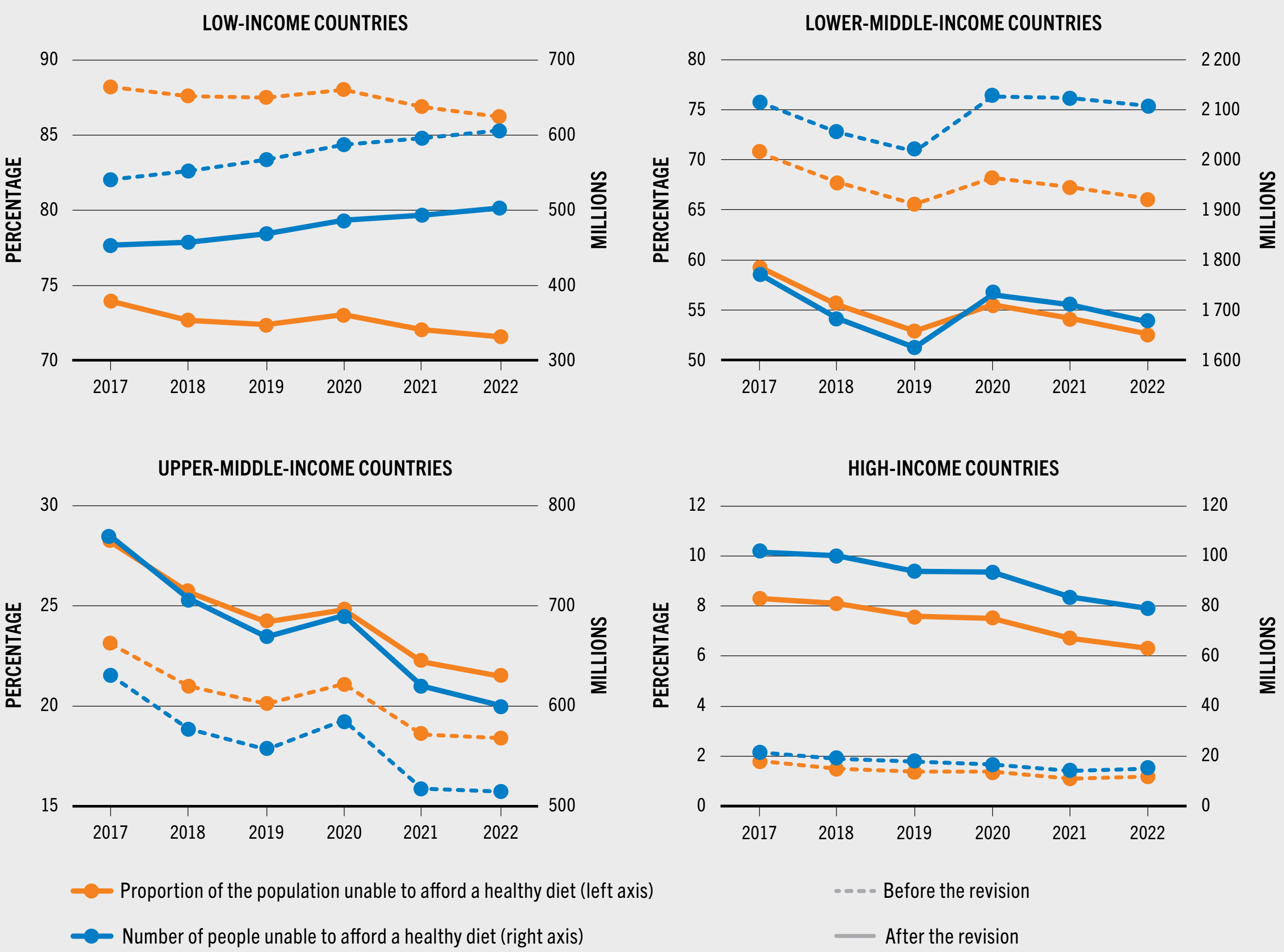
differs depending on the level of economic development of the country, which is very much in line with the concept behind the higher poverty lines used by the World Bank to monitor poverty in countries with a low incidence of extreme poverty.[30] This revision corrects for the overestimation of unaffordability in low- and lower-middle-income countries and the underestimation in upper-middle- and high-income countries, both derived from using a fixed share of income to cover for non-food basic needs. Figure A shows the extent of the corrections made in the series of unaffordability in each country income group.

As mentioned, this is the first step towards a more thorough revision of the methods used to assess the prevalence of unaffordability of a healthy diet. However, it is also important to address the fact that the cost to achieve a minimally dignified standard of living also varies *within* each country. Especially for large and diverse countries, the failure to account for such differences, and the use of a threshold set at the national average for the cost of basic non-food needs and healthy diets, may result in biased estimates of unaffordability. The direction and extent of the bias will depend on the direction and the magnitude of the possible correlation that exists between income levels and the correct, location-specific threshold.

Research is ongoing, based on analysis of data from a large number of Household Consumption and Expenditure Surveys, to establish the proper correction factor to apply to the country-specific thresholds to correct the bias, and the results will be presented in the next edition of this report. See **Annex 1B** and Supplementary material to Chapter 2 for further details on the methodology.

NOTES: * The share of non-food spending is set at the second income quintile for low- and lower-middle-income countries, and at the first income quintile for upper-middle- and high-income countries.[31] Detailed expenditure shares and real consumption data per person by quintile are derived from recent household surveys compiled by the World Bank, covering 71 countries from different income groups.[32]

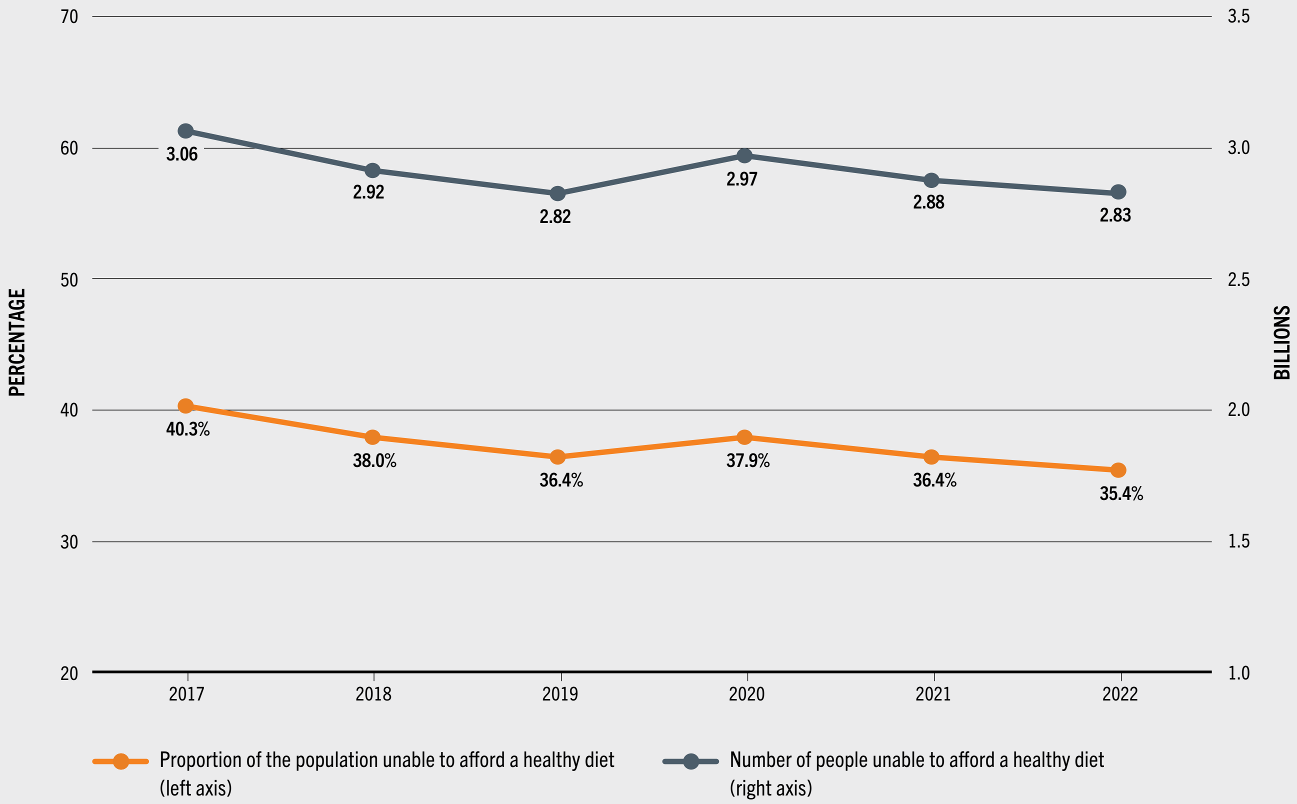
FIGURE A ADJUSTMENT IN THE SERIES OF UNAFFORDABILITY BY COUNTRY INCOME GROUP, 2017–2022



SOURCE: Authors' (FAO) own elaboration.

https://doi.org/10.4060/cd1254en-figB04-A

FIGURE 8 THE PROPORTION OF THE POPULATION AND NUMBER OF PEOPLE UNABLE TO AFFORD A HEALTHY DIET IN THE WORLD DECREASED FROM 2020 TO 2022



SOURCE: FAO. 2024. *FAOSTAT: Cost and Affordability of a Healthy Diet (CoAHD)*. [Accessed on 24 July 2024]. www.fao.org/faostat/en/#data/CAHD. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd1254en-fig08

» from 2021, and by 73.4 million from 2019 (Table 6). In Asia, a healthy diet was out of reach for 1.66 billion people in 2022, showing two consecutive years of improvement; 163 million fewer people were unable to afford a healthy diet in 2022 than in 2020. In Latin America and the Caribbean, while the number of people unable to afford a healthy diet increased by 9.2 million from 2020 to 2021, this was more than offset by an improvement of 14.3 million in 2022, bringing the total number down to 182.9 million in 2022. In Northern America and Europe, the burden of unaffordability was also alleviated, decreasing from 57.1 million in 2021 to 53.6 million in 2022. Oceania also saw a reduction, from 10 million in 2021 to 9.1 million in 2022.

Sub-Saharan Africa experienced a significant deterioration in 2022, when the number of people unable to afford a healthy diet rose by 23.9 million to 842.9 million. The majority of people who lacked economic access to a healthy diet in 2022 lived in Eastern Africa (348.6 million) and Western Africa (297.5 million). These two regions combined saw an increase of 18.9 million in the number of people unable to afford a healthy diet from 2021 to 2022. Northern Africa showed a decline in the number from 2020 to 2021 (from 89.9 million to 81.2 million), followed by a slight uptick in 2022. Nevertheless, Northern Africa had the lowest prevalence in the region at 31.5 percent. Southern Asia recorded a decline in the number for the »

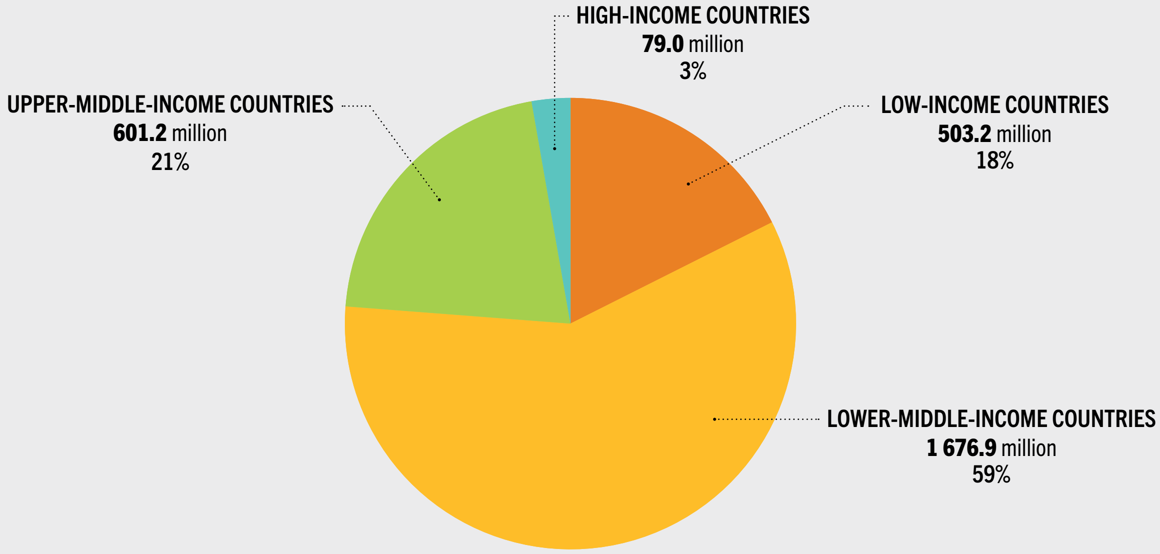
TABLE 6 PROPORTION OF THE POPULATION AND NUMBER OF PEOPLE UNABLE TO AFFORD A HEALTHY DIET, 2017–2022

	Proportion of the population unable to afford a healthy diet (%)						Number of people unable to afford a healthy diet (millions)					
	2017	2018	2019	2020	2021	2022	2017	2018	2019	2020	2021	2022
WORLD	**40.3**	**38.0**	**36.4**	**37.9**	**36.4**	**35.4**	**3 062.3**	**2 916.1**	**2 823.4**	**2 968.0**	**2 876.4**	**2 826.3**
AFRICA	**65.1**	**64.6**	**64.1**	**65.1**	**64.6**	**64.8**	**822.4**	**836.5**	**851.4**	**885.3**	**900.2**	**924.8**
Northern Africa	36.9	38.1	37.0	35.7	31.7	31.5	87.7	92.4	91.4	89.9	81.2	81.9
Sub-Saharan Africa	71.6	70.7	70.3	71.7	72.0	72.2	734.7	744.2	760.0	795.4	819.0	842.9
Eastern Africa	73.6	72.5	72.3	73.2	73.5	73.7	305.5	308.7	316.1	329.0	339.1	348.6
Middle Africa	78.1	77.7	77.5	78.6	78.7	78.8	131.3	134.7	138.7	145.1	149.8	154.5
Southern Africa	61.5	60.9	60.9	62.6	61.7	61.6	39.8	39.9	40.4	42.1	42.0	42.2
Western Africa	68.3	67.3	66.6	68.4	68.8	69.3	258.0	260.8	264.8	279.2	288.1	297.5
ASIA	**43.3**	**39.5**	**37.0**	**39.0**	**36.5**	**35.1**	**1 967.5**	**1 813.7**	**1 714.5**	**1 819.3**	**1 712.0**	**1 655.9**
Central Asia	21.2	18.5	17.6	19.1	17.1	16.3	15.1	13.4	12.9	14.3	13.0	12.6
Eastern Asia	25.7	22.4	20.3	21.2	16.5	16.3	424.4	371.4	336.8	353.3	275.3	271.4
South-eastern Asia	38.4	36.8	35.3	36.9	37.3	36.3	250.0	242.2	234.2	247.4	251.9	247.0
Southern Asia	64.2	58.6	54.8	57.9	55.8	53.1	1 221.4	1 128.3	1 068.0	1 141.1	1 110.5	1 066.3
Western Asia	20.6	21.0	22.1	22.0	21.2	20.0	56.6	58.4	62.5	63.2	61.3	58.7
LATIN AMERICA AND THE CARIBBEAN	**29.2**	**28.4**	**27.8**	**28.9**	**30.1**	**27.7**	**185.5**	**181.8**	**180.0**	**188.1**	**197.2**	**182.9**
Caribbean	47.2	45.9	46.1	49.5	50.1	50.0	20.4	19.9	20.1	21.8	22.1	22.2
Latin America	27.9	27.1	26.5	27.4	28.6	26.1	165.1	161.9	159.9	166.3	175.1	160.7
Central America	30.7	29.8	27.9	31.9	27.7	26.3	52.6	51.5	48.9	56.3	49.1	47.1
South America	26.7	26.0	25.9	25.5	29.0	26.0	112.5	110.3	111.0	110.1	126.0	113.6
OCEANIA	**15.7**	**16.4**	**18.0**	**21.2**	**22.4**	**20.2**	**6.6**	**7.0**	**7.8**	**9.3**	**10.0**	**9.1**
NORTHERN AMERICA AND EUROPE	**7.2**	**6.9**	**6.2**	**5.9**	**5.1**	**4.8**	**80.4**	**77.0**	**69.7**	**66.0**	**57.1**	**53.6**
Europe	8.4	8.1	7.3	7.2	6.4	5.9	62.7	60.3	54.5	53.8	47.5	44.1
Eastern Europe	11.0	11.3	9.9	9.8	8.4	8.0	32.5	33.3	29.2	28.8	24.5	23.1
Northern Europe	4.0	4.0	3.6	2.9	3.0	2.7	4.1	4.2	3.8	3.1	3.2	2.8
Southern Europe	14.0	12.4	11.2	11.5	9.9	9.1	21.1	18.7	16.9	17.3	14.9	13.6
Western Europe	2.6	2.1	2.4	2.4	2.5	2.3	5.0	4.0	4.6	4.6	4.9	4.5
Northern America	4.8	4.5	4.1	3.2	2.5	2.5	17.7	16.8	15.2	12.1	9.6	9.5
COUNTRY INCOME GROUP												
Low-income countries	73.9	72.6	72.3	73.0	72.0	71.5	453.9	457.8	468.9	487.0	493.5	503.2
Lower-middle-income countries	59.3	55.5	52.9	55.5	54.2	52.6	1 771.4	1 683.8	1 624.8	1 729.9	1 711.2	1 676.9
Upper-middle-income countries	28.2	25.7	24.2	24.8	22.2	21.5	769.7	707.7	668.9	690.5	620.1	601.2
High-income countries	8.4	8.2	7.6	7.6	6.7	6.3	102.9	101.0	94.4	94.0	83.7	79.0

NOTES: The global number of people unable to afford a healthy diet (NUA) estimate is obtained by multiplying the prevalence of unaffordability for each of the five world regions by the total population size in each region. Calculating the global NUA estimate as the sum of the NUA estimates of other country groupings, such as those based on income levels, should be avoided.

SOURCE: FAO. 2024. *FAOSTAT: Cost and Affordability of a Healthy Diet (CoAHD).* [Accessed on 24 July 2024]. www.fao.org/faostat/en/#data/CAHD. Licence: CC-BY-4.0.

FIGURE 9 THREE-QUARTERS OF THE PEOPLE WHO ARE UNABLE TO AFFORD A HEALTHY DIET LIVE IN LOW- AND LOWER-MIDDLE-INCOME COUNTRIES



NOTES: The global number of people unable to afford a healthy diet (NUA) estimate is obtained by multiplying the prevalence of unaffordability for each of the five world regions by the total population size in each region. Calculating the global NUA estimate as the sum of the NUA estimates of other country groupings, such as those based on income levels, should be avoided.

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https://doi.org/10.4060/cd1254en-fig09

» second consecutive year, with 44.2 million fewer people unable to afford a healthy diet, fully offsetting the increase in the wake of the COVID-19 pandemic in 2020. Western Asia also saw a recovery, with 2.7 million fewer people unable to afford a healthy diet. Following a significant improvement in 2021 (78 million fewer people), Eastern Asia's recovery continued in 2022, with 3.9 million fewer people unable to afford a healthy diet. In Central Asia, the number of people unable to afford a healthy diet slightly decreased to below pre-pandemic levels (12.6 million). In South America, the number of people unable to afford a healthy diet decreased notably from 126 million to 113.6 million, driving the regional decline. While no change was noted in Northern America, Europe experienced a significant decrease in the prevalence of unaffordability, from 6.4 percent in 2021 to 5.9 percent in 2022, with 3.4 million fewer people unable to afford a healthy diet. This change was mainly driven by improvements in Eastern Europe and Southern Europe.

The unequal recovery is even more evident across country income groups. Low-income countries had negative growth in GDP per capita in 2020 and 2021 followed by a slight recovery in 2022.[34] The halt in economic growth, coupled with the sharp rise in food prices, has significantly reduced disposable incomes, given that food makes up a larger share of household expenditures in low-income economies.[35] This has made the recovery path slower for low-income countries, which have the highest number of people unable to afford a healthy diet since 2017; a healthy diet was out of reach for 503.2 million people in low-income countries in 2022.

Lower-middle-income countries showed a declining number of people unable to afford a healthy diet from 2020 to 2022, albeit still above pre-pandemic levels of 2019. This improvement was favoured by sustained per capita gross domestic product (GDP) growth in 2021 and 2022, surpassing the levels seen in 2019.[34] In the groups of upper-middle- and high-income countries, on the other hand, the number fell well below pre-pandemic levels in 2022 (Table 6). A rebound in GDP growth, along with the ability to deploy fiscal policies that cushion the adverse economic impacts during times of crisis, played an important role in these countries.[35] While targeted fiscal policies fully counteracted the impact of the COVID-19 pandemic and other multiple shocks on the affordability of healthy diets in richer economies, they mitigated only a part of the impact in low-income countries.

Of the people in the world who were unable to afford a healthy diet in 2022, 1.68 billion, or 59 percent, lived in lower-middle-income countries (Figure 9). In terms of proportion, however, low-income countries showed the largest share of the population that could not afford a healthy diet (71.5 percent) compared with lower-middle-income (52.6 percent), upper-middle-income (21.5 percent) and high-income countries (6.3 percent) (Table 6).

Economic access to food is one component of food security. People who cannot afford the least-cost healthy diet are likely facing at least some degree of food insecurity, with negative consequences for the quality of their diet. Poor diets, in turn, are an important determinant of nutritional outcomes, which are the focus of the next section. ■

2.3 THE STATE OF NUTRITION: PROGRESS TOWARDS GLOBAL NUTRITION TARGETS

KEY MESSAGES

➔ The world is not on track to achieve any of the seven global nutrition targets by 2030. Progress for low birthweight and for childhood overweight is stagnant, and the prevalence of anaemia in women aged 15 to 49 years has increased.

➔ While global stunting and wasting prevalences have been declining and levels of exclusive breastfeeding rising over the past decade, progress on these three indicators has still been too slow to reach the 2030 targets.

➔ New estimates of the prevalence of adult obesity reveal a steady increase over the last decade, from 12.1 percent (591 million people) in 2012 to 15.8 percent (881 million people) in 2022. It is projected that the number will increase to more than 1.2 billion by 2030.

➔ Regarding progress towards achievement of the 2030 global nutrition targets for children under five years of age, half of the countries worldwide are off track for stunting, more than two-thirds are off track for wasting, and about 60 percent are off track for overweight.

➔ Three-quarters of all countries worldwide are off track to achieve the 2030 global target for low birthweight and more than 40 percent are off track to reach the exclusive breastfeeding target. Almost all countries in the world are off track to attain the 2030 global targets for anaemia among women aged 15 to 49 years and for adult obesity.

➔ Compared to the global estimates, least developed countries (LDCs) have much higher levels of stunting in children under age five and anaemia in women aged 15 to 49 years, while childhood wasting is similar to the global average (but declining more rapidly) and prevalence of childhood overweight is lower. As in the rest of the world, there is a worrying rise in adult obesity in LDCs, even as undernutrition continues to disproportionately affect these countries.

➔ Globally, the double burden of malnutrition – defined as the co-existence of undernutrition together with overweight and obesity – has been on the rise over the last two decades, characterized by a sharp increase in obesity rates and with only a gradual decline in thinness and underweight. Underweight among adults and the elderly has been cut in half while obesity is on the rise in all age groups. The true rate of the double burden is much higher if all forms of malnutrition are considered, including micronutrient deficiencies.

➔ Double-duty actions simultaneously tackle undernutrition, micronutrient deficiencies, overweight and obesity by leveraging the common drivers shared by all forms of malnutrition. Such actions include provision of antenatal care, exclusive breastfeeding, provision of healthy, nutritious foods to children during the complementary feeding period and beyond, school-feeding programmes, micronutrient supplementation, social protection, nutrition-sensitive agriculture, food fortification, and policies that improve the food environment.

Nutrition is a maker and a marker of development.[36] The benefits of good nutrition have widespread ripple effects, from families to communities, regions and nations. Malnutrition, on the other hand, hinders national progress and deeply compromises the health, development and well-being of present and future generations. Malnutrition broadly includes undernutrition and micronutrient deficiencies, as well as overweight and obesity. Ending malnutrition is foundational to the achievement of the SDGs, particularly SDG 2 (Zero Hunger), SDG 3 (Good Health and Well-being), and SDG 10 (Reduced Inequalities). The elimination of all forms of malnutrition[37] worldwide is a top investment priority for the global health and development agenda.

Section 2.3 assesses global and regional trends for the seven global nutrition targets to 2030, in alignment with the 2030 Agenda for Sustainable Development. These include the six nutrition targets endorsed by the World Health Assembly in 2012 for 2025, which were subsequently extended to 2030.[38] Four out of those six target indicators were also selected to monitor progress towards SDG Target 2.2, namely stunting, wasting and overweight in children under five years of age, and anaemia in women aged 15 to 49 years.[39] The seventh target is to halt the rise in adult obesity, which the WHA adopted as part of the Global Action Plan for the Prevention and Control of Non-Communicable Diseases in 2013, with a target year of 2025.[40] In 2016, the United Nations General Assembly (UNGA) proclaimed the United Nations Decade of Action on Nutrition (2016–2025)[41] which further boosted actions to end hunger, eradicate all forms of malnutrition, and ensure universal access to healthier and more sustainable diets. This section further provides a progress assessment of the 45 countries currently classified as least developed countries (LDCs) by the United Nations, and an analysis of the double burden of malnutrition occurring in different stages of life, as the world witnesses a gradual decline in undernutrition alongside the growing overweight and obesity epidemic.

Assessing malnutrition through the life course lens[42] highlights the critical timing of nutrition interventions in each period, from pre-conception, pregnancy and lactation, through infancy, childhood, adolescence, adulthood and older age. Exposure to environmental factors during these windows has the potential to shape the health trajectories of future generations. Malnutrition, including micronutrient deficiencies, during the vulnerable foetal, infant and early childhood stages increases morbidity and mortality risk,[43, 44] delays physical growth, and weakens the immune system resulting in recurrent illness and infection; it can also lead to suboptimal cognitive development and permanent changes in the structure and function of organ systems, thus setting the stage for susceptibility to chronic diseases in adulthood.[45, 46] Studies have shown that prenatal nutrition interventions can lead to improved birth outcomes, which in turn are associated with better education and human capital outcomes later in life.[47, 48] Children who have access to more nutritious foods in early childhood are more economically productive in adulthood.[49] In contrast, nutritional deficiencies during early childhood impair brain development, impact learning ability and school readiness, suppressing life-long achievement potential and exacerbating health disparities and social inequality.[50] Monitoring the global nutrition indicators through the lens of the life course thus acknowledges the uniqueness of each life stage and supports national and global efforts to tackle the malnutrition landscape holistically.

Global and regional trends

This subsection provides the latest status for the seven nutrition targets at global level (Figure 10) and regionally (Table 7).

Virtually no progress has been made for **low birthweight** among newborns, with a prevalence of 15 percent (21.6 million) in 2012 and 14.7 percent (19.8 million) in 2020 – the latest year with available data. Based on the trends from 2012 to 2020, it is projected that 14.2 percent of newborns will have low birthweight in 2030, falling short of the global target of a reduction of 30 percent relative to the baseline, i.e. 10.5 percent by 2030. Oceania excluding Australia and New Zealand had the highest prevalence in low birthweight among the world regions in 2012 (17.4 percent) and remains the highest with a prevalence of 17.9 percent according to latest estimates.

Significant progress has been made in increasing the global **exclusive breastfeeding** rate among infants under six months of age. Based on the latest estimates, the global prevalence steadily rose from 37.1 percent (25.7 million) in 2012 to 48 percent (31.3 million) in 2022. However, the world is not on track to achieve the 2030 target of 70 percent exclusive breastfeeding rate, as current projections point to a prevalence of 59 percent in 2030. Northern America has the lowest exclusive breastfeeding rate among the world regions (25.8 percent in 2022). Progress in this region has been stagnant over the past decade while other regions have experienced a rising trend for this indicator.

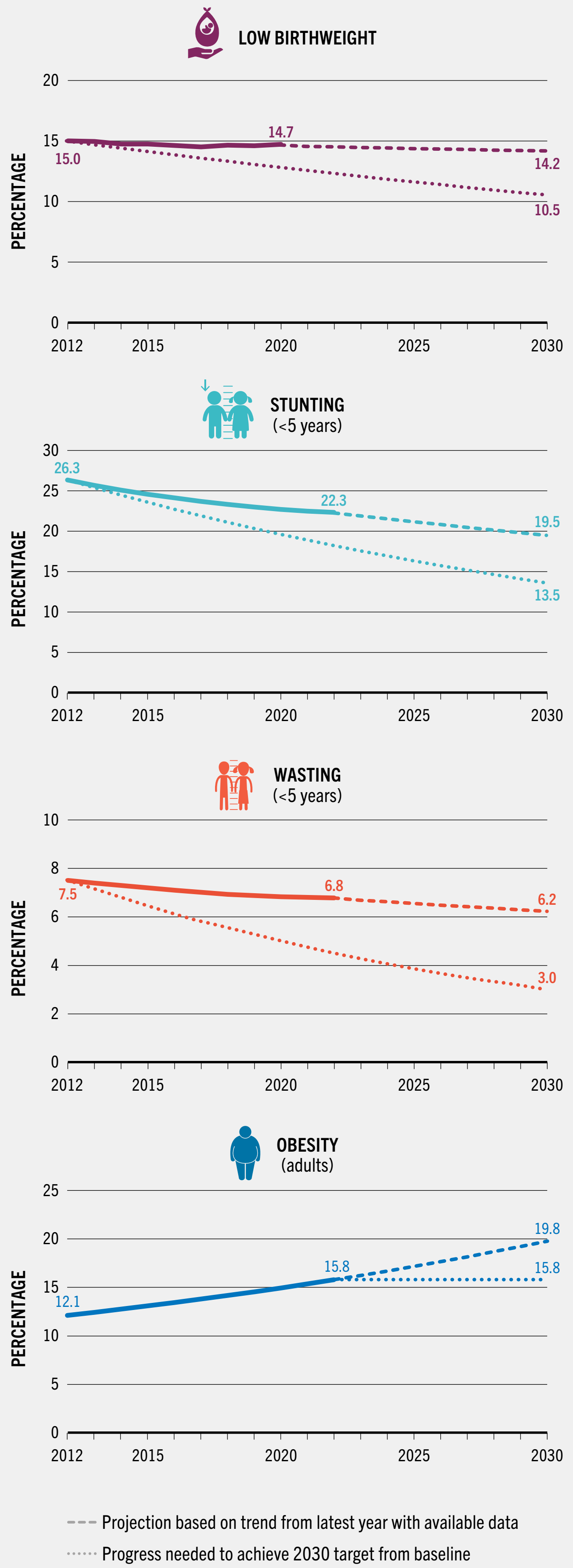
The global prevalence of **stunting** in children under five years of age has declined steadily from 26.3 percent (177.9 million) in 2012 to 22.3 percent (148.1 million) in 2022 – the latest year with available data. Assuming the trend observed since the baseline persists, it is projected that in 2030, 19.5 percent of all children under five will be stunted. The world is currently not on track to achieve the 2030 target of halving the number of stunted children under five by 2030 (13.5 percent stunted). The slower decline also means that the number of children, adolescents and adults suffering the lifelong consequences of early childhood stunting will remain high. Oceania excluding Australia and New Zealand has the highest stunting levels among children under five (44 percent in 2022). Prevalence has increased in this region since 2012, while most other regions have shown an improvement in this indicator over the past decade.

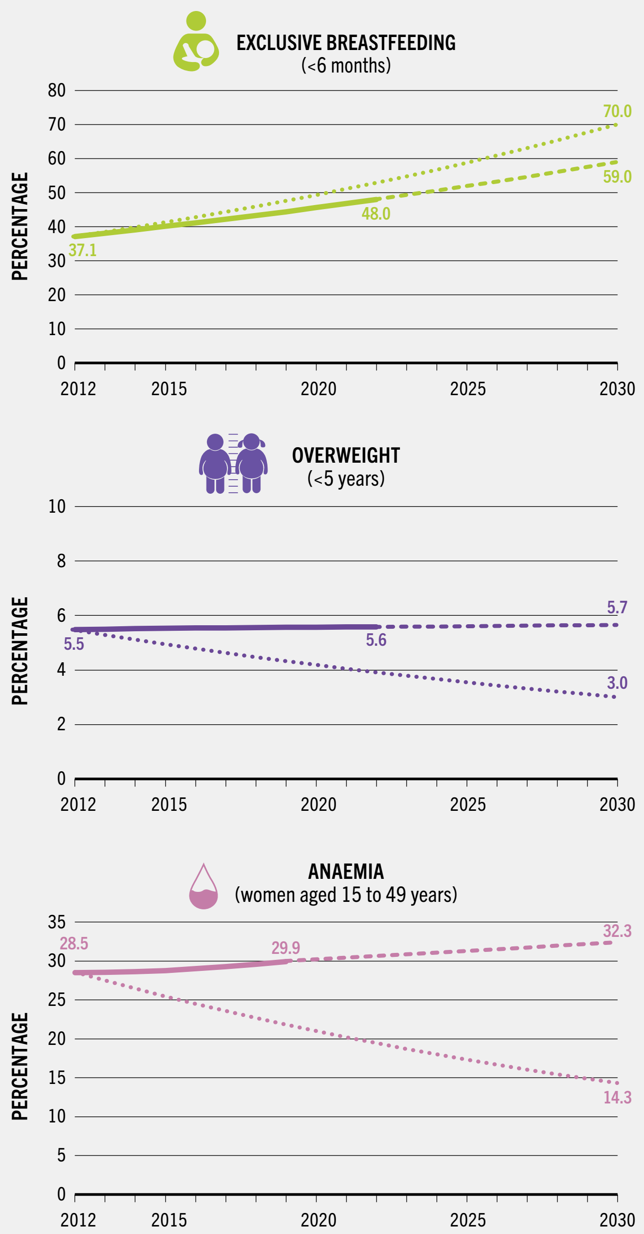
The global prevalence of **wasting** in children under five years of age has remained relatively unchanged over the past decade. In 2012, 7.5 percent of all children under five (50.7 million) were wasted. This prevalence declined to 6.8 percent (45 million) in 2022. The world remains off track to attain the 3 percent prevalence global target for 2030 based on progress exhibited since the baseline, with 6.2 percent of children under five projected to be wasted in 2030, i.e. more than double the global target. In addition, the prevalence of wasting can spike at national level during acute food insecurity contexts such as lean seasons and emergencies, or during times of increased incidence of illness (e.g. diarrhoea, measles outbreaks). Asia has the highest wasting levels among children under five, and efforts must be continued in this region to reduce this life-threatening condition.

The global prevalence of **overweight** among children under five years of age has stagnated, with little change from 5.5 percent (37 million) in 2012 to 5.6 percent (37 million) in 2022 – the latest year with available data. By 2030, 5.7 percent of children under five are projected to be overweight, which is almost double the 2030 global target of 3 percent prevalence. These children have increased risks for obesity and NCDs in adulthood.[51] Children under five living in Australia and New Zealand have the highest prevalence levels of childhood overweight among all world regions – 19.3 percent in 2022.

Globally, the prevalence of **anaemia** in women aged 15 to 49 years increased from 28.5 percent (520 million) in 2012 to 29.9 percent (571 million) in 2019. Based on the trend from 2012 to 2019 – the latest year with available data – the prevalence is projected to be 32.3 percent by 2030. At this pace, the world will not achieve the 2030 target of a 50 percent reduction in the prevalence of anaemia (to reach 14.3 percent target prevalence). Anaemia is a complex health condition with many nutritional determinants, as well as non-nutritional determinants such as infections. »

FIGURE 10 GLOBAL STUNTING AND WASTING PREVALENCES HAVE BEEN DECLINING AND LEVELS OF EXCLUSIVE BREASTFEEDING RISING OVER THE PAST DECADE, BUT THE WORLD IS NOT ON TRACK TO ACHIEVE ANY OF THE SEVEN GLOBAL NUTRITION TARGETS BY 2030





NOTES: The target year to halt the rise of adult obesity is 2025. Methodology to calculate global aggregates and projecting to 2030 can be found in the Supplementary material to Chapter 2.

SOURCES: Data for low birthweight are from UNICEF & WHO. 2023. Low birthweight. In: *UNICEF*. [Cited 24 July 2024]. https://data.unicef.org/topic/nutrition/low-birthweight; UNICEF & WHO. 2023. Joint low birthweight estimates. In: *WHO*. [Cited 24 July 2024]. https://www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-low-birthweight-estimates; data for exclusive breastfeeding are based on UNICEF. 2024. Infant and young child feeding. In: *UNICEF*. [Cited 24 July 2024]. https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding; data for stunting, wasting and overweight are based on UNICEF, WHO & World Bank. 2023. *Levels and trends in child malnutrition. UNICEF / WHO / World Bank Group Joint Child Malnutrition Estimates – Key findings of the 2023 edition*. New York, USA, UNICEF, Geneva, Switzerland, WHO and Washington, DC, World Bank. https://data.unicef.org/resources/jme-report-2023, http://www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition; data for anaemia are based on WHO. 2021. WHO global anaemia estimates, 2021 edition. In: *WHO*. [Cited 24 July 2024]. https://www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children; data for adult obesity are based on WHO. 2024. *Global Health Observatory (GHO) data repository: Prevalence of obesity among adults, BMI ≥ 30, age-standardized. Estimates by country*. [Accessed on 24 July 2024]. https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-=-30-(age-standardized-estimate)-(-). Licence: CC-BY-4.0.

https://doi.org/10.4060/cd1254en-fig10

TABLE 7 REGIONAL TRENDS FOR THE SEVEN GLOBAL NUTRITION TARGETS

	Prevalence of low birthweight		Prevalence of exclusive breastfeeding among infants (0–5 months)		Prevalence of stunting in children (<5 years)		Prevalence of overweight in children (<5 years)		Prevalence of wasting in children (<5 years)	Prevalence of anaemia in women (15–49 years)		Prevalence of obesity in the adult population (≥18 years)	
	2012	2020	2012	2022	2012	2022	2012	2022	2022	2012	2019	2012	2022
	(%)		(%)		(%)		(%)		(%)	(%)		(%)	
WORLD	**15.0**	**14.7**	**37.1**	**48.0**	**26.3**	**22.3**	**5.5**	**5.6**	**6.8**	**28.5**	**29.9**	**12.1**	**15.8**
AFRICA	**14.5**	**13.9**	**35.4**	**46.7**	**34.4**	**30.0**	**5.0**	**4.9**	**5.8**	**39.2**	**38.9**	**12.8**	**16.2**
Northern Africa	14.0	14.1	40.8	35.6	23.5	21.7	11.8	12.3	6.3	31.9	31.1	25.9	31.7
Sub-Saharan Africa	14.5	13.9	34.4	48.0	36.2	31.3	3.8	3.7	5.7	41.2	40.7	8.5	11.4
Eastern Africa	14.7	14.0	48.6	60.3	38.6	30.6	3.9	3.6	5.0	31.4	31.9	4.9	8.1
Middle Africa	12.8	12.2	28.5	44.7	37.9	37.4	4.5	4.6	5.6	46.1	43.2	6.6	9.3
Southern Africa	16.4	16.4	n.a.	32.8	23.4	22.8	12.3	11.4	3.5	28.5	30.3	27.3	29.7
Western Africa	14.9	14.3	22.1	38.3	34.5	30.0	2.3	2.4	6.7	52.9	51.8	8.1	11.6
ASIA*	**17.2**	**17.2**	**39.0**	**50.9**	**28.2**	**22.3**	**4.8**	**5.1**	**9.3**	**31.1**	**32.8**	**6.5**	**10.4**
Central Asia	6.3	6.0	29.2	32.7	14.7	7.7	8.2	5.0	2.1	28.8	28.1	18.8	25.1
Eastern Asia*	5.5	5.5	28.4	36.3	7.7	4.9	6.6	8.3	1.5	15.4	15.9	4.5	8.1
South-eastern Asia	12.8	12.5	33.4	46.0	30.4	26.4	6.4	7.4	7.8	25.0	27.2	6.0	10.0
Southern Asia	26.1	24.4	47.2	59.6	40.3	30.5	2.7	2.8	14.3	48.3	48.2	5.6	9.7
Western Asia	12.2	12.2	31.9	31.4	19.1	14.0	9.1	7.2	3.5	31.7	32.5	29.3	33.6
LATIN AMERICA AND THE CARIBBEAN	**9.5**	**9.6**	**34.3**	**43.1**	**12.7**	**11.5**	**7.4**	**8.6**	**1.4**	**18.2**	**17.2**	**22.4**	**29.9**
Caribbean	11.4	11.7	29.5	31.4	13.0	11.3	6.5	6.6	2.9	28.7	29.2	19.5	24.5
Central America	10.9	10.9	21.6	38.7	18.2	16.9	6.6	6.7	1.0	15.2	14.6	27.9	34.4
South America	8.6	8.8	42.2	47.1	10.1	9.0	7.9	9.7	1.4	18.4	17.3	20.7	28.6
OCEANIA	**11.3**	**11.8**	**n.a.**	**n.a.**	**20.0**	**22.0**	**11.0**	**16.8**	**n.a.**	**14.4**	**16.0**	**25.4**	**29.5**
Australia and New Zealand	6.4	6.4	n.a.	n.a.	3.4	3.4	12.4	19.3	n.a.	7.6	8.8	26.3	30.8
Oceania excluding Australia and New Zealand	17.4	17.9	56.6	58.3	40.9	44.0	9.3	13.9	8.3a	32.9	33.9	21.6	24.8
Melanesia	17.6	18.0	56.8	58.6	43.3	46.4	9.6	14.4	n.a.	33.3	34.2	18.3	21.9
Micronesia	12.4	12.3	55.3	59.8	16.3	13.5	4.4	4.4	n.a.	27.9	29.1	43.2	47.1
Polynesia	16.3	16.8	51.1	48.0	7.3	6.5	8.2	8.2	n.a.	25.6	27.4	52.1	57.5
NORTHERN AMERICA AND EUROPE	**7.4**	**7.4**	**n.a.**	**n.a.**	**4.2**	**3.8**	**9.0**	**7.6**	**n.a.**	**13.1**	**14.6**	**24.8**	**27.9**
Northern America**	8.0	8.1	25.5	25.8	2.6	3.6	8.6	8.2	0.2	9.9	11.7	35.7	40.3
Europe	7.1	7.0	n.a.	n.a.	5.1	4.0	9.2	7.3	n.a.	14.5	16.0	19.7	21.4
Eastern Europe	7.1	7.0	n.a.	n.a.	7.2	5.3	12.1	7.4	n.a.	19.2	20.5	22.1	25.5
Northern Europe	6.3	6.0	n.a.	n.a.	3.7	3.0	8.7	9.7	n.a.	10.6	12.0	22.3	24.2
Southern Europe	8.0	8.2	n.a.	n.a.	4.6	3.9	8.7	8.3	n.a.	13.5	15.1	18.2	18.9
Western Europe	7.0	6.8	n.a.	n.a.	2.8	2.6	5.0	5.1	n.a.	9.6	11.6	16.3	15.8

NOTES: n.a. = estimates not available. * Excluding Japan. ** Estimates for Northern America are based on the United States of America only.

SOURCES: See sources of Figure 10.

» Actions to reduce anaemia must directly address these multiple causes, which will vary by context. Growing evidence demonstrates the important association between iron deficiency, anaemia and obesity, which is of particular concern given the continual increase in both anaemia and obesity. Evidence suggests that this biological association may necessitate new approaches to prevention and treatment.[52, 53] Anaemia plagues a larger proportion of women aged 15 to 49 years in Africa than in any other world region, with 38.9 percent prevalence in 2019 and virtually no progress made in this region over the past decade. More comprehensive efforts are needed to accelerate the reduction of anaemia in women of reproductive age worldwide.

New data on the prevalence of **adult obesity** (age 18+ years) shows that it has steadily increased over the last decade, from 12.1 percent (591 million) in 2012 to 15.8 percent (881 million) in 2022. The world is off track to achieve the 2030 global target to halt the rise, with more than 1.2 billion obese adults projected for 2030 (19.8 percent global prevalence). Latin America and the Caribbean is the region with the highest prevalence, with nearly 30 percent of the adult population affected by obesity in 2022, followed closely by Oceania (29.5 percent), and Northern America and Europe (27.9 percent).

Country progress

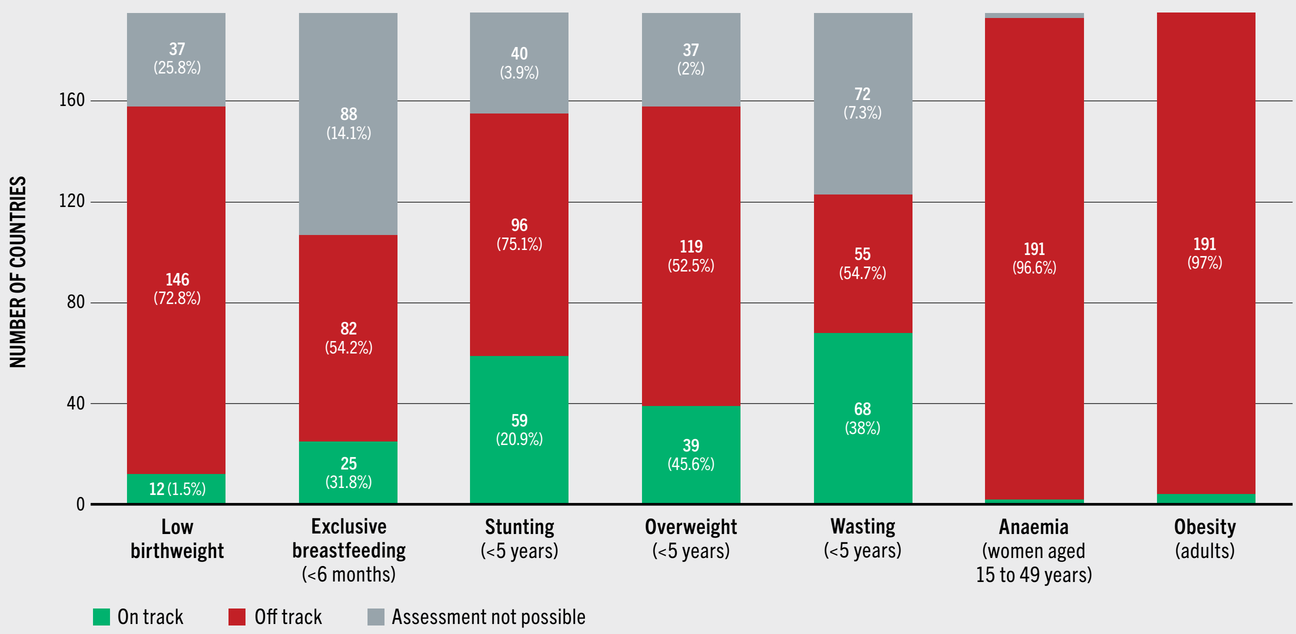
More countries are off track than on track for most of the seven global nutrition targets (Figure 11). Three-quarters of all countries worldwide (146 out of 195) are off track to achieve the 2030 global target for **low birthweight**. This does not account for 37 countries with insufficient data for progress assessment, which could potentially also be off track. Moreover, 72.8 percent of newborns in the world live in countries that are off track. More than 40 percent of countries (82 out of 195) are off track to reach the 2030 global **exclusive breastfeeding** target, and 88 countries have no progress assessments due to insufficient data. More than half of infants under six months of age (54.2 percent) are living in those countries which are off track. Half of the countries in the world (96 out of 195) are off track to achieve the 2030 global **stunting** target, with three in four children under age five (75.1 percent) living in those countries. There are insufficient data to inform progress towards the stunting target for 40 countries. More than one-quarter of countries worldwide (55 out of 195) are off track to achieve the global target for **childhood wasting**, and over half of children under age five (54.7 percent) live in those countries. Seventy-two (72) countries do not have sufficient data for tracking progress towards the wasting target, representing only 7.3 percent of the global population. About 60 percent of countries (119 out of 195) are off track to achieve the 2030 global target for **childhood overweight** and for 37 countries, progress cannot be assessed due to insufficient data. The countries that are off track for the overweight indicator represent half of total children under age five (52.5 percent). Almost all countries in the world (191 out of 195) are off track to attain the 2030 global **anaemia** target. More analyses are needed to better understand the context-specific causes of anaemia in countries so that targeted interventions can be implemented to get countries on track for the anaemia indicator. Similarly, nearly all countries (191 out of 195) are off track to achieve the global **adult obesity** target, and urgent efforts are needed to stop this ticking time bomb.

There has been significant progress in filling data gaps over the past decade, with more frequent data collection, use of advanced analytic techniques, and improvements in data flow. However, much work remains to fill the void, with about 20 percent of countries still lacking enough data to assess progress on five of the seven indicators. Exclusive breastfeeding and wasting are based on primary data collected predominantly from nationally representative surveys. The modality and frequency of these surveys may differ across countries and contexts, rendering data availability inconsistent and sometimes insufficient for progress assessment. Making better use of existing data to estimate trends using models is urgently needed to fill the gaps for these two indicators, in addition to continued efforts to collect good quality data.

Progress in least developed countries

The United Nations defines least developed countries (LDCs)[54] as "countries that have low levels of income and face severe structural

FIGURE 11 MORE COUNTRIES ARE OFF TRACK THAN ON TRACK FOR MOST OF THE SEVEN GLOBAL NUTRITION TARGETS



NOTES: The target year to halt the rise of adult obesity is 2025. Total population share (%) is in parenthesis. The methodology for assessing country-level progress towards global nutrition targets can be found in the Supplementary material to Chapter 2.

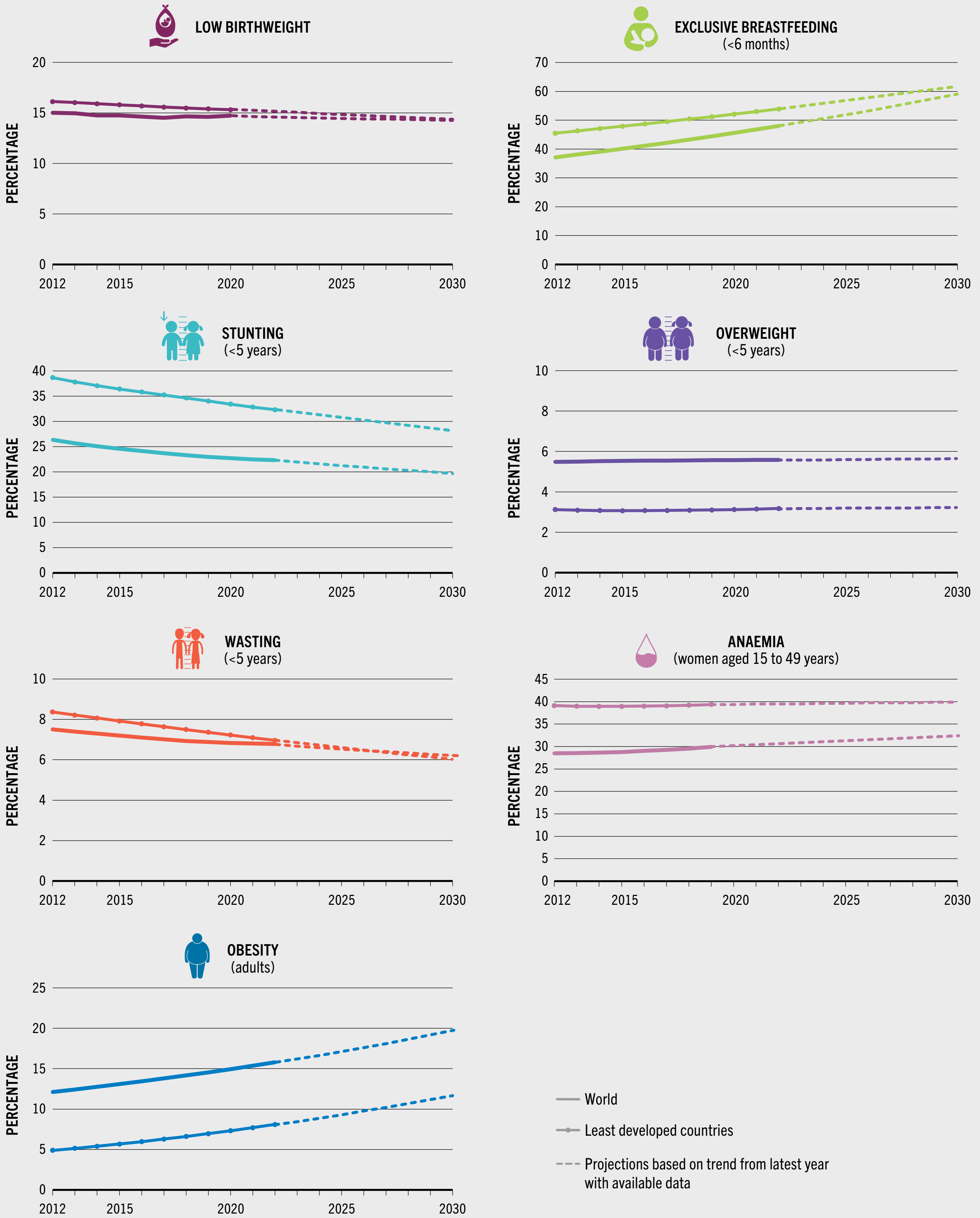
SOURCES: See sources of Figure 10.

https://doi.org/10.4060/cd1254en-fig11

impediments to sustainable development."[55] This classification was established by the UNGA as an acknowledgement that the least developed among developing countries need special support measures, including financial and technical, to boost their socioeconomic development. This analysis, including 2030 projections, is based on the group of 45 LDCs as classified by the United Nations as at January 2024. Figure 12 suggests that the LDC group is faring better than the global average on two of the seven nutrition indicators. Specifically, the prevalence of **exclusive breastfeeding** among children under six months of age in LDCs has been better than the global average since the baseline year 2012, and is projected to rise to 61.7 percent by 2030, while the global average is projected to remain at 59.0 percent. The prevalence of **wasting** in children under age five has declined more rapidly in LDCs relative to the global aggregate, despite the LDCs starting from a higher prevalence rate at the baseline (8.4 percent in LDCs versus 7.5 percent globally in 2012). By 2030, LDCs are projected to do slightly better than the global average (6.0 percent in LDCs versus 6.2 percent globally). Nevertheless, the wasting prevalence is still too high, and urgent investments in life-saving interventions to prevent and treat acute malnutrition must continue.

Undernutrition remains a dire challenge in LDCs – **stunting** in children under age five and **anaemia** in women aged 15 to 49 years are significantly higher in this group of countries compared to the global average. By 2030, LDCs are projected to have 28.1 percent stunting prevalence, compared with 19.5 percent globally, despite a declining trend since the baseline in this group of countries. In contrast, the global trend in anaemia has been increasing since the baseline. In 2019 – the latest »

FIGURE 12 COMPARED TO THE GLOBAL ESTIMATES, LEAST DEVELOPED COUNTRIES HAVE MUCH HIGHER LEVELS OF STUNTING IN CHILDREN UNDER AGE FIVE AND OF ANAEMIA IN WOMEN AGED 15 TO 49 YEARS, AND THE SAME WORRYING RISE IN ADULT OBESITY



SOURCES: See sources of Figure 10.

https://doi.org/10.4060/cd1254en-fig12

» year with available data – the anaemia prevalence among LDCs (39.4 percent) was even higher than at global level (29.9 percent). The **low birthweight** prevalence in LDCs is on a par with the global average – at the baseline year 2012, the LDC prevalence of low birthweight newborns was 16.1 percent, versus 15.0 percent globally. In 2020, the latest year with available data, LDCs had a 15.3 percent prevalence, while the global average was a close 14.7 percent. By 2030, the 45 countries and the global aggregate are projected to have comparable prevalence levels of low birthweight, with 14.3 percent and 14.2 percent, respectively. Although the prevalence of **childhood overweight** in LDCs remains below the global average, progress to further reduce child overweight has been stagnant for this group of countries, similar to the stagnation seen globally. Moreover, there is a worrying rise in **adult obesity** in LDCs that mirrors the global trend, and their share of the global adult obesity burden is also increasing over time – with all the while undernutrition continuing to weigh heavily on this group. Supporting LDCs to overcome structural impediments to sustainable development, improve incomes, and achieve the seven nutrition targets is a global development priority.

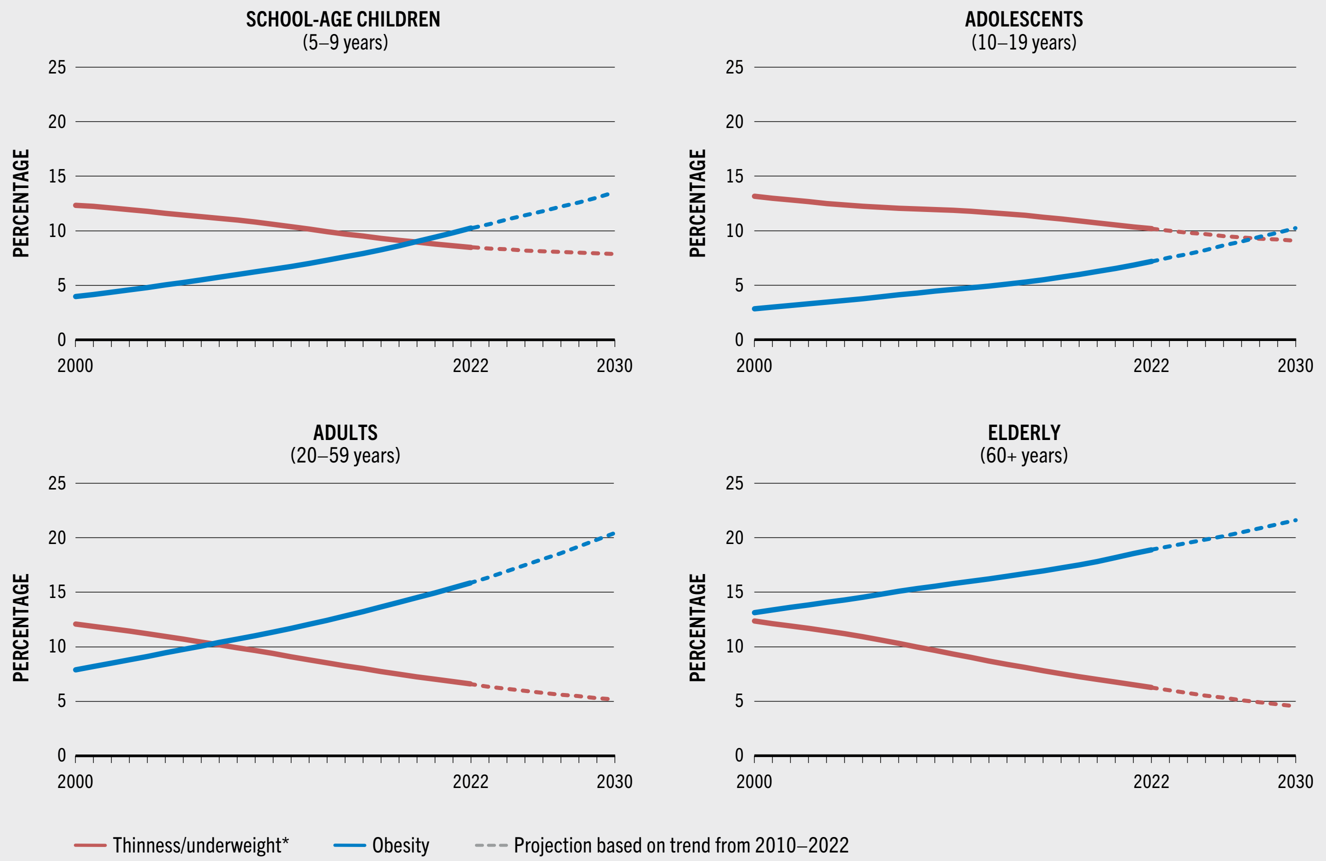
The double burden of malnutrition

The **double burden of malnutrition**[56] – defined as the co-existence of undernutrition together with overweight and obesity – has surged in recent decades among all age and income groups. Research has shown that countries undergo three kinds of population-level transitions as they develop and progress economically. The "nutrition transition" refers to a shift in a population's dietary patterns away from a staple-based diet towards greater dietary diversity including increased consumption of dairy, fish, meat, fruits and vegetables, as well as highly processed foods high in fats, sugars and salt. This is often associated with globalization, rapid urbanization, and sedentary lifestyles, contributing to the "epidemiological transition" – a shift in malnutrition burden in the population from a predominance of undernutrition to overweight and obesity, and in disease burden from infectious diseases to NCDs. The prevalence of micronutrient deficiencies continues to prevail across all global regions, despite evidence of the nutrition transition, and is often omitted from estimates of the double burden.[43, 57] Micronutrient deficiencies may continue to prevail across the transition. Furthermore, the population structure is modified largely due to lower birth rates and increased life expectancy. This "demographic transition" is characterized by a shift in average population age from younger to older and is accompanied by concomitantly higher NCD risks.[58] While in the past these transitions occurred gradually over centuries, they have accelerated in recent decades, with dietary changes and nutritional heterogeneity as well as disease risk rising significantly in just a single generation. Policymakers thus face unprecedented challenges in addressing both overweight and undernutrition and their associated health and economic implications.

The NCD Risk Factor Collaboration (NCD-RisC)[59] recently conducted a study on the double burden of malnutrition from 1990 to 2022 among adults, school-age children, and adolescents in 200 countries and territories. In this analysis, the double burden was calculated as the sum of the prevalence of underweight or thinness and obesity. The true rate of double burden is much higher if all forms of malnutrition are considered, including micronutrient deficiencies.[57] Results reveal that in most regions, decreases in the double burden were due to declining underweight and thinness, while increases in the double burden were driven by increases in overweight and obesity. A transition occurred in most countries from a predominance of underweight and thinness towards a predominance in overweight and obesity, with some exceptions such as in Southern Asia, where a decline in underweight was not offset by an increase in obesity. While population levels of obesity were highest among adults in 1990, school-age children and adolescents are increasingly affected by obesity in the twenty-first century.[60]

Figure 13 illustrates the global double burden phenomenon among **school-age children (5–9 years)**, **adolescents (10–19 years)**, **adults (20–59 years)** and the **elderly (60+ years)** from 2000 to the latest available data (2022) and projected to 2030. Thinness in school-age children and adolescents is measured as having a body mass index (BMI) <–2SD below the median of the WHO

FIGURE 13 GLOBALLY, OBESITY RATES HAVE RISEN SHARPLY AND THINNESS AND UNDERWEIGHT HAVE DECLINED AMONG SCHOOL-AGE CHILDREN, ADOLESCENTS, ADULTS AND THE ELDERLY



NOTE: * Thinness for school-age children and adolescents; underweight for adults and elderly.
SOURCE: WHO. 2024. *The Global Health Observatory*. [Accessed on 24 July 2024]. https://www.who.int/data/gho. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd1254en-fig13

2007 growth reference for school-age children and adolescents[61] while obesity in the same age groups is measured as BMI >2SD above the median. Among adults and the elderly, underweight is defined as BMI <18.5 kg/m^2 and obesity as BMI ≥30 kg/m^2. By 2030, 1 in 6 people in the world will be aged 60 years or over, and this population group will increase from 1.1 billion in 2020 to 1.4 billion in 2030.[62] Every country in the world is experiencing growth in the proportion of older persons (60+ years).[63] More prominence needs to be given to them on the global nutrition agenda in the SDG targets. Routine data collection for adults over age 60 should be strengthened to support policies aligned with the commitments made in the United Nations Decade of Healthy Ageing (2021–2030).[64, 65]

Globally and across all age groups, thinness and underweight have declined in the last two decades, while obesity has risen sharply. The global prevalence of thinness among **school-age children (5–9 years)** declined from 12.3 percent in 2000 to 8.5 percent in 2022 and is projected to decrease to 7.2 percent by 2030. Meanwhile, obesity in this age group has more than doubled since 2000, increasing from 4 percent in 2000 to 10.2 percent in 2022 and is »

BOX 5 DOUBLE-DUTY ACTIONS TO ADDRESS THE DOUBLE BURDEN OF MALNUTRITION

Double-duty actions for infants and young children (<5 years of age)

- Scale up interventions to protect, promote and support breastfeeding (early initiation, exclusive, continued).
- Promote optimal complementary feeding,[69] prioritizing nutrient-dense animal source foods, fruits and vegetables, and nuts, pulses and seeds over starchy foods, and avoiding foods high in sugars, salt and trans fats, sugar-sweetened beverages, and non-sugar sweeteners.
- Consider the risks of excessive energy density in complementary foods, avoiding feeding young children foods, snacks and beverages high in energy, sugars, fats and salt.
- Include new training curricula for primary health care workers to provide double-duty nutrition counselling.
- Flag overweight and obesity risks alongside stunting and wasting in growth monitoring programmes, especially in contexts where childhood overweight is a problem.
- Ensure adequate prevention and management of moderate and severe wasting – including with ready-to-use therapeutic foods, food supplements and improved fortified blended foods – depending on the condition and the context.[70]
- Ensure that clear criteria and targeting guidelines are used for the distribution of ready-to-use supplementary foods (therapeutic foods, improved fortified blended foods), including for the prevention and treatment of moderate and severe acute malnutrition, and manage the duration of treatment to avoid excessive or rapid weight gain beyond that needed for prevention or recovery.

Double-duty actions for school-age children (5–9 years) and adolescents (10–19 years)

- Redesign school-feeding programmes to promote access to healthy diets and devise new nutritional guidelines for food inside the school and surrounding the school campus where children have access to food. Support these efforts through policy, legal and institutional frameworks. Eliminate or, at a minimum, regulate the commercial promotion and sale of foods, snacks and beverages high in energy, sugars, fats and salt around schools.
- Create a supportive "whole-of-school" approach conducive to healthy eating such as integrating nutrition into the classroom curriculum/health literacy lessons; promoting active school environments; cultivating school gardens; building knowledge and skills to create awareness, shape tastes, and develop healthy food habits; involving parents in meal planning; and influencing healthy eating attitudes at home.
- Use innovative youth-oriented social behaviour change communication tools and platforms to reach children and adolescents with key messages about nutritious foods and healthy diets.
- In settings where the prevalence of anaemia in non-pregnant women is 20 percent or higher, provide intermittent iron and folic acid (IFA) supplementation for menstruating, non-pregnant adolescent girls. If the prevalence is 40 percent or higher, provide daily iron supplementation.[71]

Double-duty actions for pregnant women

- Scale up WHO antenatal care recommendations for pregnant women (also extending to pregnant adolescent girls) through the health system, focusing on counselling about healthy eating and keeping physically active during pregnancy to stay healthy and prevent excessive weight gain.
- Monitor targeted protein and energy supplements to prevent unintended excess weight gain during pregnancy.
- Provide cash and/or food vouchers to improve maternal diets while monitoring gestational weight gain to detect inadequate weight gain as well as excess weight gain.
- Provide daily IFA supplementation for pregnant women during routine antenatal care. In settings where the prevalence of anaemia in pregnant women is less than 20 percent, or daily iron is not acceptable due to side effects, provide intermittent IFA supplementation. In settings with a high prevalence of nutritional deficiencies, multiple micronutrient supplements that contain IFA may be considered.[71]
- In undernourished populations, use behaviour change communication (e.g. public talks, mass communication campaigns, one-to-one or small group counselling, visual communication aids) on

BOX 5 (Continued)

increasing total daily intake, including proteins, to reduce risk of low birthweight; and balanced energy and protein dietary supplementation to reduce risk of stillbirths and neonates who are small for gestational age.

Double-duty actions for all groups

- Increase nutrition-sensitivity of social protection programmes for all age groups or targeted ones (e.g. for pregnant and breastfeeding women and young children, or the elderly) through modalities of adequate size and potential for improving nutrition – e.g. subsidies or food vouchers linked to retailers serving nutritious foods, while excluding foods, snacks and beverages high in energy, sugars, fats and salt; introducing rewards for transfers or vouchers spent on nutritious foods; implementing behaviour change communication strategies focused on healthy diets, physical activity, and the preventive use of health services (early detection of overweight, obesity and non-communicable diseases).
- Scale up nutrition-sensitive agriculture programmes which promote diversified food production and consumption, particularly among poor households living in remote areas with little access to markets. Design and support urban and peri-urban agriculture to support the growing demand for nutritious foods in urban areas.
- Align actions throughout agrifood systems to ensure that diverse, nutritious foods are available to all people, including vulnerable populations, through the value chain – from farm to table.
- Transform food environments by implementing policies and legislation that eliminate the use of misleading promotion of breastmilk substitutes (infant formula, follow-on formula); strengthen restrictions on marketing of foods, snacks and beverages high in energy, sugars, fats and salt, including those which are fortified; adopt front-of-pack nutrition labelling; introduce targeted taxes on foods, snacks and beverages high in energy, sugars, fats and salt, and subsidies for nutritious foods to encourage healthier purchasing patterns.
- Food producers, retailers and traders can be incentivized to improve the nutritional quality of the food supply by reformulating unhealthy foods high in fats, sugars and salt and by fortifying staple foods (i.e. universal salt iodization, fortification of maize flour, cornmeal, rice, wheat flour, vegetable oil with vitamins and minerals).

SOURCE: Adapted from Hawkes, C., Ruel, M.T., Salm, L., Sinclair, B. & Branca, F. 2020. Double-duty actions: seizing programme and policy opportunities to address malnutrition in all its forms. *The Lancet*, 395 (10218): 142–155. https://doi.org/10.1016/S0140-6736(19)32506-1

» projected to increase 3.6-fold to 14.4 percent in 2030 relative to levels in 2000. While the decline in thinness prevalence among **adolescents (10–19 years)** was gradual from 2000 to 2022 (13.2 percent and 10.2 percent, respectively), obesity increased 2.5-fold during the same period (2.8 percent and 7.2 percent, respectively), and is projected to more than triple to 10.0 percent by 2030 relative to levels in 2000.

The global prevalence of underweight among **adults (20–59 years)** was cut by half in two decades, from 12.1 percent in 2000 to 6.6 percent in 2022. In turn, obesity doubled during the same period from 7.9 percent to 15.9 percent and is projected to increase 2.6-fold to 20.3 percent relative to levels in 2000 by 2030. The global prevalence of underweight among the **elderly (60+ years)** declined by half from 2000 to 2022 (12.4 percent and 6.3 percent, respectively). Obesity prevalence, on the other hand, increased during the same period, from 13.1 percent to 18.9 percent, and is projected to reach 21.6 percent by 2030 – 1.6-fold the level in 2000. Policies that continue to address the longstanding challenge of undernutrition need to be complemented with urgent policies to curb and reverse the growing obesity trend among all population groups.

The double burden of malnutrition is a catalyst for **double-duty actions**.[66–68] These actions simultaneously tackle undernutrition, overweight and obesity by leveraging the common drivers shared by all forms of malnutrition including those that are biological, environmental and socioeconomic, thereby creating a pathway for shared policies, programmes and interventions. Box 5 illustrates a few examples of double-duty actions. ■

SERBIA
Farmer handling wheat grain from a good harvest: strengthening agrifood productivity to increase economic resilience.
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CHAPTER 3
A NEW DEFINITION OF FINANCING FOR FOOD SECURITY AND NUTRITION

KEY MESSAGES

➔ No doubt, to get on track to meet SDG Targets 2.1 and 2.2 – end hunger, food insecurity and malnutrition in all its forms – as well as to realize the universal right to adequate food for all, there is a need to increase existing levels of financing as well as to use existing financing more cost effectively. Currently, however, there is no coherent picture of the financial resources being spent on food security and nutrition, nor of the cost of meeting these targets.

➔ Multiple definitions of financing for food security and nutrition are applied, leading to stark differences in estimates of such financing. This predicament poses a multitude of problems, including identifying underfinanced areas, ensuring accountability of institutions, and tracking the effectiveness and impact of interventions financed.

➔ Moving towards a common definition and mapping of financing for food security and nutrition is therefore urgently needed. While the definition of food security and nutrition is well established, disentangling what constitutes financing for food security and nutrition remains a non-trivial and challenging exercise that has not received the attention it merits. This report puts forward a new definition of financing for food security and nutrition:

> Financing for food security and nutrition refers to the public and private financial resources, both domestic and foreign, that are directed towards eradicating hunger, food insecurity and all forms of malnutrition. They are targeted to ensure the availability, access, utilization and stability of nutritious and safe foods, and practices that favour healthy diets, as well as health, education and social protection services that enable these, and include the financial resources that are directed towards strengthening the resilience of agrifood systems to the major drivers and underlying structural factors of hunger, food insecurity and malnutrition.

➔ Guidance for a common approach and the application of the definition is provided, along with mapping of the core and extended definitions to financial allocations using a four-level classification and keyword system. This mapping approach facilitates a shift away from the typical sector-defined boundaries in financing estimates of agriculture on the one hand, and nutrition on the other, and captures the multidimensional nature of food insecurity and malnutrition.

➔ This report calls for universal adoption of the new definition of financing for food security and nutrition and for a standardized approach to operationalize the mapping and application of the definition to financial data flows.

To achieve Sustainable Development Goal (SDG) Targets 2.1 and 2.2 there needs to be a significant increase in financing for food security and nutrition. **Chapter 2** of this report shows that there is a significant gap between progress and SDG Targets 2.1 and 2.2 to end hunger, food insecurity and all forms of malnutrition. Closing this gap requires a doubling down of efforts, using existing financing more cost effectively and adding significant new financing for food security and nutrition – but this financing must be quantified.

A wide range of estimates of the cost of achieving these targets exist (see **Section 4.2**). However, there is no coherent picture of the total amount of financial resources being spent on food security and nutrition, nor of the cost of achieving SDG Targets 2.1 and 2.2, in part due to the absence of an agreed upon definition of financing for food security and nutrition.

Although there is clarity and agreement on the definition and concept of food security and nutrition, and agreed SDG indicators to measure the levels and severity of hunger, food insecurity and all forms of malnutrition around the world, there is no equally accepted definition of financing for food security and nutrition. This is the main issue explored and addressed in this chapter.

Without a standardized definition, it will not be possible to assess adequately the existing levels and gaps in financing for food security and nutrition, nor to monitor progress or setbacks in financing efforts to achieve the goal of ending hunger, food insecurity and all forms of malnutrition. Achieving food security and ending all forms of malnutrition in the world requires a significant improvement in the quantity and quality of financing. The first step is to measure, track, monitor and analyse the different sources of financing that contribute to achieving food security and ending all forms of malnutrition, whether they be public or private, domestic or foreign, and this cannot be achieved without an adequate definition of such specific financing. ■

3.1 CHALLENGES IN DEFINING AND MEASURING FINANCING FOR FOOD SECURITY AND NUTRITION

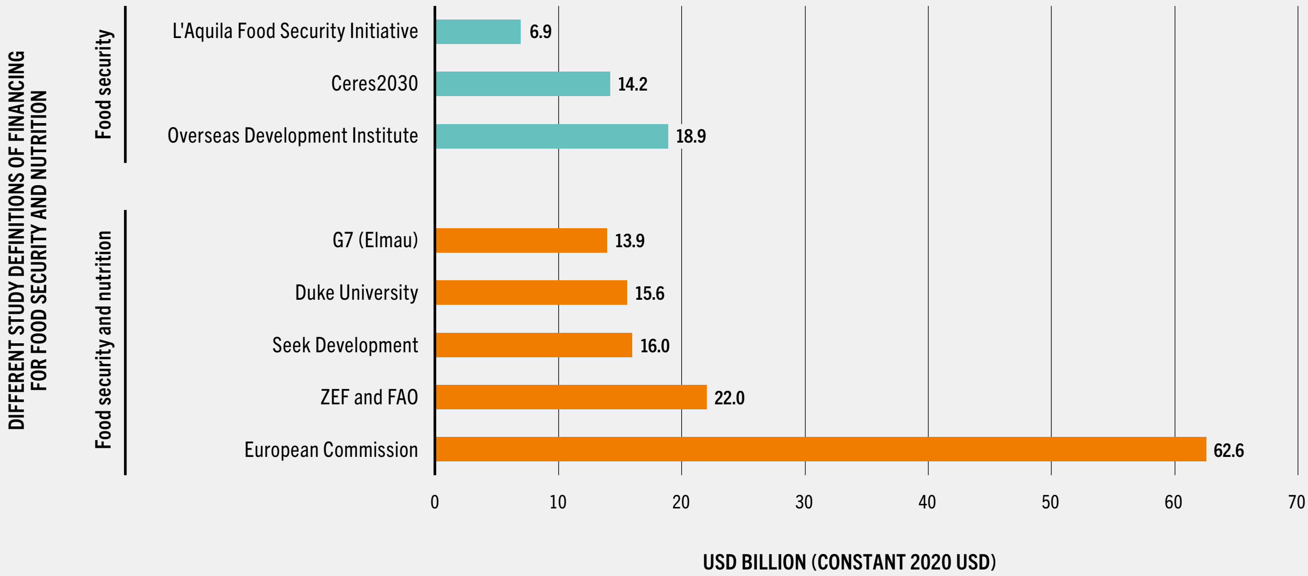
Currently, there is no agreed upon definition of financing for food security and nutrition. There is also no unity regarding how to measure the financing flows to food security and nutrition in any of the existing financial data sources. A clear understanding and knowledge of the level of financing for food security and nutrition is therefore absent. This absence undermines efforts to achieve food security and end all forms of malnutrition.[h]

Currently, several definitions are applied, leading to stark differences in estimations of the current levels of financing for food security and nutrition. For example, even in the case of official development assistance (ODA), which is the most advanced in terms of having a global tracking system and a standardized common aid database, there is no standard definition of, nor gauge for, the measurement of financing flows to support food security and nutrition. This void results in vastly divergent estimates of how much money is being spent, and where and with what efficiency it is spent, on food security and nutrition, negatively impacting the subsequent analysis of trends and outcomes needed to assess the path towards meeting SDG Targets 2.1 and 2.2.

For example, as is shown in Figure 14, depending on the definition applied, the annual average level of ODA grants between 2019–2021 ranges from USD 6.9 billion per year (according to the G7 definition) to USD 62.6 billion per year

h The International Fund for Agricultural Development (IFAD) and the World Bank have developed a methodology for measuring financial flows to food systems, known as the 3FS. This is a broader methodology for measuring financial flows to food systems as a whole; as such, it differs in scope from the definition and measurement of financing for food security and nutrition in this chapter. The 3FS methodology supports tracking of domestic public spending and international development finance flows to food systems at the country and global levels. In its next phase, the 3FS methodology will include the tracking of private sector financing flows the food systems.[35]

FIGURE 14 TOTAL OFFICIAL DEVELOPMENT ASSISTANCE GRANTS FOR LOW- AND MIDDLE-INCOME COUNTRIES ASSOCIATED WITH DIFFERENT DEFINITIONS OF FINANCING FOR FOOD SECURITY AND NUTRITION, AVERAGE 2019–2021



NOTES: Updated 2021 estimates of total official development assistance grants in billions of constant 2020 USD applying the different study definitions of financing for food security and nutrition. The references for studies included in this figure are provided in the source to Table S3.1 in the Supplementary material to Chapter 3.

SOURCES: Adapted from Eber Rose, M., Laborde, D., Lefebvre, L., Olivetti, E. & Smaller, C. 2024. *Towards a common definition of aid for food security and nutrition.* Rome, FAO and Geneva, Switzerland, Shamba Centre for Food & Climate. https://doi.org/10.4060/cd1957en. Data are from OECD (Organisation for Economic Co-operation and Development). 2024. Development finance data. In: *OECD*. [Cited 9 May 2024]. https://www.oecd.org/dac/financing-sustainable-development/development-finance-data

https://doi.org/10.4060/cd1254en-fig14

(according to the European Commission definition). Consequently, estimated levels of ODA financing for food security and nutrition vary considerably depending on the definition applied. As shall be seen in **Chapter 4**, the figure will change when a proper definition of financing for food security and nutrition is applied to ODA data.

For the United Nations Food Systems Summit 2021, the financing of agrifood systems transformation to achieve SDG 2 was defined as follows:

> A variety of financial resources, including funds "internal" to food systems (consumer food expenditures and outlays by agrifood actors) and "external" funds (international development flows, public budgets, banking systems, and capital markets). The contributions of the different funding sources are likely to vary across different aspects of the transformation.[1]

This definition roughly divides the key fiscal and financial mechanisms for investments in the transformation of food systems into six intervention areas: i) consumer expenditures on food; ii) agrifood business profits and savings; iii) fiscal measures (public expenditures and taxes); iv) international public finance (ODA and non-concessional lending by bilateral donors and multilateral development banks [MDBs]); v) bank finance; and vi) capital market finance.[2]

Alternatively, in a paper discussing the mobilization of additional financial resources for nutrition, nutrition finance was defined as follows:

> The process of acquiring needed funds to enable access to safe, nutritious and sufficient food all year round to ensure a continued adequate nutrition status. Such funds may be required by the public and/or the private sector, on a commercial or a concessionary (i.e. below market rate) basis, for short or long-term interventions for example in human development and capacity building (e.g. education and training), research and development, infrastructure, and marketing. Thus, nutrition finance interventions may occur in a variety of sectors, including health, agriculture, manufacturing (including processing and packaging), services (including logistics and retailing), education, and information.[3]

Building on this definition, the same study claims that there are:

> multiple types of capital providers, who can deploy funding to beneficiaries through a range of funding structures, intermediaries and financing instruments.[3]

More specifically, in addressing financing to achieve food security and end all forms of malnutrition in a sustainable manner while protecting livelihoods, investments are distinguished according to three areas of application: i) to support "resilient and sustainable increases in agricultural productivity and affordable healthy foods available on local markets"; ii) to ensure "uninterrupted access to nutrition and health services so that children can achieve their full economic potential"; and iii) to "protect families from shocks by putting in place risk-responsive and adaptive social safety nets linked to food and nutrition security".[4]

Challenges in moving to a common definition of financing for food security and nutrition

The current state of financing for food security and nutrition is challenging to measure due to the lack of a unified definition of what constitutes financing for food security and the end of all forms of malnutrition. Disentangling what constitutes financing for food security and nutrition remains a non-trivial and challenging exercise. This predicament poses a multitude of challenges, not only in tracking the current levels of financing flows to food security and nutrition, but also in identifying underfinanced areas, ensuring accountability of institutions, and tracking the impact of interventions financed. Moving towards a common definition and mapping of financing for food security and nutrition is not straightforward, and there are three main challenges:

1. Food security and nutrition are complex multidimensional concepts that do not neatly fit into a sector-defined financing framework.
2. Different initiatives measure financing for food security and nutrition differently, although often adopting similar language.
3. Food security and nutrition and their links are broadly understood, but this is not the case for the full scope of interventions needed to support them.

Food security and nutrition are complex multidimensional concepts that do not neatly fit into a sector-defined financing framework

Food security and nutrition are complex multidimensional concepts that do not neatly fit into sector-defined frameworks. Interventions to achieve food security and nutrition span various sectors and dimensions of economic, health, social and environmental development, among others. However, financing flows and budgets are normally defined and classified by sector and, within each sector, by purpose. In shifting from a sector-based classification system to an outcome-based measure, complex issues arise regarding the contribution of sector-based resources to the main determinants of food security and nutrition.

Classification systems are necessary in financial databases both to avoid the double counting of resources and to enable temporal statistical analysis across funders.[5–7] In the main ODA database – Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) – the purpose of aid is recorded using a classification system comprising two layers: sector codes subdivided into purpose codes. For example, the sector code relating to agriculture, encompassing agriculture, forestry and fishing, is 310. Each of these sectors has its own code – agriculture (311),[i] forestry (312) and fishing (313) – and these further disaggregate into purpose codes such as agricultural research (31182) or plant and post-harvest protection and pest control (31192). The sector and purpose codes are selected by the donor when they input ODA data into the database.[7] For the full list of OECD DAC Creditor Reporting System (CRS) purpose codes, see Table S3.1 in the Supplementary material to Chapter 3.

Databases related to domestic public finance and private finance also have classification systems that are roughly consistent with international

i Agriculture here includes both crops and livestock.

standards. For public budgets, these classification systems follow a common framework whereby expenditures are structured by administrative, economic, functional and geographical nomenclatures that explain how public resources are being spent: by whom, on what and where. Each of these nomenclatures carries information that would form the basis for a complete and accurate classification of data, be it a sector-based, function-based or outcome-based classification system. However, budgetary information that is publicly available is most often not disaggregated to the kind of granular level that would allow for a proper classification of domestic public finance, and this caveat is especially true for function- and outcome-based classification systems. For the private sector, a common framework is even more complicated in the absence of central record-keeping and a commonly agreed upon reporting framework. Data, where available, tend to be defined at a sectoral level. For example, foreign direct investment (FDI) data are available as flows to agriculture, forestry and fishing or to food, beverages and tobacco. Alternatively, data on credit to agriculture are available as an aggregate of agriculture, forestry and fishing, or for each subsector individually.[j]

While standard classification systems are necessary for financial records, several issues arise when building from sector-based classification systems to an outcome-based classification. This outcome-based classification is crucial to define and measure the level and composition of financing for food security and nutrition.

Notwithstanding that sector-based classifications are used extensively to assess governments' efforts in support of agriculture, they show limitations when it comes to assessing financing contributions to food security and nutrition outcomes. For example, an energy project in a rural area may improve agricultural productivity through access to electricity for irrigation and mechanized equipment, as well as facilities to store and clean food, thereby having a strong, positive impact on food security and nutrition. This may be recorded as a financial contribution to the energy sector, since financing is most often recorded based on what a given project is designed to achieve and the sector relevant to the intervention, and not on the outcomes of the project. This distinction between sector and outcome complicates the definition of the financing for food security and nutrition, as it requires making assumptions about the contribution of sector-allocated finance to food security and nutrition outcomes.[7]

Recently, new policy markers and tags have been added in some financial databases to capture the cross-sectoral and/or multipurpose nature of development policy objectives. However, there is still a lack of consistency and differences in definitions applied to formulate these objectives. For example, the OECD DAC has added an SDG policy marker to indicate which ODA grants are relevant to which SDGs, and policy markers exist for climate adaptation and mitigation, nutrition and gender, among others. However, the use of tags and markers is not fully consistent, and the process through which markers are developed either supports or inhibits stronger synergies across sectors. To date, while an OECD DAC methodology for a nutrition marker has been developed, it has not been applied consistently.

Furthermore, in light of the complex, cross-sectoral nature of achieving food security and ending all forms of malnutrition, development programmes are increasingly shifting away from strategies and portfolios that achieve single outcomes towards projects with multiple outcomes. This creates yet more tension with the coding systems common in financial databases. For instance, within the OECD DAC, there are three main ways to record a multisectoral project. First, it can be classified as a multisectoral project (i.e. purpose code 43010).[8] Second, a documentation review can be undertaken to disaggregate the project into separate components, each recorded under different codes corresponding to the focus of that portion of the budget. Third, all the resources can be recorded based on the project's principal component and the primary sector to which it is intended to contribute. Under this approach, a project with a 65 percent agricultural extension component and a 35 percent road development component may be entirely recorded under the

j For more information about data availability, classification and limitations for different financing streams, see the FAO and Shamba Centre for Food & Climate background note.[7]

agricultural extension code. Due to the variety of approaches for recording cross-sectoral projects, financing for food security and nutrition may be recorded inaccurately or differently, depending on the donor.

Similar challenges on linking sector-based coding systems to outcome-based classifications apply to domestic public budgets as well. Disaggregated data at the activity level and detailed project documentation, which are not always readily available, are needed to classify public finance by its contributions towards food security and nutrition dimensions. Within databases for private resources, there is less data availability and data disaggregation, and therefore less clarity on how multisectoral projects are coded.

Defining financing for food security and nutrition will require the identification of, and agreement on, the interventions and sectors that impact food security and nutrition, with an awareness of the complexities and inconsistencies in how projects relevant to food security and nutrition may be recorded. Furthermore, attention will have to be paid to the relative impact of a given investment. Not all the financial resources allocated to a given intervention or sector will have the same level of impact on food security and nutrition outcomes. The impact of some investments will be direct, like investments in more productive, diverse smallholder agriculture, while the impact of other investments, like investments in better rural infrastructure and electrification, may be indirect and depend a great deal on existing coverage. Similarly, not all investments in electrification will impact food security and nutrition outcomes. Therefore, not all the resources spent on electrification should be included in a definition of financing for food security and nutrition.

The complexities between food security and nutrition, as a multidimensional outcome, and binary finance coding systems significantly complicate efforts to estimate financing for food security and nutrition. Methodologies cannot rely on or be bound by the binary coding systems adopted by financing databases.

Different initiatives measure financing for food security and nutrition differently, although often adopting similar language

Each national government uses different approaches to allocate domestic public resources and different approaches to define the resources allocated to allegedly influence a particular outcome. Where publicly available, national budgets can reveal the sectors and ministries to which budgets are being allocated. However, there is no common accounting framework across governments, nor is there a common measurement of spending on food security and nutrition. Therefore, assessments of the resources allocated to financing for food security and nutrition may differ significantly between countries, depending on what they consider to be the resources relevant, either directly or indirectly, for influencing food security and positive nutrition outcomes. The lack of common accounting frameworks means that there have been no formal attempts to define an agreed upon measurement of financing for food security and nutrition for public and private financing, or that such financing has been unsuccessful or not scalable enough, whether from domestic or foreign sources.

In ODA, where perhaps there have been the greatest efforts to define financing for food security and nutrition, different groups use different measures to define relevant ODA, although often referring to them using similar language. For example, in Figure 14, observed differences in ODA levels are generally due to: i) differences in the questions being asked; and/or ii) differences in what counts as financing to support food security and nutrition. In the OECD DAC, ODA records are coded according to donor, recipient, purpose of aid, and flow type (commitment or disbursement), as well as other variables.[7] The codes provide a standardized way of categorizing aid according to the specific sector or area of development that the ODA resources are intended to assist. While the ODA binary nomenclature establishes a common methodology to track the purpose of aid, currently, there are over ten operational definitions used to calculate the volume of ODA relevant to agriculture, food security and nutrition, each of which tracks ODA recorded under a different selection of purpose codes.

To illustrate the issue, it is useful to look at the underlying reasons for the differences in the various estimates shown in Figure 14. They all include allocations to sectors such as agriculture, forestry and fishing, and basic nutrition within the health sector. Most also include rural development as well as food assistance. Beyond these, however, there is quite a divergence on what is included. Studies by the Center for Development Research (ZEF) of the University of Bonn and FAO,[9] and the European Commission[10] both include allocations to water and sanitation, but only the European Commission study includes basic health care, which is a key determinant of nutrition (see Table S3.1 in the Supplementary material to Chapter 3 for a full comparison of the allocations and sector coding).

Some of the differences and confusion stem from different initiatives attempting to capture agriculture and/or food security and/or nutrition. Nonetheless, the majority of the considered definitions include OECD DAC codes relating to agriculture, forestry and fishing (311–313), rural development (43040), basic nutrition (12240), food assistance (52010), and emergency food assistance (72040). Beyond these, there is quite a divergence on what is included resulting in differing estimates of how much money is being spent, where it is spent, on what it is spent, and with what efficiency it is spent, hindering the subsequent analysis of trends and outcomes towards achieving SDG Targets 2.1 and 2.2 (see Figure 14 and Table S3.1 in the Supplementary material to Chapter 3 for a full comparison of definitions and coding).

Whether emergency food assistance is included in the definition of financing for food security and nutrition has a significant effect on the estimated levels of financing.[7] For example, on average, in 2020–2021, USD 6.7 billion was recorded in ODA for emergency food assistance globally.[11] Considering country examples, definitions of ODA for food security and nutrition that do not include emergency food assistance show that Ethiopia receives the greatest volumes of ODA, whereas definitions including emergency food assistance show that the Syrian Arab Republic receives the greatest volumes.[5]

It is also important to recognize that political considerations play an important role in how financing for food security and nutrition is defined. All development funders – public and private, domestic and foreign – have certain priorities and targets that they want to meet. For example, in 2009, following the food price crisis, the G7 pledged to spend USD 20 billion on food security between 2009 and 2012.[12] Since it is normally the funder who decides how resources are recorded and under which sector the budgetary allocation will be made, funders may assign different codes for similar projects in order to maximize alignment with their priorities and targets.

Where public domestic resources are concerned, stakeholders have identified a broad and ongoing cultural shift towards the use of aid by senior executives for political considerations. Increasingly, the biggest driver of foreign aid investments is policy codes, especially those that align with multilateral agreements on climate and biodiversity. The process of defining financing for food security and nutrition is therefore somewhat political, as the inclusion or exclusion of a given intervention or sector will bias certain funders, creating further complications.

Food security and nutrition and their links are broadly understood, but this is not the case for the full scope of interventions needed to support them

The transformational vision of the 2030 Agenda for Sustainable Development, calling on all countries and stakeholders to work together to end hunger, food insecurity and malnutrition by 2030, was followed by the transformation of this report, renamed from *The State of Food Insecurity in the World* to *The State of Food Security and Nutrition in the World*,[k] to integrate nutrition and a specific focus on the linkages between food

k The 2017 edition of this report,[13] renamed *The State of Food Security and Nutrition in the World*, marked the beginning of a new era in monitoring progress towards achieving a world without hunger and malnutrition, within the framework of the Sustainable Development Goals (SDGs). Not only did the report henceforth monitor progress towards the targets of ending hunger and food insecurity (SDG Target 2.1) and all forms of malnutrition (SDG Target 2.2), but it was also reformulated to include a thematic analysis of how food security and nutrition are interlinked and related, and the actions needed to achieve both goals. Given the broadened scope to focus on nutrition, WHO and UNICEF joined the traditional partnership of FAO, IFAD and WFP in preparing the report.[13]

security and nutrition. The vision has contributed to a growing recognition that a broader range of interventions is necessary to address the complex interplay of factors influencing food security and nutrition outcomes.

There is now a broadened understanding of food security and nutrition and how they are critically linked, despite the limited consensus on the full scope of interventions that contribute to food security and nutrition. Healthy diets and health status are main determinants of nutritional status, but multiple factors related to food security (e.g. availability and affordability of nutritious foods), practices (e.g. related to food and feeding, care, and health seeking) and services (e.g. clean water, health, education and social protection) all influence the ability and mechanisms through which individuals can achieve healthy diets and adequate health. A comprehensive framework of financing for food security and nutrition therefore involves moving beyond simplistic considerations of food availability and access and delving into the broader understanding of nutrition.

However, to date there have been limited efforts to include this range of interventions in comprehensive measures of financing for food security and nutrition. For example, considering the analyses presented in Figure 14, an analysis of the definitions of ODA for food security and nutrition highlights significant gaps in addressing the full scope of nutrition interventions. Only two of the definitions presented therein include ODA targeted for water and sanitation, despite the well-established evidence of the impact of safe drinking water, sanitation and hygiene (WASH) on nutrition outcomes. Furthermore, only the European Commission definition includes financing for basic health care, despite this being a main determinant of nutritional status (see Table S3.1 in the Supplementary material to Chapter 3 for the comparative analysis and data sources).

As seen above, currently most definitions of financing for food security and nutrition do not consider the broader set of interventions to address the main determinants of food security and nutrition. Importantly, the current definitions of financing do not include the financing of interventions more specifically designed to address the major drivers behind the trends in hunger, food insecurity and malnutrition which have been identified in recent editions of this report: conflict, climate variability and extremes, and economic slowdowns and downturns, combined with structural underlying factors: lack of access to and unaffordability of nutritious foods and unhealthy food environments, and high and persistent inequality.

No doubt, to get on track to meet SDG Targets 2.1 and 2.2, better use of existing financing and newly added financing will both be needed. At the same time, it is difficult to understand how much financing is available and the financing gap for achieving food security and addressing all forms of malnutrition in the absence of a commonly agreed upon and robust definition of financing for food security and nutrition. This definition must be theoretically underpinned by the conceptual understanding and definition of food security and nutrition, and their determinants, as well as the major drivers behind hunger, food insecurity and malnutrition. ■

3.2 A NEW DEFINITION OF FINANCING FOR FOOD SECURITY AND NUTRITION

This report is the first to propose a definition of financing for food security and nutrition. This definition is grounded in a conceptual understanding of the definition and determinants of food security and nutrition, the interconnected nature of food security and nutrition, and the major drivers behind recent setbacks in achieving an end to hunger, food insecurity and all forms of malnutrition.

The different financing flows to food security and nutrition

Financing is the process of providing funds for the public and private sector to engage in economic activities, make purchases or carry out investments. The funds may or may not be provided conditional on a certain return (interests, dividends and so on) or reimbursement (of debt principal). Financial resources may be

TABLE 8 MATRIX OF DIFFERENT FINANCING FLOWS BY SOURCE

Source of financing	Domestic	Foreign
Public	Public spending Public development banks (state banks)	Official development assistance Other official flows
Private	Domestic private sector investment and spending	Multinational corporations' investments and spending Foreign direct investment Cross-border remittances

NOTES: The table is simplified to only show examples of different financing flows that belong exclusively to each source of financing. There are other financing flows that are common to more than one source of financing. For examples, see text below, **Section 5.1** and Zoubek *et al.* (forthcoming).[14] For a short definition of financial terms, see Box 6 and **Annex 2 Glossary**.

SOURCE: Authors' (FAO) own elaboration.

provided by one or a combination of four sources: i) public domestic, ii) public foreign, iii) private domestic, and iv) private foreign. Each source may provide financing through a range of financial instruments to finance short-term and long-term interventions on commercial or concessional terms (e.g. grants or loans below market rates).

Table 8 shows examples of different financing flows that belong exclusively to each source of financing. There are other financing flows that are common to more than one source of financing; for example, remittances can be private domestic or private foreign. On the other hand, commercial and non-commercial financing flows can come from all four sources of financing. For the purposes of simplicity, financing flows that are common to more than one category are not identified in Table 8 but are further elaborated in the text below and in **Chapter 5**. See Box 6 for a short definition of financial terminology, and **Annex 2 Glossary** for more elaborated definitions of key financial terms used in this report.

Public financing consists of flows financed out of public sources, the largest of which are taxes and borrowing (domestic and foreign) that governments use to fund expenditures. Social contributions, grants, property income, sales of goods and services, and other miscellaneous revenues (such as fees and sales of natural resources) are other sources of revenue, but they are much smaller for most countries.[15, 16]

Public domestic financing is the process through which governments raise, allocate and spend their own funds to finance public expenditures, mostly through taxes and loans.

Public resources can also consist of **public foreign financing**, for example, ODA and other official flows (OOF). Official development assistance refers to official financial transactions by the official sector within countries and territories that meet the requirement of a minimum grant element. It can include humanitarian finance, multilateral development banks, and blended finance, the latter of which uses public money to crowd in private finance. Other official flows are transactions by the official sector with countries and territories that do not meet the conditions for eligibility for ODA, either because they are not primarily aimed at development or because they do not meet the minimum grant element requirement.[17, 18]

Private financing, on the other hand, consists of flows at market terms financed by private sector resources and private grants. It can include both foreign and domestic financing. For example, private sector spending on research and development investments or farmers' and processors' investments in diverse and nutritious crops and foods, such as orange-fleshed sweet potato or legumes rather than wheat or maize, can be considered investments in nutrition.

Private domestic financing consists of domestic private investment usually owned by domestic or local private investors.[19] Private domestic financing includes loans and other financial instruments (including project finance) from banks as well as investment and risk-management instruments from capital markets, and private philanthropic institutions whose funding represents aid rather than for-profit activities. Private commercial sector investments and »

BOX 6 BRIEF DEFINITION OF THE FINANCIAL TERMS USED IN THIS REPORT

Blended finance. The strategic use of development or concessional finance for the mobilization of additional finance, usually commercial private finance, towards sustainable development.

Capital markets. A subset of financial markets that specifically deal with the buying and selling of equity and debt securities, primarily.

Commercial finance. Commercial refers to activities of commerce business operations to earn profits. Non-commercial activities can be conducted by non-profit organizations or government agencies.

Debt. A debt arrangement gives the borrowing party permission to borrow money on condition that it must pay back the sum later, usually with interest.

Domestic private investment. A measure of the amount of money that domestic businesses invest within their own country. It can be represented with the accounting equation: non-residential investment + residential investment + change in inventories.

Equity. Ownership stake in an asset minus the amount of all liabilities on that asset.

Export credits. Financing or credit facilities that are extended to exporters to enable them to sell goods and services in overseas markets.

Financing. The process of providing funds for the public and the private sector to engage in economic activities, make purchases or carry out investment. The funds may or may not be provided conditional on a certain return (interests, dividends and so on) and/or reimbursement (of debt principal).

Foreign direct investment (FDI). A type of investment made by a private entity resident in one economy in an enterprise resident in another.

Funding. In the strictest sense, the provision of funds without requirement of return or reimbursement. In a broad sense, any provision of funds, similar to financing, which may or may not involve an expectation of return or repayment.

Insurance. A contract, represented by a policy, in which a policyholder receives financial protection or reimbursement against the probable occurrence of losses from an insurance company.

International portfolio investment. A type of investment that consists of securities and other financial assets held by investors in another country.

Investment. The commitment of current financial resources to achieve higher gains in the future.

Official development assistance (ODA). Government aid designed to promote the economic development and welfare of developing countries that meet a minimum grant element requirement.

Other official flows (OOF). Official sector transactions that do not meet ODA criteria, either because they are not primarily aimed at development or because they do not meet the minimum grant element requirement.

Private financing. The process of obtaining or raising funds by private sector entities to support various activities or investments.

Private domestic financing. The process of obtaining funds from domestic or national private investors and lenders.

Private foreign financing. The process of obtaining funds from foreign or international private investors and lenders.

Public financing. The process of obtaining or raising funds by public sector entities (domestic and foreign governments, international organizations).

Public domestic financing. The process through which governments raise and allocate funds to finance public expenditures, mostly through taxes and loans.

Public foreign financing. The process through which governments raise, allocate and spend their own funds to support various activities or investment in other countries.

Remittances. Private, voluntary monetary and non-monetary (social or in-kind) transfers made by migrants and diaspora, individually or collectively, to people or to communities not necessarily in their areas of origin. They can be cross-border or in the home country.

Security. A fungible, negotiable financial instrument that represents some type of financial value, usually in the form of a stock, bond or option.

NOTE: For sources for the above definitions and the full list of financial terms and definitions used in this report, see **Annex 2 Glossary**.

» financing to global and national agrifood systems are sizeable, largely driven by commercial actors. However, investments by farmers and processors in crops and foods more generally are considered investments in food security. Investments in capital stock by farmers are a large share of private domestic finance.[20]

Private foreign financing consists of FDI and/or international portfolio investment, both owned by foreign or international private investors.[19] These can include private export credits, securities of multilateral agencies and bilateral portfolio investments. Private flows other than FDI are restricted to credits with a maturity of more than one year.[18] Foreign direct investment can be inflows or outflows of capital from one country to another. It is an ownership stake in a foreign company or project made by an investor, company or government from another country. Remittances are also included here. In many developing countries, remittances are the largest foreign source of financing, greater than ODA and FDI.

A core and an extended definition of financing for food security and nutrition

The new definition of financing for food security and nutrition presented in this report comprises core and extended definitions. The core definition includes the financing flows that support efforts addressing the main determinants of food security and nutrition. The extended definition builds on this, to include financing flows that contribute to addressing the major drivers and underlying structural factors behind recent increases in food insecurity and malnutrition. These definitions are articulated into one in Box 7, conceptually summarized in Figure 15 and explained in detail in the sections below.

A core definition – the lens on food security and nutrition dimensions and determinants

According to this report, food security is defined as "a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (see **Annex 2 Glossary**).

Based on this definition, four food security dimensions can be identified: food availability, economic and physical access to food, food utilization, and stability over time (Figure 15 and Figure 16). Note that the concept of food security is evolving to recognize the centrality of agency and sustainability. However, these two dimensions are captured under the extended definition of financing for food security and nutrition.

Defining the dimensions, **food availability** addresses whether or not safe and nutritious food is actually or potentially physically present, including aspects of production, food reserves, markets and transportation, and wild foods, while **food access** relates to whether or not households and individuals have sufficient physical and economic access to that food (see **Annex 2 Glossary**). In other words, food security requires that sufficient safe and nutritious food is available to all populations, through either production or imports, and that all people can physically and economically access adequate quantities of safe and nutritious food.[22] As such, poverty, and power imbalances in global food supply chains, both of which affect access and purchasing power, are drivers of food insecurity and malnutrition (see the extended definition).

The simple fact of having the availability of and access to adequate safe and nutritious food is insufficient if an individual's physiological condition prevents them from absorbing and utilizing the micronutrients in the food they are consuming.[23] Thus, food security is also determined by **food utilization**, or an individual's ability to utilize the calories and nutrients in the food they consume.[22]

Another important aspect of food utilization refers to whether households are optimizing the **consumption** of safe and nutritious foods to meet the dietary needs of each individual within the household. **Nutritional status**, however, depends not only on consumption of adequate safe and nutritious food, but also on **health status**. Both food consumption and health status are influenced by a variety of **practices** including good food handling and preparation, practices for children, girls and women, intra-household distribution of food, and service utilization. They are also influenced

BOX 7 THE DEFINITION OF FINANCING FOR FOOD SECURITY AND NUTRITION

Financing for food security and nutrition refers to the process of providing or obtaining financial resources to ensure that all people, at all times, have stable, physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life, and suitable food preparation and handling, feeding, caring, and health-seeking practices, and access to health, water and sanitation services to ensure a continued adequate nutritional status. Such financial resources may be provided by one or a combination of four sources of financing: i) public domestic, ii) public foreign, iii) private domestic, and iv) private foreign. Each of the different sources of financing deploys a range of financial instruments to finance short-term and long-term interventions on a commercial or concessionary basis (e.g. grants or loans below markets rates).

Financing for food security and nutrition therefore includes the financial resources that contribute to the eradication of hunger, food insecurity and malnutrition in all its forms across a rural–urban continuum.[21] The resources are targeted to ensure the availability, access, utilization and stability of nutritious and safe food, practices that favour healthy diets, as well as health, education and social protection services that enable adequate nutritional status across the life course.

Additionally, it covers expenditures and investments that aim to ensure that all individuals are protected against short-term or long-term instability in food security and nutrition, caused by various climatic, economic, social, commercial and political factors.

Financing therefore encompasses all the interventions aligned with the six transformative policy pathways designed to strengthen the resilience of agrifood systems to the major drivers behind hunger, food insecurity and malnutrition – namely conflicts, climate variability and extremes, and economic slowdowns and downturns – and address the underlying structural factors: lack of access to and unaffordability of nutritious foods and unhealthy food environments, and high and persistent inequality. That is, investments to: i) integrate humanitarian, development and peacebuilding policies in conflict-affected areas; ii) scale up climate resilience across agrifood systems; iii) strengthen the economic resilience of the most vulnerable to economic adversity; iv) intervene along agrifood supply chains to lower the cost of nutritious foods; v) shifting food environments towards healthier dietary patterns with positive impacts on human health; and vi) tackle structural inequalities, ensuring interventions are well targeted and inclusive. As such, investments in food security and nutrition span a wide variety of sectors. They can include investments in resilient and sustainable increases in agricultural productivity; water, sanitation and hygiene practices; conflict-sensitive policies; social protection; climate-smart agriculture; rural roads and infrastructure; healthy public food procurement; and access to essential health services.

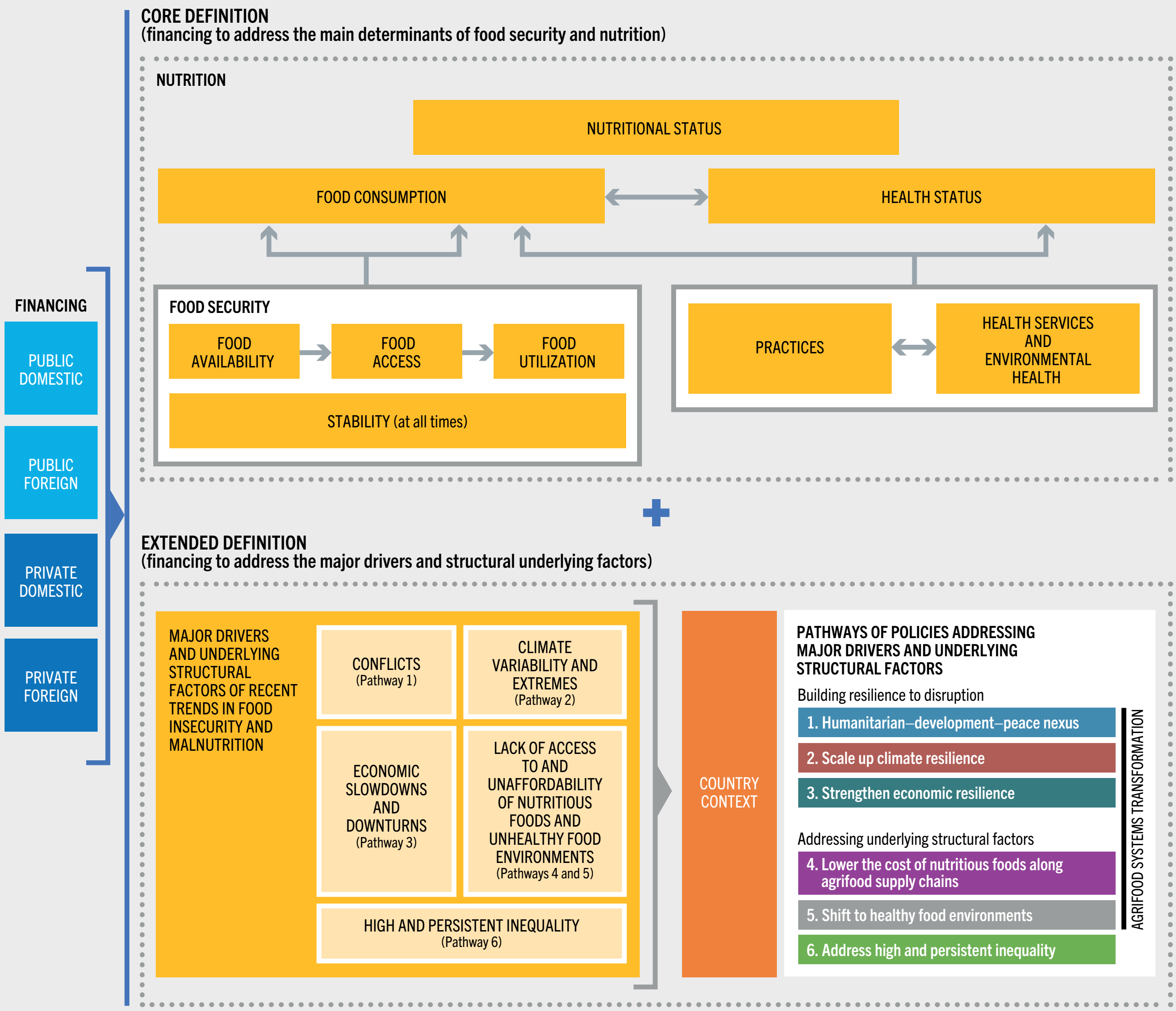
The operationalization of this definition and mapping to sector-, purpose- and intervention-related keywords is provided in **Section S3.2** of the Supplementary material to Chapter 3 in this report.

by access to a variety of **health services and environmental health,** including access to clean water, sanitation, education and health care (see **Annex 2 Glossary**).[21]

In this regard, food security and nutrition are inextricably linked. In Figure 15 and Figure 16, we illustrate how these well-established linkages provide a solid background for the core definition of food security and nutrition financing. This includes a broadened scope of factors related to **practices**, and **health services and environmental health**. This more comprehensively captures the determinants of an individual's nutritional status and places the role of food security alongside the many other practices and services that are essential to ensure not only food utilization, but the many critical non-food-related aspects.

Ensuring food security requires **stability** across all three of the dimensions of food security – **availability, access and utilization** (Figure 15 and Figure 16). If the dimensions of availability, access and utilization are sufficiently met, **stability**

FIGURE 15 A CONCEPTUAL DIAGRAM OF THE NEW DEFINITION OF FINANCING FOR FOOD SECURITY AND NUTRITION – FOR ENDING HUNGER AND FOOD INSECURITY (SDG TARGET 2.1) AND ALL FORMS OF MALNUTRITION (SDG TARGET 2.2)

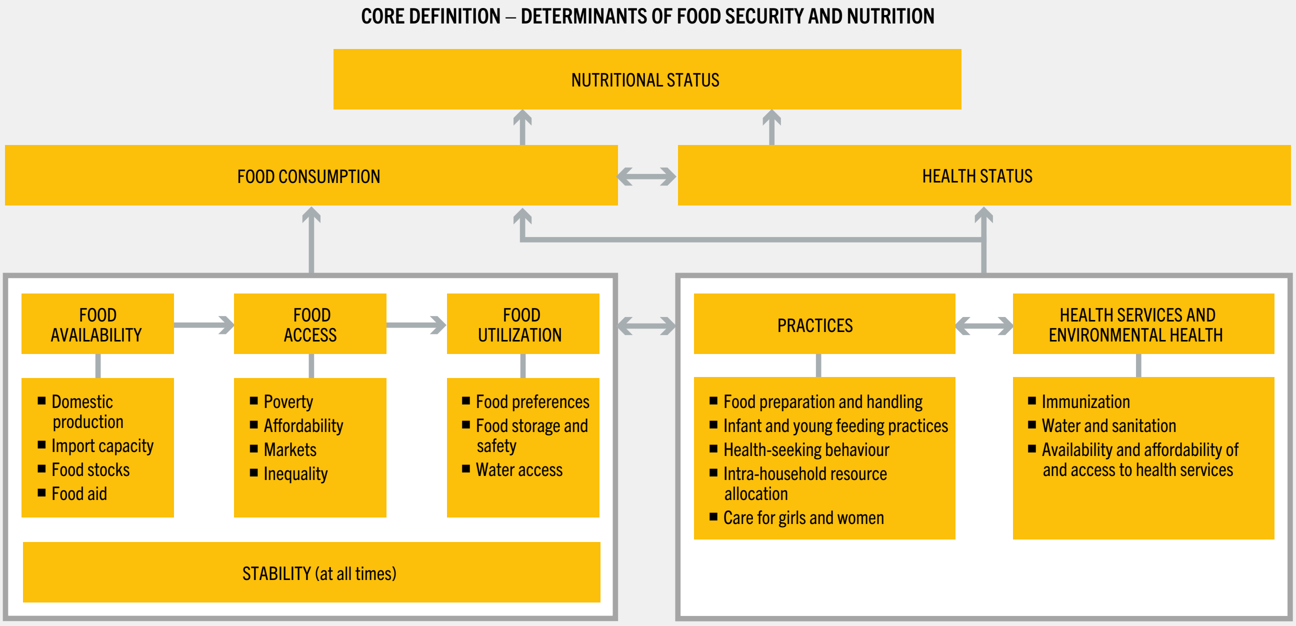


NOTES: SDG = Sustainable Development Goal. The operationalization of this definition and mapping to financial resources using purpose codes and intervention-related keywords is provided in Table S3.3 in the Supplementary material to Chapter 3.

SOURCE: Authors' (FAO) own elaboration.

is the condition in which the whole system is stable, thus ensuring that households are food secure at all times. Stability issues can refer to short-term instability (which can lead to acute food insecurity) or medium- to long-term instability (which can lead to chronic food insecurity). Climatic, economic, social and political factors can all be a source of instability

FIGURE 16 THE CORE DEFINITION OF FINANCING FOR FOOD SECURITY AND NUTRITION ENTAILS ADDRESSING THE MAIN DETERMINANTS OF FOOD SECURITY AND NUTRITION



SOURCES: Adapted from FAO, IFAD, UNICEF, WFP & WHO. 2018. *The State of Food Security and Nutrition in the World 2018. Building climate resilience for food security and nutrition*. Rome, FAO. https://www.fao.org/3/i9553en/i9553en.pdf; IPC (Integrated Food Security Phase Classification). 2021. *Technical Manual Version 3.1. Evidence and Standards for Better Food Security and Nutrition Decisions*. Rome. https://www.ipcinfo.org/fileadmin/user_upload/ipcinfo/manual/IPC_Technical_Manual_3_Final.pdf

(see **Annex 2 Glossary**). Temporary and seasonal changes, as well as shocks and crises such as political instability or extreme climate events, are all drivers of food insecurity through their effects on the availability and accessibility of food.[22] Ultimately, anything that influences any of these components will influence food security.

Eliminating hunger and food insecurity, with its explicit focus on safe and nutritious food, is a prerequisite of good nutrition.[24] Food security can enable a healthy diet, characterized by adequacy without excess of all nutrients, balance in energy and sources of energy, a wide diversity of foods, and moderation in the consumption of foods and food components associated with adverse health outcomes (see Box 3 in **Section 2.1**). However, a healthy diet alone is insufficient to ensure good nutrition, which also requires adequate food, care, hygiene and health-seeking practices, and access to services including health, water, sanitation and education.

Finally, a crucial element within the core definition is the recognition that food insecurity and malnutrition are phenomena that are found not only in rural areas, but across a rural–urban continuum. As **Section 2.1** of this report shows, while food insecurity is generally highest in rural areas, it is also very high in peri-urban and urban areas. The prevalence of moderate or severe food insecurity in 2023 was 31.9 percent in rural areas compared with 29.9 percent in peri-urban areas and 25.5 percent in urban areas. A more disaggregated rural–urban continuum lens shows that food insecurity can even be higher in urban and peri-urban areas.[21] The core definition of financing for food security and nutrition, therefore, must capture the funding needed to address all the food security dimensions and the main determinants of both food security and nutrition, with a rural–urban continuum lens.

Extended definition – a lens on the major drivers of food insecurity and malnutrition

Recent increases in hunger and food insecurity and slowed progress in eliminating all forms of malnutrition call for more than just better and increased financing to the main determinants of food security and nutrition. New financing is needed, specifically to build resilience to the disruptions to agrifood systems that the major drivers (conflict, climate variability and extremes, economic slowdowns and downturns) create and to address the underlying structural factors (lack of access to and unaffordability of nutritious foods and unhealthy food environments, and high and persistent inequality), which worsen the negative impact the major drivers already have on food security and nutrition (see Figure 15).

It is noteworthy that unhealthy food environments are considered jointly with the lack of access to and unaffordability of nutritious foods, an important underlying structural factor impeding the achievement of food security and nutrition. Enabling healthy diets for all is a critical link between food security and nutrition, as healthy diets are a necessary albeit insufficient condition to achieve good nutrition and, what is more, it is well known that the quality of diets may worsen in a variety of ways as the severity of food insecurity increases. Access to healthy diets can be determined by many factors, but this edition of the report highlights the role played by the unaffordability of healthy diets (**Section 2.2**) and unhealthy food environments. The concept of food environment refers to the physical, economic, sociocultural, policy and legislation conditions that shape the access to and availability, affordability and safety of food, as well as food preferences. Transforming food environments that can enable access to healthy diets means providing physical access to diverse, safe and nutritious foods that reduce the risk of all forms of malnutrition, including undernutrition, overweight and obesity, and reduce the risk of diet-related non-communicable diseases (NCDs). By implementing a broad-based strategy across different sectors, governments can create supportive environments for healthy diets in hospitals, schools, workplaces and other public institutions, and address the high burden of the hidden costs associated with unhealthy diets highlighted in the 2020 edition of this report.[25–29] Access to nutritious foods is not only a matter of cost and affordability. Many elements of the food environment influence dietary patterns, while culture, language, culinary practices, knowledge and consumption patterns, food preferences, beliefs and values all relate to the way food is sourced, generated, produced and consumed.[30]

The extended definition also integrates the final two evolving dimensions of food security: agency and sustainability. While these dimensions are not formally established or defined, they are understood as the following: Agency "refers to the capacity of individuals or groups to make their own decisions about what foods they eat, what foods they produce, how that food is produced, processed and distributed within agrifood systems; and to their ability to engage in processes that shape food system policies and governance"; and, sustainability "refers to the long-term ability of agrifood systems to provide food security and nutrition in a way that does not compromise the economic, social and environmental bases that generate food security and nutrition for future generations" (see **Annex 2 Glossary**).

Update of countries affected by the major drivers

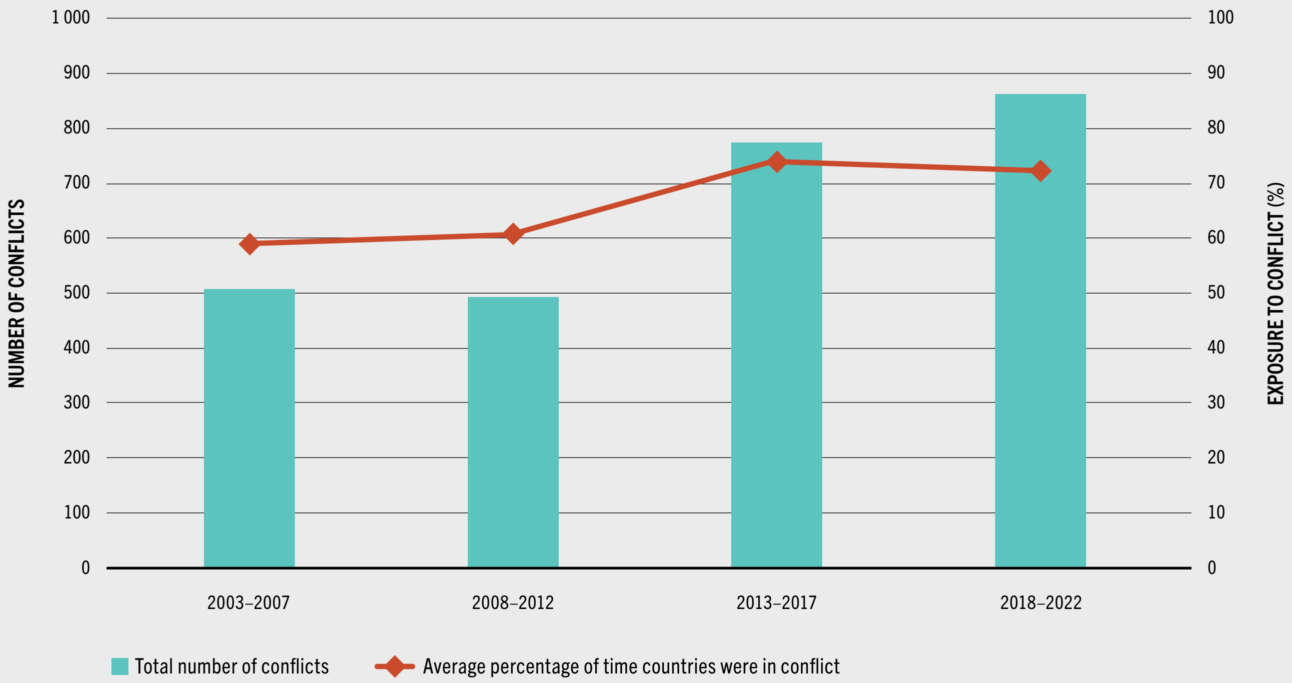
To generate a framework for increased financing and improved finance targeting, it is imperative to gain an understanding of the major drivers of food insecurity and malnutrition, and of the countries affected by these major drivers. In the last ten years, the frequency and intensity of conflict, climate extremes and economic downturns have increased and are undermining food security and nutrition around the world. Furthermore, high levels of income inequality exacerbate the effects of these major drivers (Figure 17). Of particular concern are low- and middle-income countries because the negative impacts on food security and nutrition are greatest in these countries and they carry the biggest burden of the world's population who are undernourished, and children who are stunted. Further, these countries experience multiple forms of malnutrition, including child overweight and adult obesity (see **Chapter 2**).

The analysis of the countries affected by the major drivers is a key input to generating a framework for innovative financing to scale up support to food security and nutrition, which is presented in **Section 5.1**. Therefore, the analysis of countries affected by the major drivers is updated for this year's report. Results are summarized here, while the methodology, data sources and full updated analysis are provided in the Supplementary material to Chapter 3.

The extent to which a major driver negatively affects people's food security and nutrition depends on their degree of exposure and their vulnerability to its impact. In the analysis, countries are categorized based on whether »

FIGURE 17 THE INCREASING FREQUENCY AND INTENSITY OF MAJOR DRIVERS AND INCOME INEQUALITY IN LOW- AND MIDDLE-INCOME COUNTRIES, 2003–2022

A) CONFLICTS: THE TOTAL NUMBER OF CONFLICTS IS INCREASING, 2003–2022



B) CLIMATE EXTREMES: THE PERCENTAGE OF TIME COUNTRIES ARE EXPOSED TO CLIMATE EXTREMES IS INCREASING, 2003–2022

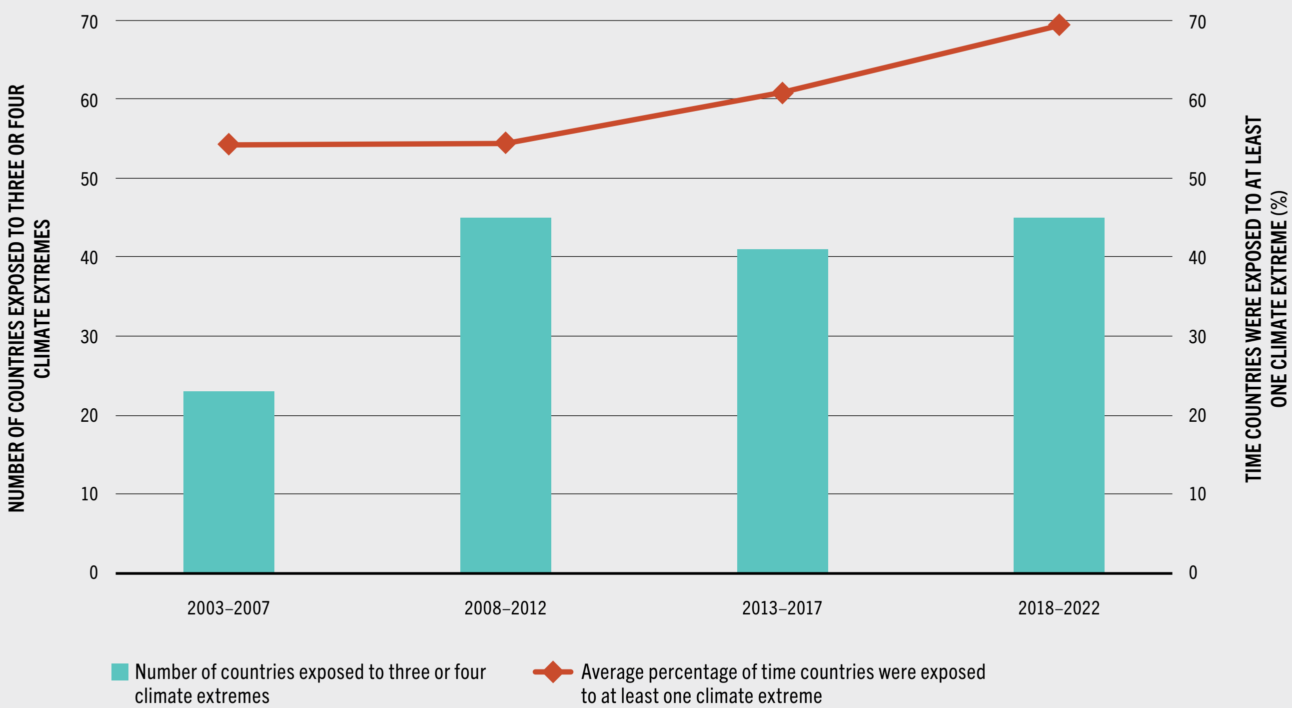
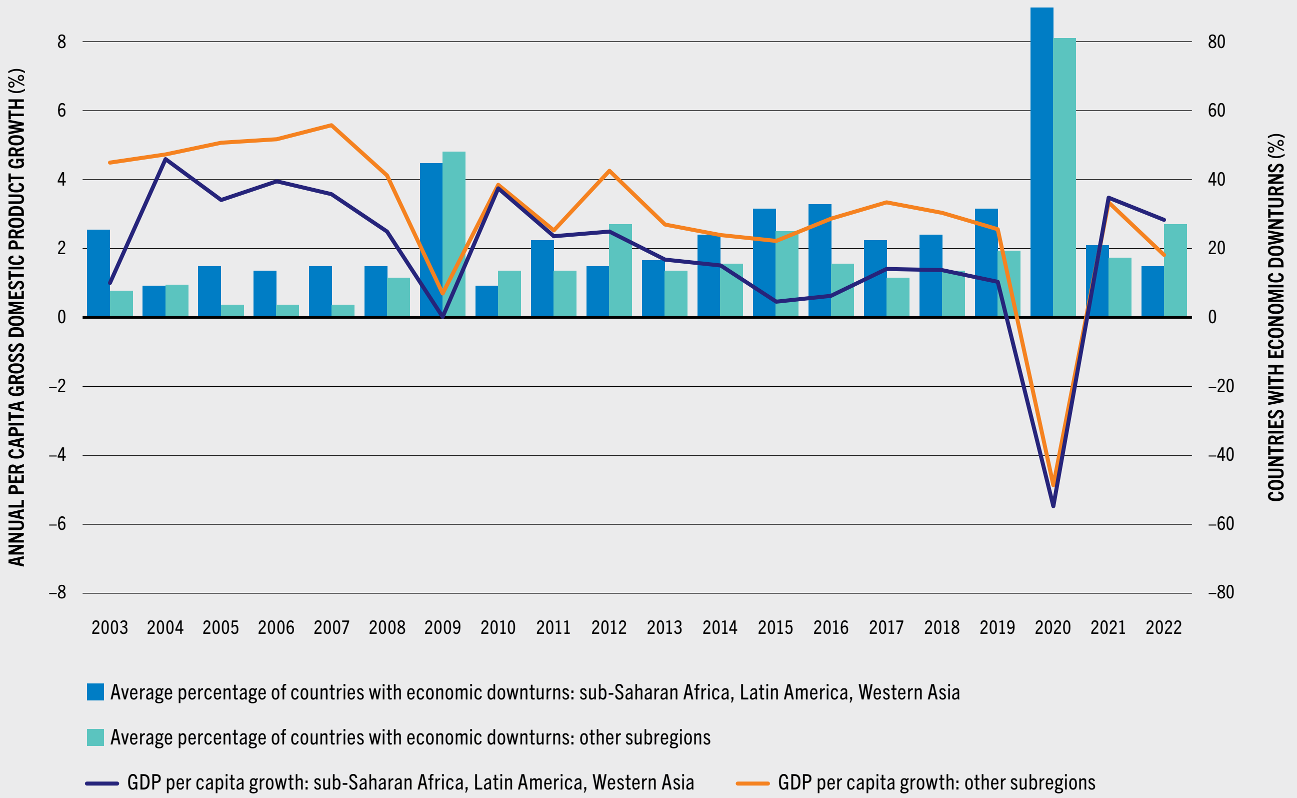
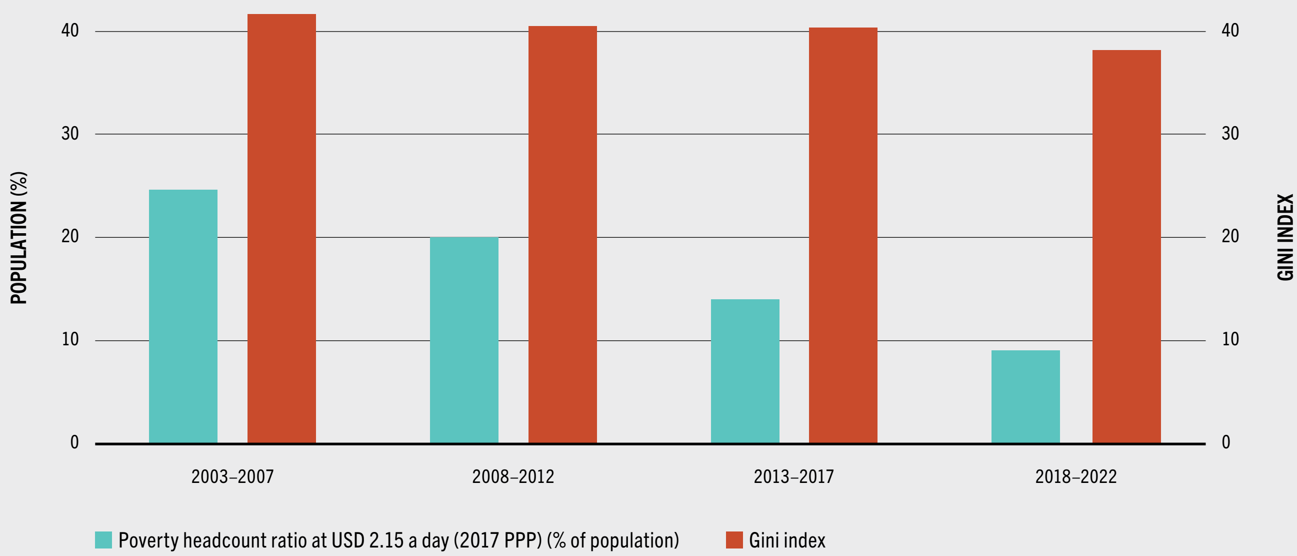


FIGURE 17 (Continued)

C) ECONOMIC DOWNTURNS: SEVERAL COUNTRIES EXPERIENCE DOWNTURNS AND DRAMATIC SWINGS IN ECONOMIC GROWTH, 2003–2022



D) INCOME INEQUALITY: WHILE POVERTY HAS DECLINED AROUND THE WORLD, INCOME INEQUALITY IS PERSISTENTLY HIGH, WITH LIMITED REDUCTIONS, 2003–2022



NOTES: GDP = gross domestic product; PPP = purchasing power parity. All figures refer to low- and middle-income countries. Figure 17A shows the total number of conflicts in each of the five-year subperiods that were caused by internal or intrastate conflict (turquoise bars), and the average percentage of years in each subperiod countries were exposed to conflict (red line). Figure 17B shows the number of countries that experienced at least three different types of climate extremes (heat spell, flood, drought, storm) in each of the five-year subperiods (turquoise bars), and the average percentage of years in each subperiod countries were exposed to at least one climate extreme (red line). Figure 17C shows the trend in GDP per capita growth (left axis) and the percentage of countries that experience an economic downturn in a specific year between the period from 2003 to 2022 (right axis). Figure 17D shows the average percentage of the population living below the poverty line of USD 2.15 a day (turquoise bars) and the average level of income inequality by five-year subperiod (red bars). The analysis is shown for 119 low- and middle-income countries with available prevalence of undernourishment information. See Table S3.5 in the Supplementary material to Chapter 3 for full methodology and full list of data sources.

SOURCE: Authors' (FAO) own elaboration.

https://doi.org/10.4060/cd1254en-fig17

» they are "affected" by a major driver. In summary, two criteria are used for a country to be categorized as being affected by a driver: i) evidence of the occurrence of an event related to the driver in a country, for example, the occurrence of a conflict, a climate extreme, or an economic downturn; and ii) evidence of vulnerability to the impacts of such an event, which refers to conditions that increase the probability that the occurrence of the driver event will negatively affect the country's food security and nutrition situation (see Supplementary material to Chapter 3, Table S3.5 for methodologies and data sources).

While each of these major drivers is unique, they often interact to create multiple compounding impacts transmitted through agrifood systems to the detriment of food security and nutrition.[30] As a result, all dimensions of food security are likely to be affected, including food availability, access, utilization and stability, as well as the other determinants of nutrition, specifically practices (e.g. food preparation and handling, infant and young feeding practices, health-seeking behaviour, intra-household resource allocation, and care for girls and women) and health services and environmental health (e.g. immunization, water and sanitation, and availability and affordability of, and access to health services). For instance, a growing body of literature is also demonstrating the direct impact of climate, particularly extreme heat, on the nutritional status. This is corroborated by the association found between the occurrence of these drivers and the food security and nutrition indicators.[30]

Alarmingly, the majority of low- and middle-income countries are affected by at least one of the major drivers and, where there are multiple drivers occurring, the compounding impacts lead to the highest increases in hunger and food insecurity (Figure 18). Countries in a protracted major food crisis are severely affected by multiple drivers and face among the highest level of food insecurity (Box 8, Figure A1).

The extended definition of financing for food security and nutrition encapsulates the interventions that contribute to one or more of the six transformative policy pathways proposed in the 2021 edition of this report[30] to address the major drivers of the current levels of food insecurity and malnutrition. Each of the six transformative pathways leads to the implementation of policies, investments and legislation to build resilience to each one of these major drivers (Figure 19 and Box 9). In this way, the extended definition builds on the core definition but goes beyond the eradication of hunger, food insecurity and all forms of malnutrition to also address the major drivers.

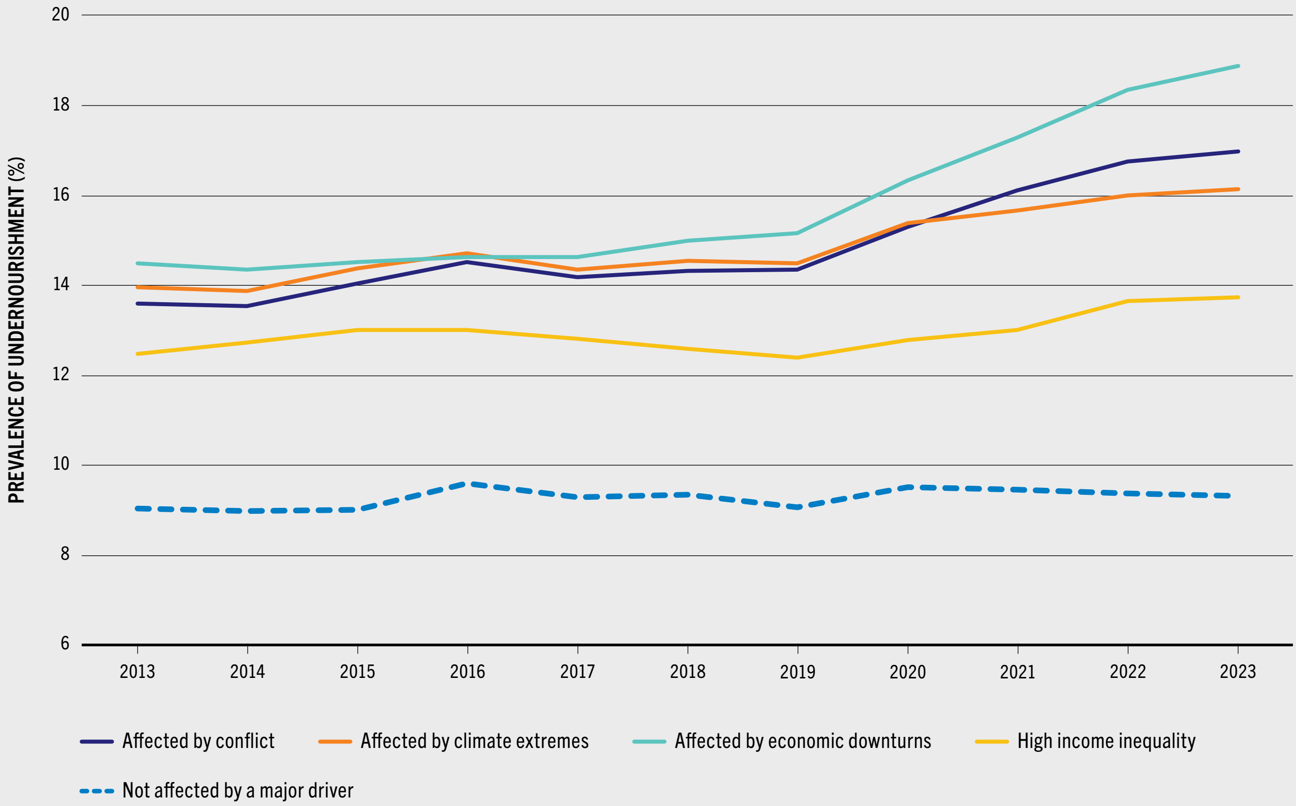
Mapping and application of the core and extended definitions to financing flows

The application of the core and extended definitions of financing for food security and nutrition is shown in Figure 20. Financing for building resilience to the major drivers of recent increases in food insecurity and malnutrition (extended definition) is additional and complementary to the core definition. Moreover, as the figure shows, the extended definition must consider country context. Not all countries are affected by all the major drivers. While some are affected by a single driver, countries in which food insecurity has increased the most are usually affected by a combination of drivers. This means that, theoretically, countries would not need to fund the adoption of all six transformative pathways, but only those that address the major drivers they are facing, considering the country's context.

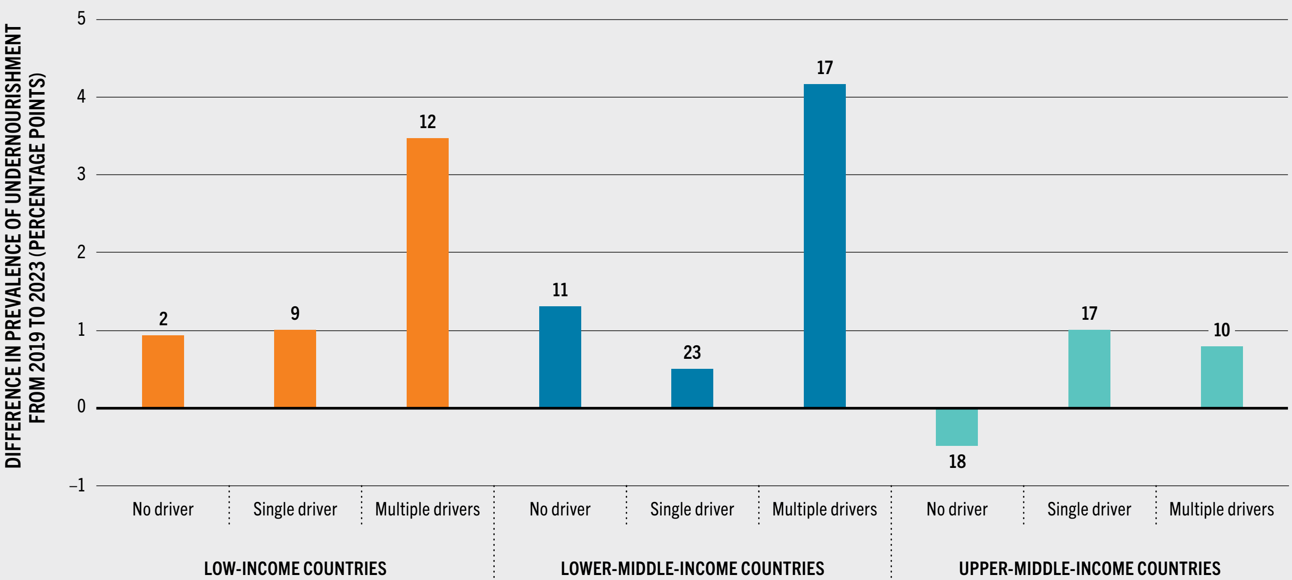
To move from the definition of financing for food security and nutrition to an application of this definition to measure the levels of financing for food security and nutrition requires an understanding of how financing flows are categorized and reported, and then the development of guidelines for mapping these flows to the definition. The conceptual framework around food security and nutrition clearly outlines the different determinants and pathways relevant to meeting SDG Targets 2.1 and 2.2. However, assessing the degree to which the conceptual framework of food security and nutrition can be mapped to financing frameworks and existing databases requires a more granular disaggregation. »

FIGURE 18 HUNGER IS HIGHER AND HAS INCREASED THE MOST IN COUNTRIES AFFECTED BY THE MAJOR DRIVERS, AND HUNGER INCREASES ARE HIGHER IN POOR COUNTRIES AFFECTED BY MORE THAN ONE MAJOR DRIVER

A) TREND IN THE PREVALENCE OF UNDERNOURISHMENT FOR COUNTRIES AFFECTED BY THE MAJOR DRIVERS AND FACING HIGH INCOME INEQUALITY, 2013–2023



B) INCREASES IN HUNGER IN LOW- AND LOWER-MIDDLE-INCOME COUNTRIES WERE HIGHER IN COUNTRIES AFFECTED BY MULTIPLE MAJOR DRIVERS, 2019–2023



NOTES: Figure 18A shows the prevalence of undernourishment (PoU) between the years 2013 and 2023 for low- and middle-income countries affected by any of the three major drivers (conflict, climate extremes and economic downturns), and for countries with high income inequality. Categories are not mutually exclusive, as a country can be affected by more than one major driver and/or face high income inequality. Countries not affected by major drivers are those not affected by conflict, climate extremes or economic downturns. PoU estimates are unweighted. Figure 18B shows the difference in PoU between 2019 and 2023 (percentage points) for countries whose food security was not affected by a major driver (conflict, climate extremes or economic downturns), those affected by a single major driver, and those affected by multiple major drivers, by country income group. The number at the top of each bar refers to the number of countries in that category. The analysis is shown for 119 low- and middle-income countries with available PoU information. See Table S3.5 in the Supplementary material to Chapter 3 for methodology and data sources.

SOURCE: Authors' (FAO) own elaboration.

https://doi.org/10.4060/cd1254en-fig18

BOX 8 PROTRACTED MAJOR FOOD CRISIS COUNTRIES ARE SEVERELY AFFECTED BY MULTIPLE MAJOR DRIVERS AND FACE AMONG THE HIGHEST LEVELS OF CHRONIC FOOD INSECURITY

The 2024 edition of the *Global Report on Food Crises*,[31] an annual report that provides analysis and evidence on acute food insecurity requiring urgent humanitarian assistance to save lives and livelihoods, identifies 19 protracted major food crisis countries,* of which most are low-income food-deficit countries (14 out of 19). These 19 countries have been in a major food crisis for the past eight years, and six countries (Afghanistan, Democratic Republic of the Congo, Ethiopia, Nigeria, Syrian Arab Republic and Yemen) have consistently ranked among the top ten in terms of the population affected, with 108 million people facing high acute food insecurity (IPC level phase 3 or above) in 2023.[31]

Based on this report's analysis,** 18 of the 19 major protracted food crisis countries have data on the prevalence of undernourishment (PoU),*** and all have been affected by at least one major driver of food insecurity, such as conflict, climate extremes or economic downturns, between 2013 and 2022. The only exception is Eswatini, which nevertheless faces high income inequality. Thirteen countries are affected by multiple drivers, a factor that mirrors the extremely high level of PoU observed in 2023 in these countries (Figure A1).

Over the past decade, protracted major food crisis countries have witnessed a steady rise in the PoU, with those affected by climate extremes or economic downturns facing always higher PoU levels (Figure A2). The increase in PoU between 2019 and 2023 was notably sharper in countries affected by economic downturns (Figure A2 and Supplementary material to Chapter 3, Figure S3.6), and it was three times higher in these protracted major food crisis countries compared to the rest of low- and middle-income countries (2.9 percent versus 1.1 percent).

The impact of major drivers on chronic hunger, as measured by the PoU, in protracted major food crisis countries cannot be understated. The gap in PoU between countries affected by conflict, economic downturns or climate extremes and those unaffected has widened over time (Figure A2). The compounding effect of multiple drivers results in higher levels of food insecurity. Countries affected by multiple drivers saw the most significant increase in PoU between 2019 and 2023, and countries affected by all three major drivers face the highest overall level of food insecurity (Supplementary material to Chapter 3, Figure S3.5 and Figure S3.6).

Among the 36 countries in protracted food crisis,**** 33 countries had available PoU data. The findings described above hold true also for them. Among protracted food crisis countries, what sets apart countries in a protracted major food crisis is their exposure to multiple drivers: 72 percent of countries (13 out of 18) in a protracted major food crisis are affected by multiple drivers compared with only 27 percent (4 out of 15) in a protracted food crisis. The tangible consequence is a general lower level of PoU for the protracted food crisis countries. Nevertheless, it is countries in protracted food crisis, excluding major crisis, affected by conflict that experienced the highest increase in PoU between 2019 and 2023 (Supplementary material to Chapter 3, Figure S3.7A and Figure S3.7B).

This analysis draws urgency to the call to integrate humanitarian and development approaches and financing in protracted food crisis countries to address immediate emergency acute food insecurity needs, while also addressing chronic food insecurity, including building resilience in agrifood systems to the major drivers and underlying structural factors. For instance, the 2023 *Financing Flows and Food Crises Report* shows that financing related to the food sector is predominantly humanitarian, while development finance represents only a small share of the financing flows related to the food sector received by protracted food crisis countries.[32]

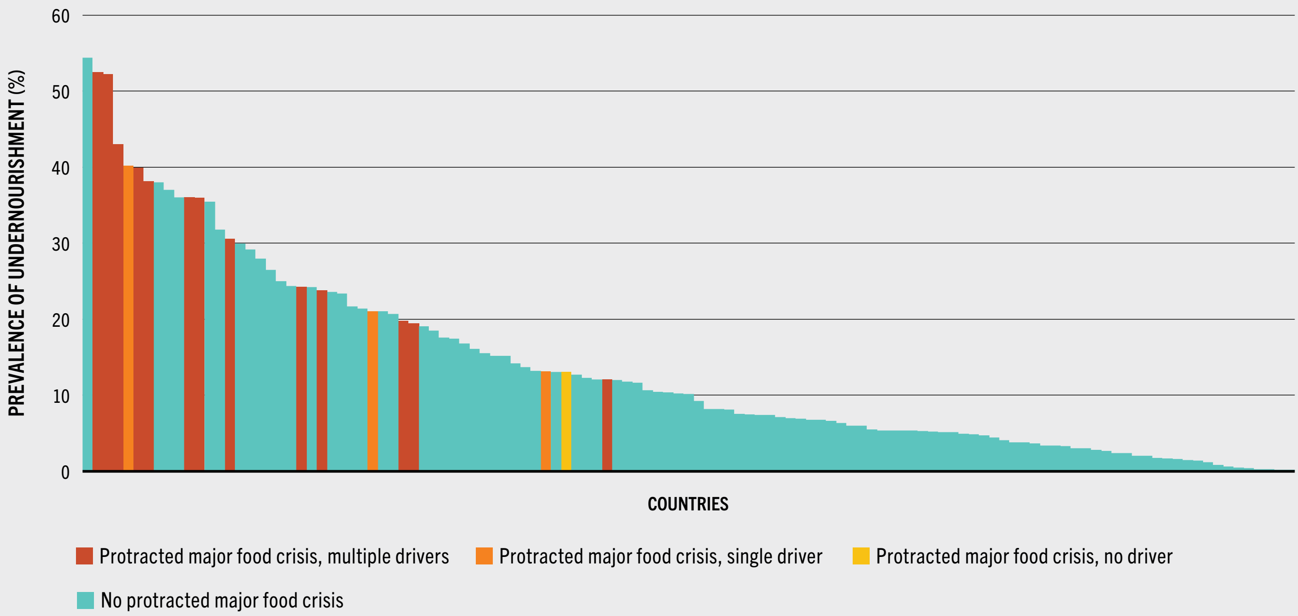
NOTES: * A country/territory is defined as a protracted food crisis country when it is included in all editions of the *Global Report on Food Crises*. A country/territory is defined as a major food crisis country/territory when its acute food insecurity estimates meet one or more of the following criteria: at least 20 percent of the country population is in crisis or worse (Integrated Food Security Phase Classification/Cadre Harmonisé [IPC/CH] Phase 3 or above) or equivalent; at least 1 million people are in crisis or worse (IPC/CH Phase 3 or above) or equivalent; any area is classified in emergency (IPC/CH Phase 4 or above); any area is included in the Inter-Agency Standing Committee humanitarian systemwide emergency response level 3. A country/territory is defined as a protracted major food crisis country when it is identified as a major food crisis country in all editions of the *Global Report on Food Crises*.[31]

** The analysis in this box applies this report's methodology for countries affected by major drivers as outlined in the Supplementary material to Chapter 3, Table S3.5. While *the Global Report on Food Crises* identifies drivers of acute food insecurity and there are overlaps on this with this report, the methodology applied to chronic food insecurity measured by the PoU is different.

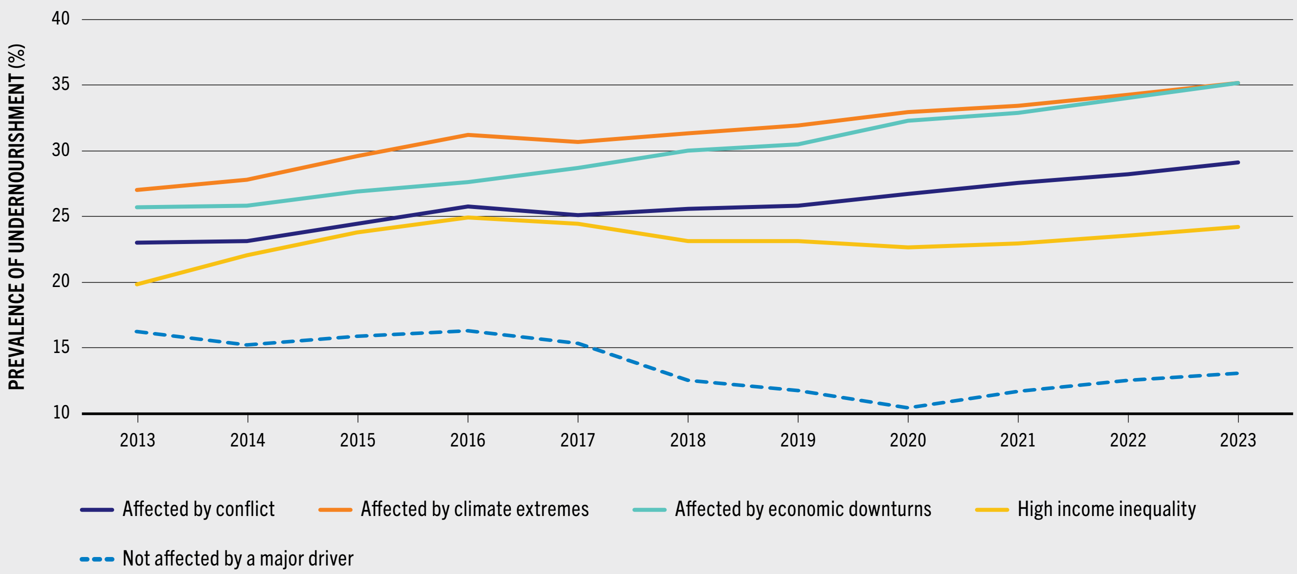
*** The 19 countries classified as protracted major food crisis countries in the *Global Report on Food Crises 2024*[31] are: Afghanistan, Cameroon, Central African Republic, Chad, Democratic Republic of the Congo, Eswatini, Ethiopia, Haiti, Madagascar, Malawi, Mozambique, Niger, Nigeria, Somalia, South Sudan, Sudan, Syrian Arab Republic, Yemen and Zimbabwe. The data series for the PoU for South Sudan is not long enough for the analysis of countries affected by major drivers and is therefore excluded.

**** The 36 countries/territories classified as protracted food crisis countries in the *Global Report on Food Crises 2024*[31] are: Afghanistan, Bangladesh, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Democratic Republic of the Congo, Eswatini, Ethiopia, Guatemala, Guinea, Haiti, Honduras, Iraq, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nicaragua, Niger, Nigeria, Senegal, Sierra Leone, Somalia, South Sudan, Sudan, Syrian Arab Republic, Uganda, Yemen, Zambia and Zimbabwe. The data series for the PoU for Burundi, South Sudan, and Lesotho are not available or not long enough for the analysis of countries affected by major drivers and are therefore excluded.

A1) COUNTRIES IN PROTRACTED MAJOR FOOD CRISIS ARE SEVERELY AFFECTED BY MULTIPLE MAJOR DRIVERS AND FACE AMONG THE HIGHEST PREVALENCE OF UNDERNOURISHMENT, 2023



A2) THE PREVALENCE OF UNDERNOURISHMENT HAS STEADILY INCREASED SINCE 2013 IN PROTRACTED MAJOR FOOD CRISIS COUNTRIES AFFECTED BY MAJOR DRIVERS



NOTES: Figure A1 shows the prevalence of undernourishment (PoU) in 2023 for the 119 low- and middle-income countries with countries classified as facing a protracted major food crisis (red/orange/yellow bars) affected by a single driver, multiple drivers or no driver of chronic food insecurity (conflict, climate extremes or economic downturns). Figure A2 shows trends in the PoU for the 18 countries classified as facing a protracted major food crisis in 2023 and affected by the major drivers (conflict, climate extremes and economic downturns), and countries facing high income inequality. Categories are not mutually exclusive, as a country can be affected by more than one driver and/or face high income inequality. PoU estimates are unweighted. Countries not affected by drivers are those not affected by conflict, climate extremes or economic downturns. See Table S3.5 in the Supplementary material to Chapter 3 for methodology.

SOURCES: Authors' (FAO) own elaboration. PoU based on FAO. For list of countries in major food crisis: FSIN (Food Security Information Network) & GNAFC (Global Network Against Food Crises) 2024. *Global Report on Food Crises 2024*. Rome. https://www.fsinplatform.org/report/global-report-food-crises-2024

https://doi.org/10.4060/cd1254en-figB08-A

FIGURE 19 THE EXTENDED DEFINITION OF FINANCING FOR FOOD SECURITY AND NUTRITION ADDRESSES THE MAJOR DRIVERS THROUGH POLICIES AND ACTIONS ALONG SIX TRANSFORMATIVE PATHWAYS

SOURCE: Adapted from FAO, IFAD, UNICEF, WFP & WHO. 2021. *The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all*. Rome, FAO. https://doi.org/10.4060/cb4474en

» For this report, initial mapping and guidance have been developed and applied to arrive at partial estimates of financing for food security and nutrition and their patterns, which are presented in **Chapter 4**. This mapping consisted of first developing four levels of classification according to the conceptual framework of the core and extended definitions: i) level 1 distinguishes between the core and the extended definition; ii) level 2 between food consumption, health status, and the three major drivers (i.e. conflict, climate variability and extremes, and economic slowdowns and downturns) and the underlying structural factors (i.e. lack of access to and unaffordability of healthy diets and unhealthy food environments, and high and persistent inequality); iii) level 3 between the four dimensions of food security (i.e. availability, access, utilization and stability), practices, and health services and environmental health, and each of the six transformative pathways of policies related to the major drivers; and iv) level 4 between descriptive elements of interventions falling under the level 3 classification. For the full identification of the four classification levels in tabular form, see Table S3.2 in the Supplementary material to Chapter 3.

Second, keywords were identified to clarify the sorts of financing and interventions that were linked to the four-level classification. A more detailed framework was necessary given that some financing and interventions could align with multiple areas of the framework. For example, school feeding is relevant to the core definition, in terms of both food consumption (i.e. food utilization and food consumption behaviour) and health status (i.e. infant and young feeding practices). School feeding is also identified in the extended definition in Pathway 3 on economic slowdowns and downturns. While conceptually this overlap »

BOX 9 SIX TRANSFORMATION PATHWAYS TO ADDRESS THE MAJOR DRIVERS OF FOOD INSECURITY AND MALNUTRITION

As shown in Figure 19, depending on the driver or combination of drivers confronting a country, there are six transformative pathways that include key policies, actions and investments for building resilience to these major drivers, based on an in-depth analysis and evidence from the 2017–2020 editions of this report.

PATHWAY 1: INTEGRATING HUMANITARIAN, DEVELOPMENT AND PEACEBUILDING POLICIES IN CONFLICT-AFFECTED AREAS

- Promoting conflict-sensitive policies; fostering peacebuilding efforts linked to livelihood support; implementing nutrition-sensitive social protection and food production and supply programmes; supporting functioning and resilient food supply chains; adopting community-based approaches in post-conflict policies.
- For example, in conflict and post-conflict areas, people-centred, negotiated development approaches can also address issues of land access, use and management, which also contribute to peace. The provision of community-based animal health services and livestock vaccinations to the Dinka Ngok and Misseriya communities in the contested Abyei area in **South Sudan** and **the Sudan**, working with local government bodies, United Nations peacekeepers and other United Nations entities, was an effective entry point for re-establishing intercommunity dialogue, leading to a local-level peace agreement.

PATHWAY 2: SCALING UP CLIMATE RESILIENCE ACROSS AGRIFOOD SYSTEMS

- Reducing climate-related risks; adapting to climate change; adopting climate risk monitoring and early warning systems; supporting climate risk insurance; promoting improved access to and management of natural productive assets (e.g. landscape restoration, water management); implementing climate-smart interventions.
- For example, in **Zambia,** new initiatives aimed at raising climate resilience include the introduction of agricultural insurance for vulnerable households. Households that adopt conservation agriculture techniques are provided with access to agricultural insurance, which in turn allows them to invest in riskier projects with potentially higher revenues. Under this approach, agricultural insurance is important not only for building climate resilience but also for supporting poverty reduction and increased food security and reduced malnutrition.[30]

PATHWAY 3: STRENGTHENING ECONOMIC RESILIENCE OF THE MOST VULNERABLE TO ECONOMIC ADVERSITY

- Strengthening agrifood productivity and market linkages along the food supply chain; curbing rises in food prices and excessive price volatility; boosting decent job creation; expanding social protection schemes and school feeding programmes.
- For example, investments to develop local agro-industrial value chains can open market opportunities for small-scale farmers, reducing their vulnerability to commodity price shocks, especially in export commodity-dependent countries, and increasing their resilience based on diversified economic activities. In **Senegal**, following a decline in global ground prices, government investments to integrate small-scale producers into profitable and diversified value chains helped farmers transition away from groundnut production by investing in poultry rearing and vegetable growing, which lead to more stable and increased crop incomes.[33]

PATHWAY 4: INTERVENING ALONG AGRIFOOD SUPPLY CHAINS TO LOWER THE COST OF NUTRITIOUS FOODS

- Increasing investments for nutrition-sensitive agricultural production and productivity; increasing efficiency of nutritious food value chains; reducing nutritious food loss and waste; promoting food biofortification; enacting mandatory food fortification; improving rural roads and infrastructure (e.g. nutritious food storage facilities).
- For example, in Myanmar, small and medium enterprises have received direct transfers, increased access to new technologies and training in sustainable production techniques to diversify food production. More than half of the programme's participants have seen their incomes increase by 50 percent, while the expansion of their production to include fresh vegetables has significantly increased the supply of nutritious foods in local markets.[30]

BOX 9 (Continued)

PATHWAY 5: SHIFTING FOOD ENVIRONMENTS TOWARDS HEALTHIER DIETARY PATTERNS WITH POSITIVE IMPACT ON HUMAN HEALTH

- Strengthening food environments (e.g. supporting healthy public food procurement and services); changing consumer behaviour to include sustainability considerations (e.g. improving trade standards with a nutrition-oriented lens, taxing energy-dense foods, introducing legislation on food marketing, food labelling and food reformulation, eliminating industrially produced trans fats).
- For example, in Chile, following the introduction of a law on food labelling and advertising, pre-school children's and adolescents' exposure to advertising for foods high in salt, sugars, energy or saturated fats dropped, while the sales of these foods in school food kiosks was banned. Purchases of foods and beverages high in salt, sugars, energy or saturated fats, which were required to carry front-of-pack warning labels, also fell 24 percent following introduction of the regulation.

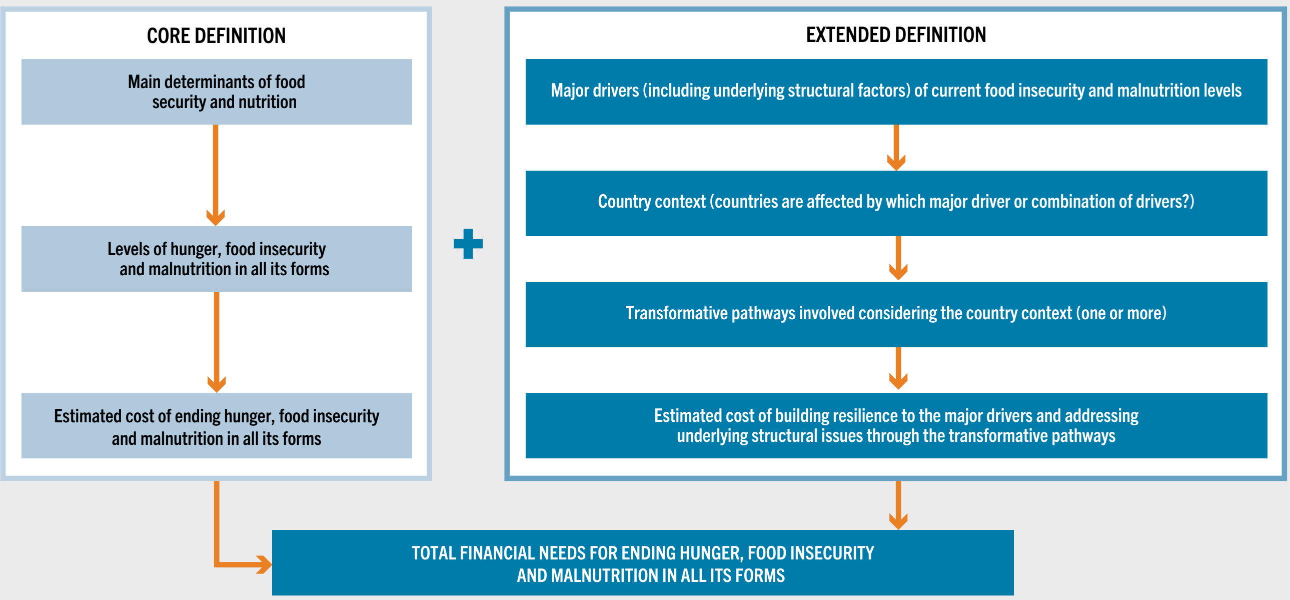
PATHWAY 6: TACKLING STRUCTURAL INEQUALITIES, ENSURING INTERVENTIONS ARE PRO-POOR AND INCLUSIVE

- Empowering populations in situations of vulnerability and marginalization; reducing gender inequalities by supporting women's economic activities and the equitable distribution of resources; promoting the inclusion of women, youth and other populations in situations of marginalization; guaranteeing access to essential services; implementing fiscal reforms to reduce income inequality.
- For example, gender inequalities are still persistent across all regions and all country income groups. In Indonesia, a coastal community development project promoted sustainable fishery and aquaculture production practices by providing production inputs and establishing processing facilities and market linkages. Women, who are primarily engaged in fish processing and marketing, saw their empowerment increase by 27 percent, while fish productivity increased by 78 percent and post-harvest losses fell by 5 percent.

NOTES: For more examples across the six transformation pathways see *The State of Food Security and Nutrition in the World 2021*[30] and the in-depth reports on each of the major drivers and underlying structural factors: conflict (2017 edition),[13] climate variability and extremes (2018 edition),[34] economic slowdowns and downturns (2019 edition),[33] lack of access to and unaffordability of healthy diets (2020 edition).[29]

SOURCE: Adapted from FAO, IFAD, UNICEF, WFP & WHO. 2021. *The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all.* Rome, FAO. https://doi.org/10.4060/cb4474en

FIGURE 20 APPLICATION OF THE CORE AND EXTENDED DEFINITIONS OF FINANCING FOR FOOD SECURITY AND NUTRITION



SOURCE: Authors' (FAO) own elaboration.

» is not necessarily an issue, when mapping the definition of food security and nutrition to data representing financing flows, this could lead to the double counting of resources. To avoid overlaps in assigning financing flows, keywords are identified, and decision rules constructed to guide the allocation across the classification levels. See Table S3.3 for the keywords and Table S3.4 for the decision rules in the Supplementary material to Chapter 3.

Distinguishing financial allocations between "specific" and "supportive" financing for food security and nutrition is important. "Specific" refers to financing that contributes wholly or 100 percent to food security and nutrition. However, as discussed in **Section 3.1**, there are important financial allocations that contribute to food security and nutrition without exclusively supporting only food security and nutrition outcomes. For these types of "supportive" financing measures – those allocations that only partially contribute to food security and nutrition – a weight is applied to account for the percentage of their contribution to food security and nutrition. The identification and application of weights is fraught with challenges and limitations, due to the lack of data and evidence to establish weights; however, the alternatives – either to disregard supportive expenditures or to include their full amounts in estimates – would present even more limitations. For the methodology, data sources and application of weights, including the limitations, see **Section S3.2** and Table S3.3 in the Supplementary material to Chapter 3.

Moving from a definition of financing for food security and nutrition, to mapping it to financial allocations is a challenging task, but one that is necessary, irrespective of what definition is applied. Given that current financing flows and budgets are defined on a sectoral basis, as explained, it is difficult to apply any definition of financing for food security and nutrition, and to do so unavoidably requires making gross assumptions. This is true not only for the new definition presented above, but also for all other financing for food security and nutrition definitions applied in published studies, although this is not always explicitly staged or transparently mentioned. Because financial resources are categorized by sector, there is a risk of "overcounting" or "undercounting" expenditures and investments in support of food security and nutrition and their relative importance.

This report brings transparency to this process, while also providing a new definition of financing for food security and nutrition, and guidance for its application that is more in line with the financing efforts needed to meet SDG Targets 2.1 and 2.2. It is an initial step, going forwards, to take advantage of one definition that should continue to be refined and improved. With this report, the United Nations System and all governments now have an adequate definition and framework for tracking the financing available and needed for food security and nutrition, as part of the means of implementation to meet SDG Targets 2.1 and 2.2. Yet, do data allow us to apply them?

Chapter 4 shows that data to apply the new definition of financing for food security and nutrition exist only for some of the financing flows; hence, it is not possible to take realistic stock of how much financing is available, let alone calculate the financing gap to support efforts to meet SDG Targets 2.1 and 2.2. Therefore, data sources and methodologies must be advanced to ensure there are better data for evidence-based decisions on financing for food security and nutrition. This report, in fact, also sends a loud and clear call for better financial data that can be used for tracking financing for food security and nutrition. Without this, tracking financing for food security and nutrition will remain elusive.

This report thus also calls for universal adoption and transparency in the use of a standardized approach for operationalizing this new definition in its mapping and application to financial data. ■

BRAZIL
Agricultural machinery harvesting corn: financing facilitates access to new technologies.
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CHAPTER 4
CURRENT LEVELS OF AND GAPS IN FINANCING TO END HUNGER, FOOD INSECURITY AND MALNUTRITION

KEY MESSAGES

➔ Financing for food security and nutrition through domestic public spending, official development assistance (ODA) and other official flows (OOF) is trackable, which is not the case for most private flows.

➔ Public spending on agriculture per capita is very low and not steadily growing in low-income countries (LICs) and lower-middle-income countries (LMICs), where food insecurity and undernutrition are more serious; public spending on agriculture is only a fraction of public spending on food security and nutrition.

➔ Public spending on food security and nutrition, particularly on food consumption, was growing before the COVID-19 pandemic in two LICs and eight middle-income countries (MICs). In LICs, governments do not have high spending capacity to address the major drivers and underlying structural factors of food insecurity and malnutrition.

➔ Food security and nutrition take less than a quarter of ODA and OOF flows and seem to have been less of a priority for donors. Between 2017 and 2021, these flows amounted to USD 76 billion per year, of which only 34 percent (USD 26 billion) helped address the major drivers and underlying structural factors of food insecurity and malnutrition. In the same period, these flows overwhelmingly grew more for Africa (across regions) and for LMICs rather than for LICs (across income groups).

➔ Private sector financing is more difficult to track. Philanthropic flows (USD 4 billion on average over 2017–2021) look small compared to cross-border remittances from migrants invested in agrifood systems (USD 29 billion on average over 2017–2022) and foreign direct investment (USD 62 billion on average over 2017–2022). Blended finance represents more modest amounts, and net banking loans to agriculture, forestry and fishing show an almost continuous decline.

➔ Policies, legislation and interventions needed to meet SDG Targets 2.1 and 2.2 could require financing amounting to several trillion USD.

➔ Not bridging the financing gap by 2030 means millions of people will still be undernourished, millions will have been pushed into crisis or worse levels of acute food insecurity, and insufficient progress will have been made to meet all global nutrition targets. Addressing the social, economic and environmental repercussions of this failure will cost several trillion USD.

➔ Executing fully and more effectively national budgets and repurposing existing public support to enable more resilient, sustainable and equitable agrifood systems will help reduce the financing gap.

Financing for food security and nutrition at the country level is provided by the public and the private sectors and is sourced domestically or from abroad (see **Chapter 3**, Table 8). Public finance is the domestic source over which policymakers have most control for targeting food security and nutrition objectives, and it is mostly used through government spending, which is a numerically tractable flow. External public finance materializes through flows, some of which, notably official development assistance (ODA) and other official flows (OOF), can also be mapped to food security and nutrition purposes. A portion of these external flows may be channelled through national budgets, in which case they would become government spending. In practice, then, some financing that is relevant to food security and nutrition may appear both in government spending and in ODA flows that are channelled through national budgets. In regions where ODA is of paramount importance, such as sub-Saharan Africa, the execution of on-budget donor funds for agriculture tends to be complex and low, and about 40 percent of these allocations are left unspent.[1] Some ODA may be legally channelled through financial transactions out of national budgets, to implement projects and programmes much faster.

Available data mostly allow the tracking only of public spending flows, ODA (on-budget and off-budget) and OOF (on-budget and off-budget). The core and extended definitions of financing for food security and nutrition can be applied to these data (definitions are introduced in **Chapter 3** and explained in detail in the Supplementary material to Chapter 3 S3.2); how the definitions are applied to data for such financing flows is explained in detail in the Supplementary material to Chapter 4. The financing flows are mapped to interventions that help to: i) improve food consumption (i.e. food availability, access, utilization and stability) and health status (i.e. practices, and health services and environmental health) (core definition); and ii) transit through the pathways for addressing the major drivers and underlying structural factors behind recent increases in hunger, food insecurity and malnutrition[I] (i.e. conflict, climate variability and extremes, economic slowdowns and downturns, lack of access to and unaffordability of nutritious foods, unhealthy food environments, and high and persistent inequality), including interventions to lower the cost of nutritious foods and strengthen food environments (extended definition). These intervention areas are identified in Table S3.2 of the Supplementary material to Chapter 3 S3.2. Understanding whether the financing flows that support these interventions for food security and nutrition are growing, the specific areas of intervention that they are targeting, and whether the most important recipient countries (in the case of ODA and OOF) are those where hunger, food insecurity and malnutrition are the most challenging in the world are key elements of this chapter.

Private financing flows (both domestic and external) are generally more difficult to track, let alone use for applying the core and extended definitions of financing for food security and nutrition proposed in this report. As a consequence, a robust number for the total financing available in support of all the efforts towards meeting SDG Targets 2.1 and 2.2 is not yet quantifiable. Therefore, this chapter makes unavoidable inferences from patchy data and existing literature to detect patterns between private finance and food security and nutrition. Philanthropic flows are exceptional as data associated with these flows can be analysed after applying the core and extended definitions of financing for food security and nutrition. For other important private flows such as cross-border remittances and foreign direct investment (FDI), one can only rely on existing studies and data sources that offer only partial information relevant to food security and nutrition.

In the face of the impossibility of fully accounting for the total amount of public and private financing flows globally available for food security and nutrition, this chapter delves into existing model-based analyses that provide partial estimates of how much it may cost to finance several policies and interventions to end hunger, food insecurity and malnutrition and make healthy diets more affordable by 2030.

I As mentioned in **Chapter 1**, unless otherwise indicated, reference to the "major drivers" considers also the underlying structural factors behind the recent trends in hunger, food insecurity and malnutrition.

The cost ranges identified have limitations but provide a sense of the financing challenge for the future. Irrespective of exactly how much financing is needed to meet SDG Targets 2.1 and 2.2, the cost of not mobilizing it can be significant and detrimental for the world; hence, the cost of inaction is discussed at the end of the chapter, which also serves as a preamble to **Chapter 5** on what is needed to catalyse scalable financing to fill the gap. ■

4.1 TRACKING CURRENT LEVELS OF FINANCING FOR FOOD SECURITY AND NUTRITION

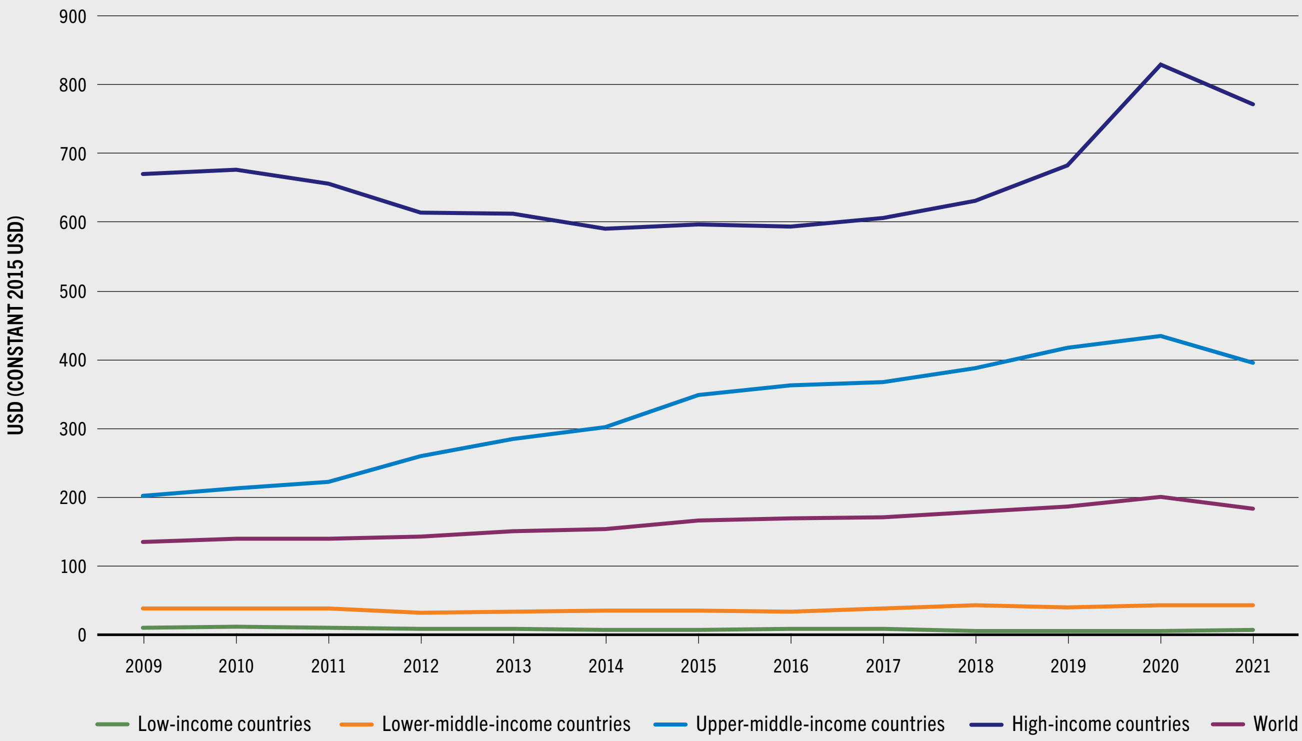
Public spending on agriculture is low and not increasing where it is most needed

Food and agriculture-specific expenditures are among the components of public finance that can most directly influence food security and nutrition outcomes. Following the definition of FAO's Monitoring and Analysing Food and Agricultural Policies (MAFAP) programme, these public expenditures can be grouped into: i) budget transfers for the provision of private goods that are allocated to agents such as producers, consumers, traders, transporters and input suppliers; ii) general support for agricultural infrastructure, research and development (R&D) and extension services, marketing, storage or inspection facilities, among others; and iii) administrative costs.[1] These public expenditures may be both recurrent in nature (e.g. to cover salaries of extensionists or administrative staff) or for investment in capital goods (e.g. agricultural infrastructure or rural roads and electrification). However, public spending that can affect food security and nutrition outcomes may also be channelled through sectors such as health (e.g. public health programmes for vitamin A deficiency control), and there may also be important overlaps with social protection programmes. This is precisely the reason why it is important to rely on a broader definition of financing – or, in this case, public spending – for food security and nutrition.

In the face of data limitations to comprehensively track government spending for the food and agriculture sector at the global level as defined by FAO's MAFAP programme, the general domestic government expenditure on agriculture per rural inhabitant (constant 2015 USD) at the global level is tracked, using information from FAOSTAT. This is a more limited approach because the spending tracked is not for the whole food and agriculture sector but only for agriculture – hence, it is interchangeably referred to in the chapter as public spending on agriculture. Furthermore, it is not possible to detect whether budget transfers for the provision of private goods are equally (or unequally) allocated to individual agents. As will be further shown below for selected low-income countries (LICs), lower-middle-income countries (LMICs) and upper-middle-income countries (UMICs), the public spending that is directly associated with food security and nutrition can be significantly higher than public spending on agriculture. Notwithstanding this limitation, the general domestic government expenditure on agriculture at the global level shows interesting facts and patterns. Total general domestic government expenditure on agriculture had been growing steadily since the early 2000s, reaching a maximum of USD 675.4 billion (constant 2015 USD) in 2020, and then it declined to USD 617.3 billion in 2021. This expenditure, when measured per rural inhabitant, barely changed between 2010 and 2021 in LICs and only saw a very slight increase in LMICs towards the last years of the period (Figure 21). In these two country income groups, public spending on agriculture was only USD 8 and USD 37, respectively, per rural inhabitant, on average, in the period from 2010 to 2019. This points to how limited the financing for food security and nutrition through public spending on agriculture generally is in these countries.

On the other hand, governments are spending more per inhabitant where food insecurity and undernutrition are, by and large, the least problematic in the world. General domestic government expenditure on agriculture per

FIGURE 21 GENERAL DOMESTIC GOVERNMENT EXPENDITURE ON AGRICULTURE PER RURAL INHABITANT IS EXTREMELY LOW AND NOT CLEARLY INCREASING IN LOW- AND LOWER-MIDDLE-INCOME COUNTRIES WHERE IT IS MOSTLY NEEDED TO REDUCE FOOD INSECURITY AND MALNUTRITION



NOTES: General expenditure includes central and subnational government expenditure where available, otherwise only central government expenditure is included. On-budget official development assistance and other official flows and public expenditure in research and development are not included. A total of 196 countries are included. Montenegro, New Caledonia, Saint Kitts and Nevis, and Serbia are excluded because of incomplete public expenditure data. The graph includes imputations for missing public expenditure data points where necessary.

SOURCE: Based on FAO. 2024. *FAOSTAT: Government Expenditure*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/IG. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd1254en-fig21

rural inhabitant is much higher in UMICs and high-income countries (HICs) (USD 317 and USD 626 per rural inhabitant, on average, during 2010–2019, before the COVID-19 pandemic). In UMICs, general domestic government expenditure on agriculture per rural inhabitant shows a steady increase up to 2020. In HICs, in contrast, this expenditure shows a reduction up to 2016 – likely in line with these countries' reduction in agriculture's share of gross domestic product (GDP); from 2017 onwards, this expenditure is notably stepped up – driven by a significant increase in spending in the United States of America.[m] General domestic government expenditure on agriculture per rural inhabitant is extremely low in LICs and LMICs, where it is mostly needed to reduce food insecurity and malnutrition, and it has increased systematically over the years only in UMICs.

m The Government of the United States of America significantly increased central government expenditures on agriculture in 2019 and 2020. The increase in 2019 reflects the pattern of agricultural subsidies from the United States Department of Agriculture Market Facilitation Program, which provides relief from tariffs on certain farm products. The increase in 2020 is predominantly related to various COVID-19 pandemic programmes to aid farmers.

As outlined in **Chapter 2** (Figure 2), hunger is still on the rise in Western Asia, the Caribbean and most subregions of Africa, regions that host the largest number of LICs. At the same time, progress has been made towards reducing hunger in most subregions in Asia and in Latin America, where middle-income countries (MICs) are more numerous than LICs. Furthermore, where public spending on agriculture per rural inhabitant is higher, such as in UMICs and HICs, this spending may not always fully contribute to the efficiency, equitability and sustainability of agrifood systems.[2] In fact, the 2022 edition of this report called for governments to repurpose some of the existing public support to agriculture to make healthy diets more affordable for all, offering alternative model-based scenarios.[2] The importance of repurposing and optimally allocating public spending on food and agriculture is further discussed at the end of this chapter.

Public spending on agriculture correlates negatively with food insecurity and some forms of malnutrition

The association between total public spending and food security and nutrition outcomes across LICs, LMICs and UMICs has attracted only scarce empirical cross-country research. Much of the existing statistical literature focuses on one country or region, or on HICs; on limited or approximative food security and nutrition indicators; on one public expenditure sector, generally agriculture given its most direct association with food security and nutrition; or on outcomes such as growth or poverty reduction that may be related to food security and nutrition but are distinct from them. Furthermore, existing studies may not control for other factors that affect food security and nutrition or consider government policies that do not involve significant expenditure.

Cross-country evidence for 65 countries (including 11 HICs) indicates that greater public spending on agriculture, social protection and health was associated with reduced stunting.[3] This has also been partially corroborated by an analysis for nine Southern African countries, which found a favourable association between public spending on agriculture, average dietary energy supply adequacy and the prevalence of undernourishment (PoU).[4] Significant impacts on food security indicators (i.e. average dietary energy supply adequacy, domestic food price index, domestic food price volatility, and proportion of population using improved sanitation facilities) have also been found for public spending on agricultural R&D in Africa and also for general public expenditure in agriculture, but only for the countries that allocate the larger proportions of their budgets to agriculture.[5]

Our analysis corroborates that public spending on agriculture correlates in expected ways with most – albeit not all – food security and nutrition outcomes, even if it is only a part, and sometimes even a small one, of all the public spending on food security and nutrition, as will be further shown below for some countries. This is an analysis of observed association, which does not imply a causal relationship and can be affected by the income level of a country, among other factors. Still, it shows that the lower the general domestic government expenditure on agriculture per capita, the larger the PoU in 87 LICs, LMICs and UMICs (Figure 22A). In more than half of these (49 countries), the PoU is above 10 percent, and governments in most of these countries (39 countries, mostly LICs and LMICs) spent on average USD 20 per person or less between 2017 and 2019. In a dozen LMICs and UMICs, the PoU is 7 percent or less, and yet the governments in these countries spent USD 20 per person or less on agriculture. This is to be expected for MICs, where the PoU is low since most people's incomes allow them to access food. The negative correlation between general domestic government expenditure on agriculture per capita and food security indicators is also seen for the prevalence of moderate or severe food insecurity (Figure 22B) and the prevalence of stunting (Figure 22C). These two additional correlations (as measured by a significant coefficient of correlation of −0.51 and −0.39, respectively) are stronger than the correlation observed for the PoU (as measured by a coefficient of correlation of −0.33).

The literature on the association between public spending and overweight and obesity is scarcer than that on the association between »

FIGURE 22 GENERAL DOMESTIC GOVERNMENT EXPENDITURE ON AGRICULTURE PER CAPITA IS NEGATIVELY CORRELATED WITH FOOD SECURITY AND UNDERNUTRITION INDICATORS, AVERAGE 2017–2019

NOTES: For all variables, the average for 2017–2019 or the most recent three years available is presented. General domestic government expenditure includes central and subnational government expenditure where available; otherwise, only central government expenditure is included. On-budget official development assistance and other official flows and public expenditure in research and development are not included. High-income countries are not included in these figures. In Figure 22A and Figure 22B, 87 countries are included. In Figure 22C and Figure 22D, 105 countries are included. Montenegro, New Caledonia, Saint Kitts and Nevis, and Serbia are excluded because of incomplete general domestic government expenditure data. China and Cuba are excluded because of the lack of sufficient data for undernourishment and prevalence of moderate or severe food insecurity. China is also excluded because of the lack of stunting and overweight data, and Cuba because it is an outlier on general domestic government expenditure.

SOURCES: FAO. 2024. *FAOSTAT: Government Expenditure*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/IG. Licence: CC-BY-4.0; FAO. 2024. FAOSTAT: *Suite of Food Security Indicators*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/FS. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd1254en-fig22

» public spending and food insecurity and undernutrition, and this shall continue to be explored more regularly through future editions of this report. Regarding obesity, for example, the literature overwhelmingly focuses on HICs and looks much more often into the consequences of obesity on public expenditure (especially in the health sector) than into the possible effects of public expenditure on obesity. It finds a positive association between overweight and public expenditure on agriculture, social protection and health.[3] Social spending in Organisation for Economic Co-operation and Development (OECD) countries (mainly on early childhood education and care) has also been found to have a favourable impact on obesity among children aged 5 to 19 years, after controlling for other factors.[6]

Our correlation analysis, which encompasses LICs and MICs instead of HICs, indicates that the more governments spend on agriculture, the more countries exhibit a high percentage of children under five years of age who are overweight – with a correlation coefficient of 0.27 for 105 LICs, LMICs and UMICs (Figure 22D). There may be several explanations for this, which merit more empirical exploration in future editions of this report. One could be that a higher prevalence of overweight among children may prompt governments to spend more on some nutrition-related programmes, although this response may not necessarily be overwhelmingly happening through national budgets for agriculture. Another hypothetical explanation is that public spending on agriculture does not support enough nutrition-sensitive actions, nor does it enable healthy food environments. As seen in previous editions of this report, not only are healthy diets unaffordable for billions, but also food environments are not conducive to healthy diets.[7] The world is also not producing sufficient fruits and vegetables and other nutritious foods for a growing population demanding them more, including in rural areas.[8] Public support to the food and agriculture sector, including fiscal subsidies, has also created incentives to increase the availability and reduce the price of staple foods and their derivatives – including highly processed foods high in unhealthy fats, sugars and/or salt and of minimal nutritional value – while at the same time discouraging and making relatively more expensive the consumption of unsubsidized or less subsidized commodities such as fruits, vegetables and pulses.[2] Unsurprisingly, as seen in **Chapter 2**, millions of children under five years of age are experiencing overweight.

Overweight may also be more highly correlated with public spending in the health sector compared with public spending in the agriculture sector. However, not only is there a positive correlation between general domestic government expenditure on treatment of nutritional deficiencies per capita and the percentage of children under five years of age who are overweight (not shown graphically here), but this correlation is also similar to that seen above for public spending on agriculture (i.e. coefficient of correlation equivalent to 0.33).[n] It may very well be the case that LICs and MICs that spend more on nutritional deficiencies are also those countries with higher levels of overweight and obesity – but this hypothesis needs further exploration. Clearly, not only will more domestic public finance be needed to support public spending on agriculture, but countries, particularly LMICs and UMICs, will need to invest more heavily in nutrition-sensitive agriculture and healthier food environments to address the problems of overweight and obesity more effectively.

The association between public spending on agriculture and food security and nutrition outcomes at the global level is likely weakened by inefficiencies in the actual public expenditures. The association between public spending on food security and nutrition and food security and nutrition outcomes is expected to be relatively stronger because, as shall be noted below, public spending on agriculture is only a small fraction of public spending on food security and nutrition.

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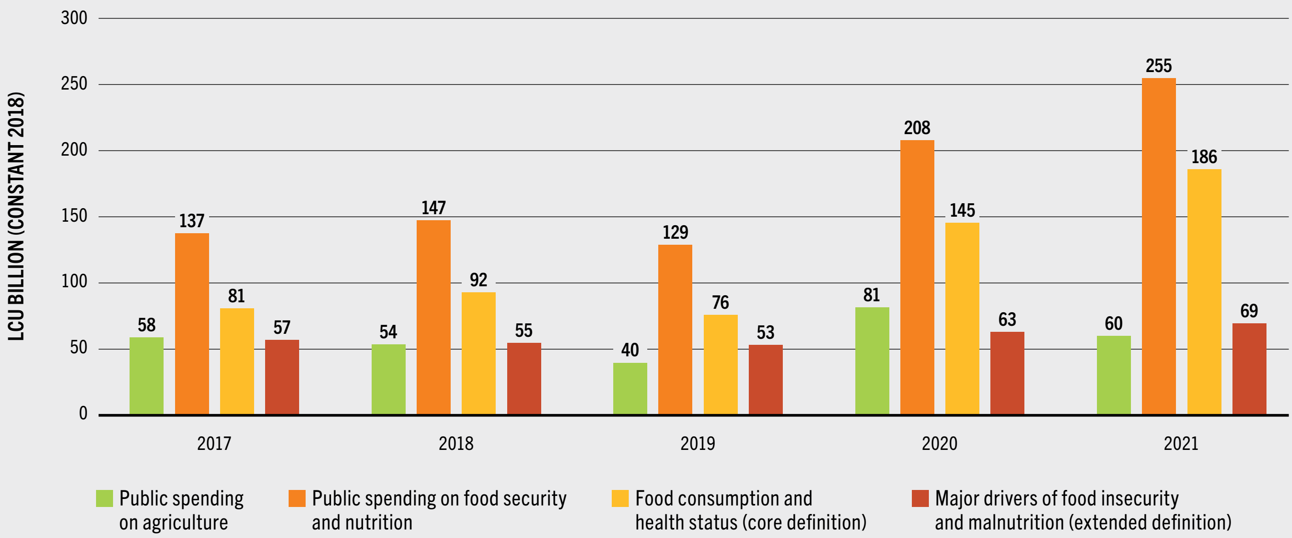
n Interestingly, but not shown here, general domestic government expenditure on nutritional deficiencies per capita (current purchasing power parity [PPP]) is negatively associated with the PoU (coefficient of correlation = –0.07), the prevalence of moderate or severe food insecurity (coefficient of correlation = –0.32), and stunting (coefficient of correlation = –0.35). The data come from WHO's System of Health Accounts; it covers 40 LICs, LMICs and UMICs, of which 33 are in sub-Saharan Africa; it excludes China and India; three outliers are also excluded from the analysis: Armenia and South Africa for public expenditure, and Tunisia for overweight.

FIGURE 23 PUBLIC SPENDING ON FOOD SECURITY AND NUTRITION SHOWS ALMOST STEADY GROWTH IN BENIN UP TO 2021



NOTES: LCU = local currency unit. Estimates derived applying the methodology described in the Supplementary material to Chapter 4 S4.2.

SOURCE: Authors' (FAO) own elaboration based on World Bank. 2023. *World Bank Data Catalog: Benin BOOST platform: Public expenditure and revenue flows*. [Accessed on 24 July 2024]. https://datacatalog.worldbank.org/search/dataset/0038083. Licence: CC-BY-4.0.

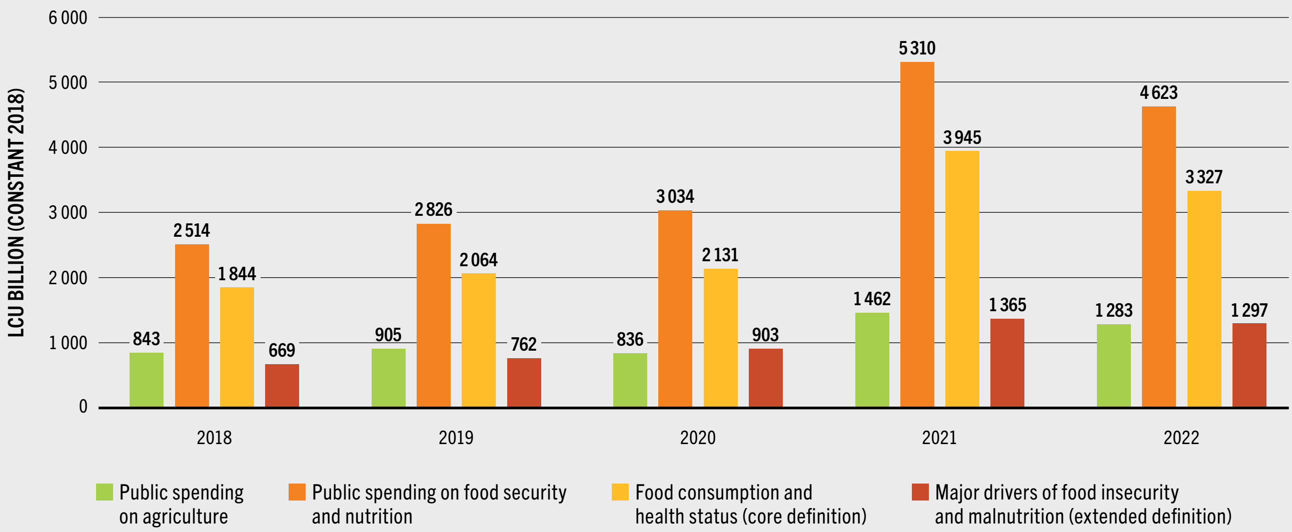
https://doi.org/10.4060/cd1254en-fig23

Public spending on food security and nutrition in selected low-income countries and middle-income countries

Readily available public spending data do not exist for all the countries in the world to apply the core and extended definitions of financing for food security and nutrition introduced in **Chapter 3** – so as to arrive at a global aggregate of this financing. This exercise has been piloted on public spending data for ten countries from different regions for this report: one LIC (Uganda), five LMICs (Benin, India, Kenya, Nigeria and Philippines), and four UMICs (Brazil, Georgia, Mexico and South Africa). Data sources and the approach for applying this exercise are described in the Supplementary material to Chapter 4 S4.2. The approach allows the calculation of public spending on food security and nutrition expressed in real terms for all ten countries.

A focus on how governments spend to support food security and nutrition in countries with the lowest income per capita levels is particularly important for two reasons: i) these are the countries where public spending per capita tends to be the lowest in the world; and ii) these are the countries with the more pressing food insecurity and malnutrition challenges which have traditionally faced higher levels of undernutrition. An interesting finding is that in the two countries with the lowest income per capita analysed here, Benin and Uganda, public spending on food security and nutrition seems to have been growing. In fact, the total public spending on food security and nutrition shows an important increase from 2017/18 to 2021, and it significantly exceeds public spending on agriculture in these two countries (Figure 23 and Figure 24). In the case of Benin, considerable growth of spending on food consumption in 2020 and also in 2021 seems to suggest that during and following the COVID-19 pandemic, high priority was given to financing key determinants of food security and nutrition such as domestic production, food

FIGURE 24 PUBLIC SPENDING ON FOOD SECURITY AND NUTRITION SHOWS STEADY GROWTH IN UGANDA, BUT THIS COULD NOT BE SUSTAINED IN 2022



NOTES: LCU = local currency unit. Estimates derived applying the methodology described in the Supplementary material to Chapter 4 S4.2.

SOURCE: Authors' (FAO) own elaboration based on World Bank. 2023. *BOOST open budget portal: Uganda BOOST Public Expenditure Database*. [Accessed on 24 July 2024]. https://datacatalog.worldbank.org/search/dataset/0038076

https://doi.org/10.4060/cd1254en-fig24

access and health services (Figure 23). In Uganda, considerable growth in public spending on food security and nutrition is observed only in 2021, but this stimulus was short-lived as this public spending decreased in 2022 – although it remained well above pre-COVID-19 levels (Figure 24).

The fact that public spending on food security and nutrition exceeds public spending on agriculture, reflects the important contribution of using the core and extended definitions of financing for food security and nutrition. These new definitions allow accounting for financing flows that target areas beyond the agrifood sector, such as health, water and sanitation, and education incurred in both rural and urban areas, as well as conflict-sensitive interventions that support livelihood resilience and do not fall within the boundaries of public spending on agriculture. An important share of the public spending on food security and nutrition is not accounted within the budget of the agriculture sector, but elsewhere, due to differences in where policies are being made.

On average, over the periods of analysis, 65 percent of total public spending on food security and nutrition in Benin (Table 9) and 73 percent in Uganda (Table 10) was allocated to food consumption and health status; the remaining share supported policies and actions along the six transformative pathways to address the major drivers of food insecurity and malnutrition (see **Chapter 3**, Figure 19). Food consumption took on average half or even more of the public spending on food security and nutrition over the period, and it mostly targeted food availability, but also food access, although to a lesser extent. Interestingly, 14 percent of these countries' public spending on food security and nutrition is related to health and is mostly oriented towards health services and environmental health. Practices do not seem to feature in such expenditures in either country, but this is to a large extent due to the difficulty

TABLE 9 COMPOSITION OF PUBLIC SPENDING ON FOOD SECURITY AND NUTRITION IN BENIN

	2017	2018	2019	2020	2021	Average
	(%)					
Food consumption and health status (core definition)	59	63	59	70	73	65
Food consumption	46	44	49	51	60	50
Food availability	30	23	28	18	16	23
Food access	16	15	14	26	23	19
Food utilization	1	5	8	7	22	9
Health status	13	19	9	19	12	14
Practices	0	1	0	0	0	0
Health services and environmental health	12	18	9	18	12	14
Major drivers of food insecurity and malnutrition (extended definition)	41	37	41	30	27	35

NOTES: Estimates derived applying the methodology described in the Supplementary material to Chapter 4 S4.2. Some subtotals may not fully add up due to rounding.

SOURCE: Authors' (FAO) own elaboration based on World Bank. 2023. *World Bank Data Catalog: Benin BOOST platform: Public expenditure and revenue flows*. [Accessed on 24 July 2024]. https://datacatalog.worldbank.org/search/dataset/0038083. Licence: CC-BY-4.0.

TABLE 10 COMPOSITION OF PUBLIC SPENDING ON FOOD SECURITY AND NUTRITION IN UGANDA

	2017	2018	2019	2020	2021	Average
	(%)					
Food consumption and health status (core definition)	73	73	70	74	72	73
Food consumption	61	61	56	61	55	59
Food availability	32	30	26	25	26	28
Food access	25	27	26	26	21	25
Food utilization	5	5	4	9	7	6
Health status	13	12	14	14	17	14
Practices	0	0	0	2	2	1
Health services and environmental health	13	12	14	11	15	13
Major drivers of food insecurity and malnutrition (extended definition)	27	27	30	26	28	27

NOTES: Estimates derived applying the methodology described in the Supplementary material to Chapter 4 S4.2. Some subtotals may not fully add up due to rounding.

SOURCE: Authors' (FAO) own elaboration based on World Bank. 2023. *World Bank Data Catalog: Uganda BOOST platform: Public expenditure database*. [Accessed on 24 July 2024]. https://datacatalog.worldbank.org/search/dataset/0038076. Licence: CC-BY-4.0.

of identifying such practices in government budgets. An important share of the public spending on food security and nutrition in both countries (35 percent in Benin and 27 percent in Uganda on average over the period) contributed to addressing the major drivers of food insecurity and malnutrition and, although not shown here, these resources mostly supported policies targeting structural inequalities.

Similar figures and tables to those presented here for Benin and Uganda are shown for eight MICs

TABLE 11 COMPOSITION OF PUBLIC SPENDING ON FOOD SECURITY AND NUTRITION IN SELECTED LOW- AND MIDDLE-INCOME COUNTRIES

	Benin	Brazil	Georgia	India	Kenya	Mexico	Nigeria	Philippines	South Africa	Uganda
	(% annual average)									
Food consumption and health status (core definition)	65	31	50	85	75	56	55	40	55	73
Food consumption	50	14	39	83	53	40	33	37	35	59
Food availability	23	11	30	45	21	34	23	33	10	28
Food access	19	1	7	35	31	0	8	3	18	25
Food utilization	9	1	2	3	0	6	2	1	7	6
Health status	14	17	11	2	20	17	21	3	19	14
Practices	0	0	0	0	1	0	0	0	0	1
Health services and environmental health	14	17	11	4	22	17	21	3	19	13
Major drivers of food insecurity and malnutrition (extended definition)	35	69	50	15	25	44	45	60	45	27

NOTES: Annual average (%) is for the following periods: 2018–2022 in Brazil, Georgia, India, Kenya, Mexico and Uganda; 2018–2021 in Nigeria; 2019–2023 in the Philippines; and 2017–2021 in Benin and South Africa. Uganda is a low-income country, Benin, India, Kenya, the Philippines and Nigeria are lower-middle-income countries whereas the other four countries are upper-middle-income countries. Estimates are derived applying the methodology described in the Supplementary material to Chapter 4 S4.2. Some subtotals may not fully add up due to rounding.

SOURCES: Authors' (FAO) own elaboration based on World Bank. 2023. *World Bank Data Catalog: Benin BOOST platform: Public expenditure and revenue flows*. [Accessed on 24 July 2024]. https://datacatalog.worldbank.org/search/dataset/0038083. Licence: CC-BY-4.0 for Benin; Government of Brazil. 2024. Orçamentos Anuais PLDO I LDO I PLOA I LOA - Atos Normativos. In: *gov.br – Ministério do Planejamento e Orçamento*. [Cited 30 April 2024]. https://www.gov.br/planejamento/pt-br/assuntos/orcamento/orcamento/orcamentos-anuais for Brazil; Ministry of Finance of Georgia. 2024. *Ministry of Finance of Georgia*. [Cited 30 April 2024]. https://www.mof.ge/en/ for Georgia; Ministry of Finance, Government of India. 2024. Accounting information. In: *Controller General of Accounts, Department of Expenditure*. [Cited 30 April 2024]. https://cga.nic.in/index.aspx#account-section for India; The National Treasury & Economic Planning, Republic of Kenya. 2021. *Sector budget proposal reports*. [Cited 30 April 2024]. https://www.treasury.go.ke/sector-budget-proposal-reports for Kenya; Government of Mexico. 2024. Investor Relations Office of the Ministry of Finance and Public Credit. In: *Gobierno de México*. [Cited 9 May 2024]. https://www.finanzaspublicas.hacienda.gob.mx/es/Finanzas_Publicas/Ingles for Mexico; Government of Nigeria. 2024. *Open Treasury Portal*. [Cited 30 April 2024]. https://opentreasury.gov.ng for Nigeria; Republic of the Philippines, Department of Budget and Management. 2022. *Budget of expenditures and sources of financing FY 2023*. Manila. https://www.dbm.gov.ph/index.php/2023/budget-of-expenditures-and-sources-of-financing-fy-2023 for the Philippines; Republic of South Africa, National Treasury Department. 2024. National budget. In: *National Treasury*. [Cited 30 April 2024]. https://www.treasury.gov.za/documents/national%20budget/default.aspx for South Africa; World Bank. 2023. *World Bank Data Catalog: Uganda BOOST Public Expenditure Database*. [Accessed on 24 July 2024]. https://datacatalog.worldbank.org/search/dataset/0038076. Licence: CC-BY-4.0 for Uganda.

in the Supplementary material to Chapter 4 S4.2. Four general patterns can be identified from the data of these eight MICs. First, public spending on food security and nutrition exceeds general domestic government spending on agriculture more than it does in Benin and Uganda (compare Figure S4.1 to Figure S4.8 in the Supplementary material to Chapter 4 S4.2 with Figures 23 and Figure 24). In some UMICs, for example, general domestic government spending on agriculture on average represents less than 10 percent (9 percent in Brazil, 3 percent in Georgia) or around 15 percent (Mexico and South Africa) of total public spending on food security and nutrition. Second, like in Benin and Uganda, these eight MICs show an absolute increase in public spending on food security and nutrition but could not sustain the growth pace during the COVID-19 pandemic or right after, with two exceptions (Georgia and South Africa) (Figure S4.1 to Figure S4.8 in the Supplementary material to Chapter 4 S4.2). Third, the share of public spending on food security and nutrition that goes to addressing the major drivers of food insecurity and malnutrition tends to be on average higher for these eight MICs than for the countries with the lowest income per capita in the sample, Benin and Uganda. In fact, in some MICs more spending is allocated to address the major drivers of food insecurity and malnutrition (69 percent in Brazil, 60 percent in the Philippines) than to support food consumption and health status (Table 11). In some other countries, this share is about half or slightly less than half (Georgia, Mexico, Nigeria and South Africa) (Table 11). Fourth, although the data are not shown here, it is worth noting that these eight MICs allocate an important share to addressing structural inequalities, just like Benin and Uganda. However, an important difference is that these MICs allocate a much higher share of their public spending on food security and nutrition to strengthen the economic resilience of the most vulnerable to economic adversity; for example, Brazil's share is an impressive 63 percent, and that of Georgia, the Philippines and South Africa is around 25 to 30 percent.

International development finance flows for food security and nutrition

The core and extended definitions of financing for food security and nutrition introduced in **Chapter 3** were applied to international development finance flows at the global level. Specifically, this was done for ODA and OOF for the period from 2017 to 2021, following the methodology described in the Supplementary material to Chapter 4 S4.3 with data from the OECD Creditor Reporting System (CRS)[9] and the AidData database,[10] where feasible.[o]

Food security and nutrition take almost a quarter of official development assistance and other official flows and this share is not growing

Global ODA and OOF flows for all aid sectors amounted to USD 354 billion in 2021. The part of these flows that can be deemed related to food security and nutrition according to the core and extended definitions amounted to USD 77 billion in 2021, of which the majority (USD 61 billion or 79 percent) corresponds to ODA (Table 12). This level of ODA is higher than each of the levels of ODA reported in the different studies mentioned in **Chapter 3** (see Figure 14), because the definition of financing for food security and nutrition is more comprehensive, especially as the extended definition includes interventions to address the major drivers of food insecurity and malnutrition.

Interestingly, not even a quarter of global ODA and OOF flows for all aid sectors were allocated to food security and nutrition between 2017 and 2021. In fact, food security and nutrition flows seem to have been less of a priority for donors during this period, as these flows grew less rapidly than the flows to all aid sectors (2 percent versus 4 percent, on average, in 2017–2021), and even contracted relatively more in 2021 (−5 percent versus −2 percent, on average) when the effects of the COVID-19 emergency were still being felt (Table 12). Flows for food security and nutrition are mostly allocated to support food consumption and health (core definition), and the rest to support interventions for addressing the major drivers of food insecurity and malnutrition (extended definition) (Figure 25). The composition of the flows for food security and nutrition is, by and large, very stable over time (Figure 26).

Food availability, health services and environmental health, conflict and inequality

As noted earlier, the composition of ODA and OOF flows for food security and nutrition is very stable over time (Figure 26) and, by 2021, most resources were flowing to food consumption (USD 35 billion out of USD 77 billion); relatively few were allocated to interventions for addressing the major drivers of food insecurity and malnutrition (USD 27 billion), and even fewer to health status (USD 15 billion) (Table 12). Little more than two-thirds of the flows for food consumption were allocated to address food availability concerns (of which, slightly more than 64 percent were allocated to support domestic production and 35 percent to support food aid); the remaining third was overwhelmingly taken by food access (Figure 27A). Health services and environmental health took the lion's share (92 percent) of the health-related flows, particularly in support of water and sanitation (Figure 27B). As for flows allocated to addressing the major drivers of food insecurity and malnutrition, conflict and inequality took a bit more than one-third each (Figure 27C).

o The bulk of the international development finance flows considered in this section's analysis (i.e. 97 percent) correspond to ODA and OOF from the CRS database.[9] The analysis does not consider the OOF tallied in the AidData database,[10] due to the difficulty of estimating the portion of these flows that present development aid characteristics.

TABLE 12 GLOBAL OFFICIAL DEVELOPMENT ASSISTANCE AND OTHER OFFICIAL FLOWS FOR ALL AID SECTORS AND FOR FOOD SECURITY AND NUTRITION

	2017	2018	2019	2020	2021	Average
	(constant 2021 USD billion and percentage)					
ODA and OOF for all aid sectors	305	310	312	362	354	329
Growth rate (%)		*1*	*1*	*16*	*–2*	*4*
ODA and OOF for food security and nutrition (core and extended definitions)	72	74	77	81	77	76
Growth rate (%)		*2*	*4*	*6*	*–5*	*2*
ODA and OOF for food security and nutrition (core definition)	48	49	51	55	50	51
Growth rate (%)		*2*	*6*	*7*	*–9*	*1*
ODA and OOF for food security and nutrition – food consumption (core definition)	36	36	38	40	35	37
Growth rate (%)		*1*	*6*	*4*	*–13*	*0*
ODA and OOF for food security and nutrition – health status (core definition)	12	13	13	15	15	14
Growth rate (%)		*4*	*4*	*15*	*1*	*6*
ODA and OOF for food security and nutrition – major drivers of food insecurity and malnutrition (extended definition)	24	25	25	27	27	26
Growth rate (%)		*3*	*1*	*4*	*3*	*3*
ODA for food security and nutrition (core and extended definitions)	59	58	60	62	61	60
Growth rate (%)		*–3*	*3*	*4*	*–2*	*1*
ODA for food security and nutrition (core definition)	38	37	38	40	37	38
Growth rate (%)		*–2*	*3*	*4*	*–6*	*0*
ODA for food security and nutrition – food consumption (core definition)	28	27	29	29	26	28
Growth rate (%)		*–3*	*4*	*2*	*–11*	*–2*
ODA for food security and nutrition – health status (core definition)	9	10	10	11	11	10
Growth rate (%)		*1*	*1*	*10*	*7*	*5*
ODA for food security and nutrition – major drivers of food insecurity and malnutrition (extended definition)	22	21	21	22	24	22
Growth rate (%)		*–4*	*3*	*4*	*6*	*2*

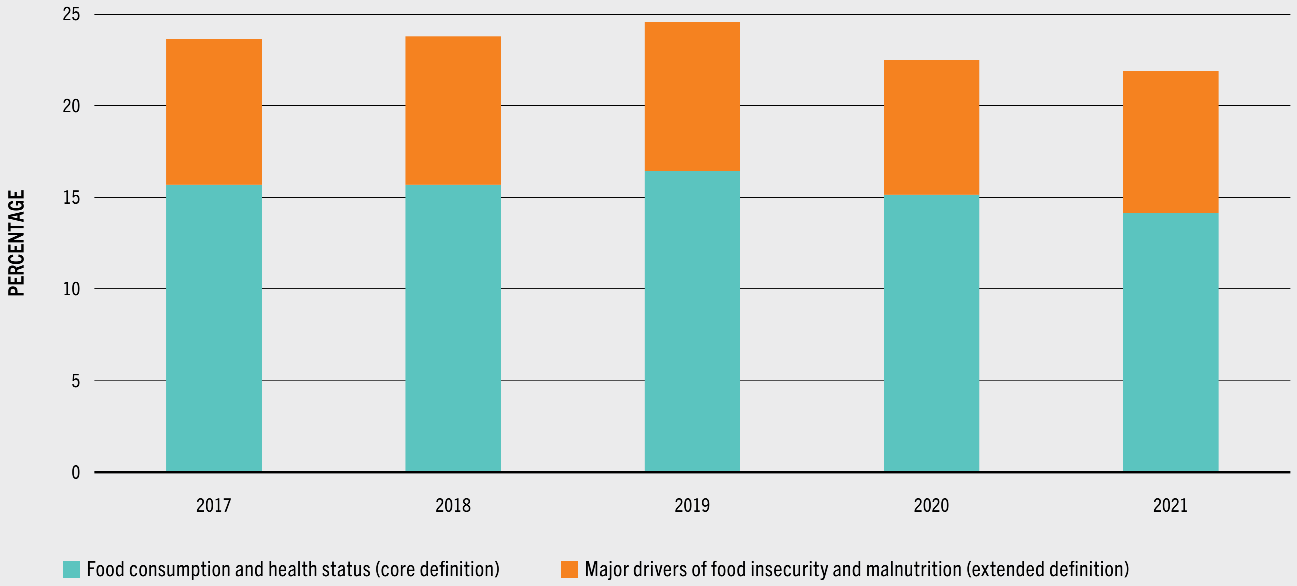
NOTES: ODA = official development assistance; OOF = other official flows. ODA flows included from AidData database represent little more than 5 percent of total flows, on average, during the period. OOF tallied in the AidData database are not included due to the difficulty of estimating the portion of these flows that present development aid characteristics. ODA and OOF for food security and nutrition result from applying the core and extended definitions of financing for food security and nutrition. Some subtotals may not fully add up due to rounding.

SOURCES: Authors' (FAO) own elaboration based on the application of the methodology in the Supplementary material to Chapter 4 S4.3 to data from OECD. 2024. *OECD Data Explorer.* [Accessed on 24 July 2024]. https://data-explorer.oecd.org/?fs[0]=T%2Co&pg=0&fc=Topic&bp=true&snb=580; William & Mary. 2024. *AidData: Data.* [Accessed on 24 July 2024]. https://www.aiddata.org/datasets

Flows broadly appear to target well the countries where hunger, food insecurity and malnutrition are more serious

Global ODA and OOF flows for food security and nutrition broadly appear to target well the country groups and regions where hunger, food insecurity and malnutrition are higher. On a per capita basis, on average, over the period from 2017 to 2021, these flows amounted to USD 30 in LICs, compared with USD 10 in LMICs and USD 8 in UMICs (Table 13). Interestingly, due to population growth over this period and to a reduction in flows in 2021, ODA and OOF flows for food security and nutrition per person were lower in 2021 than in any other year during the same period in the case of LICs, while this is not »

FIGURE 25 OFFICIAL DEVELOPMENT ASSISTANCE (ODA) AND OTHER OFFICIAL FLOWS (OOF) FOR FOOD SECURITY AND NUTRITION REPRESENT LESS THAN A QUARTER OF GLOBAL ODA AND OOF FLOWS AND ARE MOSTLY ALLOCATED TO FOOD CONSUMPTION AND HEALTH

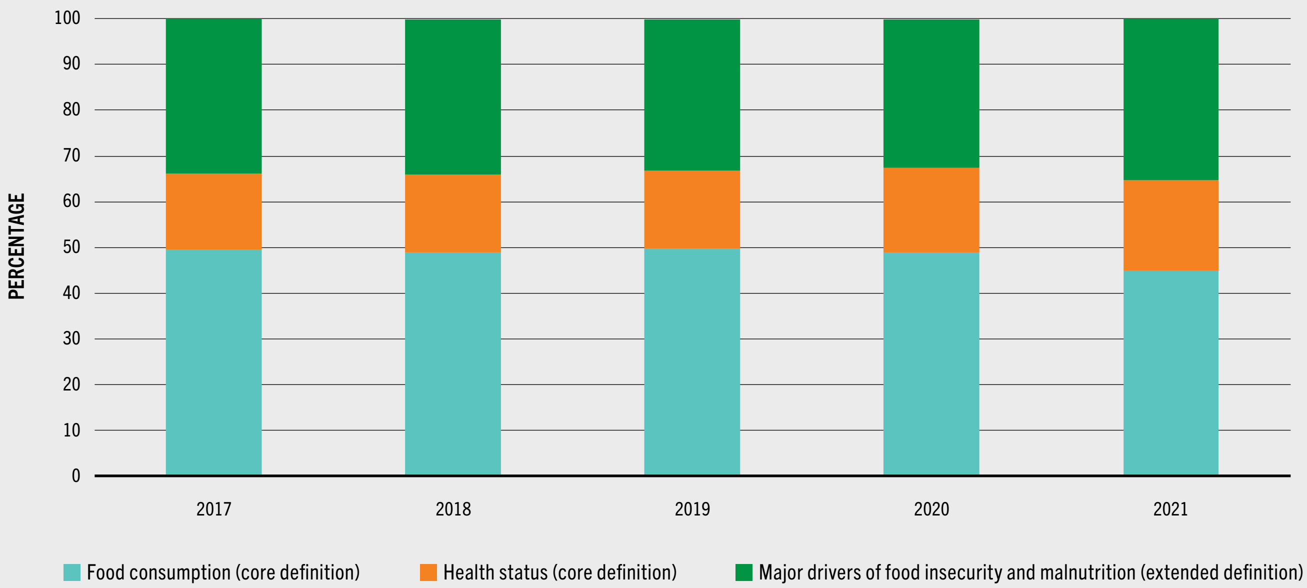


NOTE: Figures used are included in Table 12.

SOURCES: Authors' (FAO) own elaboration based on the application of the methodology in the Supplementary material to Chapter 4 S4.3 using amounts of flows in constant 2021 USD billion from OECD. 2024. *OECD Data Explorer.* [Accessed on 24 July 2024]. https://data-explorer.oecd.org/?fs[0]=T%2Co&pg=0&fc=Topic&bp=true&snb=580; William & Mary. 2024. *AidData: Data*. [Accessed on 24 July 2024]. https://www.aiddata.org/datasets

https://doi.org/10.4060/cd1254en-fig25

FIGURE 26 THE COMPOSITION OF OFFICIAL DEVELOPMENT ASSISTANCE AND OTHER OFFICIAL FLOWS FOR FOOD SECURITY AND NUTRITION IS VERY STABLE OVER TIME



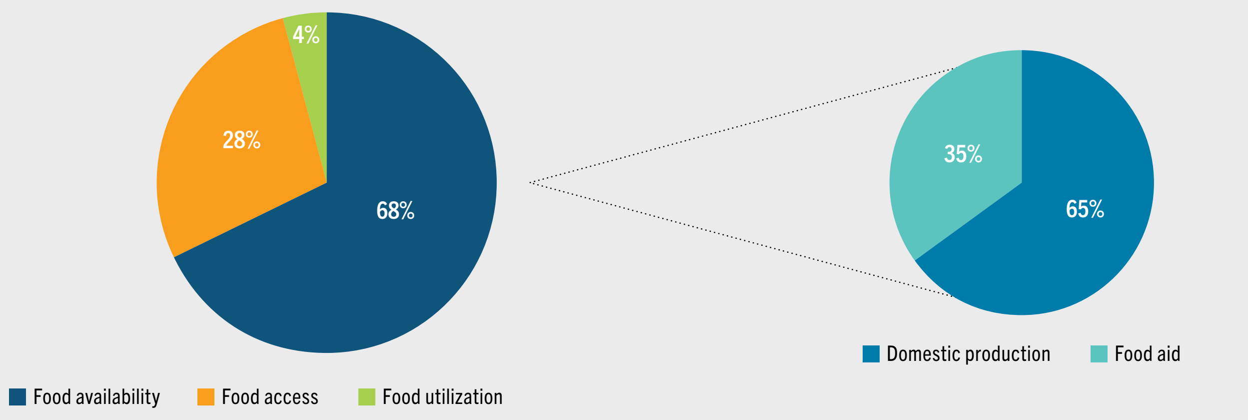
NOTE: Figures used are included in Table 12.

SOURCES: Authors' (FAO) own elaboration based on the application of the methodology in the Supplementary material to Chapter 4 S4.3 using amounts of flows in constant 2021 USD billion from OECD. 2024. *OECD Data Explorer.* [Accessed on 24 July 2024]. https://data-explorer.oecd.org/?fs[0]=T%2Co&pg=0&fc=Topic&bp=true&snb=580; William & Mary. 2024. *AidData: Data*. [Accessed on 24 July 2024]. https://www.aiddata.org/datasets

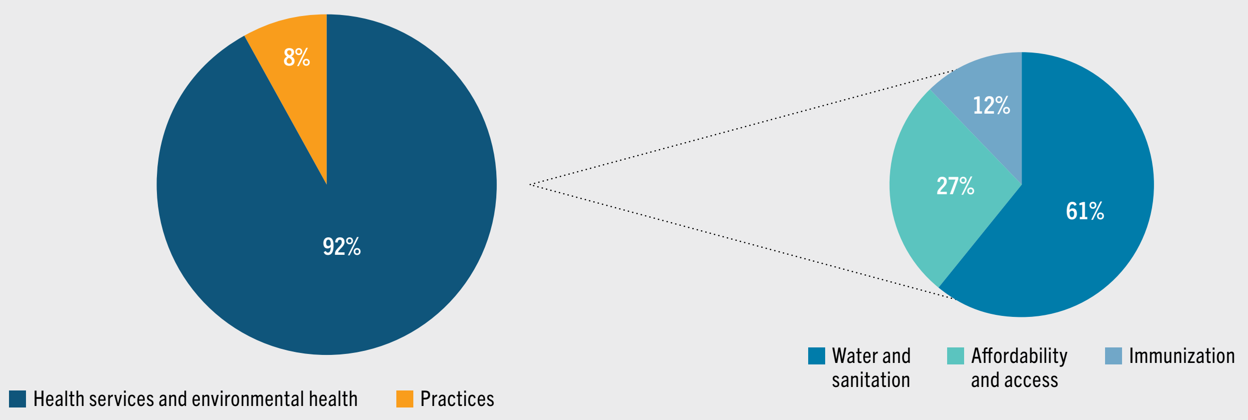
https://doi.org/10.4060/cd1254en-fig26

FIGURE 27 FOOD AVAILABILITY, HEALTH SERVICES AND ENVIRONMENTAL HEALTH, AND CONFLICT AND INEQUALITY TAKE THE MAJORITY OF THE OFFICIAL DEVELOPMENT ASSISTANCE AND OTHER OFFICIAL FLOWS FOR, RESPECTIVELY, FOOD CONSUMPTION, HEALTH, AND THE MAJOR DRIVERS OF FOOD INSECURITY AND MALNUTRITION, ANNUAL AVERAGE, 2017–2021

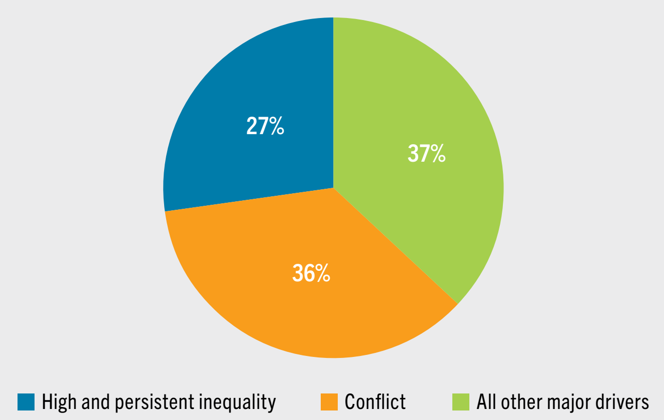
A) FOOD CONSUMPTION



B) HEALTH



C) MAJOR DRIVERS OF FOOD INSECURITY AND MALNUTRITION



NOTE: Annual average flows for food consumption, health and major drivers of food insecurity and malnutrition are included in Table 12.

SOURCES: Authors' (FAO) own elaboration based on the application of the methodology in the Supplementary material to Chapter 4 S4.3 using amounts of flows in constant 2021 USD billion from OECD. 2024. *OECD Data Explorer*. [Accessed on 24 July 2024]. https://data-explorer.oecd.org/?fs[0]=T%2Co&pg=0&fc=Topic&bp=true&snb=580; William & Mary. 2024. *AidData: Data*. [Accessed on 24 July 2024]. https://www.aiddata.org/datasets

https://doi.org/10.4060/cd1254en-fig27

TABLE 13 DESTINATION OF OFFICIAL DEVELOPMENT ASSISTANCE AND OTHER OFFICIAL FLOWS FOR FOOD SECURITY AND NUTRITION BY RECIPIENT INCOME GROUP AND REGION

	2017	2018	2019	2020	2021	Average
	(USD billion and USD per capita)					
COUNTRY INCOME GROUP						
Low-income countries (USD billion)	18	19	20	21	20	20
Low-income countries (USD per capita)	30	30	30	32	29	30
Lower-middle-income countries (USD billion)	27	29	32	33	31	30
Lower-middle-income countries (USD per capita)	9	9	10	11	10	10
Upper-middle-income countries (USD billion)	17	17	16	17	16	16
Upper-middle-income countries (USD per capita)	6	10	9	9	9	8
REGION						
Africa (USD billion)	25	25	27	28	27	26
Africa (USD per capita)	20	19	21	21	19	20
Americas (USD billion)	7	8	7	8	7	7
Americas (USD per capita)	12	13	11	13	12	12
Asia (USD billion)	28	30	31	32	29	30
Asia (USD per capita)	7	7	7	7	7	7

NOTES: All amounts of flows used are expressed in constant 2021 USD. For income groups and regions, flows in USD per capita are estimated using population by, respectively, income groups from the World Bank and regions from FAOSTAT (following M49 classification). About USD 10 billion per year on average over the period cannot be allocated to individual countries and thus to income groups and regions. In addition, Oceania and Europe (USD 3 billion per year on average during the period) are not represented. The population by region covers only LICs, LMICs and UMICs in the respective regions.

SOURCES: Authors' (FAO) own elaboration based on the application of the methodology in the Supplementary material to Chapter 4 S4.3 to data from OECD. 2024. *OECD Data Explorer*. [Accessed on 24 July 2024]. https://data-explorer.oecd.org/?fs[0]=T%2Co&pg=0&fc=Topic&bp=true&snb=580; William & Mary. 2024. *AidData: Data*. [Accessed on 24 July 2024]. https://www.aiddata.org/datasets

» observed for MICs. These flows also target chiefly Africa where, on a per capita basis between 2017 and 2021, on average, they amounted to USD 20, compared with USD 12 in the Americas and USD 7 in Asia – using the regional disaggregation allowed by the data (Table 13). Official development assistance and other official flows for food security and nutrition in absolute terms, from 2017 to 2021, overwhelmingly grew more for Africa across regions and for LMICs (rather than LICs) across income groups.

The private sector supports the financing of food security and nutrition, but proper accounting of private financing flows is not possible

There are several potential sources of private financing for food security and nutrition, both domestic and external, which were identified in **Chapter 3** (Table 8). Unfortunately, it is not possible to track all global private sector financing for food security and nutrition to provide a single number for a given year.

Hence, in this section conclusions are drawn from incomplete data from different sources to detect patterns between global private finance and food security and nutrition. Under "private sector", extremely distinct types of sources of financing that fall under two broad categories, non-commercial private financing and commercial private financing, are lumped together – following the methodology in the Supplementary material to Chapter 4 S4.4.

Non-commercial private financing

Non-commercial private financing comprises two main types of sources of financing, with some opposite characteristics. On the one hand, there are funds flowing from philanthropists; these amounts are comparatively modest

TABLE 14 PHILANTHROPIC FLOWS TO FOOD SECURITY AND NUTRITION

	2017	2018	2019	2020	2021	Average
	(constant 2021 USD billion and percentage)					
Total philanthropic flows	10	11	11	12	13	12
Growth rate (%)		*4*	*3*	*10*	*4*	*6*
Philanthropic flows for food security and nutrition (core and extended definitions)	3	3	3	4	4	4
Growth rate (%)		*5*	*1*	*10*	*2*	*4*
% of total philanthropic flows	*31*	*31*	*30*	*30*	*29*	*30*
Food consumption and health status (core definition)	2	2	2	2	2	2
Major drivers of food insecurity and malnutrition (extended definition)	1	1	1	1	1	1

NOTE: See Supplementary material to Chapter 4 S4.4 and S4.3 for methodology.

SOURCE: Authors' (FAO) own elaboration based on the application of the methodology in the Supplementary material to Chapter 4 S4.3 to data from OECD. 2024. *OECD Data Explorer*. [Accessed on 24 July 2024]. https://data-explorer.oecd.org/?fs[0]=T%2Co&pg=0&fc=Topic&bp=true&snb=580

TABLE 15 GROWTH AND DISTRIBUTION OF CROSS-BORDER REMITTANCES THAT SUPPORT FOOD SECURITY AND NUTRITION TO LOW- AND MIDDLE-INCOME COUNTRIES

	2017	2018	2019	2020	2021	2022	Average
	(current USD billion and percentage)						
Remittances to low- and middle-income countries	640	695	727	717	792	**836**	735
Remittances contributing to food security and nutrition	300	326	341	336	371	**392**	344
Growth rate (%)		9	5	*–1*	*10*	6	6
Invested in agrifood systems in rural areas	19	21	22	22	24	**25**	22
Invested in agrifood systems in urban areas	6	6	7	6	7	**8**	7
Used for food consumption	275	299	313	308	341	**359**	316

NOTE: See Supplementary material to Chapter 4 S4.4 for references and methodology.

SOURCE: Authors' (FAO) own elaboration based on Ratha, D., Chandra, V., Ju Kim, E., Plaza, S. & Shaw, W. 2023. *Leveraging diaspora finances for private capital mobilization*. Migration and Development Brief 39. Washington, DC, World Bank. https://www.knomad.org/sites/default/files/publication-doc/migration_development_brief_39_0.pdf

(compared to international development assistance and public spending), but they are easy to analyse thanks to many of the main philanthropic foundations who report them in the CRS database.[9] On the other hand, there are cross-border remittances from migrants;[p] these are much larger than the sums from international development assistance, but it is only possible to guestimate their contribution to food security and nutrition.

According to the CRS database,[9] and after applying the core and extended definitions of financing for food security and nutrition (see Supplementary material to Chapter 4 S4.4 and S4.3, in this order), philanthropic flows to food security and nutrition amounted to only USD 4 billion per year on average between 2017 and 2021 and represented a stable share of 30 percent of all philanthropic flows. These flows increased by USD 1 billion from 2019 to 2020 but are nevertheless only a modest amount compared to other private flows. Two-thirds of philanthropic flows for food security and nutrition supported food consumption and health

p Domestic remittances also exist but are not tracked globally and are effectuated in large part informally.

BOX 10 SOME PRIVATE INVESTMENTS CAN HAVE NEGATIVE IMPACTS ON SUSTAINABLE DEVELOPMENT GOAL 2

On food security, a recent study ran a meta-regression analysis of 24 studies that found little evidence for either negative or positive effects of foreign direct investment (FDI) on food security in developing countries, although it did suggest that the effect might be positive in the short term but negative in the long term.[12]

On nutrition, however, *The Lancet*, in its "Commercial determinants of health" series,[13] observed in 2023 that a substantial group of commercial actors are escalating avoidable levels of ill health, planetary damage, and inequity – the commercial determinants of health. Similarly, a review of quantitative evidence conducted in 2019[14] found that FDI appears to be more clearly associated with increases in overweight, obesity and non-communicable disease prevalence than with changes in undernutrition. In addition, a network analysis revealed that many of the large players in the global food and beverage industries are at the centre of interest groups representing the "ultra-processed food" industry.[15]

Two recent studies in the *British Medical Journal* highlight that hundreds of epidemiological studies and meta-analyses have reported associations between "ultra-processed food" consumption and adverse health outcomes.[16, 17] A review of 35 550 products manufactured by the global top 20 food and beverage companies (representing 22 percent of worldwide sales in the sector) in a few key countries including Brazil, China, India and South Africa found that the overwhelming majority were unhealthy according to the World Health Organization Regional Office for Europe nutrient profile model, with a small number of significant exceptions. In these four countries, healthier products accounted for just 4–12 percent of the 2020 sales of these companies.[18]

As far as environmental impacts are concerned, "ultra-processed foods" are associated with intensive agriculture and livestock and threaten all dimensions of agrifood systems sustainability due to the combination of low-cost ingredients at purchase and increased consumption worldwide.[19] Similarly, "ultra-processed food" production and consumption have been found to have impacts on land degradation, herbicide use, eutrophication and packaging use.[20]

(as per the core definition), while the remaining third contributed to addressing the major drivers of food insecurity and malnutrition (Table 14).

Drawing on data available from the World Bank and the Global Knowledge Partnership on Migration and Development (KNOMAD),[11] cross-border remittances to LICs and MICs are estimated at USD 735 billion on average over the period from 2017 to 2022 (at current prices), with some growth every year except for a 1 percent drop in 2020. Of these flows, USD 344 billion (or nearly half) per year were allocated to uses that likely contributed to food security and nutrition over the same period (Table 15). Most of this sum (92 percent on average) was used for food consumption, while only the remaining small part financed investments in agriculture and other agrifood systems activities.

Commercial private financing

Two issues stand out when analysing commercial private financing for food security and nutrition. The first is the highly incomplete and fragmented access to data and the lack of information on the precise utilization of the funds. Comprehensive and relevant numbers on market finance (i.e. issuances of stocks and corporate bonds), international bank loans and domestic private equity could not be obtained to meaningfully arrive at a global number.

The second major issue is the difficulty of assessing whether these financing flows positively affect food security and, even more crucially, nutrition. This issue, which also exists for public spending on food and agriculture, is even more acute for the private sector. This is the case, particularly because the private sector may not necessarily be investing its resources in agrifood-related business in ways that always help reduce hunger, food insecurity

TABLE 16 FOREIGN DIRECT INVESTMENT SPECIFIC TO FOOD SECURITY AND NUTRITION FLOWING TO DEVELOPING ECONOMIES

	2017	2018	2019	2020	2021	2022	Average
				(USD billion and percentage)			
Food and agriculture (2017–2019)/ agrifood systems (2020–2022)	20	29	20	11	12	20	19
Growth rate (%)		*45*	*–31*	*–44*	*4*	*69*	*9*
Supportive expenditure	23	20	21	16	19	46	24
Growth rate (%)		*–13*	*5*	*–24*	*19*	*142*	*26*
of which:							
Power	10	5	4	2	1	1	4
Renewable energy	5	6	9	8	12	36	13
Transport services and infrastructure	5	5	6	2	3	5	4
Telecom	2	1	2	2	2	2	2
Water/WASH	0	0	0	0	1	0	0
Health	1	1	1	1	1	2	1
Education	0	0	0	0	0	0	0
Total	43	49	41	27	31	66	43
Growth rate (%)		*14*	*–16*	*–34*	*17*	*112*	*18*

NOTES: WASH = water, sanitation and hygiene. Foreign direct investment (FDI) related to food security and nutrition is the FDI that United Nations Trade and Development (UNCTAD) reported for food and agriculture in 2017–2019 and for agrifood systems in 2020–2022. Supportive expenditures, which are regarded as having food security and nutrition outcomes but other outcomes as well, are weighted with a coefficient of 22 percent to reflect their contribution to food security and nutrition, as explained in the Supplementary material to Chapter 4 S4.1. Power excludes renewable energy and Telecom includes information services activities. Foreign direct investment data refer exclusively to announced greenfield projects in "developing economies" (low-, lower-middle-, and upper-middle-income countries, excluding Eastern Europe). Due to rounding, the total of each column may not be exactly the same as the sum of its components. For more details on definitions and methodology, see Supplementary material to Chapter 4 S4.4.

SOURCES: UNCTAD. 2020. *World Investment Report 2020. International production beyond the pandemic*. Geneva, Switzerland. https://unctad.org/system/files/official-document/wir2020_en.pdf; UNCTAD. 2023. *World Investment Report 2023. Investing in sustainable energy for all*. Geneva, Switzerland. https://unctad.org/publication/world-investment-report-2023

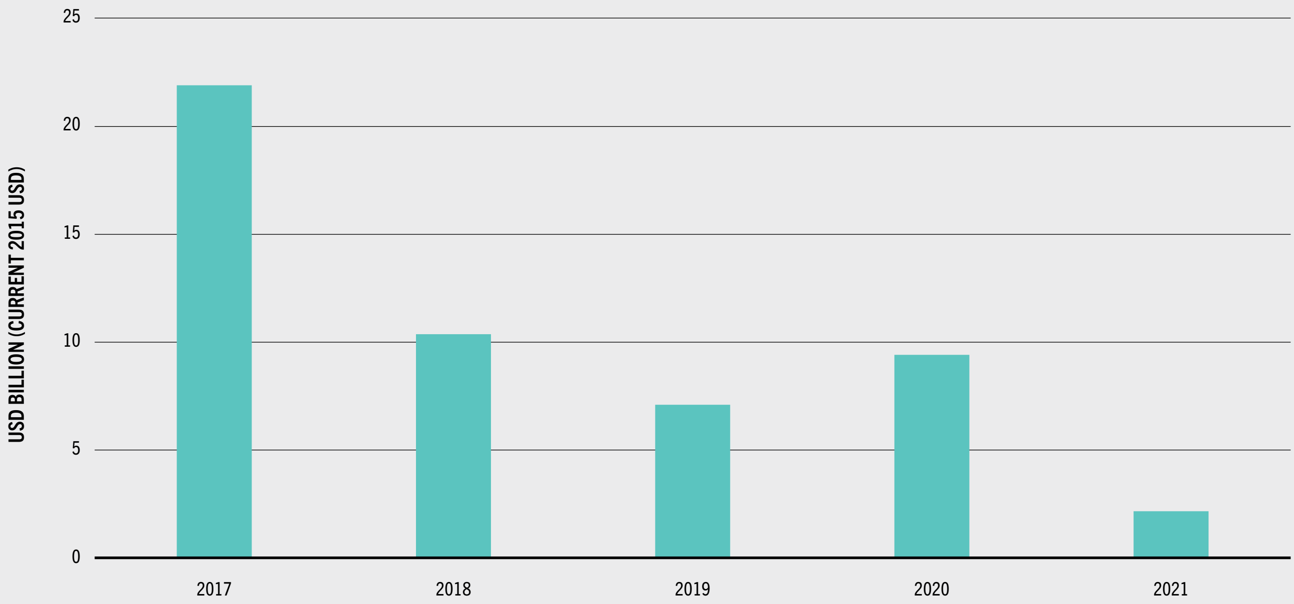
and malnutrition. Large international food and beverage companies, for example, are often viewed as being part of food security and nutrition problems, rather than part of the solution to these problems (see Box 10).

Among international commercial private financing flows, FDI is the flow type with the most comprehensive data source. According to United Nations Trade and Development (UNCTAD), between 2017 and 2022, FDI amounted to an average of USD 19 billon for "food and agriculture" (as defined in 2017–2019) or "agrifood systems" (as defined in 2020–2022), with a 44 percent drop in 2020 due to the COVID-19 pandemic and a rebound to 2019 levels in 2022 (Table 16). If one adds to this the FDIs in other sectors that can be regarded as supportive expenditure for food security and nutrition (as explained in the Supplementary material to Chapter 4 S4.1), one arrives at an additional USD 43 billon supportive of food security and nutrition on average over the period, with a 34 percent drop in 2020 mainly due to contractions in investment in transport services and infrastructure and, to a lesser extent, in the power sector during the pandemic, and a major jump of 112 percent in 2022 caused mainly by increased investment in renewable energy.

Blended finance[q] represents much more modest amounts, according to the limited data available. The 2023 edition of *State of Blended Finance*[21] estimates that, on average over the period from

q See Supplementary material to Chapter 4 S4.4 for definition from convergence blended finance.

FIGURE 28 NET BANKING LOANS TO AGRICULTURE, FORESTRY AND FISHING SHOW AN ALMOST CONTINUOUS DECLINE



NOTES: The change in stock from one year to the next was used to estimate net lending. Ninety-three low-, lower-middle- and upper-middle-income countries are included. Data are missing for three of these 93 countries (Afghanistan, Belarus and Syrian Arab Republic) for 2021 and for China for 2020 and 2021. Data from the last available year were used to fill the gaps.

SOURCE: FAO. 2024. *FAOSTAT: Credit to Agriculture*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/IC. Licence: CC-BY-4.0.

https://doi.org/10.4060/cd1254en-fig28

2020 to 2022, 26 percent of blended finance transactions, amounting to USD 1.2 billion per year, were "aligned" with SDG 2,[r] compared with 19 percent and USD 0.9 billion per year for the period from 2014 to 2019.[22] Sustainable Development Goal 2 was in eighth position for 2020 to 2022 and in ninth for 2014 to 2019 in terms of its alignment with blended finance transactions.[s] To this, one might add numbers for "private indirect mobilization"[t] in LICs and MICs provided by the joint report of the multilateral development bank (MDB) Task Force on Mobilization of Private Finance. However, these numbers (USD 46 billion on average over 2017–2021 for all sectors) are broken down only into "infrastructures" and "non-infrastructures", which is insufficient to assess their contribution to food security and nutrition.[23]

With regard to domestic commercial financing, FAOSTAT[24] provides numbers for banking credit to agriculture in LICs, LMICs and UMICs. Net banking loans – according to this source – amount to an average of USD 10 billion between 2017 and 2021, and exhibit an almost continuous decline from USD 22 billion in 2017 to USD 2 billion in 2021 (Figure 28). While these numbers are small, one may assume that, based on ISF Advisors,[25] they represent about three-quarters of the total financing available

r As transactions can be and frequently are attached to several SDGs, it is not advisable, to avoid double counting, to add to these numbers a share of the amounts for other SDGs that could be used as proxies for supportive expenditures.

s Not counting SDG 17, with which all transactions were claimed to be aligned.

t See Supplementary material to Chapter 4 S4.4 for definition from the MDB Task Force on Mobilization of Private Finance.

to "agri-SMEs", at least in sub-Saharan Africa and Southeast Asia.[u] Furthermore, these numbers reveal a clear declining trend in net banking loans that could support food security and nutrition.

Ultimately, the main source of financing for companies in sectors relevant to food security and nutrition, at least for farmers and small and medium enterprises (SMEs), appears to be self-financing. No data exist, however, on this self-financing. FAOSTAT[26] provides data on capital stock in agriculture in LICs, LMICs and UMICs, from which net capital expenditure (USD 412 billion on average over 2017–2021, at constant 2015 prices) can be calculated. Self-financing could in theory be calculated by subtracting from the net capital expenditure the external financing that backs these investments, including the flows mentioned above (i.e. banking credits, cross-border remittances used for agricultural investments, domestic government subsidies to capital expenditure, and so forth). Although data on this external financing are too partial to allow for such an exercise, it is likely that the lion's share of net capital expenditure in agriculture is being financed by farmers and SMEs themselves. ■

u The remaining quarter comprises non-bank financial institutions, public development banks, impact-oriented funds and social lenders, and private equity and venture capital funds. These estimates, however, present an incomplete geographical and company-type coverage as well as several methodological challenges. For more details on their estimation, see Supplementary material to Chapter 3.

4.2 THE COST OF POLICIES AND INTERVENTIONS TO END HUNGER AND MALNUTRITION BY 2030

All of the data on (domestic and external) public and private financing flows that are needed to apply the core and extended definitions of financing for food security and nutrition are not yet available. Consequently, it is not possible to gauge the financing gap that must be bridged globally to meet SDG Targets 2.1 and 2.2 by 2030.

Data development for a better accounting system is needed globally to understand how much financing is available to support internationally agreed upon goals such as SDG 2, using proper definitions to map financing flows to the development aspirations of the goals, including food security and nutrition goals. Filling the information deficit will require bold steps from the international community; otherwise, the likelihood of achieving development goals cannot be realistically estimated and projected.

Due to these existing data gaps to fully estimate how much additional financing is needed to end hunger, food insecurity and malnutrition, economic models are often used to estimate the necessary additional investments, mostly to reduce hunger, but also to address nutrition concerns, although to a lesser extent. This section reviews existing relevant studies, aiming to arrive at some indicative ranges of the cost of policies and interventions – that will require new financing – to end hunger, food insecurity and malnutrition by 2030. Cost estimates are partial, though, for several reasons explained below.

How much will ending hunger and malnutrition by 2030 cost at the minimum?

Several studies have estimated the global cost of additional investments to end hunger by 2030, whereas studies on ending malnutrition in its multiple forms are scarcer. These studies often rely on economic models such as global computable general equilibrium (CGE) models and global partial equilibrium models, marginal abatement cost curves (MACC), and investment cost minimization and cost–benefit analysis. The first two types of models have the advantage that they allow for first- and second-round effects of the additional investments for food security and nutrition on either specific sectors or the economy at large, or both, including through private investment and household consumption responses. For this reason, the review of studies relies a great deal on the literature that uses those models.

The studies provide different cost estimates for several reasons. To begin with, different global economic models or estimation techniques are used. There are also differences in the questions asked and objectives targeted, in the investment strategies or set of interventions considered to meet targets, and in the period of analysis. Most – but not all – analyses available use 2030 as the target year in line with the SDGs. Different measures to ascertain the end of hunger are also considered across studies; while most consider it to be achieved when the PoU is under 5 percent, others target almost or fully eliminating undernourishment. Most analyses use a base or business-as-usual scenario that begins in a past year and projects how many million people will still be undernourished in 2030. Subsequently, these exercises develop alternative scenarios whereby policies and interventions are stepped up to trigger changes to reduce hunger and malnutrition. The different analyses available may have a different first year for the base scenario, which affects the period of analysis and, hence, the cost estimates for the period from that first year to 2030 (or any other final year).

Because not all the relevant pillars of food security and not all the forms of malnutrition are systematically accounted for in existing studies, the cost estimates are only partial. Furthermore, because the quantitative methods differ across studies, the focus is mostly on the cost of new policies and interventions (which is the most comparable aspect across studies) and less on the resources mobilized for private investment and household food consumption in response to the policies and interventions, the magnitude of which is also important for food security and nutrition.

While these global analyses provide useful costings for different policies and interventions, it is not possible to know whether these policies and interventions can realistically be financed in practice to the extent estimated, not to mention the macroeconomic trade-offs of using one source of finance over another, and countries' absorptive capacity for foreign resources and for fully executing newly available financing. These are important considerations at the country level as shown by a body of CGE modelling literature.[v, 27] The global cost estimates here presented operate under the assumption that all the financing needed is available, which may not necessarily be the case for countries that have no easy access to grant aid or borrowing, or where there is no political feasibility to raise taxes. They also assume that countries that have access to such financing have full absorptive capacity, meaning that their economies can properly adjust to any local currency appreciation from foreign exchange inflows, which may also not be the case for some countries. The cost estimates must be taken with the assumption that the additional annual costs estimated by the studies for past years (i.e. before 2024) were never fully borne, because the exact investments and interventions whose costs are estimated were not necessarily implemented. Furthermore, these global analyses assume that groups of countries or regions implement the same policies and interventions in unison, which in practice would require a comprehensive global accord. The financial cost associated with enacting new legislation, which is a key tool for improving »

v Existing global model-based analyses, such as those referred to here, include, for each country or region, a current account balance (that can be in surplus or deficit) for the domestic economic institutions (i.e. households, enterprises and the government) and the rest of the world. These domestic and foreign balances are summed up to estimate the total savings to which total investment is equalized for each country or region. With some refinement, some of these global models may have a current account balance for each institution. However, they do not include a capital account for each economic institution that allows mapping up institutions' surpluses and deficits to specific sources of domestic and foreign financing. The body of CGE modelling literature at the country level referred to here includes capital accounts for each economic institution and recognizes the different potential macroeconomic trade-offs from using alternative ways of financing public investment, although its focus is on country-level applications.

TABLE 17 OVERVIEW OF STUDIES WITH COST ESTIMATES FOR ENDING HUNGER, FOOD INSECURITY AND MALNUTRITION

Study	Main question asked	Targets and time frame	Modelling approach	Additional annual costs up to 2030 (unless otherwise indicated) for a specific period	Investments/interventions
FAO, IFAD and WFP (2015)	What are the additional transfers and investments needed to end poverty and hunger in all countries by 2030?	No Poverty and Zero Hunger targets by 2030.	Global partial equilibrium model with country projections of food supply and demand (called GAPS).	USD 265 billion per year, of which USD 198 billion for pro-poor investments (2016–2030).	Poverty gap transfers and pro-poor investments in irrigation, genetic resources, mechanization, primary agriculture and natural resources, agroprocessing operations, infrastructure, institutional framework, research and development (R&D), extension; social protection.
Global Nutrition Report (2021)	What is the minimum cost to meet the World Health Assembly (WHA) goals on reducing undernutrition by 2030?	40% reduction in child stunting; 50% reduction in anaemia in women; 50% increase in exclusive breastfeeding rates; child wasting at 5%.	Investment cost minimization and cost–benefit analysis.	USD 10.8 billion per year (2022–2030).	Targeted nutrition interventions (micronutrient and protein supplementation, promoting good health and hygiene, complementary foods) and select nutrition-sensitive interventions (staple food fortification and pro-breastfeeding policies).
Laborde *et al.* (2016)	What is the minimum cost to end hunger for vulnerable households in all countries by 2030?	Prevalence of undernourishment at 5% or less by 2030; bottom-up approach with household-level targeted interventions.	Global computable general equilibrium (CGE) model (MIRAGRODEP) combined with household surveys for targeted interventions.	USD 11 billion per year (2015–2030).	Social safety nets (food subsidies); farm support (production subsidies, fertilizer subsidies, investment grants, R&D, extension); rural development and infrastructure (reduction of post-harvest losses, irrigation, roads).
Laborde *et al.* (2020)	What will it cost governments to end hunger, double the incomes of small-scale producers, and protect the climate by 2030?	End hunger (saving 490 million people from hunger by 2030); double the incomes of 545 million small-scale producers; maintain greenhouse gas emissions below commitments made in Paris Agreement.	Global CGE model (MIRAGRODEP) combined with household surveys for targeted interventions.	Additional USD 33 billion per year; donor share of USD 14 billion and country share of USD 19 billion (2020–2030).	14 policy interventions categorized into 3 categories. "On the Farm": aimed at directly assisting farmers, including provision of farm inputs, R&D, improved livestock feed, and irrigation infrastructure. "Food on the Move": targeting the reduction of post-harvest losses through measures such as storage improvement, enhancing returns from sales, and supporting services offered by small and medium enterprises. "Empower the Excluded": social protection and vocational training programmes.
Laborde and Torero (2023)	How much would it cost to reduce chronic hunger to a 5% level by 2030?	Chronic hunger at 5% by 2030; cut the number of people in chronic hunger by 314 million; an additional 568 million people able to afford healthy diets by 2030.	Global CGE model (MIRAGRODEP) including various social and environmental outcomes to track the various trade-offs at stake.	Countries would have to redistribute USD 1.4 trillion per year (2020–2030).	Eliminating hunger by implementing a major redistribution of income, massively subsidizing production, or investing massively in agricultural R&D.

TABLE 17 (Continued)

Study	Main question asked	Targets and time frame	Modelling approach	Additional annual costs up to 2030 (unless otherwise indicated) for a specific period	Investments/interventions
Mason-D'Croz *et al.* (2019)	How much would hunger decrease given investments to achieve target yield increases by 2030?	World hunger at 5% by 2030; 10% only for Eastern and Central Africa.	Agriculture sector partial-equilibrium model linked to biophysical models and a CGE model; impacts of climate change included.	USD 52 billion per year (2010–2030).	Agricultural R&D, irrigation expansion, water-use efficiency, soil management, transport and infrastructure.
Shekar *et al.* (2017)	What is the minimum cost to meet the WHA goals on reducing undernutrition by 2025?	40% reduction in child stunting; 50% reduction in anaemia in women; 50% increase in exclusive breastfeeding rates; child wasting at 5%.	Investment cost minimization and cost–benefit analysis.	USD 7 billion per year (2015–2025).	Targeted nutrition interventions (micronutrient and protein supplementation, promoting good health and hygiene, complementary foods); select nutrition-sensitive interventions (staple food fortification and pro-breastfeeding policies).
ZEF and FAO (2020)	What are the costs of ending hunger?	G7 commitment of lifting 500 million people out of hunger by 2030.	Marginal abatement cost curve (MACC) to identify a mix of least-cost investment options with the highest potential for reduction in hunger and malnutrition.	Total annual investments in a range of about USD 39–50 billion per year (2020–2030).	Mix of cost-effective investments including enhancing efficiency in R&D, extending agricultural advisory services, improving agricultural information services, expanding small-scale irrigation in Africa, enhancing female literacy rates, and amplifying existing social safety nets.

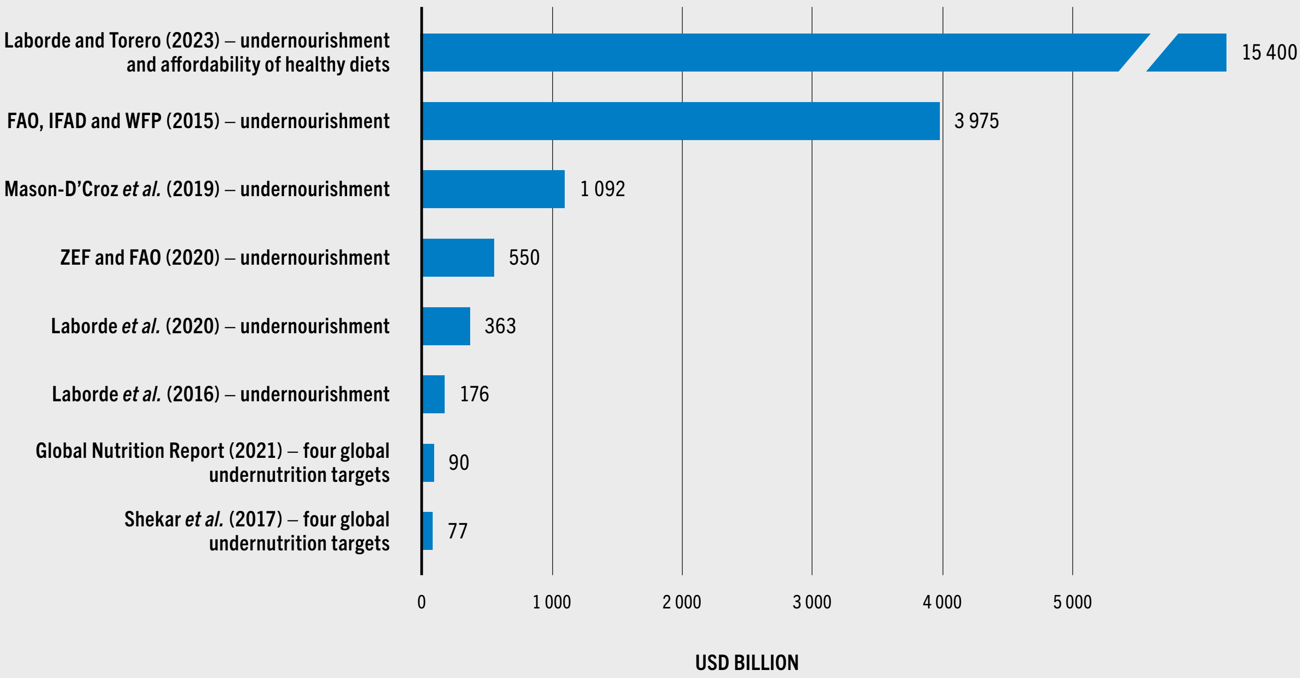
SOURCES: Authors' (FAO) own elaboration based on FAO, IFAD & WFP. 2015. *Achieving Zero Hunger: The critical role of investments in social protection and agriculture*. Rome, FAO. https://www.fao.org/3/i4951e/i4951e.pdf; Global Nutrition Report. 2021. *2021 Global Nutrition Report. The state of global nutrition*. Bristol, UK, Development Initiatives. https://globalnutritionreport.org/reports/2021-global-nutrition-report; Laborde, D., Bizikova, L., Lallemant, T. & Smaller, C. 2016. *Ending Hunger: What would it cost?* Winnipeg, Canada, IISD (International Institute for Sustainable Development) and IFPRI (International Food Policy Research Institute). https://www.iisd.org/system/files/publications/ending-hunger-what-would-it-cost.pdf; Laborde, D., Murphy, S., Parent, M., Porciello, J. & Smaller, C. 2020. *Ceres2030: Sustainable solutions to end hunger. Summary report*. Cornell University, IFPRI and IISD. https://ceres2030.iisd.org/wp-content/uploads/2021/03/ceres2030_en-summary-report.pdf; Laborde, D. & Torero, M. 2023. Modeling actions for transforming agrifood systems. In: J. von Braun, K. Afsana, L.O. Fresco & M.H. Ali Hassan, eds. *Science and Innovations for Food Systems Transformation*, pp. 105–132. https://link.springer.com/chapter/10.1007/978-3-031-15703-5_7; Mason-D'Croz, D., Sulser, T.B., Wiebe, K., Rosegrant, M.W., Lowder, S.K., Nin-Pratt, A., Willenbockel, D., Robinson, S., Zhu, T., Cenacchi, N., Dunston, S. & Robertson, R.D. 2019. Agricultural investments and hunger in Africa modeling potential contributions to SDG2 – Zero Hunger. *World Development*, 116, 38–53. https://doi.org/10.1016/j.worlddev.2018.12.006; Shekar, M., Kakietek, J., Eberwein, J.D. & Walters, D. 2017. *An investment framework for nutrition: Reaching the global targets for stunting, anemia, breastfeeding, and wasting*. Directions in Development Series. Washington, DC, World Bank. https://hdl.handle.net/10986/26069; ZEF (Center for Development Research of the University of Bonn) & FAO. 2020. *Investment costs and policy action opportunities for reaching a world without hunger (SDG2)*. Rome and Bonn. https://doi.org/10.4060/cb1497en

» food security and nutrition and is inherently different from policies due to its capacity to create enforceable rights and obligations, is also not included in these studies.

Caveats aside, the reviewed studies provide an idea of the additional financing that could be needed to support policies and interventions for the world to be on track to meet SDG Targets 2.1 and 2.2. The main characteristics and findings of these studies are summarized in Table 17.

The findings are that policies and interventions to get on track to meet SDG Targets 2.1 and 2.2 would require additional resources from now until 2030 ranging between USD 176 billion and

FIGURE 29 TRILLIONS OF USD ARE ESTIMATED TO BE NEEDED TO FINANCE INVESTMENTS FOR ENDING HUNGER AND SOME FORMS OF MALNUTRITION, AND TO INCREASE THE AFFORDABILITY OF HEALTHY DIETS BY 2030



NOTE: For all studies, the additional average cost estimate per year is multiplied by the number of years in the period of their simulation, which is identified in Table 17.

SOURCE: Authors' (FAO) own elaboration based on sources of Table 17.

https://doi.org/10.4060/cd1254en-fig29

USD 3.98 trillion to eradicate undernourishment, plus an additional USD 77–90 billion to meet selected global undernutrition targets. Estimates jump sharply to USD 15.4 trillion when adding the types of transformational policies that would require financing in order to increase the affordability of healthy diets for millions while still reducing undernourishment (Figure 29).[w] It is not possible to know exactly the extent to which these numbers are overestimating or underestimating the real financing gap. On the one hand, the baselines of these studies use PoU and malnutrition indicators that are outdated compared to those reported in **Chapter 2** – because they have shown either progress or statistical improvement due to increased data availability, which may very well result in an overestimation of the real financing gap. On the other hand, since the existing studies have not comprehensively considered all the dimensions (or indicators) of food security and nutrition and the effects of the COVID-19 pandemic on all of them, among other shocks, there may also be an underestimation of the real financing gap. Nevertheless, the analyses reviewed prove useful to show that trillions of USD will be needed – in addition to existing financing – to finance alternative policy mixes so that meeting SDG Targets 2.1 and 2.2 can still be within reach.

w These absolute amounts for the period from now until 2030 are calculated by multiplying the additional annual cost that has been estimated by the number of years for which the additional annual cost was estimated in each of the studies that have been selected to do this exercise. The information used is presented in Table 17.

Different interventions, same targets, different cost estimates

The various studies suggest that different policies and interventions can be used to meet the same SDG 2 target, but at different costs. Some case studies embrace the premise that hunger stems from a deficiency in purchasing power, resulting in lack of access to sufficient, safe and nutritious food. Consequently, achieving the goal of eliminating hunger (SDG 2) is contingent upon eliminating poverty (SDG 1) and upon broader economy-wide investments that boost GDP growth and people's incomes. FAO, IFAD and WFP (2015)[28] estimated that USD 265 billion per year are needed to eliminate hunger, of which USD 198 billion per year would be for targeted pro-poor private and public investments, especially in rural areas and agriculture.

In several studies, increasing agricultural productivity through new investments is seen as a channel to reduce hunger. It has been estimated – using a global economy-wide model – that investing an additional USD 52 billion annually between 2015 and 2030 to boost agricultural productivity in the face of climate change in LICs and MICs would fill the yield gaps and reduce the PoU to 10 percent in Eastern and Central African countries and to 5 percent in all other countries.[29]

Some studies focus on the most vulnerable households in all countries. A global economy-wide modelling study projects that the number of hungry people would decrease to 599 million from 2015 to 2030, primarily driven by economic growth, and to reduce this number to 310 million (or the PoU to 5 percent) by 2025, a policy mix would be needed. This includes a reallocation of public spending for countries to prioritize social safety nets supporting consumers through cash transfers and food stamps; farm support to increase production and farmers' incomes; and investments in infrastructure, education, storage, market access and value chains. This policy mix results in an overall cost of USD 11 billion annually between 2015 and 2030 – of which USD 4 billion are expected to come from donor contributions and the remaining USD 7 billion from countries themselves. These measures are also projected to stimulate an additional USD 5 billion in private investment per year, on average.[30]

Another global economy-wide modelling study identifies 14 policy interventions that are clustered into three categories to, respectively: i) directly assist farmers, including through provision of farm inputs, research and development, improved livestock feed, and irrigation infrastructure; ii) reduce post-harvest losses through measures such as storage improvement, enhancing returns from sales, and supporting services offered by SMEs; and iii) empower excluded populations through social protection and vocational training programmes. It estimates that USD 33 billion per year would be needed between 2020 and 2030 to support these public interventions and reduce the PoU to 3 percent – of which USD 14 billion from donors and the remaining USD 19 billion from domestic resource mobilization. These public interventions would increase the profitability of primary and processed food sectors, attracting the private sector to invest USD 52 billion per year on average in such sectors.[31]

Using marginal cost curve analysis – a simpler approach that does not account for economy-wide effects – helped to estimate the additional costs associated with lifting people out of hunger through 24 interventions that have been proven to be the least-cost measures with significant potential for reducing hunger and malnutrition. These include a mix of enhancing efficiency in agricultural R&D, expanding agricultural extension services, improving agricultural information services, expanding small-scale irrigation in Africa, enhancing female literacy rates, and scaling up existing social safety nets. They would require an additional annual investment of about USD 39 to 50 billion to lift approximately 840 to 909 million people out of hunger by 2030.[32]

An investment cost minimization and cost–benefit approach helped estimate the minimum cost to meet four of the six World Health Assembly targets by 2025: i) reducing the number of stunted children under the age of five by 40 percent; ii) reducing the number of women at reproductive age with anaemia by 50 percent; iii) increasing the rate of exclusive breastfeeding in the first six months to 50 percent; and iv) reducing and maintaining child wasting at less than 5 percent. This study aligns with SDG Target 2.2 but does not fully cover it – as, for example, interventions to address child overweight are not included – and the study leaves out SDG Target 2.1. It estimates that an additional USD 7 billion per year is needed between 2015 and 2025 to achieve these four global nutrition targets through nutrition-specific investments in micronutrient supplementation, good infant and young child nutrition practices, and staple food fortification.[33] To include additional costs for mitigating the impact of the COVID-19 pandemic, this cost estimate was updated to USD 10.8 billion per year, and the period of analysis was extended to 2030 (rather than 2025) from 2022.[34]

Cost estimates jump sharply when transformational policies and interventions to increase the affordability of healthy diets are factored in. Using a global economy-wide model, a study arrives at a much higher estimate of the cost of investments needed not only to reduce the PoU to 5 percent by 2030, but also to increase the affordability of healthy diets for 568 million people. Adding the latter target requires multiple policies and interventions to simultaneously transform agrifood systems and achieve SDG 2 targets. These interventions are tailored to increase calorie consumption while ensuring healthy diets, increasing the productivity and incomes of small producers, enabling the sustainable use of biodiversity and ecosystems, and addressing climate change. They are estimated to cost USD 1.4 trillion every year and include spending on social safety nets to ensure healthy diets for all; implementing school feeding programmes; repurposing farm subsidies; reforming consumer incentives; enhancing innovation, technology and knowledge for farmers; and reducing food loss and waste.[35]

It is important when considering the different cost estimates to keep all the aforementioned caveats in mind. Nonetheless, irrespective of what the exact amount of financing needed might be to make the necessary progress in all the indicators associated with SDG Targets 2.1 and 2.2, the financing gap is by no means negligible and the cost of not bridging it will be high, as is further explained in the next section. ■

4.3 THE COST OF INACTION OR SLOW ACTION

There are two ways of examining the cost of not timely addressing the financing gap for the world to be on track to meet SDG Targets 2.1 and 2.2. Although it is not possible to realistically and fully estimate this gap, the different studies reviewed in the previous section indicate that it would be in the trillions of USD from today up until 2030. The first way to examine the cost of not bridging the financing gap is by measuring the millions of people that, by 2030 and beyond, will still be hungry, food insecure, malnourished and unable to afford a healthy diet, not to mention the medium- to long-term socioeconomic and health repercussions of this food insecurity and malnutrition.

The second way to examine the cost of inaction relates to the inefficiency, inequity and lack of sustainability with which current financing is being spent and allocated. In this section, reference is also made to the opportunity cost of not efficiently implementing and allocating public funds that are important for food security and nutrition.

Not bridging the financing gap will make hunger, food insecurity, malnutrition and unhealthy living prevail while costing trillions

Chapter 2 provides stark evidence of what business as usual means for hunger, food insecurity and malnutrition. Projections indicate that with a continuation of past trends, millions of people will still be undernourished by 2030 (see **Chapter 2**, Figure 3). Furthermore, for seven global nutrition targets, the progress will be less than needed to achieve the 2030 targets, and obesity is actually projected to increase in all regions and in almost all age groups (see **Chapter 2**, Figure 8).

Current amounts of financing are insufficient for the quantity and quality of programmes and interventions needed to eradicate acute and chronic food insecurity, which is affecting the people in most need of food assistance. Studies by the World Food Programme (WFP) show that failing to fund the assistance that must be provided to these people will have negative consequences for individuals, but also for local communities and even for donor countries. At the individual level, for example, estimates demonstrate that, on average, every percentage point cut in food assistance provided by WFP could push more than 400 000 additional people into emergency levels of hunger.[36] Microsimulations indicate that halving the value of transfers to each beneficiary suffering from acute hunger in countries such as Afghanistan, Haiti, Iraq and Yemen could push an additional 7 million people into emergency or worse levels of acute food insecurity, up from the 2022 baseline of 14 million people.[36]

In the absence of more financing to scale up programmes and interventions to reduce hunger, people adopt negative coping strategies, but the consequences of these strategies do not necessarily materialize immediately. The *Global Report on Food Crises 2024*[37] notes that, to survive now, people tend to trade off their potential future food security and livelihoods by exhausting or selling their productive assets or cutting down on education, health care or other essential needs. For this reason, as well as because of the long-term health consequences of famine, several studies cited in the report calculate that early action saves money compared to belated action. The report also notes that many deaths can occur before a situation reaches famine level, which is often the scale of acute food insecurity that triggers the scaling up of assistance.

For local communities, there is evidence of a high risk that inadequate assistance increases social tensions, such as conflict over land and limited resources, and contributes to national and regional destabilization.[38] In protracted situations without prospects of return, resettlement or a sustainable life outside of a camp, it has been found that refugees may be at higher risk of being targeted and recruited by militant and extremist groups,[39] which in turn fuels regional or even international conflict, further exacerbating food insecurity and malnutrition.[40] Humanitarian inaction can further imply lost opportunities to facilitate post-conflict recovery and peacebuilding, thereby setting the stage for future exodus, as some studies have observed.[41, 42]

For donor countries, inadequate assistance can have a higher financial cost than adequate assistance. This especially holds true for assistance for forcibly displaced people – whose number has skyrocketed in recent years[43, 44] – when they reach the Global North.[45] According to preliminary ODA estimates, member countries of the Development Assistance Committee spent USD 31 billion on in-donor refugee costs in 2023, which is more than the USD 25.9 billion that the same countries spent on humanitarian aid.[46]

While there are short-term urgencies that need more financing, including for humanitarian aid, failing to finance the actions that will once and for all address the main determinants of food insecurity and malnutrition will result in an even bleaker future when it comes to the likelihood of meeting SDG Targets 2.1 and 2.2. This action failure will result in higher social, economic and environmental costs.

A study has found that the cost of inaction on stunting represents annually at least USD 135 billion (between 0.01 percent and 1.2 percent of national GDP across countries) in lost sales, in addition to a monthly income loss by private sector workers ranging between USD 700 million in the Near East and North Africa and USD 16.5 billion in East Asia and the Pacific.[47] The African Union Commission and WFP have put the cost of child undernutrition (including the cost to health and education systems and the productivity loss) in 21 African countries at USD 15.3 billion per year in 2025, assuming efforts to reduce it would stay at existing levels.[48]

The *World Obesity Atlas 2023*,[49] based on another global study,[50] estimates the worldwide economic impact of overweight and obesity at USD 3.3 trillion in 2030 and USD 4.3 trillion in 2035 (in constant 2019 USD). Studies have also estimated that without further interventions, childhood and adolescent obesity would translate into economic losses at constant 2020

USD (due to higher health care expenditure and reduced wages and productivity) in the range of USD 1.84 trillion in Mexico[51] and USD 31.6 trillion in China,[52] over the periods 2026 to 2090 and 2025 to 2092, respectively.

As explored in **Chapter 2**, countries are increasingly facing multiple simultaneous nutrition challenges in the form of the coexistence of undernutrition and overweight and obesity. The double burden of malnutrition (DBM) confers a serious and negative economic impact on individuals and populations. What is more concerning is that severe levels of this double burden are shifting towards the poorest countries. In contrast to the 1990s, when the DBM was typically seen in the highest income bracket countries among LMICs, it nowadays predominates in the poorest LMICs, particularly in Southern and Eastern Asia and sub-Saharan Africa. This will likely have implications for countries' ability to address malnutrition in all its forms. Estimates suggest that all undernutrition, micronutrient deficiencies and overweight cost the global economy an estimated USD 3.5 trillion per year.[33] Addressing multiple forms of malnutrition makes most sense in the face of such evidence. If actions are not accelerated to address them simultaneously, countries stand to face high costs across the spectrum of disease, especially given the interconnections between various forms of malnutrition across the life course and across generations. The *2021 Global Nutrition Report 2021*[34] provided an updated estimate that the total economic gains to society of investing in nutrition could reach USD 5.7 trillion a year by 2030 and USD 10.5 trillion a year by 2050 (all in constant 2021 USD).[34]

Although some transformative policies and legislation for better and more sustainable production may cost billions of USD that will need to be financed, the cost of not mobilizing such financing would easily be in the trillions of USD. The Food and Land Use Coalition's Global Consultation Report estimated that current food and land-use systems generate worldwide health, nutrition and environmental costs that amounted to USD 12 trillion a year in 2018 prices (of which USD 2.7 trillion were due to obesity and USD 1.8 trillion were due to undernutrition), which could rise to USD 16 trillion a year by 2050 under a continuation of current trends in malnutrition, global warming, ecosystem degradation and biodiversity loss.[53]

The 2020 edition of this report provided evidence that under current food consumption patterns, diet-related health costs linked to mortality and non-communicable diseases are projected to exceed USD 1.3 trillion per year by 2030. On the other hand, the diet-related social cost of greenhouse gas (GHG) emissions associated with current dietary patterns is estimated to be more than USD 1.7 trillion per year by 2030.[7] Similar evidence from another study shows that in the absence of interventions, covering the income gap of those who cannot afford a healthy diet will cost USD 1.4 trillion annually by 2030. The interventions recommended in this study would cut this amount to USD 428 billion, but additional financing would be required to finance them.[35]

FAO's *The State of Food and Agriculture 2023*[54] report found that – with a very high degree of confidence, using national-level assessment for 154 countries – the global quantified hidden costs of agrifood systems amount to USD 10 trillion or more at 2020 purchasing power parity (PPP). Interestingly, this study finds that the dominant quantified hidden costs are those arising from dietary patterns that increase the risk of diseases and may lead to lower labour productivity.[54]

No doubt, these findings reveal the urgent need to factor these hidden costs into decision-making to transform agrifood systems before the cost and financing needed to address them become completely out of reach for governments. This implies addressing the issues of unhealthy dietary patterns, which will necessitate significant additional financing for policies, legislation and interventions.

Not improving execution and the quality of spending will also be costly

Even if more financing for food security and nutrition becomes available, changes and reforms are necessary to guarantee a higher execution and quality of spending. Governments »

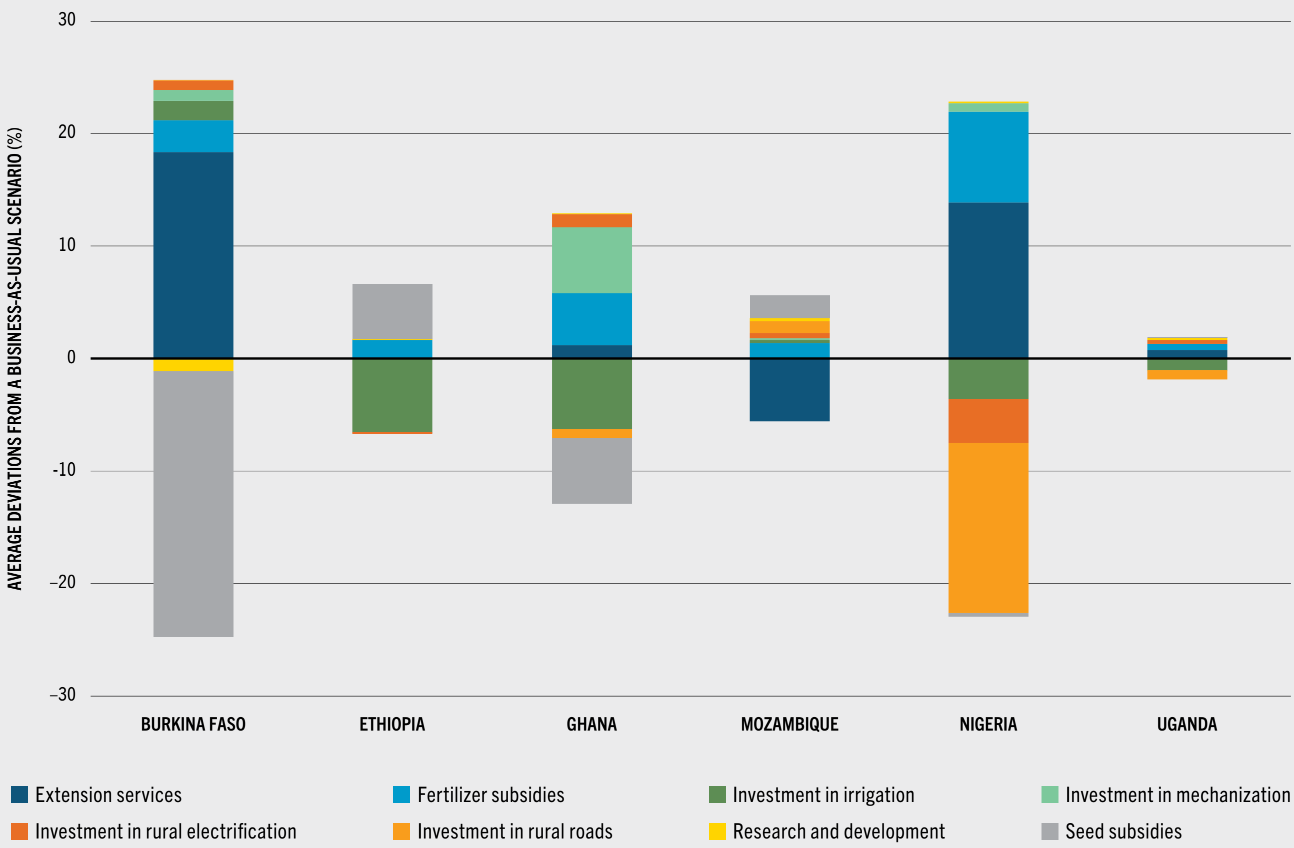
BOX 11 THE OPPORTUNITY COST OF NOT REPURPOSING BUDGET ALLOCATIONS FOR THE AGRICULTURE AND LIVESTOCK SECTORS IN SIX SUB-SAHARAN AFRICAN COUNTRIES

The 2022 edition of this report[2] analysed a scenario of what would happen if public spending across different support measures (i.e. extension services, fertilizer subsidies, investment in irrigation, investment in mechanization, investment in rural electrification, investment in rural roads, research and development, and seed subsidies) and commodities in the agriculture and livestock sectors were reallocated to pursue four objectives: maximize agrifood gross domestic product (GDP), maximize off-farm jobs in rural areas, minimize the incidence of rural poverty, and minimize the cost of a least-cost healthy diet. The reallocation is optimal because, given a set of preferences, the best possible outcome for the four objectives is obtained subject to a set of economic constraints. Using an innovative policy optimization modelling tool with data for Ethiopia, this optimization scenario was compared with a business-as-usual scenario whereby the current budget continued to be allocated without changes across support measures and commodities. The results showed that the optimal reallocation of the budget in 2025 would allow the Ethiopian Government to boost agrifood output, create thousands of off-farm jobs in rural areas, lift thousands of people out of poverty, and ensure that millions of additional Ethiopians could afford a healthy diet – without any additional fiscal costs.[60]

For this edition of the report, the analysis has been updated for Ethiopia and extended to include Burkina Faso, Ghana, Mozambique, Nigeria and Uganda.[59] The potential gains from optimizing budget allocations are not estimated only for 2025 but also cumulatively up to 2030.

Results show that the budget would have to be reallocated very differently in these six countries for it to efficiently help governments improve on the four objectives (see Figure A), considering the differences in the effectiveness, coverage and unit cost of the different support measures or interventions. It is

FIGURE A OPTIMAL REALLOCATION OF PUBLIC SPENDING ACROSS SUPPORT MEASURES IN THE AGRICULTURE AND LIVESTOCK SECTORS TO MAXIMIZE AGRIFOOD GDP AND OFF-FARM EMPLOYMENT IN RURAL AREAS, AND TO MINIMIZE RURAL POVERTY AND THE COST OF THE LEAST-COST HEALTHY DIET, 2025–2030



NOTES: GDP = gross domestic product. Breeding and feeding services are excluded for simplicity, because they are used only in Ethiopia among the countries covered, and because they barely show a percentage change as a result of the optimal reallocation.

SOURCE: Sánchez, M.V., Cicowiez, M., Pernechele, V. & Battaglia, L. (forthcoming). *The opportunity cost of not repurposing public expenditure in food and agriculture in sub-Saharan African countries – Background paper for The State of Food Security and Nutrition in the World 2024*. FAO Agricultural Development Economics Working Paper. Rome, FAO.

https://doi.org/10.4060/cd1254en-figB11-A

found that, for example, from 2025 to 2030, several countries would have to reduce average spending on irrigation (Ghana, Ethiopia, Nigeria and Uganda) or seed subsidies (Burkina Faso and Ghana), whereas other countries – or even the same countries in some cases – would have to step up spending on seed subsidies (Ethiopia and Mozambique), mechanization (Burkina Faso, Ghana and Nigeria) or extension services (Burkina Faso, Ghana, Nigeria and Uganda). Interestingly, while extension services would need to be prioritized in certain countries, in other countries these services would have to be the most deprioritized, at the cost of subsidizing more inputs and building more rural roads (Mozambique). The larger the required budget reallocations (e.g. Burkina Faso and Nigeria), the further away the country is from the optimal budget allocation. The reallocation across commodities is even more varied across countries, as is shown in the study[59] – but not here for simplicity.

The optimal budget reallocations, irrespective of their size in each country, can significantly increase the value for public money. At the country level, there would be significant efficiency gains in agrifood output, thousands of off-farm jobs would be created in rural areas, thousands of people would be lifted out of poverty, and millions could newly afford a healthy diet (Table A). Importantly, even if one of the objectives is to minimize rural poverty, the economy-wide gains would go beyond rural areas such that, as explained in the study, thousands of people would also be lifted out of poverty in urban areas.[59] Gains would be seen immediately in 2025, the first year of budget optimization, but impressive gains would also build up over time to 2030 – except in Uganda where the required budget reallocations would be the most modest as this is the country where the current budget allocated to the agriculture and livestock sectors seems closest to the optimal allocation. Agrifood GDP would be 8 percent (Burkina Faso and Ghana) or even 11 percent (Nigeria) higher in 2030 compared with 2025. When summed up across the six countries, by 2030, almost 1 million off-farm jobs would be created in rural areas, 2.8 million people would be lifted out of poverty, and 16 million additional people would be able to afford a least-cost healthy diet, all with the same budget. In other words, not optimally repurposing the budget allocated to the agriculture and livestock sectors in these six sub-Saharan African countries would have a substantial cost.

TABLE A POTENTIAL SOCIOECONOMIC GAINS RESULTING FROM OPTIMALLY REALLOCATING PUBLIC SPENDING ACROSS SUPPORT MEASURES AND COMMODITIES IN THE AGRICULTURE AND LIVESTOCK SECTORS (DEVIATIONS FROM A BUSINESS-AS-USUAL SCENARIO)

	Burkina Faso		Ethiopia		Ghana		Mozambique		Nigeria		Uganda	
	2025	2025–2030	2025	2025–2030	2025	2025–2030	2025	2025–2030	2025	2025–2030	2025	2025–2030
Number of people lifted out of poverty	185 214	616 717	596 802	728 939	236 992	275 699	321 955	555 336	427 166	460 287	250 120	139 049
Off-farm jobs created in rural areas	54 800	182 709	46 371	66 256	133 310	181 503	90 095	150 914	183 819	213 092	81 954	57 988
Additional people who can afford a healthy diet	337 621	1 448 952	3 186 681	5 254 814	4 216 027	5 383 325	661 723	1 265 444	1 023 286	1 857 148	1 043 022	939 929
Agrifood GDP increase (%)	2	8	2	2	6	8	9	11	1	1	3	2

NOTES: GDP = gross domestic product. The second column for each country shows the absolute change between 2025 and 2030 for each of the four indicators.

SOURCE: Sánchez, M.V., Cicowiez, M., Pernechele, V. & Battaglia, L. (forthcoming). *The opportunity cost of not repurposing public expenditure in food and agriculture in sub-Saharan African countries – Background paper for The State of Food Security and Nutrition in the World 2024*. FAO Agricultural Development Economics Working Paper. Rome, FAO.

» in many countries find it difficult to execute the budgets they have funded. A study by FAO's MAFAP programme finds that 21 percent of the public budget on food and agriculture was left unspent across 13 sub-Saharan African countries between 2004 and 2018, undermining transformative investments. In addition to concerns with regard to weak public financial management, this study noted that agriculture is a seasonal business, and funds may be disbursed at the wrong time or periodicity. Furthermore, it notes that regarding civil servants' salaries, which are more predictable and easier to implement than investments, the relative share of public spending in the agriculture sector is much lower than in other sectors. The significant reliance on donor funds, that are more difficult to implement, further contributes to the low execution rates of agricultural budgets. It should be noted, however, that execution rates can vary across sectors even within infrastructures. A World Bank study found execution ratios of 94 percent for roads versus only 75 percent for the power sector,[55] and differences in execution rates can even be observed within one country over time, even over short periods, as is shown in public expenditure reviews for some African countries.[x]

Some of the financing available may nonetheless not be utilized in the most cost-effective, equitable and environmentally sustainable manner in countries across all income groups. Billions of USD are financing some poorly designed and distortive government policies and subsidies that are not only inequitably targeting producers but are also harming rather than helping efforts to achieve SDG 2 and are behind some of the hidden costs discussed above. In 2021, FAO, the United Nations Environment Programme and the United Nations Development Programme estimated that – with a continuation of past trends – the total agricultural producer support in LICs, LMICs and UMICs would reach USD 1.3 trillion in 2030; of this, USD 1 trillion would provide support through border measures (mainly import tariffs and duties) and USD 276 billion would finance fiscal subsidies (for inputs and production).[57]

x See, for example, *Tanzania Agriculture Public Expenditure Review 2022*.[56]

Beyond the billions of USD currently allocated to support food and agriculture, there is also a significant opportunity cost of not repurposing some of these resources to achieve better outcomes for people, the economy and the planet. This opportunity cost may itself be important to reduce the financing gap to meet SDG Targets 2.1 and 2.2. The 2022 edition of this report[2] analysed several scenarios of repurposing some of the worldwide support to food and agriculture, which accounted for almost USD 630 billion per year, on average over the period from 2013 to 2018. It showed that repurposing some of this support to increase the availability of nutritious foods to consumers, in particular, can result in making a healthy diet less costly and more affordable, globally and particularly in MICs. The scenarios showed the potential global gains of repurposing in terms of GDP growth, poverty reduction, and GHG emissions reduction. A similar study by the World Bank and the International Food Policy Research Institute for 79 countries (including OECD member states) found that the bulk of transfers to producers are provided through measures that the OECD refers to as "potentially most distorting", and they amounted to USD 456 billion per year from 2016 to 2018. For a scenario where a portion of said support is repurposed for increased spending on green innovations, this study finds that by 2040, global real income would increase by 1.6 percent while global extreme poverty, the cost of a healthy diet, and overall emissions from agriculture would decrease by, respectively, 1 percent, 18 percent and 40 percent compared to a business-as-usual projection.[58] No doubt, repurposing some of the worldwide support to food and agriculture is an important move to improve food security and nutrition outcomes and this would help to reduce the financing needed to meet SDG Targets 2.1 and 2.2.

In practice, however, governments in LICs, but also perhaps in some LMICs, do not provide significant support to food and agriculture due to fiscal constraints. For this reason, a new FAO study developed for this report has evaluated what would happen if the limited budget allocated to the agriculture and livestock sectors were reallocated optimally across support measures (i.e. subsidies, investments, services) and commodities, without changing the current budget, in six sub-Saharan African countries.[59] The results are staggering: The opportunity of achieving higher agrifood output, creating thousands of off-farm jobs in rural areas and allowing millions of people to get out of poverty and afford a healthy diet will be lost unless these countries' governments optimize the way in which they allocate their budget across the agriculture and livestock sectors (Box 11). Taking advantage of this opportunity will help these countries reduce their financing needs to meet SDG Targets 2.1 and 2.2. While optimizing policies will be important mostly in LICs, but also in MICs, there is evidence that diminishing marginal returns to additional public spending over time increases the marginal costs to achieve development goals;[27] hence, public spending optimization must be a recurrent action of policymaking. ■

KENYA
Farm worker walking across drying maize to pour corn kernels onto a tarpaulin to dry.
© Jen Watson/Shutterstock.com

CHAPTER 5
WHAT IS NEEDED TO CATALYSE SCALABLE FINANCING TO FILL THE GAP?

KEY MESSAGES

➔ Finding innovative, more inclusive and equitable solutions to scale up financing for food security and nutrition in countries with high levels of hunger, food insecurity and/or malnutrition and important constraints in accessing affordable financing flows, is urgently needed. Only a minority (37 percent) of 119 low- and middle-income countries have many financing options.

➔ The prevalence of undernourishment and that of stunting in children below five years of age tend to be much higher in countries with limited ability to access financing. Countries with more ability to access financing exhibit a higher prevalence of overweight in children below five years of age.

➔ Countries with limited access to financing are generally affected by one or more major drivers of food insecurity and malnutrition, particularly climate extremes but also conflict, which opens up opportunities for leveraging climate and humanitarian finance activities for financing food security and nutrition. For these countries, grants or concessional loans remain the most suitable option to scale up financing for food security and nutrition and can be leveraged through collaborative financing partnerships as part of blended finance strategies.

➔ Countries with moderate ability to access financing can rely more heavily on domestic tax revenues due to their wider tax base and stronger public institutions. Their governments can raise revenues by steeping up health taxes to promote the consumption of healthy diets.

➔ Countries with a high ability to access financing can take advantage of increasingly promising financing instruments such as green, social, sustainability and sustainability-linked bonds, which may also embed food security and nutrition objectives.

➔ Making innovative financing instruments more accessible to population groups facing constraints in accessing financial services, such as women, Indigenous Peoples, smallholder farmers and small and medium agrifood enterprises, will be key for financing to work for food security and nutrition.

➔ The current financing architecture for food security and nutrition is highly fragmented. Country donors, multilateral development banks, development finance institutions, international financial institutions and philanthropic foundations have risen in number, but this has created coordination challenges, not only for these actors, but also for recipient countries whose political and financial priorities are not always considered.

➔ Commercial private actors consider food security and nutrition a risky area to invest in, and the lack of data and transparency in the financial sector does not facilitate the creation of an "investment case" for meeting SDG Targets 2.1 and 2.2.

➔ The financing architecture for food security and nutrition needs to shift from a siloed approach towards a more holistic perspective whereby stakeholders consider food security and nutrition to be a single policy goal that is featured in their broader financing flows and investments.

➔ Policy priorities of national and local actors must be considered while building this new narrative for an enhanced financing architecture for food security and nutrition. Multilateral development banks, development finance institutions and international financial institutions should take the lead in scaling up financing for food security and nutrition, increase their risk tolerance and be more involved in de-risking activities.

➔ The public sector should fill gaps not addressed by commercially oriented actors, primarily by investing in public goods and enhancing social values, which requires relying on tax revenues, reducing corruption and tax evasion, stepping up food security and nutrition expenditure, and repurposing policy support.

➔ Improving transparency is essential for enhancing coordination and efficiency among the different stakeholders and will require harmonizing data collection standards at the national and global levels and making data available, which, in turn, is critical to target financing towards the countries most affected by food insecurity and malnutrition and their drivers.

5.1 SCALING UP FINANCING FLOWS TO FOOD SECURITY AND NUTRITION

What are the levels of ability to access financing for food security and nutrition and what determines a country's level?

The determinants of access to financing at national level

The spread and severity of how the major drivers of food insecurity and malnutrition are affecting the world is alarming (**Chapter 3**). At the same time, the ever-widening gap between current financing and the financing needed to meet SDG Targets 2.1 and 2.2 (**Chapter 4**) renders the challenge even more urgent: How can all financing for food security and nutrition stakeholders scale up financing for the countries most affected by food insecurity and malnutrition, which also are those most affected by multiple major drivers concurrently?

One of the most important variables that determines countries' ability to access financing is **national income**. Naturally, low- and middle-income countries (LICs and MICs) face more barriers than high-income countries (HICs) do in accessing financing flows, as national income is an indicator of a country's capacity to pay back debts. For instance, the World Bank uses per capita income as a main indicator to establish whether countries are part of the International Development Association (IDA), the branch of the World Bank that provides concessional finance to the poorest countries,[1, 2] while the focus of the financing flows mobilized by the United Nations Capital Development Fund is on the world's least developed countries (LDCs).[y, 4]

In addition to national income, a **country's level of debt** is without doubt a key assessment variable. Countries that are highly indebted are unlikely to receive more resources from external sources, and certainly not from private stakeholders (banking systems, capital markets, and so on), but nor do they receive non-concessional financing inflows from other stakeholders such as development finance institutions (DFIs) or international financial institutions (IFIs).[z] For instance, the World Bank and the International Monetary Fund (IMF) assess countries' debt sustainability to make decisions on the allocation of concessional finance for LICs and lower-middle-income countries (LMICs) in the form of grants or loans.[5]

Unsustainable levels of debt, especially when interest rates are high, limit the much-needed public investments for LICs and MICs in sectors that are key for development; such limitations likewise create uncertainty that can undermine economic growth.[6] Debt service levels are increasingly burdensome for debtor countries and can restrict public spending options. For instance, Africa's external debt service has been increasing, and projections show it can reach a peak of USD 74 billion in 2024.[7] While not all countries at risk of debt distress are necessarily facing a high prevalence of undernourishment and food insecurity and multiple burdens of malnutrition, when these issues are faced concurrently the situation can become even worse: In some cases, a country's debt default can lead to economic downturns and rising food prices, which can certainly increase the risk of becoming food insecure and/or malnourished.[8]

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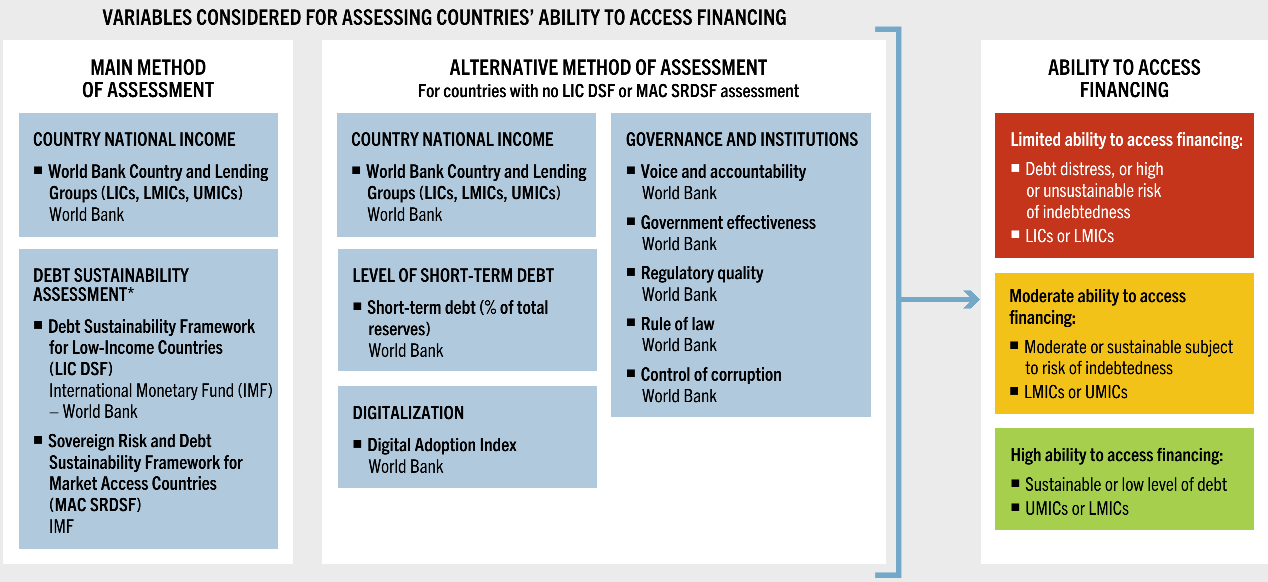
y Please note that the LDC identification criteria consider not only national income, but also other variable groups in two categories: human assets and economic and environmental vulnerability. Therefore, the composition of LDCs is different from the World Bank's LICs.[3]

z Please consider that DFIs can be bilateral, serving to implement their government's foreign development and cooperation policy, or multilateral, acting as private sector arms of IFIs established by more than one country.

FIGURE 30 SUMMARY OF THE METHODOLOGY FOR ASSESSING COUNTRIES' ABILITY TO ACCESS FINANCING



NOTES: LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries. See Supplementary material to Chapter 5 for the details about the criteria for assessing countries' ability to access financing. * LIC DSF and MAC SRDSF are composite indicators that consider several variables relevant for assessing countries' ability to access financing, including governance and transparency assessments.

SOURCE: Authors' (FAO) own elaboration.

In addition, **governance quality** can affect a country's ability to access financing. Even in contexts of high debt and/or low-income levels, the capacity and effectiveness of national institutions, rule of law, accountability and transparency, and the quality of regulations may influence the outcome of financing decisions. In fact, financial institutions such as the World Bank and the IMF already consider governance quality in their country assessments.[aa] Governance is also a key factor in addressing the major drivers of food insecurity and malnutrition and can accelerate the building of resilience to these drivers through the implementation of sound policies, investments and legislation;[10] it is widely recognized as an essential condition for scaling up different financing flows such as domestic revenues[11] or foreign direct investments,[12] and it is even considered an important factor for achieving an adequate national food supply.[13] Therefore, strengthening national governance and institutions is essential – not only to increase countries' ability to access financing, but also to enable them to use financial resources effectively to achieve food security and end all forms of malnutrition.

Finally, the level of **digitalization** is increasingly considered relevant for improving access to financing,[14] and studies have shown that countries' investments in digitalization can boost economic growth, employment and governance quality.[15] Digitalization also supports enhanced levels of traceability of financing flows, which could lead to higher levels of transparency and increased trust among financial stakeholders, thereby improving countries' ability to access financing. Especially in situations where other

aa For instance, the World Bank's Country Policy and Institutional Assessment[9] is a diagnostic tool used for assessing the quality of national policies and institutions; it is a key variable for allocating the IDA's resources for LICs and LMICs and is also used as part of the Debt Sustainability Framework for Low-Income Countries (LIC DSF) indicator.[5]

determinants of countries' ability to access financing still need to be improved, high digitalization levels can facilitate a financial stakeholder's decision to invest.

The operationalization of these variables to create three groups, assessing countries' ability to access financing, is presented in Figure 30. Three indicators were identified for the four variables discussed above: i) the World Bank's country and lending groups; ii) the World Bank and IMF's Debt Sustainability Framework for Low-Income Countries (LIC DSF); and iii) the Sovereign Risk and Debt Sustainability Framework for Market Access Countries (MAC SRDSF). For countries not assessed by either LIC DSF or MAC SRDSF, in addition to the World Bank's country and lending groups, the short-term debt as a percentage of total reserves is used for the debt levels; five out of six of the World Bank's Worldwide Governance Indicators[ab] are used for governance quality; and the World Bank's Digital Adoption Index (DAI) is used for digitalization.[ac]

Do countries with high levels of hunger, food insecurity, childhood stunting and childhood overweight, including those affected by the major drivers, have the ability to access financing for food security and nutrition?

The results of applying the methodology outlined in Figure 30, jointly with data of food security and nutrition indicators and of countries affected by the major drivers of food insecurity and malnutrition, are shown in Table 18.[ad]

Table 18 shows the urgency to find innovative solutions to scale up financing for food security and nutrition in LICs and MICs. Sixty-three percent of these countries have limited or moderate ability to access financing,[ae] while the minority (37 percent) have high ability. The prevalence of undernourishment (PoU) is, on average, much higher in countries with limited ability to access financing (23.1 percent) than in countries with moderate and high ability to access financing (10.4 percent and 6.9 percent, respectively). A similar trend is observed for the prevalence of stunting in children below five years of age, although the average prevalence of stunting in countries with limited and moderate ability to access financing (23.9 percent and 20.9 percent, respectively) is much closer than the average PoU. These results are aligned with the findings of **Chapter 4**, which found a negative association between general domestic government expenditure on agriculture and PoU and stunting. As discussed in the next section, countries with limited ability to access financing have lower possibilities of increasing public spending, and therefore, their current spending levels are probably low. Similarly, the average of overweight in children below five years of age follows the same pattern as the findings in **Chapter 4**: The higher the ability to access financing (or the general domestic expenditure in agriculture), the higher the levels of childhood overweight.

On the other hand, 74 percent of all countries analysed are affected by one or multiple major drivers, and 66 percent of these countries have limited or moderate ability to access financing (most of them limited, 42 percent). Among countries affected by major drivers, climate extremes are the most prevalent driver at all levels – limited (75 percent, alone or in combination with other drivers), moderate (76 percent) or high (80 percent) ability to access financing – which is expected considering that climate extremes are the most common driver, as analysed in **Chapter 3**. For countries with moderate or high ability, there is no difference between conflict and economic downturns: 28 percent of countries with moderate ability to access financing are affected by conflict or by economic downturns, alone or in combination, and for countries with high ability, this proportion increases to 36 percent. However, for countries with limited ability to access financing, more are affected by conflict (48 percent) than by economic slowdowns (35 percent). In fact, as observed in Table 18, across all categories of financial access, and for all combinations of drivers, conflict affects more countries with limited access to financing than countries with moderate or high financing options.

ab Voice and accountability, government effectiveness, regulatory quality, rule of law, and control of corruption.

ac See Supplementary material to Chapter 5 for more details.

ad See Supplementary material to Chapter 5 for more details.

ae Please note that this assessment is only indicative for analytical purposes and is not to be considered an assessment tool for financial purposes.

TABLE 18 LOW- AND MIDDLE-INCOME COUNTRIES' DEGREE OF ABILITY TO ACCESS FINANCING, CONSIDERING FOOD SECURITY AND NUTRITION INDICATORS AND THE MAJOR DRIVERS

Countries' ability to access financing	Number of countries affected by food insecurity and malnutrition major drivers									Food security and nutrition indicators		
	Total	Climate extremes	Economic downturns	Conflict	Climate extremes – economic downturns	Conflict – economic downturns	Conflict – climate extremes	Climate extremes – economic downturns – conflict	Not affected by major drivers	Prevalence of undernourishment in total population	Prevalence of stunting in children (<5 years)	Prevalence of overweight in children (<5 years)
	2013–2022									2023	2022	2022
	(number of countries)									(% average)		
Limited ability: High financial risk	44	12	4	3	3	2	9	4	7	23.1	23.9	4.9
Moderate ability: Medium financial risk	31	9	3	2	3	0	4	0	10	10.4	20.9	6.4
High ability: Low financial risk	44	11	3	2	5	1	6	2	14	6.9	13.3	7.7
Total	**119**	**32**	**10**	**7**	**11**	**3**	**19**	**6**	**31**	–	–	–

NOTES: Prevalence of undernourishment, childhood stunting and childhood overweight averages are unweighted. See Supplementary material to Chapter 3 for the list of countries analysed and the methodology on defining countries affected by major drivers of food insecurity and malnutrition. See Supplementary material to Chapter 5 for the details about the criteria for assessing countries' ability to access financing.

SOURCE: Authors' (FAO) own elaboration.

The high proportion of countries affected by at least one major driver builds the case for mainstreaming food security and nutrition objectives across other sector financing where the priorities do not always include meeting SDG Targets 2.1 and 2.2. Considering that climate extremes are the most prevalent driver in all country groups, the opportunity of creating synergies between food security and nutrition and climate objectives will be essential for scaling up enough resources to fill the funding gap. On the other hand, the relevance of conflict as a driver in countries with limited access to financing calls for strengthening the humanitarian–development–peace nexus, as well as for bridging the short-term horizon of humanitarian operations with the needed long-term perspective of investments oriented to eradicating hunger, food insecurity and malnutrition. In addition, the higher PoU and stunting levels found in countries with limited or moderate access to financing emphasize the urgency of scaling up financing flows for ending hunger, food insecurity and malnutrition. This, together with the higher prevalence of children's overweight in countries with high ability to access financing, opens the window for innovative financing instruments that may consider objectives related to SDG Targets 2.1 and 2.2 in their design and implementation.

Nevertheless, the opportunity to create such synergies and seize those opportunities is challenged by the conditions limiting the access to financing in most of these countries. As mentioned above, most of the countries analysed are facing the double challenge of eradicating hunger, food insecurity and malnutrition, as well as building resilience to the three major drivers, in adverse financial

FIGURE 31 RISK GRADIENT FOR FINANCIAL STAKEHOLDERS

SOURCE: Zoubek, S., Lateef, A., Carrasco Azzini, G. & Holleman, C. (forthcoming). *Reorientation, innovation and the global architecture for financing for food security and nutrition – Background paper for The State of Food Security and Nutrition in the World 2024*. FAO Agricultural Development Economics Working Paper. Rome, FAO.

conditions, because they have limited or moderate ability to access financing. How do these conditions affect the risk perception among financial stakeholders, and what alternatives do these countries have to effectively increase their financing options for meeting SDG Targets 2.1 and 2.2?

Which are the available and most affordable financing tools, depending on a country's ability to access financing, to fill the financing gap for meeting SDG Targets 2.1 and 2.2?

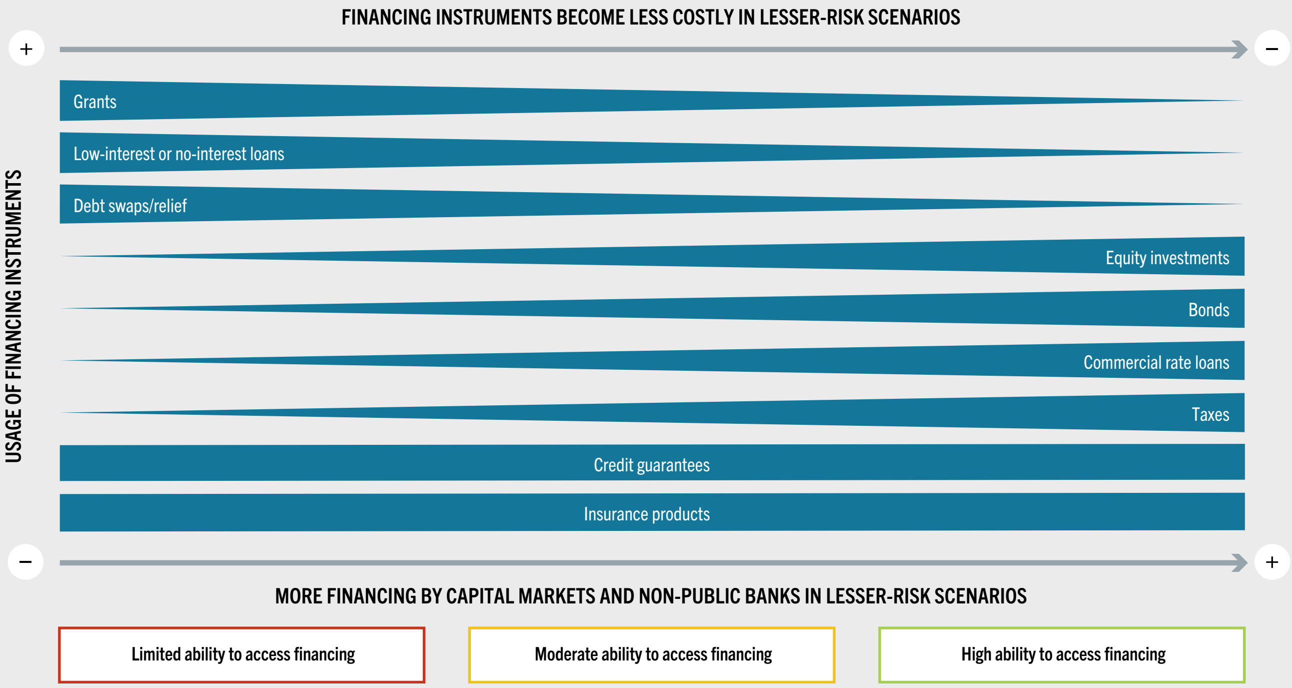
Scaling up financing flows towards countries with the highest levels of hunger, food insecurity and malnutrition and/or those most affected by the major drivers is essential. For example, considering only official development assistance (ODA), Asia and Africa have received most of the ODA for agriculture in recent years,[af] which is to be expected since most of the hungry and food insecure live in these regions. In terms of budgetary needs from external donors, high-priority countries (i.e. countries with more than 50 percent of their budget dependent on donors) are all located in Africa.[17] In addition, the increased financing should be consistent with the global roadmap for achieving SDG 2 without breaching the 1.5 °C threshold,[18] to ensure that there is access to sufficient, nutritious foods for all today and tomorrow.[ag]

However, in most cases, countries that are the most in need, in terms of both hunger and food insecurity levels, as well as in terms of how they are affected by the major drivers, are facing structural limitations to increase financing for food security and nutrition, as shown in Table 18. Even if, formally speaking, all countries have access to most of the existing options for financing, their ability to access financing is driven by levels of perceived financial risk and the associated costs (see Figure 31). The obvious risk aversion of all financial stakeholders, especially

af From 2003 to 2018.[16]

ag The last Intergovernmental Panel on Climate Change report[19] outlined that in the period from 2011 to 2020, global surface temperature was already 1.1 °C above that in the period from 1850 to 1900, while the World Meteorological Organization confirmed that in 2023, the annual global temperature was 1.45 ± 0.12 °C above that in the period from 1850 to 1900.[20]

FIGURE 32 WHICH ARE THE MOST ADEQUATE FINANCING TOOLS AND MECHANISMS DEPENDING ON THE COUNTRY CONTEXT?



SOURCE: Zoubek, S., Lateef, A., Carrasco Azzini, G. & Holleman, C. (forthcoming). *Reorientation, innovation and the global architecture for financing for food security and nutrition – Background paper for The State of Food Security and Nutrition in the World 2024*. FAO Agricultural Development Economics Working Paper. Rome, FAO.

in the case of private, commercially oriented ones, renders their engagement practically impossible in the most financially risky countries.

When the confidence in countries' ability to repay loans decreases (thus, a higher financial risk), the affordability of financing flows is reduced.[ah] Therefore, countries with limited ability to access financing may rely only on grants or low- to no-interest loans from international development flows (e.g. ODA), as other financing instruments may not be available – or, more precisely, financial stakeholders may not be interested due to a country's high financial risk profile (see Figure 31 and Figure 32). The involvement of private, commercially oriented actors in these countries is unlikely as risks are high, affecting, for instance, the cost of borrowing. Only large corporations and/or export-oriented actors have a higher likelihood of being financed by private flows, and even in these cases, these entities may be considered risky investments. In addition, the low tax base of many of these countries – due, inter alia, to structural factors, with a predominantly informal environment not conducive to tax collection, and to governance weakness – makes public investment with domestic resources difficult.[11]

The high dependence on concessional finance for countries with limited ability to access financing could lead to the consideration of some possible trade-offs. For example, some

ah While the focus here is on the sovereign level, this also applies within countries to companies and other commercial, private actors.

scholars have studied the possibility that scaling up concessional finance (e.g. grants and no-interest loans) could cause "Dutch disease",[ai] highlighting the need to create capacities in national governments to absorb and spend these resources, particularly on public investments and capital goods.[22] Likewise, the orientation of concessional finance itself matters for meeting SDG Targets 2.1 and 2.2. It has been observed, in a sample of 95 LICs and MICs, that an increase of 10 percent in certain categories of ODA related to food security and nutrition[aj] can reduce hunger by 1.1 percent, on average two years after the financing flow is disbursed.[23]

The high reliance on concessional finance can also affect the trends of other sources of financing. For instance, one study found a negative association between ODA grants and tax revenues, particularly in LICs.[24] Another[25] showed that some grants from international development flows include conditionalities such as increases in tax revenues over time and reductions in external debt through borrowing. However, as indicated above, countries with limited ability to access financing in most cases are not able to increase tax revenues. Therefore, a country's reduction in borrowing and the inability to increase tax revenues can lead to fewer available resources and, in turn, place a lower-than-expected expenditure on the sector to which the grant was directed.

Countries with limited ability to access financing have high levels of sovereign debt and must spend significant amounts of public revenue on servicing debt. For these countries, debt swaps and debt relief measures can allow the reallocation of resources towards food security and nutrition.[ak]

In sum, in countries with limited ability to access financing, the role of donors and other development institutions in delivering international development flows is essential to fill the financing gap for meeting SDG Targets 2.1 and 2.2. In countries with moderate ability to access financing, utilizing concessional finance and commerce-oriented instruments following a blended finance approach[al] will still be essential for de-risking investments and providing the right incentives for private actors to participate in these markets. However, while moving towards lower levels of risk, it is expected that public and private actors can progressively increase their engagement, making more financing flows available (i.e. more affordable).

Mobilizing domestic tax revenues is more feasible in countries with moderate ability to access financing (see Figure 32). Deepening the tax base could reduce some countries' dependence on concessional finance (or commercial loans and debt), and in several countries, there is the potential to increase tax revenues from their current levels.[26] However, as mentioned, the potential expansion of tax revenues has income as a strong determinant (the higher the GDP per capita, the higher the tax potential), as well as other factors such as the composition and formalization of national economies, and institutional and governance mechanisms.[am] Some scholars have studied countries' "tax effort" (the ratio of actual tax collection to tax potential) to analyse whether there is space to improve mobilization of domestic resources. While the numbers vary, there is agreement on the potential for expanding revenues globally, and such potential is greater in LMICs and upper-middle-income countries (UMICs) than in LICs.[26, 28]

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ai The term "Dutch Disease" refers to the discovery of large natural gas deposits in the territorial sea of the Kingdom of the Netherlands, which led to a rapid rise in revenues and the consequent appreciation of the national currency; as a result, other sectors' exports were more expensive (and imports for the same sectors cheaper), reducing their competitivity. The phenomenon is often associated with the discovery of natural resources, but it can occur in the case of any sudden inflow of foreign currency.[21]

aj The paper calls it "nutrition-sensitive ODA" and includes the following categories from the database of the Development Assistance Committee of the Organisation for Economic Co-operation and Development (OECD): food aid/food security programs (CRS code 52010), emergency food assistance (72040), reproductive health care (13020), basic health care (12220), material relief assistance and services (72010), STD control including HIV/AIDS (13040), urban development and management (43030), agricultural development (31120) and agricultural research (31182).[23]

ak Debt swaps are discussed more in depth in **Section 5.2**.

al Blended finance is analysed more in depth in **Section 5.2**.

am Regarding the importance of institutions and governance for increasing tax revenues, corruption is an important determinant of tax revenues. It has been found that corruption has a significant negative effect on tax collection, and an improved, transparent and accountable tax administration is critical for improving tax revenues.[27]

As financial risk decreases, more financing flows are available for countries. Countries with a high ability to access financing will draw in equity investments, commercial rate loans and bonds from private financing flows such as company investments, banking systems and capital markets, with many fewer de-risking activities needed from donors or the public sector (Figure 31 and Figure 32). However, as analysed in detail in **Section 5.2**, even in these countries, access to guarantees and insurance is still essential for de-risking private financing flows. While the way in which guarantees or insurance are delivered varies depending on a country's ability to access financing, these instruments are essential for scaling up financing in the three categories of countries. Therefore, these instruments are recommended for all country groups in Figure 32.

Scaling up private financing is essential for meeting SDG Targets 2.1 and 2.2 because of its well-known role in overall economic development, and for the simple reason that funding from other financing flows like international development flows or public budgets is not sufficient to fill the financing gap to end hunger, food insecurity and malnutrition. For instance, foreign direct investment (FDI) has an important role for LICs and MICs, but its effects may vary depending on a country's income level and the sector of the FDI. For example, agriculture and industry FDI have a significant impact on GDP growth in LICs, while FDI oriented to other sectors (e.g. manufacturing and services) has insignificant effects. On the other hand, all kinds of FDI positively impact GDP growth in HICs.[29] Foreign direct investment directed to agriculture has also been shown to increase agricultural production in LICs and MICs, and its effects are higher when these are combined with agricultural ODA.[30] Nevertheless, as indicated, LICs have mostly limited ability to access financing, making private financing flows costly and rarely available. How can countries reduce their financial risk to attract other sources of financing?

Figure 32 provides recommendations for financing instruments, depending on a country's ability to access financing flows, as assessed in Table 18. Private financing flows (e.g. equity investments, bonds and commercial rate loans), as well as public domestic financing (e.g. taxes), are more affordable as countries' financial risk decreases, making them more suitable options; on the other hand, international development flows and concessional finance (e.g. grants, low-interest loans and debt swaps) are the best alternative in contexts of high financial risk, as other options could be too expensive. While Figure 32 proposes examples of financing instruments that could fit each category and be used to increase a country's ability to access financing (as analysed in detail in **Section 5.2**), the most effective way to increase a country's financial options is undoubtedly to address the determinants of their ability to access financing. Addressing these development challenges can result in win–win solutions; for instance, sound economic and monetary policies that reward savings and deepen capital markets are essential for creating a better environment for private investments. Improving tax systems not only increases the financing flows needed to fill the funding gap, but can also lead, through public expenditure, to gains in economic growth and inequality reduction. The strategic adoption of digital technology can make tax collection easier and lead to enhanced transparency, which is key for building trust in national public administrations.[31] Reducing and making sovereign debt levels more manageable is an essential requisite for mobilizing the financing needed to implement urgent food security and nutrition actions, as well as policies to build resilience to the major drivers of food insecurity and malnutrition.[8] Therefore, better macroeconomic management for income growth, reducing a country's sovereign risk and debt, and strengthening national institutions and governance, are essential, not only from a financial perspective, but also from the overall development perspective of the countries most affected by hunger, food insecurity and malnutrition. ■

5.2 INNOVATIVE FINANCING APPROACHES AND TOOLS TO BRIDGE THE FINANCING GAP FOR SDG TARGETS 2.1 AND 2.2

The adoption of innovative financing instruments will be essential for scaling up food security and nutrition financing flows to meet SDG Targets 2.1 and 2.2. Of course, as mentioned previously, it is critical that countries also consider repurposing their current public spending to make it more cost effective (**Chapter 4**), as well as implementing reforms to enhance their macroeconomic performance and governance quality. In any case, considering that eradicating hunger, food insecurity and malnutrition requires not only strategic medium- and long-term actions, but also immediate answers, this section focuses on the financing instruments currently available to countries. While the first part of this section analyses in detail the most promising instruments considering the country's ability to access financing (see Figure 31), the second part discusses how financial inclusion can be strengthened within countries, focusing on the population segments that face more constraints in accessing financial services. These financing instruments should, from a food security and nutrition perspective, provide the necessary resources to implement the policies and investments recommended in the six transformative pathways presented in **Chapter 3**. The examples of investments financed through these financing instruments, provided in this section, are linked with elements of the food security and nutrition financing definition, when relevant.

Instruments for scaling up financing at global, regional and national levels

Available financing tools for increasing food security and nutrition financing flows are described below, following the categories of a country's ability to access financing presented in **Section 5.1**. This section covers the tools mainly used for mobilizing financing flows at the sovereign level (for country governments), as well as tools for private actors within countries, from companies to smallholder farmers, as they are all crucial for ending hunger, food insecurity and malnutrition. Among these tools, emphasis is placed on the type of financing instruments that promise innovative approaches to fill the financing for food security and nutrition gap. Yet, why is innovation needed and how can it mend the gap that traditional mechanisms cannot?

Innovations, particularly market-creating innovations,[32] provide a strong economic foundation since they offer the mass population access to a product or service that was previously unaffordable, unattainable or non-existent. In the case of financing, innovation mobilizes, leverages and redirects resources to increase the effectiveness and efficiency of financing flows, directing them to specific purposes[33] such as food security and nutrition that they would otherwise not be directed or channelled to. That said, although all instruments and mechanisms are at countries' disposal – depending on their risk profile and thereby the cost of capital – the optimal financing options for achieving food security and improving nutrition are not easily accessible for countries with high levels of financial risk.

The term "innovative finance" became more widely used during the 2000s, amidst concern about the resources required to meet the Millennium Development Goals. It is difficult to agree on a universal definition, considering the different beliefs regarding what constitutes "innovation". For this report, an innovative financing instrument for food security and nutrition is one that fulfils at least one of the following conditions:[34]

1. It has been developed in the last ten years.
2. It is implemented in a different way from its original purpose.
3. It is new to being used in financing for food security and nutrition.
4. It involves new combinations of actors.

Financing instruments for countries with limited ability to access financing flows

As mentioned in **Section 5.1**, the high perception of risk from private stakeholders for this country group, and the often limited capacity of increasing public domestic revenues, makes **concessional finance** from international development flows the most suitable option for scaling up financing for these countries.

While **grants** and **low- or no-interest loans** are certainly among the most traditional concessional financing instruments, they can be designed in more innovative ways to collaborate with de-risking initiatives to increase private financing flows, as part of blended finance strategies. As the amount from grants and other concessional financing instruments falls short of the funding needed to meet SDG Targets 2.1 and 2.2, these instruments should focus on countries most in need and invest in activities that are not likely to be financed by other instruments, for example, public goods.[35] Grants and/or loans, jointly implemented with **technical assistance**, can be leveraged to address the main limitations for accessing private financing flows – for example, poor bankability and lack of operational readiness to access finance – often faced by food security and nutrition initiatives (Figure 33A). For instance, the Good Food Innovation Fund uses both grants and interest-free loans to support initial investments in midstream small and medium enterprises (SMEs) producing nutritious foods (e.g. biofortified foods, dairy and aquatic food products), with the objective of increasing the SMEs' ability to access other sources of financing after that first investment (**Pathway 4**).[36] The injection of grants can likewise support initiatives to pioneer high-tech solutions to enhance food security and nutrition by protecting and regenerating traditional and/or indigenous crops, which often in time strengthen climate resilience and improve nutrition within their territories: Rockefeller Foundation grants are financing the Vision for the Adapted Crops and Soils initiative, a project focused on identifying and promoting the production of crops with the greatest potential to improve nutrition in Africa (**Pathway 4**). In the first phase, a research institution analyses the indigenous and traditional crops' productivity under different climate scenarios, while in the second phase, a private company steps in to leverage artificial intelligence to analyse current barriers and potential facilitators for scaling up these crops.[37]

Grants can also be implemented alongside loans for countries facing high climate variability, such as hilly landlocked or small island countries. In Nepal, the Adaptation for Smallholders in Hilly Areas project totalled USD 37.6 million, funded by a grant, a government contribution and participants' contributions. The project contributed to strengthening the capacity of vulnerable smallholder farmers and local institutions to adapt to climate-related risks (**Pathway 2**). Impact assessment findings show that the project improved production capacity – for example, by increasing access to irrigation especially during the dry season by 4 percentage points – and increased livestock sales by 112 percent.[38] In Kiribati, the Outer Islands Food and Water Project, aimed at improving the livelihoods and resilience of people living in nine of the country's poorest islands, was financed with a grant complemented by government investments. The project enhanced beneficiaries' nutrition and health by improving water management through installation of rainwater harvesting for households, promoting home gardening and the consumption of underutilized species, and providing training and farming tools (**food availability**). Between inception and completion, results indicated a 41 percent reduction in severe food insecurity and increases in dietary diversity.[39]

The term **debt swaps** (or, more precisely, **debt-for-development swaps**) refers to a conditional restructuring of a specific part of debt, which in most cases is linked to some form of debt relief. The condition requires that the liberated funds (or a portion of them) are redirected towards a predefined development investment. Especially at times when many LICs and MICs – home to the most food-insecure people – are highly indebted, debt swaps provide debtor countries with fiscal space, whereby the cancelled amount is repurposed domestically and typically earmarked for sustainable projects (Figure 33A).

The most common form of debt-for-development swaps are bilateral public debt swaps, directly negotiated between a creditor and the debtor country. The creditor foregoes all or part of the principal and/or interest due; in exchange, the debtor country commits a set amount (in local

FIGURE 33 RECOMMENDED INNOVATIVE FINANCING INSTRUMENTS FOR COUNTRIES, CONSIDERING THEIR ABILITY TO ACCESS FINANCING FLOWS

A. LIMITED ABILITY TO ACCESS FINANCING

CONCESSIONAL FINANCE FOR DE-RISKING PRIVATE FINANCING

- **Grants**
- **Low- or no-interest loans**
  Combined with technical assistance for effective de-risking

REALLOCATING FUNDS FOR FOOD SECURITY AND NUTRITION

- **Debt swaps**
  Debt service reallocated towards food security and nutrition investments
- **Special drawing rights reallocation**
  Increased lending opportunities for low- and middle-income countries

INSURANCE AND GUARANTEES FOR RISK-RESILIENT FOOD SECURITY AND NUTRITION INVESTMENTS

- **Parametric insurance**
  Better management of agricultural risks
- **Risk pools**
  Increased insurance affordability
- **First loss**
  Absorbed losses for high-risk investments

B. MODERATE ABILITY TO ACCESS FINANCING

INCREASED FUNDING FOR PUBLIC SPENDING

- **Sovereign bonds**
  Linked with contingencies to decrease default risk
- **Health taxes**
  Increased revenues and healthier food environments

DE-RISKING FOOD SECURITY AND NUTRITION INVESTMENTS THROUGH BLENDED FINANCE

- **Donors and development finance institutions**
- **Public sector and development banks**
- **Philanthropic foundations**
  Strategic placement to further leverage private funding environments

INSURANCE AND GUARANTEES FOR RISK-RESILIENT FOOD SECURITY AND NUTRITION INVESTMENTS

- **Parametric insurance**
  Better management of agricultural risks
- **Risk pools**
  Increased insurance affordability
- **First loss**
  Absorbed losses for less risky investments

C. HIGH ABILITY TO ACCESS FINANCING

SCALING UP FINANCING WITH SUSTAINABILITY CONSIDERATIONS

- **Green, social, sustainability and sustainability-linked bonds**
  Increased private financing for development objectives

EMBEDDING DEVELOPMENT OBJECTIVES IN INCREASED PRIVATE FINANCING

- **Results-based funding**
  Mobilized private financing for better development impacts
- **Incubators and accelerators**
  Projects financed in early stages
- **Impact investment funds**
  Public–private finance mobilization

INSURANCE AND GUARANTEES FOR RISK-RESILIENT FOOD SECURITY AND NUTRITION INVESTMENTS

- **Parametric insurance**
  Better management of agricultural risks
- **Risk pools**
  Increased insurance affordability
- **First loss**
  Absorbed losses to boost project bankability

NOTES: As mentioned in this report, all financing instruments are potentially available for all countries, but they might be too expensive depending on countries' ability to access financing flows, making these instruments unaffordable in practice. Nevertheless, please note that these recommendations are not restrictive. The instruments recommended for countries with a certain degree of ability to access financing can be, if possible, adopted by countries belonging to other groups. In addition, please note that this figure includes instruments that can be adopted by public or private actors, at sovereign or local levels, with just a few of them applicable only to a certain type of actor or level (e.g. taxes). The requirements, means of implementation and results may vary depending on the implementing actor, and these are indicated, when possible, in the examples provided for each instrument.

SOURCE: Authors' (FAO) own elaboration.

currency, when possible) towards a development project agreed upon by the two parties. Payment in local currency by the debtor country reduces the country's external debt obligations in foreign-denominated currency, freeing up scarce foreign currency reserves. The type of sustainable investment differs among debt-for-development swaps and may include investments in education, health, food security and nutrition.

Debt-for-nature or debt-for-climate swaps exchange debt in return for environmental or climate investments. Recent debt-for-climate swaps have attracted a great deal of attention due to transactions involving substantial volumes of debt and amounts of money. Their design differs significantly from the design of the traditional debt-for-development swap discussed above. Debt-for-climate and debt-for-food security swaps are explained in more detail in Box 12.

Special drawing rights (SDRs) are an international reserve asset created by the IMF that can supplement countries' foreign exchange reserves »

BOX 12 DEBT SWAPS FOR CLIMATE AND FOOD SECURITY AND NUTRITION OBJECTIVES

Since 2000, global debt levels have surged fourfold.[40] Many of the countries grappling with debt problems are also among the most vulnerable to climate change.[41] Countries facing this double challenge are caught in a vicious cycle. Climate-related destruction and disasters necessitate substantial investments, but their fiscal space is constrained as a significant portion of resources must be allocated to debt servicing.[42] The debt servicing obligations of 58 of the low- and middle-income countries (LICs and MICs) most vulnerable to climate change are projected to reach nearly USD 500 billion between 2023 and 2026.[42]

For countries struggling with both unsustainable public debt and high levels of food insecurity and/or malnutrition among their population, the situation is similarly dire. Substantial debt servicing obligations impede the ability of governments to invest in crucial food security and nutrition policies. They reduce foreign exchange reserves otherwise available for food imports and hamper investments in health, nutrition and education, critical for enhancing future human capital and laying the foundation for sustainable pathways out of food insecurity and malnutrition. The analysis in **Section 5.1** underscores the large number of countries struggling with this double challenge: Out of 119 LICs and MICs, 75 have limited or moderate access to any financing flow (see Table 18).

In the three decades up to 2017, debt swaps have alleviated governmental liabilities amounting to USD 2.6 billion in exchange for investments in development or climate action totalling USD 1.2 billion.[41] The bulk of these transactions comprise modest-sized bilateral, directly negotiated between debtor and creditor countries.[41] To date, creditors have been Paris Club countries.* Recent years have witnessed heightened attention towards debt-for-climate swaps. Current transactions, such as those in Belize, Ecuador and Gabon, have individually reached volumes of USD 1.6 billion, USD 553 million and USD 500 million, respectively.[43–45] In 2023, China, the largest bilateral creditor for LICs and MICs, signed a first memorandum of understanding with Egypt to negotiate a debt swap for development projects.[46, 47] Although still considered a niche financial instrument, debt-for-climate swaps hold immense potential, with an estimated market size of USD 800 billion.[42, 48]

These recent debt-for-climate swaps – so-called tripartite swaps – involve development partners as financial intermediaries providing loans to debtor countries for the repurchase of debt. The loans are contingent upon the recipient country's commitment to introduce and implement nature or climate policy measures. Financing for these loans typically involves labelled bonds (see details on green bonds in this chapter), bolstered by support from donors or guarantees from multilateral banks, enabling favourable credit terms including beyond market interest rates and maturities.[41] This approach allows both bilateral swapping and swapping of privately held debt. It further broadens refinancing options and offers a lifeline to countries excluded from credit markets.

Given the critical challenges posed by unsustainable debt burdens and high levels of food insecurity and malnutrition in many countries, exchanging debt for food emerges as a practical solution with good potential. Debt-for-food security swaps have already been instrumental in addressing food insecurity and malnutrition. Noteworthy initiatives, such as home-grown school feeding and social protection programmes, have been supported. In the current situation, where some countries' food import volumes have fallen, leveraging freed-up foreign exchange through debt relief to procure essential foodstuffs on international markets presents a viable option.

To date, debt-for-food security swaps have been used primarily to swap bilateral debt.[41] In practice, they are typically executed through development partners to ensure effective implementation, transparency, mutual accountability and thorough monitoring and evaluation. Successful examples led by the World Food Programme (WFP) in countries such as Egypt, Guinea-Bissau, Madagascar, Mauritania, Mozambique and Pakistan demonstrate the effectiveness of this approach. Notably, resources totalling USD 145 million since 2007 were allocated to existing WFP programmes within these countries. For instance, a debt swap signed by Egypt and Italy in 2009 channelled approximately USD 15 million worth of Egyptian debt towards a school feeding project implemented by WFP, significantly improving nutritional outcomes and educational participation.[49]

NOTE: * The Paris Club is "an informal group of official creditors whose role is to find coordinated and sustainable solutions to the payment difficulties experienced by debtor countries".[50]

BOX 13 INSURANCE AND GUARANTEES, ESSENTIAL TOOLS FOR DE-RISKING FOOD SECURITY AND NUTRITION INVESTMENTS

Insurance is an essential tool for building resilience to risks in agrifood systems, enabling improved access to credit and financial services. Even so, insuring agrifood small and medium enterprises (SMEs) and smallholder farmers is still very challenging, and important public or donor subsidies are often needed to make insurance work for them.[57] In fact, insurance coverage remains very low in low- and middle-income countries due to its high premium costs and the low awareness of its benefits among agrifood SMEs and smallholder farmers.[58] For example, out of 600 million farmers in Africa, only 600 000 possess insurance coverage.[59] Women, particularly in rural areas, face more challenges than men to access insurance products, due to their lack of resources and lower levels of financial literacy, the distrust of financial institutions, and discriminatory social norms and policies that may prevent them from signing legal contracts without male signatories. As a result, they tend to acquire lower value coverage.[60]

Innovative insurance tools include yield-index insurance, parametric/index-based weather insurance and trade credit insurance.[61] Case studies from sub-Saharan Africa have shown that the adequate combination of de-risking instruments depending on the national and subnational context is key for maximizing their impact in rural contexts. In addition, it is important to include technical assistance components and implement them before engaging the beneficiaries with other rural finance instruments.[62] In particular, **parametric insurance** is a valuable instrument for managing agricultural risks associated with weather-related events such as droughts, floods or extreme temperatures, contributing to reducing risks by offering a dependable income source in the face of weather-induced crop failures (Figure 33). Parametric insurance is typically used to complement traditional insurance. While conventional insurance refunds adjusted losses suffered by policyholders caused by an insured peril, up to the policy limit, parametric insurance pays out a specified sum when a certain, very specific event occurs – the "parameter".

However, the implementation of parametric insurance can be financially burdensome, encompassing expenses associated with data collection, index development and administrative operations. These elevated costs often translate into higher premiums, impeding the affordability of insurance coverage. Moreover, parametric insurance may not comprehensively address all risks, for example, those stemming from pests, diseases or market fluctuations. Consequently, farmers remain exposed to losses outside the coverage scope of the insurance scheme.[34] These challenges have been addressed in some countries using **risk pools**, which are groups of stakeholders that band together to share insurance resources and costs (Figure 33). For example, in 2023, the African Risk Capacity (ARC) Group, comprising two agencies* from the African Union, which provides insurance services through risk pooling, launched a new parametric insurance mechanism for African countries to cope with the devastating effects of flooding. This product provides countries with predictable and rapid financing for early response to cope with emergency disaster events caused by floods (**Pathway 2**). The flood product generates daily flood analysis and calculates the associated impacts for each country. These impacts are compared to the parametric triggers (economic losses or the number of people affected), and pay-outs are calculated if flood impacts exceed the trigger threshold defined by the country.[63]

There are also interesting examples of parametric insurance in countries with limited access to financing flows. Pula, an insurtech** company, together with the World Food Programme's Rural Resilience Initiative (R4) in Kenya, allows farmers to access a combination of crop insurance and risk reduction practices which protect them from the impact of climatic shocks (**Pathway 2**).*** Specifically, the initiative invests in the Area Yield Insurance Index (AYII) in support of government efforts to offer microinsurance coverage to farmers. The AYII adopts ecological zones as a way of measuring unit areas for insurance compared to the previous administrative boundaries. This method reduces the risk basis and provides fairer compensation to farmers.[64]

In Rwanda, the Ministry of Agriculture and Animal Resources initiated the National Agriculture Insurance Scheme in collaboration with three insurance firms: SONARWA Life, Prime Insurance and RADIANT. The programme involved governmental subsidies covering 40 percent of the premiums for weather-indexed and yield-indexed insurance (**Pathway 2**). Consequently, it expanded the access of smallholder farmers and agrifood SMEs to pre-harvest

BOX 13 (Continued)

financing. Additionally, the One Acre Fund, backed by concessional finance from donors, plays a significant role in advancing Rwanda's agricultural insurance sector.[58]

Guarantees serve as cash collateral against loan defaults for lenders who are considered high risk. This instrument is particularly important within countries to close the financing gap for smallholder farmers and agrifood SMEs in LICs and MICs.[65] However, guarantees have not proved very effective in terms of incentivizing domestic banks to expand their lending activities in agrifood systems, primarily due to inadequate expertise and the absence of tools for assessing sector-specific credit risks.[58] For example, the ARIZ fund, launched by the French Development Agency and jointly operated by Alliance for a Green Revolution in Africa (AGRA) and Standard Bank, guarantee credit to fertilizer distributors in Africa. AGRA and partners provided a USD 10 million loan guarantee fund, and in turn, Standard Bank made USD 100 million available for loans over three years. Nevertheless, the programme did not perform well due either to low utilization or to financial institutions' risk appetite vis-à-vis the guarantee amount.[66] To overcome this challenge, scaling up results-based lending incentives for domestic banks is needed to incentivize them to increase their lending to smallholder farmers and agrifood SMEs.[58]

Finally, **first loss** is a guarantee instrument in which the investor is the first to take losses if the project or business fails (Figure 33).[36] For instance, INVEST – a United States Agency for International Development mechanism supporting funding mobilization – provides first-loss coverage and directly influences the risk profile of a project by absorbing losses should the investment not perform as forecasted, thereby presenting a more attractive investment target.[67]

NOTES: * The ARC Agency is oriented to improving country members' capacities to address weather-related disasters, and the ARC Insurance Company Limited, a mutual insurance facility, implements the risk pooling.[63]
** The term "insurtech" refers to the use of technology to develop accessible insurance initiatives; it is part of "fintech", financial technology applications oriented to improve the access of smallholder farmers and other agrifood actors to financial services.[68]
*** Interestingly, the cost of the premium is paid not in cash but upon fulfilling the condition of participating in asset-producing activities.[57]

» in case of need.[51] Special drawing rights have the potential to alleviate cost escalation and exchange rate losses resulting from diminished foreign currency reserves by bolstering foreign reserves, thereby assisting in currency stabilization. Acting as part of IMF members' foreign exchange reserves, SDRs can be sold – or exchanged freely as usable currency – to other countries and prescribed holders who are allowed to acquire, hold and use SDRs. Therefore, the use of SDRs can reduce inflationary pressure on capital expenditure and on working capital finance for businesses.[34] There were four SDR allocations, the last one in 2021, in response to the COVID-19 pandemic. Special drawing rights are allocated proportionally to the relative size of a country's economy, which means that most allocations go to HICs. Considering that HICs have a wide fiscal space compared to the limited access to financing flows of many LICs and MICs, **SDR reallocation** towards the latter country groups can provide an adequate window of new resources for development finance,[52] which can be used to fill the financing gap to end hunger, food insecurity and malnutrition (Figure 33A). Such reallocation can be channelled through multilateral development banks (MDBs); for example, the African Development Bank (AfDB) and Inter-American Development Bank (IDB) have already signed agreements to that effect. This channelling could allow SDR financing to then be leveraged for food security and nutrition and other development purposes. An alternative is to continue using the resources from SDRs in the IMF's Resilience and Sustainability Trust (RST)[an] and the Poverty Reduction and Growth Trust (PRGT).[ao, 54]

an The RST is an IMF lending initiative oriented to building resilience to shocks in LICs and MICs, and is already using reallocated SDRs.[53]

ao The PRGT is the main vehicle of IMF to provide concessional financing to LICs.

The G20 pledged to reallocate about USD 100 billion worth of SDRs sitting unused in HICs' central banks to LICs and MICs at the end of October 2021 (20 percent of each G20 country's reserves). However, the actual pledges are still nearly USD 13 billion short, and less than 1 percent of support has been received by countries in the direst economic straits. Australia, Canada, China, France, Japan and Saudi Arabia have exceeded their 20 percent pledge, but many countries have either not engaged at all or are having difficulty reaching 10 percent.[34]

One potential utilization of the SDRs is for lending: An example is the hybrid capital model proposed by the AfDB and the IDB, both IMF prescribed holders. The initiative proposes to borrow rechannelled SDRs and leverage these static foreign reserves in HICs into lending instruments to finance transformational development projects. The African Development Bank would then channel the financing into regional entities such as the African Export–Import Bank and other regional development banks for capacity building, credit enhancement and beyond. With the current imbalanced holding of SDRs between the major holders and African and other developing nations, prescribed holders such as the multilateral banks are in a perfect position to garner the necessary resources for their respective regions as a whole.[55]

Insurance and guarantees are instruments to facilitate lending and financing, particularly to specific sectors and actors that might be considered "risky".[56] As indicated in Figure 31 and Figure 33, these instruments are relevant at all levels: for countries with limited access to financing and high financial risk perception, but also for other countries that have more options to access financing instruments. Of course, the cost of implementing these instruments may vary depending on the level of financial risk (being more expensive in contexts of higher risk). Box 13 analyses these instruments and provides relevant examples for all levels of access to financing.

Financing instruments for countries with moderate ability to access financing flows

Countries with moderate ability to access financing can start moving beyond the use of concessional finance towards other instruments. One alternative for governments is scaling up public resources. For example, **income-linked sovereign bonds** have gained attention since the onset of debt crisis situations such as the 2008–2009 financial crisis; they link the obligation to pay to countries with an indicator of the ability to pay, thus reducing the risk of defaults (**Pathway 3**). These bonds can create important welfare gains and allow national fiscal policies to be more stable and predictable.[69] Pure income-linked bonds are related to GDP growth (e.g. the bonds issued by Argentina some years ago), while similar bonds – **contingent bonds** – can be related to export levels, commodity prices or the occurrence of natural disasters, among others (Figure 33B).[70]

Governments can also increase their tax revenue linking these with other development outcomes.[ap] One of the most interesting examples for enhancing health and nutrition is **health taxes.** These are excise taxes levied on products of high energy density and minimal nutritional value, such as sugar-sweetened beverages (SSBs) (**Pathways 4 and 5**). They are cost effective – but largely underused[aq] – policies for creating incentives to reduce dietary risk factors for non-communicable diseases (NCDs) with untapped potential for the triple win of improving health, generating government revenue and enhancing equity (Figure 33B).[72–74] By reducing the consumption of products with high energy density and minimal nutritional value, and creating incentives to substitute them with healthier options, health taxes can contribute to the prevention and control of overweight, obesity and other forms of malnutrition or dietary risks, reducing costs to the health care system.[71, 75] Governments can also use health taxes as a tool to increase revenues for financing

ap Repurposing policy support, which is discussed in **Chapter 4** and more in depth in the 2022 edition of this report, is also an important alternative for increasing financing for food security and nutrition, through a better and evidence-based use of the current fiscal resources available.

aq Health taxes are often opposed by commercial industry because of a potential reduction in their profits. As such, the food and beverage industry presents arguments similar to those used by the tobacco industry to prevent or delay implementation of taxes. Globally, stakeholders with vested interests often use lobbying tactics to sway decision-makers away from implementing such taxes, or to structure taxes in such a way as to minimize their negative impact on profits and consumer purchasing. To increase policy effectiveness, it is important for decision-makers to prepare for potential industry opposition to health tax policies during all stages of the policy cycle.[71]

actions that can combat food insecurity and malnutrition in all its forms, either through specific spending prioritization or by increasing overall national budgets. While revenues obtained through health taxes tend to represent only a small fraction of GDP, the revenue increases from taxes can be significant, particularly when taxes across a range of harmful products are combined. In addition, health tax revenues tend to account for a significant share of public health expenditure, ranging from 15 percent in HICs to over 30 percent in LMICs.[76] A recent World Bank analysis found that the largest financing gap for universal health coverage in LMICs could be largely mitigated by tax increases on SSBs, tobacco and alcohol.[77] By releasing additional resources to be spent on food or improving food environments, such taxes can indirectly help reduce undernourishment and food insecurity.

Some countries have opted to earmark part or all of revenues generated from health taxes towards health promotion (**Pathway 5**). Of the nine countries that apply excise taxes to SSBs with revenues earmarked for specific purposes, most are destined for NCD prevention and treatment, health system financing and promotion of physical activity.[71, 75] For instance, in Portugal, revenue generated by the specific excise tax on non-alcoholic beverages is destined for health care. Within one year of implementation, USD 90 million were generated, all of which contributed to funding the Portuguese national health service.[75] Health taxes can also be used to shape agricultural practices. In the Philippines, for example, 15 percent of the revenue generated from taxing tobacco is earmarked to assist tobacco farmers in planting alternative crops. Similar approaches could be taken with SSB taxes, using revenues to support farmers in the transition from sugar production to other crops. It will be imperative for such schemes to ensure that the alternative crops are nutritious foods that contribute to a healthy diet. Ultimately, the decision to earmark funds depends on the contextual factors faced by individual countries. Opponents of this practice argue that it can increase rigidities in the budget and inefficiencies in spending, since earmarked funds cannot be easily diverted to other purposes, should new priorities arise. Some also argue that, although earmarking funds for health can diversify sources of public health funding, this does not necessarily lead to an increase in overall revenue for public health. This is because budgets are fungible, meaning that earmarked revenue from one source is likely to be offset by reductions in contributions from other sources of financing. An alternative is to implement a soft earmark, aligning more closely with the standard budgeting process. With this approach, the recommended earmark remains flexible – because no set amount is prescribed for the earmark, or the expenditure benefiting from the earmark is quite broad, or the duration is limited. By highlighting a political priority, soft earmarking can enhance the visibility and political acceptability of a health tax.[76, 78, 79]

As indicated in **Section 5.1**, countries with limited ability to access financing urgently need to de-risk financing flows, and this is possible through concessional finance. Nevertheless, even if countries with moderate ability to access financing have better chances of leveraging private financing flows, these flows still need to be de-risked. In both cases, implementing **blended finance** – a development finance strategy combining different types of sources of financing to attract private capital – is essential. It is a de-risking tool for private investors, increasing investment in agrifood systems transformation, and has been increasingly used at the global level to de-risk financing flows towards agrifood systems (Figure 33B). Blended finance is used when there is a high perception of risk among private investors, channelling financial resources that can take on more risk with a longer investment horizon.[80] Especially when there is a substantial development benefit, actors such as governments and donors can use blended finance as a vehicle to channel the financing flows needed to achieve that outcome. The objective is that, over time, the risk perception will diminish due to the initial support of the more risk-tolerant capital, and that commercial finance can then replace the grants or concessional financing which played a crucial and catalytic role in the initial stage.[81]

Considering that agrifood investments are often considered high-risk, blended finance is particularly important for catalysing private investments to meet SDG Targets 2.1 and 2.2. Data show divergent evidence. For example, in 2022, 36 percent of global climate blended finance deals supported rural and smallholder farmers, marking a significant increase from 26 percent in the period from 2016 to 2018;[61] overall (not counting only climate finance), nearly 25 percent of the total transactions between 2016 and 2018 were oriented towards agriculture.[70] In contrast, another study identified that, by value, the blended finance transactions deployed across food value chains[ar] in the world represent just 6 percent of the total market value.[82] Nevertheless, as indicated in **Chapter 4**, a modest amount of blended finance transactions were oriented to SDG 2 in the period from 2020 to 2022; therefore, there is ample room for increasing the importance of blended finance for ending hunger, food insecurity and malnutrition.

The Nutritious Foods Financing Facility (N3F) expects to be an example of how blended finance can support the attainment of SDG 2, taking into consideration the cost and affordability of healthy diets. Focused on sub-Saharan Africa, N3F's objective is to mobilize financing flows into agrifood SMEs that process and produce safe and nutritious foods (**Pathway 4**). Its structure, comprising multiple capital tranches, is expected to attract a wide range of actors, from those with a high risk-taking and catalytic profile to short- and long-term investors. While many financing actors have a focus on climate, smallholder farmers or sustainable agriculture, focusing on midstream SMEs contributing to healthy diets and positive nutrition outcomes is quite new, and may be perceived as risky due to the complex landscape. The support of different public and private actors, including government donors (United States Agency for International Development) and philanthropic foundations (Rockefeller Foundation), in addition to the technical background of the Global Alliance for Improved Nutrition, has allowed N3F to reduce the perception of risk among private investors.[36, 83]

Another recent example of blended finance applied to food security and nutrition is the Africa and Middle East SAFE (Scale-up Agriculture and Food systems for Economic development) Initiative, launched at the end of 2023 at the Twenty-eighth Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP28) by the leading DFIs from Africa and the Near East. The objective of the initiative is to mobilize USD 10 billion to develop climate-smart agricultural investments that can contribute to food security and economic growth (**Pathways 2 and 3**). Contrasting with the above example, the initial investment opportunities identified are related to staple foods – rice in Senegal and wheat in Ethiopia – with the objective of increasing the domestic production of these crops and, therefore, reducing the import bill for staple foods.[84]

Nevertheless, an open question is the effectiveness of this financial approach. Evidence has shown that the leverage ratio (the additional amount of financing flows mobilized) of traditional blended finance instruments is lower than expected for LICs, where the total amount of blended finance instruments (particularly concessional debts and guarantees) of every US dollar from a DFI or national development bank has mobilized only an additional USD 0.37 from private commercial sources. On the other hand, LMICs show different results, mobilizing slightly more than the invested US dollar (a ratio of 1:1.06), while the leverage ratio falls again in UMICs to USD 1:0.65. These numbers may imply lowering the expectations regarding the amount of money that blended finance can mobilize.[34, 85] In addition, the most recent data show that the overall volume of blended finance operations decreased by about 45 percent in 2022, reflecting the key macroeconomic and political challenges that the world – particularly LICs and MICs – is facing.[86] However, it is important to consider blended finance results not only from a resource mobilization perspective but also in terms of other "additionalities" beyond resource mobilization,[34] i.e. the achievement of an outcome that would not have been reached without the inflow of the financial resources, for example, the diversification of financial intermediaries.[67]

Multilateral Financial Institutions (MFIs) can play a lead role in enhancing blended finance's mobilization of resources.[as] Nevertheless, playing that role would imply achieving a delicate

ar When unbundled by food value chain stage, most resources were channelled to food value chains upstream, followed by the processing phase of the midstream stage. Most of these investments were in sub-Saharan Africa.[82]

as For more details, see **Section 5.3**.

balance: They should take a greater risk to unlock other commercial private flows, but not so great that these are crowded out.[67, 87] One example is the Rural Kenya Financial Inclusion Facility Project, a USD 142.6 million project that aims to provide catalytic financing and technical assistance to support the financial inclusion of 190 000 rural Kenyan households. The project combines the capacity building of local commercial banks, MFIs and deposit-taking savings and credit cooperatives, alongside training for potential borrowers with a Rural Credit Guarantee Scheme and a Green Financing Facility. The project also works with local financial service providers to provide innovative green financing solutions specifically for youth (**Pathway 6**).[88]

In East Africa, the Africa Rural Climate Adaptation Finance Mechanism (ARCAFIM), led by financing institutions including Equity Bank and by Nordic countries, addresses the pressing need to strengthen support for East African small-scale food producers' adaptation to climate change. By integrating blended finance and incentivizing private sector participation, ARCAFIM allocates a total of USD 180 million for climate change adaptation loans, complemented by USD 20 million for technical assistance. Leveraging the expertise and resources of private financial institutions like Equity Bank, ARCAFIM aims to pioneer climate change adaptation financing in the region, enhancing agricultural sustainability and resilience to climate shocks. Through this innovative financing mechanism, ARCAFIM aspires to alleviate poverty and hunger in rural communities by supporting agricultural livelihoods and fostering economic growth amidst climate uncertainty (**Pathway 2**).[89]

Financing instruments for countries with high ability to access financing flows

Green, social, sustainability and sustainability-linked (GSSS) bonds are debt instruments that can be issued by governments, multilateral development banks, commercial banks and local corporates; they are linked with development goals, and can be especially relevant for targeting financing for countries that are affected by some of the major drivers of food insecurity and malnutrition such as climate extremes and/or economic slowdowns (Figure 33C). The global issuance of GSSS bonds has grown markedly since 2012.[90] Nevertheless, after reaching a peak in 2021, the amount of GSSS bonds issued saw a decrease in 2022, to then recover in 2023,[at] reaching a total amount of USD 981 billion.[91] Among GSSS bonds, **green bonds** are those where proceeds go to financing climate and environmental projects and initiatives, and they are the main instrument used for sustainable climate finance. Green bonds are also predominant among all other kinds of GSSS bonds, representing 74 percent of the total amount of GSSS bonds issued by the private sector in 2023, while for the public sector these bonds are also the most prevalent, but to a lesser extent; for instance, in the period from 2021 to 2023, green bonds represented on average 45 percent of the total GSSS bonds issued.[92] It should be noted that from 2012 to 2022, the issuance of GSSS bonds was largely dominated by HICs,[au] which accounted for 71 percent of the total issuance. However, when considering only green bonds, China has become the country that issues the majority of this kind of instrument.

In Latin America and the Caribbean, since at least the 2010s, several governments have enacted regulatory frameworks and policies to promote green finance tools, including green bonds, and as a result the issuing of green bonds has increased, in terms of both the number of countries and the value of the bonds.[93] For example, in Mexico, Trust Funds for Rural Development, an agricultural development finance institution under the Bank of Mexico, issued three green bonds to a total value of USD 400 million (as at 2023) to finance sustainable agriculture projects, water efficiency investments, and renewable energy and energy efficiency projects (**Pathway 2**).[94]

One important incentive for issuing green bonds is that they show high returns relative to conventional emerging market bond indices.[70] However, in some cases, the premium paid for these bonds might be larger than that for "regular" bonds for LICs and LMICs.[95] In addition, there is the risk of green bonds being

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at There are different sources reporting the amount of GSSS bonds issued, and they all differ in their calculations. Therefore, please refer specifically to the source cited for each statement regarding GSSS bond amounts, and do not compare them with other sources.

au "Developed markets" in the original publication.

used for "greenwashing" of private companies,[70] which means that even if companies use these instruments, they do not necessarily adopt more sustainable practices over time.[96]

Social and sustainability bonds do not represent a large portion of the GSSS bonds issued by the private sector, but they are relevant for the public sector, accounting on average for, respectively, 29 percent and 26 percent of all GSSS bonds between 2021 and 2023.[92] On the other hand, **sustainability-linked bonds** have only been issued recently by the public sector and represent just 1 percent of the total issued in the triennium from 2021 to 2023,[92] but their role may become more important in the coming years. For example, in 2023, the Development Bank of Rwanda (BRD) issued, for the first time, a sustainability-linked bond.[av] The bond is backed by an escrow financed by the World Bank through concessional finance and allows the BRD to mobilize financing flows to finance projects oriented to one of the three main objectives of the bond: i) improving environmental, social and governance (ESG) practices; ii) increasing access to financing for women-led projects; and iii) financing the building of affordable housing (**Pathway 6**). If borrowers meet certain performance indicators related to at least one of the three objectives, they are rewarded with lower interest repayments.[97]

While for the private sector, the use of the proceeds of the GSSS bonds issued is mostly oriented towards renewable energy projects, energy efficiency and green buildings, for the public sector the priority is largely social expenditure, followed by biodiversity conservation. Interestingly, the share of proceeds related to agriculture is very minor, representing only 1 percent of total public sector expenditure (and 0 percent of private sector expenditure).[92]

Multilateral Financial Institutions have also started to use bonds to raise funds from capital markets. For example, in 2022, two private placements were settled under IFAD's Sustainable Development Finance Framework. These bonds are sold to investors with a strong ESG corporate profile who generally support transforming agriculture, rural economies and agrifood systems. The proceeds of the bonds are used to finance development projects through loans to borrowing countries. On such loans, borrowing countries pay a market-based rate that allows IFAD to pay a commensurate coupon to the investors. The first two private placements were bought by Folksam, a Swedish insurance and pension fund, for USD 100 million, and Dai-ichi Frontier Life, a provider of savings-type life and pension insurance, for USD 50 million.[98]

Results-based funding (RBF) consists of financial instruments linked to the achievement of certain results (Figure 33C). For example, **impact bonds** are outcome-based instruments that provide capital to an activity with specific and measurable outcomes. The repayment to the investor is linked to the achievement of these outcomes; in most cases, failure to reach the outcomes leads to a loss, while in some cases, the bond is designed to provide an additional payment when outcomes are reached.[99–101] On the other hand, **impact-linked finance** describes all private financial activities that are linked with rewards for achieving positive social outcomes. These instruments have been used in both the health and the agrifood systems sector. For example, through the Global Partnership for Results-Based Approach project in Ghana, an RBF grant was used to stimulate demand for urban household sanitation, attracting larger contractors to supply toilets to low-income communities as well as financial institutions to enter the market.[102] From an agrifood systems perspective, a project has been financed by the Impact-Linked Fund for Eastern and Southern Africa via an impact-linked loan to encourage the company to engage with more women farmers throughout the value chain, and as such, lower the interest rate of the loan (**Pathway 6**).[36] Another example is Aceli Africa, a market incentive facility that offers results-based financial incentives to domestic lenders in Kenya, Rwanda, Uganda and the United Republic of Tanzania. Without these incentives, local lenders could refrain from providing loans to agrifood SMEs. Supported by donors, this facility provides various incentives, including origination incentives for domestic lenders to cover the cost of extending loans of between USD 25 000 and USD 500 000 to agrifood SMEs in remote areas or of supporting the production

av More precisely, it is the first bond ever issued by the BRD.

of local food crops (**food availability**); impact bonuses for loans extended to agrifood SMEs meeting higher standards in environmental and social performance, gender inclusion, food security and nutrition (**Pathway 6**); partial loan guarantees for loans between USD 25 000 and USD 1.75 million; and technical assistance to agrifood SMEs and capacity-building support to domestic lenders.[58]

Incubators and accelerators provide funds to projects that are in an early stage of development with the objective of consolidating them in the long term (Figure 33C). For example, in Cameroon, the Youth Agropastoral Entrepreneurship Promotion Programme provides comprehensive support to young entrepreneurs, including 100 percent subsidized education, blended financing, and coaching for business start-ups. The blended financial mechanism incorporates young entrepreneurs' own capital, a start-up loan with no interest, and productive credit. A one-off subsidy from the project, in the form of a starter kit, facilitates the installation of young entrepreneurs and encourages the development of existing activities (**Pathway 6**). Impact assessment findings show that the project impact on food security is positive. About 59 percent of the beneficiaries have achieved minimum dietary diversity for women aged 15 to 49 years. The impact on gross annual income shows a 48 percent increase in total annual income. This represents an increase of approximately USD 1 500 in total gross household income per year. Youth enterprises supported by the project have an average profit margin of about USD 3 000 with an annual growth rate of 38 percent between 2016 and 2022.[103]

All countries must address the current failure of agrifood systems by investing domestic resources to address the major drivers of food insecurity and malnutrition. The creation of **impact investment funds** can support the mobilization of financing for this objective from a public–private perspective (Figure 33C). United Nations Trade and Development (UNCTAD) estimated that, by 2022, more than 7 000 sustainable funds existed, and they accounted for USD 2.5 trillion (a drop from USD 2.7 trillion in 2021). A large part (83 percent) of the global sustainable fund assets were managed by European countries, followed by the United States of America (12 percent) and China (2 percent).[104]

One other example, the Child Nutrition Fund (CNF) is a new financing instrument designed to transform the way the world addresses child wasting. The Match Window of the CNF offers national governments the opportunity to match domestic resources for essential services and supplies. Since its launch in 2021, the Match Window has supported over a dozen countries across Africa and Asia, including Cambodia, Ethiopia, Eswatini, Kenya, Mauritania, Nigeria, Pakistan, Papua New Guinea, Senegal, Sierra Leone, Timor-Leste, Uganda and Zambia. In 2023, the CNF's Match Window deployed over USD 9 million in matched funding primarily for the procurement of ready-to-use therapeutic foods for the treatment of child wasting. The single largest recipient of this matched funding in 2023 was Pakistan (USD 5.9 million), followed by Ethiopia and Uganda, both receiving around USD 1 million in matched funding. In Pakistan, the CNF also concluded the first match for multiple micronutrient supplements for women, matching over USD 300 000 in domestic resources from Punjab Province. In 2024, the CNF Match Window is expected to match over USD 15 million and enter the first of a series of multi-year matching partnerships with national governments to increase government investments in nutrition to foster greater sustainability of nutrition financing.[105]

However, sometimes these funds, as well as many of the financing instruments discussed in this section, are not available due to the lack of technical capacity of enterprises that could be potential recipients of the investments. For example, this is often the case with agrifood SMEs in LICs and MICs.[106] Yoking financing to activities to improve the recipients' access to financial services can make a difference in turning the increased financing flows into impactful investments for food security and nutrition. If the population most in need does not receive adequate financing, not only will meeting SDG Targets 2.1 and 2.2 not be possible, but neither will achieving other objectives such as SDG 1 (No Poverty) and SDG 10 (Reduced Inequalities).

Increasing financial inclusion and equality within countries

Not only financing, but also financial inclusion is among the means of implementation to achieve all the SDGs.[107] Even if financing for food security and nutrition could be scaled up using the innovative instruments described above, within countries there are population groups that have historically faced important constraints in accessing financial services. This section provides examples for some of the population groups; however, this does not exclude the recognition of several other segments in situations of vulnerability and marginalization, for which adequate policies are also necessary.

Women play a key role in agrifood systems, representing 37 percent of rural agricultural employees at global level and 48 percent in LICs.[60] However, while 78 percent of men had access to a bank account of some kind in 2021, for women the figure was only 74 percent – a 4 percentage-point gap that, for LICs and MICs, increases to 6 percentage points (74 percent for men, 68 percent for women).[108] The gap can be even wider at the country level, considering access not only to bank accounts but also to other financial services. For example, in India, while the account access gap was successfully closed between 2017 and 2021, there remains a 5 percentage-point gap in access to borrowing and a wider 13 percentage-point gap regarding the use of banking accounts for saving purposes.[109] **Increasing women's access to financial services** would not only contribute to women's social and economic empowerment, but it would also improve the overall livelihoods of their households and communities, including food security and nutrition outcomes[110] (Box 14). From a macro perspective, women's inclusion would bring overall positive economic growth effects,[111] which could increase the country's resilience to economic slowdowns and downturns.

There are cases in which the financing tools described in the previous section include gender considerations (**Pathway 6**). For example, the Asian Development Bank issued 14 gender bonds (for a total of USD 3.6 billion) up to 2023 through its gender thematic bond programme, which mobilizes financing towards projects aimed at narrowing gender disparities and promoting the empowerment of women and girls.[112] In Morocco, a private bank (Banque Centrale Populaire) issued a bond of USD 20.4 million to finance women-led projects through microleasing, a sound alternative for increasing women's access to financial services[113] (see Box 14).

Indigenous Peoples face limited access to financial services not only in LICs and MICs but also in HICs like Australia and Canada. Indigenous Peoples often live in remote rural areas and possess no or little collateral, leading financial institutions to perceive that the challenges of providing services to these communities may outweigh the benefits.[115–117]

Despite the wide recognition that Indigenous Peoples are indispensable partners for reaching the targets of the Paris Agreement, the Global Biodiversity Framework and the 2030 Agenda for Sustainable Development, the corresponding funding strategies do not necessarily reflect their crucial role. It is estimated that most funds targeting Indigenous Peoples and local communities are channelled through indirect funding modalities. For example, only 7 percent of funds disbursed under the USD 1.7 billion COP26 pledge to advance tenure rights and forest guardianship of Indigenous Peoples and local communities went directly to their organizations.[118] Thus, the ongoing global discussion on improving direct financing to Indigenous Peoples for their self-driven development remains paramount (see Box 15).

Access to financing by agrifood value chain actors is very different depending on their characteristics. While large commercial agricultural producers have relatively easy access to loans and capital, smallholder farmers and agrifood SMEs face many challenges in accessing financing due to their lack of collateral, a financial track record or even a bank account.[81] The lack of access to financial services can also diminish the potential contribution of **smallholder farmers and agrifood SMEs** to achieving food security and improving nutrition, for instance, by limiting their capacities to offer safe and nutritious foods (see Box 16).[123]

BOX 14 CLOSING THE GENDER GAP IN ACCESSING FINANCING FLOWS AND SERVICES

The structural constraints that women face to access financial services require the adoption of an inclusive and gender-transformative approach* that takes their different backgrounds and needs into account, as well as the differences between women themselves, related to age, ethnicity, health and disability status, among other social factors.[109]

A main underlying cause of gender inequalities is women's common lack of the traditional collateral required to access credit, as they are less likely than men to own land, which makes them less attractive clients for formal financial institutions. For example, **group-based approaches** can enable asset-poor women to use social collateral instead of physical collateral for accessing credit. Commonly adopted by microfinance institutions, this approach allows women to use a group's joint liability as collateral for accessing credit. Nevertheless, one of the limitations of this approach is that it usually provides short-term credits that do not allow women beneficiaries to make major investments.[110, 114]

Some countries have promoted the use of **movable collateral** such as jewellery or livestock units, in opposition to the usual request for fixed assets. For example, the establishment of public movable collateral registries can reduce the risks of using movable goods as collateral. For agricultural producers, warehouse receipt finance is an approach where the stored production is used as collateral for accessing credit and can be sold later when prices are more convenient.[114]

Microleasing is another promising approach in which collateral is not required since the microfinancing institution retains full ownership of the asset until the payment is completed, giving women the opportunity to purchase capital goods and, therefore, access other sources of financing. A microleasing approach can be more convenient than microcredit for women; for instance, since microleasing is linked to a specific capital good, women can trust that it will not be expropriated or used by other household members for non-business-related expenditures.[114]

Mobile money has had a positive impact on women's financial inclusion, changing their financial behaviour and increasing their engagement in savings and budget planning, contributing to their economic empowerment.[60]

However, these measures should be implemented jointly with initiatives for tackling inequalities and gender norms that prevent women from participating in economic activities. This implies addressing the structural barriers to women's empowerment and gender equality, by giving equal access to productive resources, services, local institutions and decent employment, supporting their engagement in planning and decision-making, and strengthening technical skills and financial literacy. It also requires overcoming discriminatory social norms and rules and changing financial behaviour within households and communities. Otherwise, the increased levels of access to financial services will not be effective in the long term.[109]

NOTE: * Understood as an approach that addresses the root causes of gender discrimination; specifically, a gender-transformative financial approach means enhancing women's empowerment, improving negotiation dynamics and establishing adequate regulatory and sociocultural norms.[109]

Agrifood SMEs are critical for rural economies.[125] They are often value chain actors that create opportunities and benefits for smallholder farmers through sourcing, processing, packaging, transporting and selling food to consumers.[126] Despite the vital role of these SMEs in agrifood systems, they are often underserved, as investors are reluctant to finance local market producers in local currency as they wish to avoid risks associated with exchange rates, and prefer to serve more export-oriented SMEs. Local lenders need to fill this gap but are hesitant to participate in these markets due to the high risk. Small lenders, such as microfinance institutions, often provide too little financing, while commercial lenders may find it too risky to lend to agrifood SMEs.[127] Providing access to appropriate financing and complementary investments enables agrifood SMEs to offer economic opportunities in rural and urban areas alike. Through backward and forward linkages, the multiplier effects of these agrifood

BOX 15 THE INDIGENOUS PEOPLES ASSISTANCE FACILITY

The Indigenous Peoples Assistance Facility (IPAF) is an innovative funding instrument that Indigenous Peoples' communities can use to find solutions to the challenges they face. It finances small projects that foster the implementation of self-driven development projects based on the demand expressed by Indigenous Peoples themselves.[119] Several IPAF-funded projects have enabled Indigenous Peoples' communities to improve their food security and nutrition and strengthen their agrifood systems by promoting sustainable food production, traditional agricultural systems and techniques, and by reviving Indigenous Peoples' knowledge. Projects have addressed food security with a holistic perspective while also trying to protect biodiversity, natural resources, traditional cultures and Indigenous Peoples' rights. For example, through an IPAF project implemented in Argentina (2018–2021),[120] the Mapuche Cayún community was supported to improve food security at community level. In addition to generating a surplus to be sold to the market and reinforcing economic links with other Mapuche communities, the project helped promote the importance of diet diversification, traditional cuisine and medicinal herbs in the communities (**Pathway 6**).

Another project implemented in the Plurinational State of Bolivia[121] aimed to address the negative effects of El Niño and La Niña, which have caused considerable economic losses for Guaraní Indigenous farmers due to droughts and frosts in the municipality of Yacuiba. The project focused on improving agricultural practices through the revival of traditional knowledge and participatory learning practices such as Farmer Field Schools. It covered a wide range of activities such as training on traditional production techniques and organic farming, irrigation techniques, natural resources management, and nutrition, food security and traditional food and recipes (**Pathway 6**). As a result, 57 households were able to set up 55 agroecological and three communal gardens. In Colombia, an IPAF project[122] specifically focused on the preservation and promotion of potato varieties with great potential to both improve marketing as well as food security and nutrition of Pastos Indigenous communities in the territory of Gran Cumbal. The project conducted research and identified over 36 varieties of native potato and five select varieties with great production potential. Furthermore, it established seed banks and promoted traditional techniques for organic potato production ("shangra"), sowing, cultivation, harvesting and storage in experimental units covering a territory of 15 hectares (**Pathways 4 and 6**).

These examples show that a key characteristic of IPAF projects for food security and nutrition is their focus on promoting and reviving traditional foods as they provide a variety of nutrients, enhance dietary diversity, and increase the adaptability to climate change. In 2023, 18 new projects worth USD 1.2 million were approved, to be implemented by Indigenous Peoples' communities and their support organizations in 13 countries in Latin America and the Caribbean.

SMEs can support the achievement of SDG Targets 2.1 and 2.2, as well as the overall rural transformation objectives.

For instance, in Cambodia, the Accelerating Inclusive Markets for Smallholders project develops and promotes linkages among small-scale producers, off-takers and service providers.[128] It develops a value chain innovation fund, which will provide direct financial support to stimulate private investment in high-value agriculture. Also, the project organizes multistakeholder platform events and offers business literacy training (**Pathway 3**). As at December 2023, the project had supported more than 78 000 households across more than 1 900 producer organizations. In addition, more than 3 000 multistakeholder platform events had been organized, and a credit line of more than USD 6 million disbursed to agricultural cooperatives, SMEs and agribusinesses.[129]

In Uzbekistan, the Dairy Value Chains Development Project was co-financed by the Government of Uzbekistan, domestic financial institutions and project participants. It promoted development of dairy value chains by increasing productivity, competitiveness, income, and market access to small-scale producers and

BOX 16 INNOVATIVE SOCIAL IMPACT INVESTMENT FUND IN UGANDA

The Yield Uganda Investment Fund was established in 2017 by the European Commission through the National Social Security Fund. It was set up as a Ugandan company partly to support financial sector development. Most similar funds are registered in countries like Mauritius, which brings clear advantages to the investors in terms of smooth transfer of funds, taxation and the resolution of potential disputes.

The fund invests in companies that offer social impact with financial returns. A business development facility improves the companies' operational processes and addresses environmental and social impact and governance. To date, the fund has made 13 investments in Uganda worth over EUR 12.9 million.

Experience has confirmed the findings of the initial market study done by the European Commission that many agrifood small and medium enterprises (SMEs) in Uganda are constrained by a lack of adequate capital to fuel their growth.[124] Financial institutions' terms are too expensive, require a lot of collateral or have repayment schedules not in line with the company's business plan. It is essential to the business ecosystem that small agribusinesses access this capital in order to grow, creating demand for smallholder farmers' produce, which will in turn provide more opportunities in their communities and drive sustainable rural transformation.

Having a Uganda-based fund manager is a major advantage in different ways. First, a local presence and informal networks in the sectors allows the fund to identify risks associated with the investments that would have been extremely difficult to discern otherwise. Their proximity to the SMEs allows them to build a closer partnership with the promoters who get to benefit from continuous capacity support from the fund manager.

Agricultural technical assistance plays an important role in mitigating risk and boosting confidence for financial institutions involved in smallholder financing. It ensures that other constraints hindering the growth of SMEs are addressed to create the right enabling environment. Technical assistance linked to investment vehicles is ideal, providing more flexibility for companies and supporting pipeline development effort for the funds. For the Yield Uganda Investment Fund, this cost-sharing facility is helping companies tackle environmental, social and governance gaps, build or extend their smallholder farmer networks, obtain important certifications, and improve their operational efficiencies.

commercial dairy farms. It offered capacity building, training and financial support in the form of credit lines to dairy processing enterprises for production and processing activities (**food availability and Pathway 3**). Findings from the project's impact assessment show that credit provided by the project increased recipients' total income by 36 percent. More specifically, credit led to an 84 percent increase in livestock income, a 55 percent increase in crop income and a 27 percent increase in agricultural wage income.[130] Among those who received the credit, milk sales increased by 41 percent, and the share of milk sales in total production was 13 percent higher. Food security was found to be 26 percent higher in households that received the credit compared to households that did not.

In addition, for both smallholder farmers and agrifood SMEs, supply chain innovations can be adopted to reduce the barriers to access financing flows in a timely manner. For instance, contractual arrangements between agrifood supply chain actors can enable suppliers to access transaction funds faster and under favourable terms. One example of this is long-term contracts signed between the dairy industry and producers in Northern America and Europe, which involve price agreements that stabilize producers' profits and allow them to access credits and other financial tools.[131] Warehouse receipts are another instrument that, even though not new, have not yet been fully adopted by smallholder farmers. These receipts allow farmers to store their production surplus and sell it later, when prices are higher, and use it as collateral for accessing credit. However, the cost involved could be high and/or the crops targeted may not be the most adequate for implementing this instrument. Increasing price premium and/or lowering the cost of storage in warehouses should be considered for making this instrument attractive in LICs and MICs.[132] Invoice discounting is a mechanism for suppliers to instantly obtain the value of their invoice, thereby replenishing working capital for further operational arrangements. Smallholder farmers often sell through cooperatives and aggregators, who likewise fall short of working capital to pay the farmers immediately. To remedy this, in India, for example, Mastercard works with M1xchange, an entity that facilitates discounting and the sale of receivables to banks and non-banking financial companies, bringing on board a wide range of lenders for agrifood SMEs to better access credit and working capital (**food availability**). By leveraging digital platforms, farmers and cooperatives within this initiative have access to both buyer and lender, thereby increasing the business velocity both ways and being paid instantly.[133]

For several countries, remittances can be a significant component of financing flows for food security and nutrition, but a low share is invested in agrifood systems, while the lion's share supports food consumption (see **Chapter 4**). Most of the time these resources are received by low-income households in LICs and MICs, and evidence has shown that they could improve the food security and nutrition of the recipient households.[aw]

Bringing **remittances** to the formal financial system can increase its impact at the household and community levels. As shown in **Chapter 4**, cross-border remittances have grown every year except 2020, and nearly half of the flows sent between 2017 and 2022 were allocated to uses that likely contributed to food security and nutrition, such as food consumption, but much less was destined for investment in agrifood systems. For instance, the Platform for Remittances, Investments and Migrants' Entrepreneurship in Africa (PRIME Africa) supports the reduction of transaction costs of remittances and the inclusion of the recipients in the financial system.[136] In an effort to connect the largest economies in Africa – i.e. the East and the West – Access Holding, the parent holding company of one of the major banks on the continent, announced a partnership with key telecommunication operators, financial services providers and mobile money/digital payment operators to enable remittance across this East–West corridor (**Pathways 3 and 6**). Such an initiative will reach 60 million customers and 5 million businesses across more than 20 countries on the continent. In 2023, remittances to Nigeria accounted for 38 percent of the USD 58 billion remittance flows to the region, growing by 2 percent, while Ghana and Kenya posted estimated gains of 5.6 percent and 3.8 percent, respectively. In Tajikistan, an FAO pilot implemented a cash-matching grant scheme, which matched every US dollar of every remittance that beneficiaries invested in agribusinesses. Implemented jointly with technical assistance, the pilot allowed beneficiaries to scale up agribusiness investments and employment generation.[137] And yet, the remittance effect regarding improving food security and nutrition is mixed: Remittances contribute to improved consumption patterns, the average value of food products, and the accessibility of dietary energy supply, but their influence on nutritional quality and dietary diversity remains inconclusive.[138] Nevertheless, remittance inflows support access to essential food items, particularly during periods of escalating food prices.[139, 140] ■

aw For example, in the Bolivarian Republic of Venezuela[134] and in rural households in Mexico.[135]

5.3 HOW TO ACHIEVE BETTER ALIGNMENT WITH AND SYNERGIES IN DIFFERENT SOURCES OF FINANCING

The complexity of the financing landscape for food security and nutrition

Agrifood systems are currently not delivering the necessary outcomes to achieve food security and end all forms of malnutrition, and they are also creating several environmental, social and economic costs. **Chapter 4** of this report showed that not bridging the financing gap to meet SGD Targets 2.1 and 2.2 can cost trillions of USD, making it crucial to adopt investment practices that take climate, health, social and environmental risks into consideration.[141] However, this might not be possible if the financing architecture is not designed to become a critical means to facilitate the achievement of these development objectives.

The current financing architecture for food security and nutrition is highly fragmented: The lack of consensus about what should be financed and the different objectives among stakeholders have led to a proliferation of actors that often step outside their mandates instead of collaborating among them.[34] Bilateral donors often choose to engage in their own aid activities, rather than channelling this through multilateral organizations. This results in many small, uncoordinated aid activities, driven principally by bilateral donors. For instance, in 2018, 73 percent of agriculture official development assistance was bilateral, while multilateral aid accounted for 27 percent in the same year (a reduction of 3 percentage points compared to 2013), which, without adequate coordination among actors, can lead to competition and inefficiencies[35] (more details in **Chapter 3**). In the period from 2000 to 2020, and particularly since 2010, the emergence of multi-bi ODA (earmarked funds whose management is entrusted by bilateral donors to multilateral institutions) has been observed with a gradual reduction in bilateral ODA.[142]

While considering a complex, multisectoral objective such as achieving food security and improved nutrition, the lack of coordination can be even more important. Many sectoral investments can influence hunger, food insecurity and malnutrition, but often this is not recognized. For example, two key areas for meeting SDG Targets 2.1 and 2.2 – humanitarian and development actions – are often planned, funded and implemented separately.[34] In a financial landscape where several development objectives are competing for scarce financing flows, the current financing architecture is failing to embed food security and nutrition into broader development objectives.

At the country level, the high number of uncoordinated projects is causing high transaction costs and hindering the pursuit of common SDG objectives. The competition among many actors with similar mandates for funds provided by a small group of donors is detrimental, compared to a situation of fewer actors with differentiated mandates.[35] For instance, while in 2009 most of the countries engaged with between 61 and 100 different donors, in 2019 the majority engaged at least once with more than 100 donors. The number of bilateral donors increased from 25 in the period between 2000 and 2004 to 43 in the period from 2015 to 2019, and the number of agencies from these bilateral donors increased from 145 to 411 in the same period. Multilateral donors have also increased from 46 to 91 agencies, banks, funds and other institutions. In total, the number of every kind of donor increased from 191 in 2000 to 502 in 2019.[142]

Some studies have found that fragmentation of development financing can be associated with lower economic growth rates[143–145] and lower levels of accountability that can lead, potentially, to corruption in recipient countries.[146] On the other hand, fragmentation can also lead to efficiency gains by encouraging the specialization of agencies and funds, promoting competition among donors to enhance efficiency and encouraging innovation, while this competition can also increase the bargaining power of recipient countries (as there could be several donors interested in a single problem and/or country).[142]

Fragmentation can also imply shifting priorities and competition – instead of cooperation – among donors, data scattered across different sources and methodologies, lack of alignment with country priorities and plans, and a marked preference for financing projects instead of programmes, implying a high number of small bilateral projects in recipient countries, which can lead to high transaction costs and inefficiencies.[35]

Evidently, donors (which include governments, international financial institutions, multilateral development banks, development finance institutions and philanthropic foundations) play a crucial role in the current financing architecture. For instance, they are involved in most of the blended finance transactions and provide funds for intermediary organizations[ax] for investing in small-scale projects.[148]

Among them, philanthropic foundations are important stakeholders in the financing architecture for food security and nutrition. Compared to private investors, philanthropic foundations have more chances to focus on impacts than on financial returns and are more tolerant regarding the risks that are often part of development finance. Leveraging patient capital[ay] from philanthropic foundations can be a game-changer approach for supporting social enterprises, creating solutions to the problems of hunger, food insecurity and malnutrition, and for making the necessary infrastructure investments in LICs and LMICs to address some of the major drivers of food insecurity and malnutrition. Philanthropic foundations are uniquely placed to be catalytic, acting as early risk-takers and showing that investing in food security and nutrition may not be as risky as it seems. While the growing interest from philanthropic foundations in financing instruments as blended finance is encouraging, the way in which many foundations are organized can limit their role to simply delivering grants and development projects. For example, few foundations are organized to deliver equity, which is important for early-stage partnerships, and they are not prepared to receive money back.[148]

Nevertheless, one of the greatest challenges probably lies in addressing the current fragmentation of the financing architecture for food security and nutrition. Increased coordination between large, medium and small stakeholders should be encouraged, as sometimes large donors do not coordinate with or co-finance activities led by other minor actors, since there are no incentives to do so. In addition, there is a crucial need for donors to align their spending priorities with countries' priorities: Since the current architecture is extremely dominated by HICs and large development agencies, the priorities of recipient countries and communities are not always considered.[34]

An important challenge faced by many recipient countries of ODA, other official flows (OOF) and other development finance flows is their relatively minor role regarding how development finance is planned and implemented.[az] In fact, discussions about how to shape financing architecture have revealed differences between the vision of some HICs, which have traditionally led the development finance discussion, and that of some LICs and MICs. For instance, an analysis of the positions in the 2015 Conference on Financing for Development in Addis Ababa found that, while certain HICs have promoted a greater role for the private sector and a vision of national governments as "enablers" for mobilizing private financing flows, some LICs and MICs have argued in favour of enhancing the role of governments to make sovereign decisions about their development strategies.[ba, 152] The mismatches about how to build solutions could affect the necessary coordination and integration of actors towards a less fragmented financing

ax An intermediary organization, in the context of blended finance, is a facilitator that channels funds from various sources into specific projects oriented to de-risk further financing.[147]

ay Patient capital is a long-term investment approach in which providers aim to capture benefits in the long term rather than the short term.[149]

az These differences are not only noticed between countries but also within countries, as there are also important imbalances in the representation of certain population groups. For instance, women are clearly under-represented in the financing architecture. In 2021, women represented only 21 percent of the boards of financial services institutions worldwide.[150, 151] While **Section 5.2** made a call for increasing women's access to financial services, it is equally important to fill the gender gap in the financing architecture, increasing the participation of women in leadership positions.

ba In the source, HICs and large development agencies are called the "Global North", while other countries and smaller stakeholders are the "Global South".

architecture for food security and nutrition, making essential the achievement of agreements among all kinds of actors, regardless of their size.

Certainly, this increased coordination among actors, and the more equal integration of LICs and MICs into the financing architecture would require stronger and more solid national governments which, in any case, face several challenges. Political economy issues and unpredictable government decision-making can affect the capacity of alignment between the sources of financing flows and a country's priorities and create a perception of higher risk for private investors. Low-absorptive capacity is also a problem that could limit the potential increases in financing flows for food security and nutrition (see **Chapter 4**); furthermore, the weaknesses of governance mechanisms, institutions and the rule of law not only affect countries' ability to access financing, they can also lead to an extreme concentration of national markets that could undermine the position of key agrifood systems actors as smallholder farmers and SMEs.[34]

It is also important to ensure that at the national level the increased financing flows turn into effective policy solutions for ending hunger, food insecurity and malnutrition. The absorptive capacity and technical efficiency of expenditure (which can have impressive potential gains for some countries as seen in **Chapter 4**, Box 11) are important, but good governance and strong national institutions are also necessary. For instance, in countries highly dependent on ODA and OOF, data suggest that national elites may have been capturing sums of the money received and depositing these in offshore financial centres.[153]

The commercial private sector is without doubt the most important actor in terms of the level of financing flows directed to food security and nutrition. It is often private actors who develop new technologies and innovative financing tools, conceived and ready to be implemented in agrifood markets. Government and donor funding can help get projects started, but these will not be sustainable over time without private capital.[87] From a food security and nutrition perspective, multinational food and beverage corporations can bring investments and new technologies and business practices. On the one hand, this can inspire competition to influence food item pricing, though on the other, it can lead to the development of domestic highly processed food and beverage industries.[154]

As a matter of fact, recent decades have seen a rise in the availability, variety and consumption of highly processed food products across country income and development levels, especially in highly populated LICs and MICs, contributing greatly towards dietary transitions. Nevertheless, the growth in highly processed food and beverage sales is not driven by demand alone. Foreign direct investment, meant to develop economies, has also been associated with dietary transitions and increases in the prevalence of overweight and obesity worldwide. In contrast, there is no clear evidence that such investments benefit undernutrition.[155] So far, most private capital investment in nutrition has focused on stand-alone projects that not only fail to address the systemic and structural determinants of malnutrition, but also divert governments' and stakeholders' capacities and resources away from the enforcement of high-impact public policies.[156] Globalization of agrifood systems, largely driven by trade liberalization and deregulation of domestic markets, has enabled multinational food and beverage companies to more easily enter and drive consumption in emerging markets.

Growth in the highly processed food market has coincided with a rise in the subsidization and production of agricultural commodities representing key low-cost ingredients for such products including vegetable oils (palm, soy and rapeseed), sugars and cereal crops (wheat), a significant proportion of which goes towards the production of highly processed foods.[154] Even those companies whose first business is not the manufacturing of highly processed foods often have a vested interest in the supply of commodity ingredients used in these products. These practices also contribute to the displacement of smaller food producers, with negative impacts on the local economy, biodiversity and access to healthy diets.

Regulations often disincentivize the private sector to finance high-risk investments, such as those related to food security and nutrition, since private investors seek to protect the value of their assets in the long term. However, regulatory changes focused on stimulating financing flows towards investments with developmental benefits can make the investments more attractive,[148] and can reduce the risk of "greenwashing".[100] For example, even if non-mandatory, the EU Taxonomy provides guidance for identifying environmentally sustainable investments and is considered a first step towards encouraging financing towards activities that contribute to the achievement of the European Union's climate and environmental goals.[157]

In addition, it is important to close the gap between the risk that all financial stakeholders – especially private sector investors – perceive, and which is often very high, and the actual likelihood of that risk happening. This high risk perception also disincentivizes the financing of initiatives that could create further development opportunities.[148] Even stakeholders who accept higher levels of risk, such as philanthropic institutions, donor governments or DFIs, have their own criteria, timelines and reporting standards for delivering grants, which may impede the involvement of commercially oriented private actors.[83] It is crucial to consider environmental, social, and food security and nutrition factors as part of risk assessments to reduce the risk aversion of financial stakeholders towards food security and nutrition, and agrifood systems.[34]

With a focus on development and a private sector approach, social enterprises[bb] have progressively become important stakeholders for financing food security and nutrition, especially for supporting investments at the local level. Given their wide scope, social enterprises are important vehicles for achieving inclusive economic development; they can create income opportunities in areas with poor access to financing, such as distressed urban areas, or remote rural communities.[158] This can be relevant for an area of investment like food security and nutrition, which, as discussed, is rarely a priority for private investors. However, since social enterprises tend to be oriented towards social impact rather than pure profit, most of their resources come from concessional finance funded by donors. The long-term and risk-tolerant kind of capital needed for these enterprises is not easily found in private, profit-oriented investors.[159]

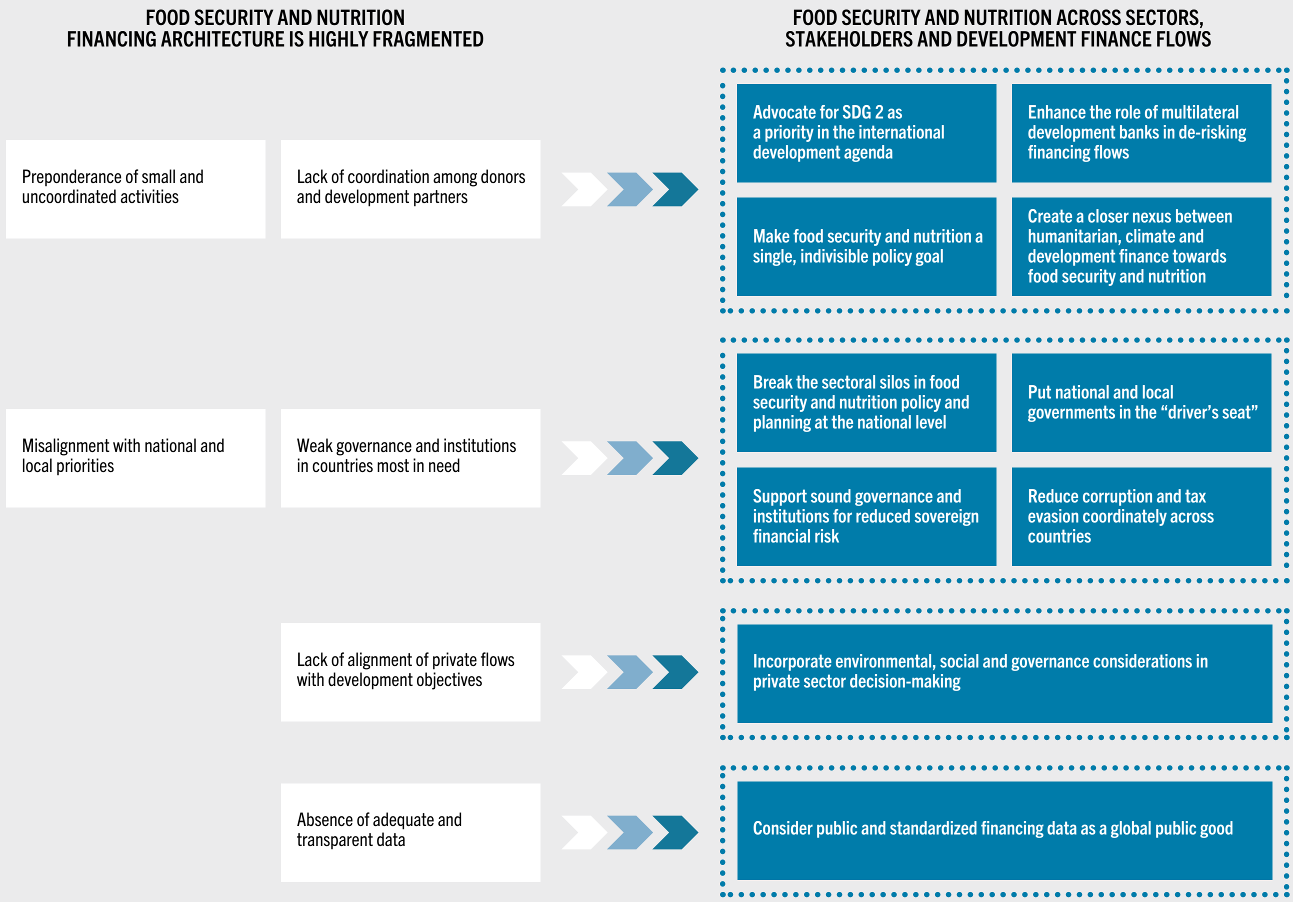
Finally, lack of data, transparency and accountability is another key characteristic of the current financial landscape, and it actually increases the perception of financial risk. Private sector financing is data driven and requires a reliable data infrastructure. Transparency around methodologies and assumptions is needed, as well as timeliness of data. For instance, using "traditional" metrics, food security and nutrition interventions are often considered risky investments, as they have a long return period and lower returns than other sectoral investments. This increases the perception of risk, making the investment unaffordable for recipients. Moreover, this challenge is not limited to the private sector, as the perception that dietary interventions require a long time before health benefits are seen in the population may not align with typically shorter political or budget cycles.[160, 161] Making financial data (including food security and nutrition, agricultural, environmental, health and any other related data) more reliable and widely available could reinforce the "investment case" for food security and nutrition interventions, as is already happening in areas such as regenerative agriculture.[34]

Towards financing architecture for ending hunger, food insecurity and malnutrition

Addressing the issues identified in the previous section will require the implementation of several reforms, summarized in Figure 34. For instance, even before making structural changes in the financing architecture for food security and nutrition, an essential first step for scaling up financing for food security and nutrition is to make the objective of achieving SDG Targets 2.1 and 2.2 a priority in the international policy agenda, which, as analysed in **Chapter 4**, does not seem to be the case, at least considering donors'

bb Private activities whose main purpose is not the maximization of profit but the achievement of development and social goals.[158]

FIGURE 34 RECOMMENDATIONS FOR ADDRESSING THE FRAGMENTATION OF THE CURRENT FOOD SECURITY AND NUTRITION FINANCING ARCHITECTURE FOR ENDING HUNGER, FOOD INSECURITY AND MALNUTRITION



SOURCE: Authors' (FAO) own elaboration.

priorities for ODA and OOF flows. For example, priorities set up by the G7 could have an effect on donors' priorities: When the G7 prioritizes a policy area, more financing flows tend to be directed towards it.[162] Therefore, the role of advocacy is essential: Financing flows can be available, and the most adequate instruments to mobilize these can be identified, but financial stakeholders such as country donors, philanthropic foundations or private sector actors should have a better understanding of food security and nutrition investments, what they mean from both a financial and a development perspective, and what the long-term cost implications of inaction are, discussed in **Chapter 4**. Food security and nutrition is often associated with agriculture only, which most financial stakeholders consider to be a traditional and too risky investment, offering small returns.[34] Adopting a food security and nutrition lens, considering its intersectoral nature (as shown in the definition of financing for food security and nutrition presented in **Chapter 3**) and highlighting the short- and long-term returns of investing in areas such as nutrition[163] are essential conditions for a successful reform of the financing architecture for food security and nutrition.

For national governments, on the other hand, food security and nutrition should be embedded within broader development and investment plans, breaking the sectoral silos and providing firm signs of commitment to ending hunger and malnutrition, and sending the right signals to all financial stakeholders that investment in food security and nutrition is more than an undertaking in a sectoral, traditional area – it is a high-level objective with benefits that go beyond agrifood systems. Governments can also implement food security- and nutrition-sensitive financial taxonomies[bc] that could inform financial actors about investment activities that can support food security and nutrition and/or support the development of resilience to the major drivers.[100] For instance, in Ethiopia, the government issued the Seqota Declaration in 2015, oriented towards mobilizing resources to implement the national Food Security and Nutrition Strategy. Initially targeted at 40 woredas,[bd] it was recently expanded to 700 woredas, and it includes an annual financial commitment by the central government of EBR 3 billion (Ethiopian birr),[be] plus another EBR 3 billion from local governments. The expectations are to mobilize an additional EBR 6 billion from financial partners to invest a total of EBR 12 billion annually to achieve the declaration's objectives.[165]

Breaking the sectoral silos for the design and implementation of food security and nutrition policies also implies a shift in our conceptual understanding of food security and nutrition. The definition of FINANCE for food security and nutrition (presented in **Chapter 3**) is a call for a holistic understanding of what has been commonly considered two separate notions: food security on the one hand, nutrition security on the other. The term "food security and nutrition" has been used to emphasize the achievement of the four dimensions of food security and its tight link with the achievement of nutrition security, as well as the need to adopt complementary actions to achieve food security and nutrition.[166] Nevertheless, it may be time to recognize the overall objective of achieving "food and nutrition security" as a single indivisible policy goal encompassing also the realization of the right to adequate food. Certainly, the stagnating trends in the reduction of hunger and food insecurity, and the slow pace of progress towards the global nutrition targets, including the increasing prevalence of adult obesity in the world,[bf] are sound arguments to make this call, and can strongly support a better understanding of the importance of meeting SDG Targets 2.1 and 2.2 for all financial stakeholders.

The increased political commitment to meeting SDG Targets 2.1 and 2.2 should be followed, from the perspective of donors, by the creation of a closer nexus between humanitarian, climate and development finance. For instance, agencies dealing with humanitarian issues are in most cases totally different from those managing development activities, with different sources of financing and time horizons; the same distinction can be made between national and subnational governments. Long-term investments should foster sustainable development in food crisis contexts to enable humanitarian assistance to meet immediate needs without being overwhelmed by prolonged emergencies. This approach should ensure proper coordination between humanitarian and development finance, with investments oriented towards addressing the root causes of acute and chronic food insecurity. In countries with ongoing crises and frequent famine risks, where humanitarian aid dominates and development finance is limited, greater coherence is crucial to build resilience to the major drivers of food insecurity and malnutrition.[167]

In addition, climate financing actors have barely considered agrifood systems as a priority; between 2021 and 2022, less than 4 percent of

bc As indicated for the EU Taxonomy for environmentally sustainable investments in the previous section.

bd Ethiopian districts, equivalent to the third level of administrative divisions in the country.

be USD 1 = EBR 57.165.[164]

bf See **Chapter 2**.

climate financing went to agriculture, forestry and other land-use activities.[34] However, another study showed that, even if climate financing for agrifood systems is decreasing, the share focused on food security was slightly increasing until 2021.[168] Regarding nutrition, on the other hand, a recent report shows that climate and nutrition are often not well connected, but that there are many exceptions revealing, in turn, solid linkages between climate and nutrition, which can be streamlined for better coordination and improved results.[1] Both situations create opportunities for strengthening climate–food security–nutrition linkages and reinforcing agreements that are currently in place. For example, in 2017, at COP23, countries established the Koronivia Joint Work on Agriculture, recognizing the important role of agriculture in tackling climate change. In 2022, at COP27, countries agreed on a four-year window (2022–2026) for bringing together the discussions about the linkages between climate, agriculture and food security – the Sharm el-Sheikh joint work on implementation of climate action on agriculture and food security – that makes an explicit call to move from technical discussions to implementation.[169, 170] During COP27, the Egyptian Presidency launched, in partnership with WHO, FAO, the Global Alliance for Improved Nutrition, the Scaling Up Nutrition Movement and the UN-Nutrition Secretariat, the Initiative on Climate Action and Nutrition, a multistakeholder, multisectoral global flagship that focuses on fostering collaboration to accelerate transformative action to address the critical climate–nutrition nexus.[171]

To consolidate the vision of embedding food security and nutrition across sectors and financial stakeholders, a new governance of finance to promote the alignment of financing flows towards collective agrifood systems priorities, such as meeting SDG Targets 2.1 and 2.2, will be imperative.[172] Building this new governance would require recognition of the role that all food security and nutrition financial ecosystem stakeholders have played in building the current fragmentation, and consideration of stronger incentives to avoid it. Nevertheless, it should be noted that for at least two decades the issue of fragmentation has been part of the agenda in high-level political fora.

For example, the Monterrey Consensus in 2002[bg] emphasized the need for donors, countries and international development agencies to increase their efforts to harmonize their procedures at country level, taking national needs and objectives into account. Even if theoretically the principles of coordination are well articulated, putting them into practice has been challenging, especially when considering complex areas of action such as food security and nutrition, and agrifood systems transformation.[173] Stronger multistakeholder leadership at the international level will be key for making food security and nutrition financing coordination work.

One essential step for effective coordination is placing national and local actors and their priorities in the "driver's seat". However, this is not always straightforward, considering, among other challenges, the imbalance of power and capabilities among actors, the lack of donor coordination at the global level that negatively affects coordination efforts at the national level, and the data gap that might make it difficult to build the case for shifting donors' priorities.[173] Nevertheless, there are ongoing efforts to address these issues. For example, the G20 has supported the creation of country-level coordination bodies for specific development goals (e.g. the Development Partners Coordination Group in Rwanda).[35] The experience of joint programme funding at the regional level (e.g. the Alliance for a Green Revolution in Africa) or at the global level (e.g. the Global Agriculture and Food Security Program and the Global Donor Platform for Rural Development) provides interesting examples of pooling resources from different sources towards country-level priorities.[173] Therefore, a requisite for successful coordination is the integration of food security and nutrition financing flows, even if coming from different stakeholders with divergent interests, into the objectives defined by the most legitimate bodies at the regional, national and subnational levels.[142]

bg The Monterrey Consensus was the outcome of the 2002 Monterrey Conference, the United Nations International Conference on Financing for Development in Monterrey, Mexico. It was adopted by heads of state and government on 22 March 2002. The Monterrey Consensus was updated at Doha, Qatar in 2008, and again at Addis Ababa, Ethiopia in 2015 and will be updated again in Madrid, Spain in 2025.

There are other sectors from which food security and nutrition financial stakeholders can incorporate lessons. One important example of coordination mechanisms is the One Health approach, an integrated, unifying approach to balance and optimize the health of people, animals and ecosystems. This approach recognizes that the health of humans, animals, plants and the wider environment are closely interlinked and offers a means to tackle associated threats to the human–animal–plant–environment interface through collaboration and coordination between all relevant sectors and stakeholders involved.[174] This approach makes it possible to harness and integrate expertise and resources from across the spectrum of health domains and other disciplines, and it is a proven approach to policymaking and cross-sector collaboration to prevent zoonotic and vector-borne diseases from emerging and re-emerging, ensuring food safety and maintaining sustainable food production; reducing antimicrobial-resistant infections; and addressing environmental issues to collectively improve human, animal and environmental health, among many other areas. In addition to saving lives and promoting well-being, One Health actions offer important economic benefits. FAO and the World Bank estimate that One Health efforts could bring at least USD 37 billion per year back to the global community, while investing in One Health requires less than 10 percent of this figure. As countries consider investing in health security and other targets (e.g. agricultural production and food security, and healthy ecosystems), One Health can be a particularly relevant concept for country budget allocation among the ministries responsible for security as well as human, animal and environmental health (e.g. in decisions by the finance minister, parliamentary body, or prime minister).[175]

Besides enhancing coordination, financial stakeholders should take steps towards improving their role in scaling up financing for food security and nutrition. As noted throughout this document, food security and nutrition is considered a risky investment for private commercial actors. As a consequence, development partners such as donors, including IFIs, MDBs and DFIs, should take the lead in de-risking activities, for instance, increasing the allocation of ODA oriented to mobilizing private investments, through blended finance or other financing instruments.[35, 81] Considering, on the one hand, that countries with limited ability to access financing rely mostly on concessional finance and, on the other hand, that these financing flows are insufficient to cover the financing gap for meeting SDG Targets 2.1 and 2.2, the shift of ODA flows for mobilizing private finance could be an effective solution for scaling up financing in these countries, which are often affected by one or multiple drivers of food insecurity and malnutrition. Official development assistance can be strategically implemented in UMICs to incentivize the gradual increase in domestic funding by governments, as well as the transition towards more commerce-oriented loans, with the objective of targeting grants and concessional financing to LICs and LMICs.[35]

Multilateral development banks face the challenge of increasing risk tolerance towards food security and nutrition investments and need to put in perspective their contribution to achieving overall development objectives. Recent research found that MDBs' credit rating agencies were overestimating financial risk, which made these institutions more conservative regarding expenditures in high-risk markets.[34] In fact, DFIs are governed by prudential rules and statutes, which prevent them from lending to high-risk projects. Development finance institutions and multilateral development banks receive their capital for shareholder governments and benefit from government guarantees. The backing from governments enables them to receive investment grade credit ratings and thus raise money from international capital markets and provide financing at competitive rates. They also take a portfolio approach to investment and therefore invest in a range of projects with varying risks and returns.[58]

There is a global call for an MDB reform agenda that considers increased resource mobilization not only towards MICs with moderate or high ability to access financing, but also towards LICs[176] that have limited access to financing, higher prevalence of undernourishment, food insecurity and malnutrition, and fewer chances to build resilience to the major drivers. Food and agriculture is considered particularly risky and with lower financial returns; this has deterred DFIs and MDBs from investing in these sectors. And when they do invest, they tend to take senior debt positions rather than offer much needed first loss financing.[bh, 58]

Multilateral development banks can play a central role in mobilizing private financing towards countries with limited access to financing but, unfortunately, this has not always been the case. However, in 2020, MDBs mobilized a total of USD 168.9 billion, of which a mere USD 15.6 billion were directed towards LICs. In 2021, the total resource mobilization increased (by 44 percent), but the resources towards LICs amounted to only USD 5.2 billion in the same year.[177] Multilateral development banks can leverage their potential access to financing flows to then mobilize them at lower interest rates (or through concessional finance instruments) towards countries with limited ability to access financing. In addition, MDBs can deliver technical assistance to national public development banks, which in turn can make these financing flows available for agrifood stakeholders such as smallholder farmers or agrifood SMEs.[34] Recently, ten MDBs endorsed a document calling for better coordination among these institutions to achieve greater impact in addressing development challenges, including better coordination at the country level and improved actions to catalyse private sector financing.[178] The inclusion of food security and nutrition as one of the six global challenge problems in the new World Bank's evolution process[179] can work as a sign for other MDBs to include the eradication of hunger, food insecurity and malnutrition among their priorities for mobilization of financing flows.

Taking a new approach to reducing the sovereign debt levels in LICs and MICs is also critical. As discussed in **Section 5.1**, debt levels, including debt service, have a major role in determining countries' access to financing flows. While these countries can use concessional finance strategically to reduce their financial risk, it is impossible to fill the financing gap without tapping private sources of capital, which would require addressing issues such as high debt levels. Unfortunately, current arrangements for restructuring sovereign debt are complex and time-consuming, and often result in non-optimal outcomes for borrower countries. In addition, debtors are usually placed in a very vulnerable situation before their creditors.[180] There have been past and current initiatives to address this issue, such as the IMF's Heavily Indebted Poor Countries Initiative,[181] the former G20–World Bank–IMF Debt Service Suspension Initiative (DSSI)[182] and the G20 Common Framework for Debt Treatments beyond the DSSI, launched in 2020.[183] However, especially after the COVID-19 pandemic, the needs for countries to alleviate their debt are increasing, and policy responses have been inadequate.[bi] Higher-income countries, especially the members of major political fora such as the G7 or the G20, should take, jointly with MDBs, a stronger position on debt relief, making the current mechanisms work and supporting coordination with private creditors to facilitate negotiations with debtor countries.[7]

The IMF has itself begun to explore how environmental and social factors can be as critical as economic and financial factors for assessing sovereign debt sustainability. At present, the IMF's debt sustainability analyses look at how a country's prevailing debt and prospective borrowing will affect its ability to meet debt service commitment in the immediate and medium term. The indicators used are primarily financial and economic but, given that other factors such as climate, biodiversity, water, soil and even food security and nutrition can also affect debt sustainability, experts have begun to present the case for the IMF to improve the definition of debt sustainability and include these environmental and social factors therein. This might be a critical first step towards helping countries with limited ability to access financing and raise affordable financing flows.[185]

An open question is the inclusion of the private sector in improved food security and nutrition financing architecture. How can the profit-oriented interests of private actors be aligned with overall development objectives,

bh Creditors holding senior debt are among the first to be repaid, while those offering first loss would be the first to lose money if the project does not succeed.

bi For instance, the G20 Common Framework has not worked as expected.[7, 184]

particularly those to end hunger, food insecurity and malnutrition? For instance, some scholars have flagged that the increased financialization of agrifood systems could lead to negative outcomes such as land grabbing, food price volatility and corporate concentration.[186] As previously outlined in Box 10 (**Chapter 4**), concerns have also been raised vis-à-vis the negative impacts that private sector investments may have with regard to food security and nutrition outcomes. Private actors must incorporate health, environmental and social risks into their financial decision-making, to shift financing flows from potentially harmful investments to others that work towards the achievement of environmental, health and social outcomes. Currently, most financial stakeholders do not account for the hidden costs of agrifood systems in their business models, and they do not have standardized reporting measures for climate, biodiversity and health.[141] Evidently, there is a need to realign incentives with sustainability, and these incentives are heavily shaped by public support, which, as noted in **Chapter 4**, must be repurposed.

To this end, incentives for capital markets should align within environmental, social and governance investing practices, and food security and nutrition must be explicitly embedded in there.[34, 187] For instance, from 2012 to 2020, the value of ESG assets tripled to USD 40.5 trillion (i.e. almost half of all assets under management). Disclosure regulations and standards can be established, entreating private financial actors to disclose how their investment portfolios may affect food security and nutrition outcomes. Technical standards are already in place, such as the European Union Sustainable Finance Disclosures Regulation or Japan's Corporate Governance Code, each designed to disclose the alignment of investors with sustainability and/or climate standards.[100]

At the global level, in 2020, the Access to Nutrition Initiative released the Investor Expectations on Nutrition, Diets and Health, which to date have been signed by 87 institutional investors. The document commits these investors to engaging with food and beverage manufacturers to address most of the challenges considered in SDG Target 2.2 and the World Health Assembly targets (undernutrition, overweight and obesity, micronutrient deficiencies and diet-related non-communicable diseases) in particular, promoting a more active role for private companies in delivering healthy diets for all.[188, 189] Other financing instruments often adopted by private actors, such as venture capital in technological investments, are increasing; nevertheless, only 10 percent of venture capital allocation in 2021 was directed to agrifood technology. The food security and nutrition considerations of these portfolios remain low and extremely concentrated in HICs; however, there is growing interest in agricultural practices that conserve more soil and water and increase nutritional density in foods.[156] For example, the venture capital company Tikehau launched an EUR 1 billion regenerative agriculture fund, supported by several large food and insurance firms. The fund has tied 50 percent of "carried interest" to impact-linked finance (see **Section 5.2**) and expects to leverage a minimum of USD 7 in terms of profitability and social and environmental benefits from every USD 1 invested in regenerative agriculture.[156]

Public–private partnerships (PPPs) offer opportunities to mobilize and leverage greater resources, expertise and innovation to agricultural and rural development projects. Unlike blended finance, PPPs work along the whole investment cycle; for instance, by partnering with local banks and aggregators, IFIs can leverage their financial capabilities to reach more small-scale producers and rural communities in need. By increasing agricultural productivity, improving market access, and enhancing value chain productivity, private sector co-financing plays a crucial role in scaling up efforts to reduce hunger and poverty by unlocking new opportunities for smallholder farmers and facilitating sustainable development in rural areas.

For example, the partnership between IFAD and Hamkorbank aims to alleviate rural poverty and enhance food security in Uzbekistan by providing vital access to financing for low-income dairy and horticulture producers. With a USD 2.5 million loan, 1 500 small-scale producers will access microloans, enabling them to increase their incomes and improve their livelihoods. This collaboration addresses a critical challenge »

BOX 17 LEVERAGING TOOLS TO TRACK PROGRESS IN FINANCING FOR FOOD SECURITY AND NUTRITION AND AGRIFOOD SYSTEMS

Analytics and tools to inform targeted allocation of public financing and track progress in mobilizing financing flows for agrifood systems transformation for meeting SDG Targets 2.1 and 2.2 are critical; these include artificial intelligence (AI) and data systems (see **Section 4.1**). Financial Flows to Food Systems (3FS) is a financial tracking tool co-developed by IFAD and the World Bank in collaboration with the United Nations Food Systems Coordination Hub and the ecosystems of support.* The 3FS provides countries and stakeholders with a methodology to help decision-makers track financing flows to agrifood systems at the country and global level in a systemic manner. Drawing on the High Level Panel of Experts on Food Security and Nutrition definition of food systems and aligning with the Classification of the Functions of Government, the 3FS measures financing flows to agrifood systems in a systemic manner across five interconnected expenditure components: agricultural development and value chains, infrastructure for food systems, nutrition and health, social assistance including emergency assistance, and climate change and natural resources. The 3FS builds on the SDG financing strategy and tracks three financing flows to agrifood systems: domestic public spending, international development financing, and private sector financing.

The overall aim of the 3FS is to move the needle on transformative public and private financing flows to agrifood systems, providing governments, development partners, private investors, and stakeholders with much needed evidence on financing flows to agrifood systems, progress and challenges, because having access to quality and timely evidence is essential to inform decision-making. The 3FS methodology for tracking domestic spending and international development finance flows to agrifood systems is operational, whereas the methodology for private sector financing flows is under development.

In the field of humanitarian aid, the *Financing Flows and Food Crises Report*[167] offers an evidence-based snapshot of humanitarian and development finance trends in food crisis contexts. Understanding these trends is essential to inform decision-making and promote policy dialogues to enhance partner coordination. While humanitarian assistance is crucial for immediate relief, coordinated efforts are needed to address the root causes of food crises and reduce reliance on humanitarian aid.[167]

Mapping the agrifood finance landscape for nutrition is also critical. An example of this is the Scaling Up Nutrition methodology for identifying and analysing nutrition-sensitive investments in agriculture and food systems; a guidance note detailing this method was published by FAO in 2020.[199] The method was adapted and implemented in ten countries. Most recently it was used to inform fiscal repurposing in support of healthy diets in Ethiopia.

More generally, the fast-paced development and adoption of AI technologies, in particular generative AI and multimodal models, now allow for the detailed processing and analysis at scale of troves of reports, statements and policies on agrifood systems in order to more easily surface valuable insights from text-based data and other data forms to advanced analytics.[200] However, as indicated in this report, these innovative data tools can only be fully leveraged if data on food security and nutrition financing flows are made available, which currently is not the case. Therefore, while these tools are offering important opportunities to inform financial stakeholders and policymakers, the commitment of the international community to collect and standardize financial data as a global public good cannot be left aside.

NOTE: * IFAD and the World Bank consulted with a strategic advisory group comprising experts from the Inter-American Institute for Cooperation on Agriculture (IICA), the Global Alliance for Improved Nutrition (GAIN), FAO, the Organisation for Economic Co-operation and Development (OECD), the African Agricultural Transformation Initiative (AATI) in collaboration with McKinsey & Company, the Scaling Up Nutrition Movement, Alliance for a Green Revolution in Africa (AGRA), AKADEMIYA2063, the Good Food Finance Network (GFFN) and the 4SD Foundation.

that Uzbekistan's rural population faces, where financial support for agriculture has historically been limited. By empowering small-scale farmers and supporting rural agribusinesses, Hamkorbank contributes to driving economic progress and sustainable agricultural development, ultimately helping to combat hunger and poverty in Uzbekistan's rural communities.[190]

However, recent research on nutrition-related PPPs in agrifood systems has highlighted that, if not properly managed, there are potentially negative effects, including the promotion of commercial interests that shift priorities away from evidence-based solutions addressing malnutrition. Public–private partnerships may also divert resources away from essential public health services or result in unequal access to nutrition interventions, particularly for marginalized communities that may not be profitable for private investors. While PPPs can offer opportunities for innovation, careful management and oversight are necessary to mitigate potential harm and ensure that public health objectives remain the primary focus in nutrition financing initiatives. Public–private partnerships most commonly fail due to a lack of strong governance and regulatory frameworks.[191]

In response, it is vital that governments and other key stakeholders including United Nations Agencies, academia and civil society adopt a clear framework to avoid conflicts of interest and ensure impartiality, accountability and transparency in policymaking and food and nutrition financing.[175] There are several examples of such frameworks that can be used and replicated. The UNICEF guidance on engagement with the food and beverage industry[192] summarizes ten parameters to guide actions across all UNICEF programme areas including principles on avoiding engagement with companies that interfere with public policies or produce highly processed foods.[193] The WHO report on safeguarding against possible conflicts of interest in nutrition programmes[194] aligns with its internal framework of engagement with non-state actors[195] and lays out six steps, each followed by an assessment to support national authorities in deciding whether engagement with the external actor should continue or be terminated. It includes guidance on risk management with respect to engaging with external actors and emphasizes the importance of monitoring and evaluation, accountability and transparency.[194]

Nevertheless, the public sector plays an essential role in filling the gaps not addressed by commercially oriented actors, primarily by investing in public goods and enhancing social values.[196] National and subnational governments (the latter in the case of federal countries) can further mobilize domestic tax revenues, increase priority sector expenditures on food security and nutrition and consider repurposing policy support (see **Chapter 4**). As analysed in **Section 5.1**, countries with limited ability to access financing do not have enough fiscal space to increase tax revenues, mostly due to structural and governance issues. At the same time, while these countries strengthen governance and institutions (essential for accessing more financing options), attention should turn to bringing down corruption in tax collection and management and reducing tax evasion. In parallel, countries that already have a higher ability to access financing must enact stronger controls on tax havens and money laundering, which often allow tax evasion from countries with limited access to financing.[34]

One interesting development is that, since the 1980s, corporate income tax (CIT) has decreased globally, starting a sort of "race" among countries to attract investments through lower taxes.[197, 198] High-income countries[bj] have on average lower CIT rates than LICs and MICs[197] and lower financial risk; therefore, most of the multinational corporations operating around the world establish their tax residency in HICs rather than in LICs and MICs. To address this issue, which leads to tax avoidance by major multinational corporations (and disproportionally affects LICs and MICs), the Organisation for Economic Co-operation and Development and the G20 established the Inclusive Framework on BEPS (base erosion and profit shifting), currently joined by 138 jurisdictions. The agreement comprises two pillars: The first is "revised allocation of taxing rights over a share of profits towards market jurisdictions",[198] and the second is a

bj "Developed economies" in the original publication.[197]

global minimum tax on multinational enterprise (MNE) profits exceeding EUR 750 million and aims to ensure that a minimum 15 percent of effective tax is paid in each country where an MNE operates.[198] While this agreement has not yet been implemented, an UNCTAD study shows that implementing the global tax considered in the second pillar could significantly increase the tax revenue of all countries, with a trade-off of a 2 percent lower foreign direct investment towards the sectors taxed.[197]

Finally, improving the transparency of international financing architecture is essential for enhancing coordination and efficiency among the different actors in the system. Data development for a better accounting system is needed globally to understand how much financing is available to support internationally agreed upon goals such as SDG 2. Furthermore, harmonizing data collection standards at the national and global levels and making data available would contribute to enhancing the transparency and targeting of financing (see Box 17).[35] Also, at the national level, countries should work towards stronger public financing management systems, which can increase the ability to track and coordinate financing flows across sectors and development partners.

Financial stakeholders should advocate for developing central hubs of public knowledge, designed as public global goods critical to reducing the perceived risk of investments for achieving food security and nutrition.[35, 100] To achieve this, collaboration among finance and development stakeholders such as research bodies, extension services, civil society organizations and non-governmental organizations will be imperative. This collaboration can be channelled through multistakeholder mechanisms to establish shared methodologies and insights on innovative financing mechanisms oriented to fill the funding gap. The effective dissemination of knowledge should be facilitated by strategically coordinated, publicly funded knowledge hubs, ensuring broad access and utilization.[81] In addition, the harmonization of the accounting systems, ensuring the availability of data and measuring the level of alignment of financing activities with the SDGs are among the priority activities to be delivered. Currently, donor countries have taken more steps in this direction than have multilateral actors.[142] Filling the information deficit will require bold steps from the international community; otherwise, the likelihood of achieving development goals cannot be realistically estimated and projected. ■

UGANDA
Indigenous youths of the Pokot people leaving the market carrying bags with food: supporting inclusive economic activities empowers populations and contributes to reducing hunger.
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CHAPTER 6
THE WAY FORWARD

The state of food security and nutrition in the world described in this report presents a concerning picture but also provides ample cause for hope. While global levels of hunger and food insecurity have essentially not changed for two years, there has been encouraging progress in many subregions of the world. With respect to nutrition, the rising trends in adult obesity and anaemia among women aged 15 to 49 years are worrying, yet in many countries, fewer children are affected by stunting and wasting, increasing their chances of achieving their full potential for growth and development. The global prevalence of child stunting has declined by one-third in the last two decades, showing that positive change is possible and is happening at scale across countries and regions. This is the potential we need to harness: the potential for positive change and the full realization of the right to adequate food and a standard of living that guarantees the dignity, health and well-being of all people, especially future generations.

This report once again reminds us that real transformative change is the only way to get the world back on track, moving in the right direction towards meeting the Sustainable Development Goal (SDG) Targets 2.1 and 2.2 of ending hunger, food insecurity and malnutrition in all its forms by 2030.

In many low- and middle-income countries in particular, conflicts, climate variability and extremes, and economic slowdowns and downturns continue to occur more frequently and often together. Hunger is higher and has increased the most in countries affected by the major drivers, and hunger increases are higher in poor countries affected by more than one major driver. Because agrifood systems in these countries are not resilient to these external forces, hunger, food insecurity and malnutrition are still on the rise and disproportionately affect children. Moreover, underlying structural factors such as lack of access to and unaffordability of nutritious foods, unhealthy food environments, and high and persistent inequality further worsen the negative effects of the external drivers on food security and nutrition.

Business as usual is not an option in the face of the major drivers of food insecurity and malnutrition, and their growing occurrence and intensity. Past editions of this report have clearly laid out what must be done. Different policies, interventions and investments as well as legislation changes are proven to work in diverse contexts and in different combinations; however, there seems to be a binding financing constraint to implement them at scale and with better targeting. Paradoxically, pinpointing the financing gap to support efforts towards meeting SDG Targets 2.1 and 2.2 is a daunting task since there is no coherent picture of the financing flows available for, and being spent on, food security and nutrition.

A serious problem is the lack of a common definition or standard for measuring financing for food security and nutrition. It is hard – if not impossible – to manage what cannot be adequately measured. In the case of financing for food security and nutrition, it is not possible to adequately assess the existing levels and gaps, let alone monitor progress or setbacks in financing efforts to meet SDG Targets 2.1 and 2.2. This predicament poses a multitude of problems, including identifying underfinanced areas, ensuring accountability of institutions, and tracking the effectiveness and impact of the interventions financed, among others. Hence, the urgent need to move towards a common definition of, and measurement guidelines for, financing for food security and nutrition has been timely noted and addressed in this edition of the report.

This report has taken an important step forward by advancing a definition of financing for food security and nutrition together with detailed guidance to implement it. While this step is very important, the report has also starkly shown that the current structure and availability of financial data impede the application of the newly proposed definition to the public and private financing flows globally available for food security and nutrition. In other words, due to serious data constraints, it is not possible to arrive at the global measurement of the financing for food security and nutrition that is currently available and of the financing gap that must be bridged to support efforts towards meeting SDG Targets 2.1 and 2.2.

At best, it is possible to know that not even one-quarter of all international development funding flows go to food security and nutrition, and this share is not growing. Flows broadly appear to target well those countries where hunger, food insecurity and malnutrition are higher, and they mostly support food consumption and health. However, relatively fewer flows go to addressing the major drivers of food insecurity and malnutrition, namely conflict, climate variability and extremes, and economic slowdowns and downturns, and their underlying structural factors, lack of access to and unaffordability of nutritious foods, unhealthy food environments, and high and persistent inequality.

Assessing public domestic financing for food security and nutrition is problematic as there is no global financial database with sufficient data for the analysis. Public spending on agriculture is available globally, but this accounts for only a fraction, and sometimes a very small one, of all the public spending on food security and nutrition. There are not readily available data for all the countries in the world to estimate the public spending that is supporting food security and nutrition. An analysis of ten low- and middle-income countries shows that public spending on food security and nutrition was growing before the COVID-19 pandemic, with support to food consumption taking the greatest share, but this trend could not be sustained in some countries. Governments in some middle-income countries also seem to be spending relatively larger shares of their budget on addressing the major drivers of food insecurity and malnutrition compared to low-income countries.

Private financing, both domestic and foreign, is thought to represent the largest financing flow to agrifood systems and sectors that impact food security and nutrition, yet it is impossible to properly verify and account for this flow due to missing information. Philanthropic flows to food security and nutrition are not large; cross-border remittances are much larger, but they support food security and nutrition mostly through food consumption rather than investments in agrifood systems. Among international commercial private financing flows, foreign direct investment is the flow type with the most comprehensive data source. However, there cannot be a full accounting of private financing, since, as this report has shown, comprehensive and relevant numbers on market finance (i.e. issuance of stocks and corporate bonds), international bank loans and domestic private equity are extremely difficult to obtain. Furthermore, where there is access to these sources of private financing, their contribution to food security and nutrition cannot be taken for granted, as many of the investments being financed – particularly those by large international food and beverage companies – may not always help reduce hunger, food insecurity and malnutrition. The main source of funding for companies in sectors relevant to food security and nutrition, at least for farmers and small and medium enterprises, appears to be self-funding, on which no data exist.

Against such a backdrop, this report lays bare the dismal state of the availability, accessibility and adequacy of financing flows data that would allow a proper assessment of financing for food security and nutrition. Addressing this gap must be a top priority, and this report sends a strong and urgent call for global and national actions to address this problem as part of the SDG global agenda for action. This call falls squarely within the purview of SDG 17 – Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development. Finance and financial inclusion are among the key means of implementation in SDG 17, therefore this report's call to address the financing data gap must be prioritized as a key action to be taken immediately.

Of course, beyond the data gap there is an important financing gap to bridge. While this report has demonstrated that it is not possible to fully apply the newly proposed definition of financing for food security and nutrition to all relevant financing flows available due to data constraints, existing model-based scenarios suggest that different policies and interventions to reach SDG Targets 2.1 and 2.2 bear a cost in the trillions of USD. No matter the estimate, more financing for food security and nutrition is needed, particularly in countries with the greatest needs. Moreover, there needs to be a serious rethinking of how existing financing is being allocated because in several instances the current financing is not cost effective, and this is resulting in lost opportunities to reduce hunger, food insecurity and all forms of malnutrition much faster. There are also inequalities in the access to financing for food security and nutrition both between countries and within countries. Such inequalities are further exacerbated within countries by a lack of inclusive and gender-sensitive financing.

Countries that have the greatest need for financing are those that struggle the most to actually access financing. Around 63 percent of the countries with high and/or increasing hunger, food insecurity and malnutrition struggle to access financing for food security and nutrition and have limited or moderate ability to access financing. Most of these countries (82 percent) are affected by one or more of the major drivers of food insecurity and malnutrition. This is quite at odds with the fact that very few of the international official development flows going to these countries are directed towards addressing these drivers. Scaling up financing towards countries with the highest levels of hunger, food insecurity and malnutrition and those most affected by the major drivers is essential.

Countries facing limited ability to access financing also have high levels of sovereign debt and must spend important amounts of public revenues on servicing debt. Multilateral development banks (MDBs), development finance institutions (DFIs), international financial institutions (IFIs) and all international lenders in general need to support these countries so that, through debt swaps and debt relief measures, their governments can reallocate resources towards food security and nutrition. In countries with more moderate ability to access financing, utilization of concessional finance and commerce-oriented instruments following a blended finance approach will still be essential for de-risking investments and providing the right incentives for private actors to participate in these markets. However, while moving towards lower levels of risk, it is expected that public and private actors can progressively increase their engagement, making financing more widely available.

Official and public sources of financing alone will not be sufficient to fill the financing gap to end hunger, food insecurity and malnutrition. Scaling up private financing, including through private–public partnerships, will also be essential to supplement the efforts for meeting SDG Targets 2.1 and 2.2. Economic development is essential for the private sector, but it is difficult to achieve and sustain where large segments of the population are unproductive and unhealthy due to hunger, food insecurity and malnutrition.

The current financing architecture for food security and nutrition makes the scale-up and effective implementation of financing for food security and nutrition unfeasible. It is highly fragmented, exhibits a lack of consensus about the priorities, and is characterized by an over-proliferation of actors delivering mostly small, short-term projects. Donors, MDBs, DFIs, IFIs and philanthropic foundations have increased in number, but this has created further coordination challenges, both among actors and with recipient countries, whose political and financial priorities are not always considered. Therefore, more can be achieved in scaling up financing for food security and nutrition if there is better alignment and synergy among the different sources of financing.

Ending hunger, food insecurity and all forms of malnutrition is also unnecessarily in competition with many other development objectives. Considering the complex and multisectoral nature of food security and nutrition, the financial landscape must shift from a siloed approach towards a more holistic perspective, in which financial stakeholders can streamline food security and nutrition objectives into broader financing flows and investments. A starting point is breaking the sectoral silos within food security and nutrition, from complementary but separate "food security" and "nutrition" objectives towards a single "food and nutrition security" policy goal. Embracing this new narrative can be catalytic in recognizing the interconnected dependency of both – one without the other prevents the achievement of either. A new narrative for financing for food security and nutrition across sectors and financial stakeholders can help lead to a new finance governance that promotes the complementarity of the different financing flows towards food security and nutrition. For example, a closer nexus between humanitarian, climate and development finance must be promoted, as these are essential for meeting SDG Targets 2.1 and 2.2. This requires improving the transparency of the international financing for food security and nutrition to enhance coordination and efficiency among the different stakeholders.

This report has also warned that the challenges relate not only to mobilizing more resources, but also to using existing financing more effectively. Executing more effectively available national budgets for food security and nutrition; repurposing existing public support to enable more resilient, sustainable and equitable agrifood systems; and optimizing national budgets allocated to the food and agriculture sector will allow countries to achieve better food security and nutrition at no extra cost. However, this will only help reduce, but not fully fill the financing gap for food security and nutrition.

Estimating the financing gap for food security and nutrition is an unavoidable step going forward. Not bridging it by 2030 means millions of people will still be undernourished, millions will have been pushed into crisis or worse levels of acute food insecurity, and insufficient progress will have been made to meet all global nutrition targets. The resulting social, economic and environmental costs will be unmeasurable. There is no time to lose, as the cost of inaction greatly exceeds the cost of action this report calls for.

It is hoped that this report's calls to action will inform the sustainable development and financing discussions at the Summit of the Future in September 2024 and all the upcoming SDG global discussions, including the political processes of the Fourth International Conference on Financing for Development in 2025. A world without hunger, food insecurity and malnutrition is a world worth saving, and a world worth financing and investing in. ■

UNITED STATES OF AMERICA
Farmer holding green lettuce with roots: diversifying production improves food security.

ANNEXES

The supplementary material to *The State of Food Security and Nutrition in the World 2024* is available at: https://doi.org/10.4060/cd1254en-supplementary

ANNEX 1A
STATISTICAL TABLES TO CHAPTER 2

TABLE A1.1 PROGRESS TOWARDS THE SUSTAINABLE DEVELOPMENT GOALS AND GLOBAL NUTRITION TARGETS: PREVALENCE OF UNDERNOURISHMENT, MODERATE OR SEVERE FOOD INSECURITY, SELECTED FORMS OF MALNUTRITION, EXCLUSIVE BREASTFEEDING AND LOW BIRTHWEIGHT

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2021–23[4] (%)	2014–16 (%)	2021–23 (%)	2014–16 (%)	2021–23 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2019 (%)	2012[6] (%)	2022[7] (%)	2012 (%)	2020 (%)
WORLD	12.0	9.1	7.6	10.9	21.7	29.0	6.8	26.3	22.3	5.5	5.6	12.1	15.8	28.5	29.9	37.1	48.0	15.0	14.7
Least developed countries	26.5	22.1	19.2	22.1	50.2	57.3	7.0	38.7	32.3	3.1	3.2	4.9	8.1	39.1	39.4	45.5	53.9	16.1	15.3
Landlocked developing countries	24.8	19.6	15.7	18.9	44.3	51.9	4.1	35.8	28.3	4.2	3.7	9.7	13.4	32.0	32.9	45.3	52.5	15.2	14.7
Small Island Developing States	17.2	16.3	25.1	22.7	52.8	52.6	4.1	21.3	21.1	6.8	8.0	18.0	22.6	28.2	29.2	37.0	42.1	14.0	14.4
Low-income countries	29.3	28.7	21.3	25.7	55.3	64.5	6.7	39.7	33.7	3.8	3.3	6.5	9.6	38.2	38.5	43.0	53.4	15.4	14.9
Lower-middle-income countries	18.0	13.5	12.0	17.6	29.8	43.1	9.6	35.7	28.0	3.9	4.1	8.2	12.1	43.2	43.2	39.9	51.5	20.7	19.1
Upper-middle-income countries	8.0	2.5	2.6	3.3	11.5	12.9	2.1	13.2	11.3	8.2	9.0	11.0	15.8	18.4	19.4	30.5	39.3	7.9	8.3
High-income countries	<2.5	<2.5	1.5	1.8	8.0	8.0	0.4	4.0	4.0	7.4	7.6	22.4	25.9	13.2	14.4	n.a.	n.a.	8.0	8.1
Low-income food-deficit countries	27.2	25.4	20.1	24.5	51.8	61.4	6.0	36.8	30.5	4.0	3.7	8.0	11.7	37.8	37.7	41.1	52.1	14.6	14.0

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2021–23[4] (%)	2014–16 (%)	2021–23 (%)	2014–16 (%)	2021–23 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2019 (%)	2012[6] (%)	2022[7] (%)	2012 (%)	2020 (%)
AFRICA	**19.9**	**19.9**	**17.2**	**21.6**	**46.3**	**57.7**	**5.8**	**34.4**	**30.0**	**5.0**	**4.9**	**12.8**	**16.2**	**39.2**	**38.9**	**35.4**	**46.7**	**14.5**	**13.9**
Northern Africa	**7.7**	**7.5**	**9.8**	**11.7**	**28.6**	**33.4**	**6.3**	**23.5**	**21.7**	**11.8**	**12.3**	**25.9**	**31.7**	**31.9**	**31.1**	**40.8**	**35.6**	**14.0**	**14.1**
Algeria	6.2	<2.5	13.0	5.6	22.9	18.9	2.7	12.1	8.6	13.5	11.9	18.8	23.8	32.9	33.3	25.4	28.6	6.9	7.2
Egypt	5.9	8.5	8.4	10.4	27.8	29.8	n.a.	24.6	20.4	15.7	18.8	37.4	44.3	31.0	28.3	52.8	40.2	n.a.	n.a.
Libya	4.8	11.4	11.2	19.9	29.1	37.9	n.a.	30.0	52.2	26.4	28.7	32.0	36.7	28.6	29.9	n.a.	n.a.	n.a.	n.a.
Morocco	4.8	6.9	n.r.	n.r.	n.r.	n.r.	2.3[g]	15.8	12.8	9.5	4.9	16.7	21.8	29.8	29.9	27.8	35.0	16.1	14.8
Sudan	–	11.4	n.r.	n.r.	n.r.	n.r.	n.a.	36.0	36.0	2.4	2.7	11.5	17.0	36.8	36.5	41.0	n.a.	n.a.	n.a.
Tunisia	4.0	3.2	9.1	11.3	18.2	26.7	2.1	8.8	8.6	12.7	19.0	22.0	26.8	30.4	32.1	8.5	13.5	8.1	8.2
Northern Africa (excluding Sudan)	**5.6**	**6.6**	**9.1**	**10.1**	**26.1**	**28.8**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**28.0**	**34.1**	**31.0**	**30.0**	**40.7**	**35.6**	**13.9**	**13.9**
Sub-Saharan Africa	**23.0**	**22.7**	**19.0**	**23.8**	**50.4**	**63.2**	**5.7**	**36.2**	**31.3**	**3.8**	**3.7**	**8.5**	**11.4**	**41.2**	**40.7**	**34.4**	**48.0**	**14.5**	**13.9**
Eastern Africa	**32.4**	**29.0**	**22.0**	**25.5**	**58.5**	**65.4**	**5.0**	**38.6**	**30.6**	**3.9**	**3.6**	**4.9**	**8.1**	**31.4**	**31.9**	**48.6**	**60.3**	**14.7**	**14.0**
Burundi	n.a.	n.a.	n.a.	20.9[b]	n.a.	70.8[b]	4.9[g]	56.5	56.5	2.2	3.6	3.0	5.0	31.1	38.5	69.3	85.0	15.1	14.8
Comoros	16.6	16.9	n.a.	27.4	n.a.	79.7	n.a.	31.9	18.8	11.5	7.7	10.7	16.3	32.8	33.8	11.4	n.a.	24.1	23.0
Djibouti	30.1	12.9	n.a.	16.5	n.a.	49.2	10.6[g]	29.6	18.7	1.3	3.2	7.1	11.3	31.0	32.3	12.4	n.a.	n.a.	n.a.
Eritrea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	51.6	50.2	1.9	3.0	2.7	4.8	36.2	37.0	68.7	n.a.	15.4	15.2
Ethiopia	37.0	22.2	14.5	19.7	56.2	59.0	6.8	42.1	34.4	2.5	2.7	1.5	2.8	22.4	23.9	52.0	58.8	n.a.	n.a.
Kenya	28.2	34.5	15.0[b, c]	28.0[c]	50.7[b, c]	72.8[c]	4.5	28.6	18.4	4.6	3.8	8.1	12.4	28.4	28.7	31.9	59.7	10.8	10.0
Madagascar	33.5	39.7	n.a.	14.9	n.a.	68.6	7.2	47.3	38.6	1.8	1.5	2.3	4.3	37.5	37.8	41.9	54.4	19.5	18.7
Malawi	21.3	19.9	47.7[b, c]	53.5[b, c]	78.1[b, c]	81.7[b, c]	2.6	43.6	34.0	4.9	3.9	4.5	7.7	30.6	31.4	70.8	64.1	15.8	15.6
Mauritius	5.2	5.9	5.2	10.2	13.0	31.2	n.a.	9.0[e]	8.6[e]	7.8[e]	6.8[e]	16.5	19.2	19.2	23.5	n.a.	n.a.	19.1	18.7
Mozambique	33.7	24.8	n.r.	n.r.	n.r.	n.r.	3.8	42.6	36.4	5.5	5.5	6.1	10.3	48.8	47.9	40.0	55.5	18.1	17.8

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2021–23[4] (%)	2014–16 (%)	2021–23 (%)	2014–16 (%)	2021–23 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2019 (%)	2012[6] (%)	2022[7] (%)	2012 (%)	2020 (%)
Rwanda	36.9	31.4	n.r.	n.r.	n.r.	n.r.	1.1	41.2	29.8	6.3	4.7	2.4	4.9	18.3	17.2	83.8	80.9	9.3	9.4
Seychelles	2.6	<2.5	3.2[b]	3.2[c]	14.3[b]	14.3[c]	n.a.	7.9	7.2	9.9	9.1	25.1	29.4	23.5	25.1	n.a.	n.a.	12.3	12.5
Somalia	70.0	51.3	n.a.	43.5	n.a.	79.7	n.a.	27.6	18.0	3.0	2.7	9.6	14.6	44.0	43.1	5.3	33.7	n.a.	n.a.
South Sudan	–	19.6	n.a.	63.2[b]	n.a.	87.3[b]	n.a.	30.8	27.9	6.3	4.7	5.3	8.6	34.7	35.6	44.5	n.a.	n.a.	n.a.
Uganda	18.6	36.9	21.5[c]	23.0[c]	66.3[c]	71.2[c]	3.6	33.3	23.4	3.9	3.5	4.2	7.9	31.3	32.8	62.2	65.5	n.a.	n.a.
United Republic of Tanzania	28.4	23.8	20.6[c]	25.4[c]	48.9[c]	58.2[c]	3.1	38.1	30.6	4.5	4.6	7.5	12.6	40.3	38.9	48.7	64.3	10.5	9.7
Zambia	49.1	35.4	n.r.	n.r.	n.r.	n.r.	4.2	40.8	31.4	6.0	5.4	6.8	11.1	30.5	31.5	59.9	69.9	12.0	11.2
Zimbabwe	29.6	38.1	35.5	26.0	64.7	70.7	2.9	31.1	21.6	4.6	2.7	10.1	14.2	30.0	28.9	31.3	41.9	12.2	11.8
Middle Africa	**33.0**	**28.9**	**n.a.**	**37.6**	**n.a.**	**76.7**	**5.6**	**37.9**	**37.4**	**4.5**	**4.6**	**6.6**	**9.3**	**46.1**	**43.2**	**28.5**	**44.7**	**12.8**	**12.2**
Angola	52.2	23.2	n.a.	31.9[c]	n.a.	79.2[c]	n.a.	31.8	43.6	3.0	3.9	8.5	11.5	45.9	44.5	n.a.	n.a.	15.7	15.5
Cameroon	15.7	5.7	22.3	25.4	49.9	59.6	4.3	32.1	26.9	7.1	10.5	11.8	14.9	41.2	40.6	19.9	39.4	12.9	12.5
Central African Republic	38.7	23.5	n.a.	61.8	n.a.	81.3	5.4	40.6	39.8	3.5	2.6	5.9	9.3	47.9	46.8	33.0	36.2	15.9	16.4
Chad	34.6	35.1	32.4[c]	36.4	67.9[c]	76.6	7.8	38.9	32.3	2.5	3.2	4.5	6.7	49.2	45.4	3.2	7.4	n.a.	n.a.
Congo	29.1	26.8	n.a.	38.3[b]	n.a.	79.9[b]	n.a.	23.1	16.5	5.1	4.5	7.4	8.5	53.1	48.8	20.2	n.a.	11.6	11.9
Democratic Republic of the Congo	31.7	37.0	n.a.	41.7	n.a.	80.2	6.4	42.7	40.3	4.6	3.7	4.4	6.6	46.4	42.4	36.4	53.6	11.0	10.2
Equatorial Guinea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	25.0	16.1	8.5	8.2	13.9	17.7	47.4	44.5	7.4	n.a.	n.a.	n.a.
Gabon	14.6	20.1	n.r.	n.r.	n.r.	n.r.	3.4	17.2	13.4	6.2	5.4	15.5	21.0	55.3	52.4	5.1	19.4	14.9	14.6
Sao Tome and Principe	10.3	16.4	n.a.	14.1	n.a.	54.6	4.1	18.8	10.0	2.5	4.7	11.8	16.5	45.7	44.2	50.3	63.1	10.6	11.1

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2021–23[4] (%)	2014–16 (%)	2021–23 (%)	2014–16 (%)	2021–23 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2019 (%)	2012[6] (%)	2022[7] (%)	2012 (%)	2020 (%)
Southern Africa	**4.8**	**9.4**	**9.1**	**10.9**	**21.5**	**24.1**	**3.5**	**23.4**	**22.8**	**12.3**	**11.4**	**27.3**	**29.7**	**28.5**	**30.3**	**n.a.**	**32.8**	**16.4**	**16.4**
Botswana	22.9	24.3	18.4[c]	26.4[b, c]	46.5[c]	54.8[b, c]	n.a.	24.6	21.6	10.4	10.1	14.7	18.3	31.3	32.5	20.3	30.0	17.3	16.8
Eswatini	9.5	12.4	n.a.	17.2[b]	n.a.	55.9[b]	n.a.	28.0	21.2	10.1	7.9	23.2	30.1	30.0	30.7	43.8	n.a.	10.6	10.2
Lesotho	n.a.	n.a.	n.a.	32.8[c]	n.a.	56.7[c]	2.1	37.5	31.8	7.0	6.9	15.9	21.0	28.3	27.9	52.9	59.0	14.8	14.4
Namibia	20.0	22.2	28.8[c]	31.9[c]	53.2[c]	56.8[c]	n.a.	24.0	16.8	4.2	5.3	14.0	17.0	24.7	25.2	22.1	n.a.	15.9	15.6
South Africa	3.4	8.1	n.a.	8.4[b, c]	n.a.	19.4[b, c]	3.6[g]	22.5	22.8	13.1	12.1	28.6	30.8	28.6	30.5	n.a.	31.6	16.6	16.6
Western Africa	**12.2**	**15.0**	**11.2**	**17.8**	**39.7**	**60.7**	**6.7**	**34.5**	**30.0**	**2.3**	**2.4**	**8.1**	**11.6**	**52.9**	**51.8**	**22.1**	**38.3**	**14.9**	**14.3**
Benin	11.4	10.3	10.4[c]	15.8[b, c]	55.0[c]	63.3[b, c]	8.3	33.9	30.4	1.6	2.2	8.1	11.2	55.5	55.2	32.5	41.4	17.5	16.4
Burkina Faso	17.3	15.4	n.a.	7.2[b]	n.a.	40.7[b]	10.3	33.3	21.8	1.8	2.0	3.7	6.7	53.3	52.5	38.2	51.3	19.1	18.5
Cabo Verde	11.1	12.6	n.a.	6.0[b]	n.a.	34.3[b]	n.a.	12.6[e]	9.4[e]	n.a.	n.a.	11.3	15.8	26.9	24.3	59.6	41.8	n.a.	n.a.
Côte d'Ivoire	19.3	9.6	6.2[c]	8.9[b, c]	34.1[c]	39.4[b, c]	8.1	29.6	20.2	2.6	2.6	8.2	11.6	52.2	50.9	11.8	34.0	19.1	18.3
Gambia	17.6	20.5	n.a.	25.5	n.a.	59.0	5.1	22.3	13.6	1.9	1.8	9.4	14.9	56.4	49.5	33.2	53.6	13.7	13.2
Ghana	11.1	6.2	5.1[b, c]	8.2[b, c]	38.3[b, c]	42.4[b, c]	5.8	22.0	12.7	2.3	1.9	10.2	12.9	44.2	35.4	45.7	53.1	14.9	14.4
Guinea	16.3	10.3	n.r.	n.r.	n.r.	n.r.	6.4	33.7	27.9	4.4	5.6	5.9	9.5	50.9	48.0	20.4	33.4	n.a.	n.a.
Guinea-Bissau	16.4	32.2	n.a.	9.0[b]	n.a.	62.5[b]	5.1	29.3	27.7	2.8	3.3	7.9	11.5	49.9	48.1	38.3	59.3	21.8	19.5
Liberia	33.4	38.4	38.6	37.3	79.7	81.0	3.4	35.0	26.6	3.3	5.3	10.3	17.0	43.6	42.6	27.8	55.2	19.7	19.9
Mali	13.1	9.6	n.a.	2.7[b]	n.a.	20.0[b]	10.6	30.7	23.8	1.6	2.0	7.6	11.4	58.2	59.0	20.2	49.8	n.a.	n.a.
Mauritania	9.1	9.3	4.6[c]	11.6[c]	26.3[c]	61.2[c]	13.6[g]	26.0	22.1	1.9	2.0	16.2	22.7	45.1	43.3	26.7	40.9	n.a.	n.a.
Niger	19.0	13.3	n.a.	7.5[b]	n.a.	50.3[b]	10.9	46.6	47.4	1.1	2.7	3.9	6.0	49.1	49.5	23.3	24.5	n.a.	n.a.
Nigeria	7.0	18.0	11.0[b, c]	22.6[b, c]	34.7[b, c]	73.9[b, c]	6.5	37.7	34.2	2.5	2.2	8.7	12.4	54.9	55.1	14.7	34.4	n.a.	n.a.
Senegal	18.0	4.6	7.5[c]	4.0[b, c]	39.0[c]	29.4[b, c]	8.1	18.5	17.0	1.5	3.4	7.6	10.2	55.9	52.7	39.0	40.8	19.1	17.2
Sierra Leone	46.2	28.4	26.7[b, c]	32.3	75.8[b, c]	88.6	6.3	34.9	26.0	3.3	5.2	5.8	7.1	47.9	48.4	31.2	50.9	11.4	10.3
Togo	27.0	12.8	16.1[c]	10.9[b, c]	60.4[c]	57.0[b, c]	5.7	27.3	22.3	1.6	2.2	7.1	11.6	47.4	45.7	62.1	64.3	15.1	14.3

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2021–23[4] (%)	2014–16 (%)	2021–23 (%)	2014–16 (%)	2021–23 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2019 (%)	2012[6] (%)	2022[7] (%)	2012 (%)	2020 (%)
Sub-Saharan Africa (including Sudan)	**22.1**	**22.2**	**18.8**	**23.7**	**50.1**	**62.8**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**8.6**	**11.7**	**41.0**	**40.5**	**34.7**	**48.0**	**14.5**	**13.9**
ASIA*	**13.6**	**8.2**	**6.7**	**9.9**	**17.8**	**24.9**	**9.3**	**28.2**	**22.3**	**4.8**	**5.1**	**6.5**	**10.4**	**31.1**	**32.8**	**39.0**	**50.9**	**17.2**	**17.2**
Central Asia	**13.8**	**3.1**	**1.7**	**4.3**	**9.2**	**18.0**	**2.1**	**14.7**	**7.7**	**8.2**	**5.0**	**18.8**	**25.1**	**28.8**	**28.1**	**29.2**	**32.7**	**6.3**	**6.0**
Kazakhstan	7.3	<2.5	n.a.	0.6[b]	n.a.	2.2[b]	n.a.	11.0	4.9	12.1	7.7	16.1	18.4	27.3	28.7	31.8	n.a.	5.7	5.3
Kyrgyzstan	8.1	6.1	n.a.	1.1[c]	n.a.	7.0[c]	1.0[g]	16.0	10.3	7.9	6.4	20.1	26.6	34.1	35.8	56.0	45.6	6.4	6.0
Tajikistan	38.1	8.7	4.9	6.7	19.1	28.0	5.6	25.7	13.1	5.4	3.0	17.1	23.8	31.0	35.2	32.6	35.8	9.3	8.7
Turkmenistan	4.2	4.1	n.a.	n.a.	n.a.	n.a.	4.1	12.5	6.7	5.4	3.6	17.2	21.4	25.3	26.6	10.9	56.5	4.9	4.3
Uzbekistan	14.2	<2.5	n.r.	n.r.	n.r.	n.r.	2.4	13.2	6.9	7.7	4.2	21.0	30.0	28.7	24.8	23.8	25.2	5.8	5.8
Eastern Asia*	**7.0**	**<2.5**	**1.0**	**1.0**	**6.0**	**6.2**	**1.5**	**7.7**	**4.9**	**6.6**	**8.3**	**4.5**	**8.1**	**15.4**	**15.9**	**28.4**	**36.3**	**5.5**	**5.5**
China	7.1	<2.5	n.r.	n.r.	n.r.	n.r.	1.9	7.6	4.6	7.0	8.9	4.5	8.3	14.8	15.5	27.6	35.1	5.1	5.0
China, mainland	7.2	<2.5	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Taiwan Province of China	4.4	3.7	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
China, Hong Kong SAR	<2.5	<2.5	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
China, Macao SAR	16.0	10.7	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Democratic People's Republic of Korea	34.5	n.a.	n.a.	n.a.	n.a.	n.a.	2.5	25.7	16.8	1.6	2.8	6.7	10.8	31.7	33.9	68.9	71.4	n.a.	n.a.
Japan	<2.5	3.4	<0.5	1.2	2.6	5.5	n.a.	6.5	5.0	1.7	2.1	3.9	5.5	19.7	19.0	n.a.	n.a.	11.1	11.3
Mongolia	28.7	<2.5	n.a.	<0.5[c]	n.a.	5.3[c]	0.9	12.2	6.1	9.8	10.7	17.6	24.1	14.3	14.5	65.7	58.0	5.7	4.9
Republic of Korea	<2.5	<2.5	<0.5[b]	0.9	4.8[b]	5.7	0.2[g]	1.9	1.7	6.8	5.4	4.1	7.3	13.7	13.5	n.a.	n.a.	6.3	7.5

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2021–23[4] (%)	2014–16 (%)	2021–23 (%)	2014–16 (%)	2021–23 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2019 (%)	2012[6] (%)	2022[7] (%)	2012 (%)	2020 (%)
Eastern Asia (excluding China and Japan)	**13.5**	**17.6**	**0.6**	**0.8**	**5.0**	**5.3**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**5.2**	**8.8**	**19.6**	**20.4**	**n.a.**	**69.1**	**7.6**	**8.4**
South-eastern Asia	**16.8**	**6.0**	**2.0**	**2.7**	**14.8**	**17.0**	**7.8**	**30.4**	**26.4**	**6.4**	**7.4**	**6.0**	**10.0**	**25.0**	**27.2**	**33.4**	**46.0**	**12.8**	**12.5**
Brunei Darussalam	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	17.0	10.9	8.6	9.1	23.3	31.7	14.8	16.7	n.a.	n.a.	13.2	13.6
Cambodia	18.0	4.6	16.9	13.9	48.9	50.5	9.6	33.8	22.3	2.2	3.8	2.2	4.4	46.1	47.1	72.8	50.3	12.7	11.4
Indonesia	18.4	7.2	0.7[b]	<0.5[b]	6.0[b]	4.9[b]	10.2	34.6	31.0	9.2	10.6	5.9	11.2	27.0	31.2	40.9	50.7	10.5	9.9
Lao People's Democratic Republic	22.4	5.4	n.a.	6.2	n.a.	36.3	9.0	40.4	27.7	2.2	4.0	4.7	8.0	36.3	39.5	39.7	44.4	17.2	16.7
Malaysia	3.2	<2.5	7.8	5.8	17.4	16.7	11.0	17.6	21.9	6.2	5.7	16.0	22.1	30.1	32.0	n.a.	40.3	13.0	13.8
Myanmar	29.0	5.3	n.a.	6.9	n.a.	32.0	7.4[g]	31.1	24.1	1.8	0.8	5.2	7.4	39.4	42.1	23.6	51.2	12.7	12.5
Philippines	14.6	5.9	n.a.	5.9[c]	n.a.	44.1[c]	5.4	31.9	28.8	3.5	4.6	5.7	8.7	16.9	12.3	33.0	40.9	21.2	21.1
Singapore	n.a.	n.a.	1.0	2.5	2.8	7.7	n.a.	3.4	3.0	3.0	3.8	8.1	13.9	11.5	13.0	n.a.	n.a.	10.6	11.0
Thailand	12.1	5.6	n.a.	1.4[b, c]	n.a.	7.2[b, c]	7.2	14.0	11.8	9.1	8.6	10.0	15.4	22.1	24.0	12.3	28.6	10.5	10.3
Timor-Leste	30.7	15.9	n.a.	8.9	n.a.	53.7	8.3	52.5	45.1	2.4	1.3	1.1	2.4	26.8	29.9	50.8	65.0	16.8	18.2
Viet Nam	15.3	5.2	n.a.	2.1[c]	n.a.	10.8[c]	4.7	25.4	19.3	4.3	8.1	0.8	2.0	17.0	20.6	17.0	45.4	7.6	6.3
Southern Asia	**19.6**	**14.2**	**13.1**	**19.4**	**27.6**	**41.3**	**14.3**	**40.3**	**30.5**	**2.7**	**2.8**	**5.6**	**9.7**	**48.3**	**48.2**	**47.2**	**59.6**	**26.1**	**24.4**
Afghanistan	34.2	30.4	14.8	30.6	45.1	80.9	3.6	44.3	33.1	5.0	3.7	10.3	19.2	37.5	42.6	n.a.	63.3	n.a.	n.a.
Bangladesh	13.7	11.9	13.3	11.4	32.2	30.5	11.0	39.2	26.4	1.8	2.1	2.5	5.3	35.7	36.7	64.1	54.8	24.3	23.0
Bhutan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	30.2	22.7	6.9	6.5	7.1	12.2	39.8	38.6	48.7	n.a.	11.7	11.4
India	21.4	13.7	n.r.	n.r.	n.r.	n.r.	18.7	41.6	31.7	2.2	2.8	4.1	7.3	53.2	53.0	46.4	63.7	29.5	27.4[f]
Iran (Islamic Republic of)	5.4	6.5	9.5	6.4	48.0	39.9	4.3	5.9	4.7	4.8	3.8	19.9	24.3	22.8	24.1	53.1	47.4	n.a.	n.a.

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2021–23[4] (%)	2014–16 (%)	2021–23 (%)	2014–16 (%)	2021–23 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2019 (%)	2012[6] (%)	2022[7] (%)	2012 (%)	2020 (%)
Maldives	n.a.	n.a.	2.2	2.2	13.4	13.4	9.1	16.4	13.9	6.0	3.3	11.2	17.3	45.6	52.2	45.3	63.0	13.8	13.7
Nepal	17.0	5.7	10.4	13.5	29.5	37.0	7.0	40.3	26.7	1.2	1.7	3.4	7.0	35.9	35.7	69.6	56.4	20.9	19.7
Pakistan	17.0	20.7	0.9[c]	15.1[c]	14.1[c]	44.9[c]	7.1	43.8	34.0	4.6	2.7	12.7	23.0	42.7	41.3	37.0	47.8	n.a.	n.a.
Sri Lanka	14.1	4.1	0.7[c]	1.2[c]	5.9[c]	11.4[c]	15.1	16.7	15.9	1.2	1.3	5.7	10.6	33.5	34.6	75.8	80.9	18.5	18.0
Southern Asia (excluding India)	**15.0**	**15.3**	**7.3**	**13.2**	**27.1**	**40.8**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**9.9**	**16.1**	**36.0**	**36.7**	**49.0**	**52.3**	**19.5**	**19.0**
Western Asia	**8.5**	**12.0**	**9.7**	**13.5**	**30.7**	**38.9**	**3.5**	**19.1**	**14.0**	**9.1**	**7.2**	**29.3**	**33.6**	**31.7**	**32.5**	**31.9**	**31.4**	**12.2**	**12.2**
Armenia	12.4	<2.5	n.a.	<0.5	n.a.	7.8	4.4	13.9	7.2	15.0	11.5	20.3	24.5	17.6	17.3	34.1	44.5	8.3	8.3
Azerbaijan	4.7	<2.5	<0.5	0.7	5.9	12.2	n.a.	17.4	13.3	12.2	10.1	21.4	26.5	34.7	35.1	10.8	n.a.	11.0	11.0
Bahrain	n.a.	n.a.	n.r.	n.r.	n.r.	n.r.	n.a.	6.8[e]	5.0[e]	n.a.	n.a.	31.7	36.1	36.3	35.4	n.a.	n.a.	11.6	12.4
Cyprus	8.4	<2.5	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	21.6	22.9	12.0	13.6	n.a.	n.a.	n.a.	n.a.
Georgia	4.0	4.0	7.0	7.5	31.8	32.4	0.6	8.8	4.8	13.9	5.0	27.2	34.7	26.9	27.5	54.8	20.4	6.9	7.4
Iraq	16.5	16.1	n.r.	n.r.	n.r.	n.r.	3.0	19.6	9.9	9.5	6.4	34.4	40.5	29.8	28.6	19.4	25.8	10.8	10.9
Israel	<2.5	<2.5	1.3[b]	3.4[c]	11.0[b]	12.2[c]	n.a.	n.a.	n.a.	n.a.	n.a.	21.9	22.5	11.5	12.9	n.a.	n.a.	9.4	9.0
Jordan	5.2	17.9	n.r.	n.r.	n.r.	n.r.	2.3	7.7	6.6	5.9	9.5	36.3	38.5	30.5	37.7	22.7	17.8	17.0	18.9
Kuwait	<2.5	<2.5	4.9	3.5	12.6	8.7	3.0	4.8	6.9	9.0	11.7	40.7	41.4	21.1	23.7	n.a.	n.a.	12.4	14.4
Lebanon	10.6	9.6	n.a.	11.7	n.a.	40.1	1.4	11.7	7.4	8.5	8.3	26.2	29.8	25.4	28.3	n.a.	22.1	12.2	12.6
Oman	10.2	5.7	n.a.	n.a.	n.a.	n.a.	9.3	11.1	12.7	2.9	6.5	24.9	31.1	29.0	29.1	n.a.	23.2	13.3	13.2
Palestine	n.a.	n.a.	n.a.	4.5[b, h]	n.a.	27.4[b, h]	1.3	10.3	7.5	7.6	8.3	34.2	37.6	30.5	31.0	28.7	38.9	9.8	10.4
Qatar	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6.2[e]	4.4[e]	12.2[e]	11.7[e]	36.1	43.1	27.1	28.1	29.3	n.a.	9.9	10.0
Saudi Arabia	4.5	3.0	n.r.	n.r.	n.r.	n.r.	4.5[g]	11.8	12.4	9.3	10.1	35.0	40.6	25.8	27.5	n.a.	n.a.	n.a.	n.a.
Syrian Arab Republic	6.2	34.0	n.r.	n.r.	n.r.	n.r.	n.a.	26.4	25.4	16.6	11.7	29.2	33.9	31.7	32.8	42.6	28.5	n.a.	n.a.
Türkiye	3.8	<2.5	n.r.	n.r.	n.r.	n.r.	1.7	9.1	5.5	10.2	8.1	29.6	33.3	n.a.	n.a.	41.6	40.7	14.0	12.9

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2021–23[4] (%)	2014–16 (%)	2021–23 (%)	2014–16 (%)	2021–23 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2019 (%)	2012[6] (%)	2022[7] (%)	2012 (%)	2020 (%)
United Arab Emirates	7.8	2.7	n.a.	1.4[b, c]	n.a.	10.0[b, c]	n.a.	n.a.	n.a.	n.a.	n.a.	31.9	32.1	24.0	24.3	n.a.	n.a.	13.9	13.9
Yemen	25.5	39.5	n.a.	n.a.	45.7	72.5	n.a.	46.9	35.1	2.4	1.7	9.2	13.7	61.5	61.5	n.a.	n.a.	n.a.	n.a.
Central Asia and Southern Asia	**19.3**	**13.8**	**12.7**	**18.9**	**26.9**	**40.5**	**13.7**	**39.3**	**29.4**	**2.9**	**2.9**	**6.1**	**10.2**	**47.5**	**47.5**	**46.5**	**58.7**	**25.4**	**23.5**
Eastern Asia and South-eastern Asia*	**9.6**	**2.7**	**1.3**	**1.5**	**8.5**	**9.4**	**4.2**	**16.0**	**13.9**	**6.5**	**8.0**	**4.9**	**8.6**	**18.1**	**19.4**	**30.3**	**41.1**	**8.1**	**8.7**
Western Asia and Northern Africa	**8.1**	**9.9**	**9.7**	**12.6**	**29.8**	**36.3**	**4.9**	**21.2**	**17.9**	**10.4**	**9.8**	**27.8**	**32.7**	**31.8**	**31.8**	**37.2**	**33.7**	**13.1**	**13.1**
LATIN AMERICA AND THE CARIBBEAN	**8.9**	**6.6**	**7.0**	**10.6**	**25.1**	**31.3**	**1.4**	**12.7**	**11.5**	**7.4**	**8.6**	**22.4**	**29.9**	**18.2**	**17.2**	**34.3**	**43.1**	**9.5**	**9.6**
Caribbean	**18.1**	**16.5**	**n.a.**	**27.5**	**n.a.**	**59.6**	**2.9**	**13.0**	**11.3**	**6.5**	**6.6**	**19.5**	**24.5**	**28.7**	**29.2**	**29.5**	**31.4**	**11.4**	**11.7**
Antigua and Barbuda	n.a.	n.a.	n.a.	7.1	n.a.	33.0	n.a.	n.a.	n.a.	n.a.	n.a.	26.8	33.3	16.7	17.2	n.a.	n.a.	15.1	15.4
Bahamas	n.a.	n.a.	n.a.	3.4	n.a.	17.2	n.a.	n.a.	n.a.	n.a.	n.a.	39.8	47.3	13.3	14.5	n.a.	n.a.	15.3	15.4
Barbados	5.7	3.5	n.a.	7.4	n.a.	31.1	n.a.	7.5	6.0	11.8	12.5	30.9	38.0	16.9	17.0	19.7	n.a.	n.a.	n.a.
Cuba	<2.5	<2.5	n.a.	n.a.	n.a.	n.a.	2.0	7.0	7.0	9.7	10.2	16.3	21.8	20.2	19.3	48.6	40.6	7.2	7.1
Dominica	2.7	13.4	n.a.	5.8	n.a.	34.4	n.a.	n.a.	n.a.	n.a.	n.a.	24.5	31.3	20.1	20.8	n.a.	n.a.	n.a.	n.a.
Dominican Republic	19.3	4.6	24.3[b]	19.0[b, c]	54.2[b]	46.1[b, c]	2.2	7.9	5.6	7.5	7.6	22.3	29.3	28.0	26.4	8.0	15.8	12.1	13.4
Grenada	n.a.	n.a.	n.a.	5.8[b]	n.a.	19.9[b]	n.a.	n.a.	n.a.	n.a.	n.a.	23.9	30.3	18.9	19.2	n.a.	n.a.	n.a.	n.a.
Haiti	50.8	50.4	n.a.	42.4	n.a.	82.8	3.7	23.8	19.5	3.4	3.7	8.3	10.7	47.6	47.7	39.3	39.9	n.a.	n.a.
Jamaica	7.5	7.3	25.3	26.6	48.3	55.1	3.2	6.1	6.5	6.9	5.7	26.4	33.8	19.5	19.9	23.8	n.a.	14.3	13.7
Puerto Rico	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	34.6	41.1	18.4	18.8	n.a.	n.a.	n.a.	n.a.

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2021–23[4] (%)	2014–16 (%)	2021–23 (%)	2014–16 (%)	2021–23 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2019 (%)	2012[6] (%)	2022[7] (%)	2012 (%)	2020 (%)
Saint Kitts and Nevis	n.a.	n.a.	n.a.	5.6	n.a.	29.8	n.a.	n.a.	n.a.	n.a.	n.a.	38.7	45.6	16.0	15.4	n.a.	n.a.	n.a.	n.a.
Saint Lucia	n.a.	n.a.	4.5[b]	4.5	22.2[b]	22.2	n.a.	2.3	2.5	6.0	6.0	26.1	33.5	14.1	14.3	3.5	n.a.	15.9	16.3
Saint Vincent and the Grenadines	8.2	4.8	n.a.	10.3	n.a.	33.3	n.a.	n.a.	n.a.	n.a.	n.a.	26.6	33.2	17.3	17.0	n.a.	n.a.	n.a.	n.a.
Trinidad and Tobago	10.8	12.6	n.a.	10.2	n.a.	43.3	n.a.	8.6	8.8	10.5	13.9	24.7	28.1	17.8	17.7	21.5	n.a.	15.9	16.3
Central America	**7.6**	**5.8**	**6.4**	**7.8**	**28.9**	**29.3**	**1.0**	**18.2**	**16.9**	**6.6**	**6.7**	**27.9**	**34.4**	**15.2**	**14.6**	**21.6**	**38.7**	**10.9**	**10.9**
Belize	5.2	4.6	n.a.	5.9[b]	n.a.	45.5[b]	n.a.	17.5	12.0	8.7	5.9	35.2	42.3	21.2	20.5	14.7	n.a.	11.3	11.6
Costa Rica	3.4	<2.5	1.8[c]	2.8[c]	12.2[c]	16.2[c]	1.8	6.4	9.5	7.6	7.6	24.9	31.4	12.3	13.7	32.5	25.3	8.5	8.7
El Salvador	8.6	6.8	13.8	15.8	42.2	46.9	n.a.	15.5	10.0	6.2	6.8	25.3	30.9	9.9	10.6	31.4	45.3	10.4	10.2
Guatemala	19.3	12.6	16.1	21.1	42.7	59.8	0.8	47.1	43.5	5.1	4.8	20.0	26.8	11.0	7.4	49.6	58.5	14.4	14.5
Honduras	21.5	20.4	14.2[c]	26.9	41.6[c]	56.0	1.9	22.0	17.5	5.0	4.7	22.7	29.5	16.6	18.0	30.7	30.2	12.5	13.1
Mexico	4.1	3.1	3.4[b]	3.0[b]	24.9[b]	20.7[b]	1.0	13.3	12.6	6.8	6.9	29.3	36.0	15.9	15.3	14.4	35.9	10.2	10.2
Nicaragua	21.8	19.6	n.r.	n.r.	n.r.	n.r.	n.a.	17.3	14.9	7.3	8.7	27.5	33.6	13.3	15.7	31.7	n.a.	10.7	10.1
Panama	20.6	5.6	n.r.	n.r.	n.r.	n.r.	1.1	19.9	13.8	10.5	11.4	26.7	36.1	22.1	21.2	n.a.	n.a.	10.7	10.3
South America	**8.4**	**5.9**	**4.7**	**10.0**	**19.7**	**29.2**	**1.4**	**10.1**	**9.0**	**7.9**	**9.7**	**20.7**	**28.6**	**18.4**	**17.3**	**42.2**	**47.1**	**8.6**	**8.8**
Argentina	3.6	3.2	5.8	13.1	19.2	36.1	1.7	7.1	9.5	11.0	12.6	26.3	35.4	12.7	11.9	32.0	n.a.	7.2	7.4
Bolivia (Plurinational State of)	27.5	23.0	n.r.	n.r.	n.r.	n.r.	2.0	19.9	11.1	8.9	9.0	20.5	28.7	28.6	24.4	64.3	55.7	8.3	7.9
Brazil	6.2	3.9	0.7[b, c]	6.6[b, c]	13.3[b, c]	18.4[b, c]	3.4	6.3	7.2	7.9	10.3	19.1	28.1	18.3	16.1	38.6	45.8	8.3	8.7
Chile	3.0	<2.5	2.9[c]	3.7[b, c]	10.8[c]	17.6[b, c]	n.a.	1.9	1.6	9.8	8.8	29.6	38.9	7.9	8.7	n.a.	n.a.	6.1	6.8
Colombia	11.1	4.2	4.9[c]	5.3[b, c]	20.0[c]	30.7[b, c]	1.6	12.7	11.2	5.0	6.2	18.2	23.6	22.1	21.2	42.9	36.7	10.5	11.0

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2021–23[4] (%)	2014–16 (%)	2021–23 (%)	2014–16 (%)	2021–23 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2019 (%)	2012[6] (%)	2022[7] (%)	2012 (%)	2020 (%)
Ecuador	21.5	13.9	6.0[b, c]	12.7[c]	20.7[b, c]	36.9[c]	3.7	24.4	22.7	7.5	11.9	20.1	27.4	17.3	17.2	n.a.	n.a.	10.9	10.6
Guyana	6.6	<2.5	n.a.	4.7[b]	n.a.	25.5[b]	6.5	14.5	7.6	6.2	5.7	21.4	28.5	34.4	31.7	31.3	28.5	17.0	17.2
Paraguay	7.0	4.5	1.2[c]	6.6[b, c]	8.3[c]	26.2[b, c]	1.0	9.4	3.4	10.4	14.6	24.8	33.0	22.2	23.0	24.4	29.6	10.0	10.0
Peru	17.7	7.0	13.5[d]	20.3[d]	37.2[d]	51.7[d]	0.5	18.6	10.1	8.1	9.4	18.5	27.3	20.6	20.6	67.4	66.9	8.3	7.5
Suriname	9.2	10.1	n.a.	7.2	n.a.	35.8	5.5	8.3	7.6	3.7	3.8	22.8	29.0	20.3	21.0	2.8	8.9	15.7	16.5
Uruguay	2.7	<2.5	n.a.	2.9[b, c]	n.a.	15.7[b, c]	1.4	9.1	6.1	9.3	11.5	25.0	33.3	13.2	15.0	n.a.	57.7	8.0	7.8
Venezuela (Bolivarian Republic of)	7.8	17.6	n.r.	n.r.	n.r.	n.r.	n.a.	12.1	10.5	6.2	6.9	22.7	22.7	20.9	24.2	n.a.	n.a.	9.0	9.3
OCEANIA	**6.7**	**7.3**	**8.6**	**9.9**	**22.2**	**25.0**	**n.a.**	**20.0**	**22.0**	**11.0**	**16.8**	**25.4**	**29.5**	**14.4**	**16.0**	**n.a.**	**n.a.**	**11.3**	**11.8**
Australia and New Zealand	**<2.5**	**<2.5**	**2.8**	**4.1**	**10.6**	**13.5**	**n.a.**	**3.4**	**3.4**	**12.4**	**19.3**	**26.3**	**30.8**	**7.6**	**8.8**	**n.a.**	**n.a.**	**6.4**	**6.4**
Australia	<2.5	<2.5	2.8	4.2	10.8	12.9	n.a.	3.2	3.4	13.7	21.8	25.7	30.2	7.4	8.5	n.a.	n.a.	6.4	6.6
New Zealand	<2.5	<2.5	2.8	3.8	10.0	16.4	n.a.	n.a.	n.a.	n.a.	n.a.	29.3	33.6	8.8	10.4	n.a.	n.a.	6.0	5.9
Oceania excluding Australia and New Zealand	**20.9**	**22.8**	**22.2**	**23.2**	**49.4**	**51.3**	**8.3[a]**	**40.9**	**44.0**	**9.3**	**13.9**	**21.6**	**24.8**	**32.9**	**33.9**	**56.6**	**58.3**	**17.4**	**17.9**
Melanesia	**23.2**	**24.7**	**n.a.**	**24.7**	**n.a.**	**54.0**	**n.a.**	**43.3**	**46.4**	**9.6**	**14.4**	**18.3**	**21.9**	**33.3**	**34.2**	**56.8**	**58.6**	**17.6**	**18.0**
Fiji	3.5	7.8	n.a.	8.5	n.a.	29.2	4.6	8.5	7.1	6.3	7.4	28.0	33.8	31.5	32.0	n.a.	42.9	7.4	7.4
New Caledonia	10.2	5.6	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Papua New Guinea	27.8	27.7	n.a.	27.0	n.a.	57.3	n.a.	48.0	51.2	10.5	16.0	16.8	20.5	33.4	34.4	56.1	59.7	19.0	19.4
Solomon Islands	12.0	19.4	n.a.	n.a.	n.a.	n.a.	n.a.	31.8	29.8	3.5	5.5	19.1	22.6	38.4	37.7	73.7	n.a.	13.2	13.2
Vanuatu	6.8	7.9	n.a.	2.4	n.a.	23.3	n.a.	27.0	31.4	4.8	5.1	18.5	21.3	24.1	28.5	39.5	n.a.	12.7	13.1

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2021–23[4] (%)	2014–16 (%)	2021–23 (%)	2014–16 (%)	2021–23 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2019 (%)	2012[6] (%)	2022[7] (%)	2012 (%)	2020 (%)
Micronesia	**6.2**	**3.7**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**16.3**	**13.5**	**4.4**	**4.4**	**43.2**	**47.1**	**27.9**	**29.1**	**55.3**	**59.8**	**12.4**	**12.3**
Kiribati	6.2	3.7	n.a.	8.0	n.a.	41.0	3.5	16.2	14.2	2.1	2.0	43.2	46.3	31.8	32.6	66.4	63.6	9.3	9.0
Marshall Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.5	37.0	30.5	4.1	4.4	42.0	45.9	29.7	30.6	27.3	43.1	n.a.	n.a.
Micronesia (Federated States of)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	42.4	47.1	22.7	25.0	n.a.	n.a.	n.a.	n.a.
Nauru	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	21.0	14.8	4.0	4.5	67.4	69.9	29.5	29.6	67.2	n.a.	n.a.	n.a.
Palau	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	39.2	41.1	27.3	28.5	n.a.	n.a.	13.7	13.5
Polynesia	**3.5**	**5.4**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**7.3**	**6.5**	**8.2**	**8.2**	**52.1**	**57.5**	**25.6**	**27.4**	**51.1**	**48.0**	**16.3**	**16.8**
American Samoa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	72.3	75.2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cook Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	62.5	68.9	25.8	27.1	n.a.	n.a.	10.1	10.3
French Polynesia	3.9	5.4	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	43.0	48.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Niue	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	61.2	66.6	25.9	27.3	n.a.	n.a.	n.a.	n.a.
Samoa	2.8	5.4	n.a.	3.4	n.a.	23.6	3.1	5.0	7.4	6.0	7.9	55.7	62.4	24.5	26.8	51.3	51.7	n.a.	n.a.
Tokelau (Associate Member)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	65.0	69.8	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tonga	n.a.	n.a.	n.a.	2.6[b]	n.a.	14.8[b]	1.1	7.2	1.8	15.0	10.9	62.8	71.7	27.2	28.5	52.2	39.6	n.a.	n.a.
Tuvalu	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.8	7.8	5.2	5.2	4.2	58.9	64.2	26.0	27.5	34.7	43.8	n.a.	n.a.
NORTHERN AMERICA AND EUROPE	**<2.5**	**<2.5**	**1.3**	**1.5**	**8.8**	**8.2**	**n.a.**	**4.2**	**3.8**	**9.0**	**7.6**	**24.8**	**27.9**	**13.1**	**14.6**	**n.a.**	**n.a.**	**7.4**	**7.4**
Northern America**	**<2.5**	**<2.5**	**1.0**	**0.9**	**9.9**	**9.0**	**0.2**	**2.6**	**3.6**	**8.6**	**8.2**	**35.7**	**40.3**	**9.9**	**11.7**	**25.5**	**25.8**	**8.0**	**8.1**
Bermuda	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	26.4	33.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Canada	<2.5	<2.5	n.a.	1.5[c]	n.a.	8.5[c]	n.a.	n.a.	n.a.	11.4	11.1	24.7	26.2	8.8	10.4	n.a.	n.a.	6.2	6.6

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2021–23[4] (%)	2014–16 (%)	2021–23 (%)	2014–16 (%)	2021–23 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2019 (%)	2012[6] (%)	2022[7] (%)	2012 (%)	2020 (%)
Greenland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	23.3	27.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
United States of America	<2.5	<2.5	1.1[b]	0.8[b]	10.5[b]	9.1[b]	0.1	2.5	3.6	8.4	7.9	36.9	42.0	10.0	11.8	25.5	25.8	8.2	8.3
Europe	**<2.5**	**<2.5**	**1.4**	**1.8**	**8.2**	**7.8**	**n.a.**	**5.1**	**4.0**	**9.2**	**7.3**	**19.7**	**21.4**	**14.5**	**16.0**	**n.a.**	**n.a.**	**7.1**	**7.0**
Eastern Europe	**<2.5**	**<2.5**	**1.5**	**1.8**	**11.2**	**10.6**	**n.a.**	**7.2**	**5.3**	**12.1**	**7.4**	**22.1**	**25.5**	**19.2**	**20.5**	**n.a.**	**n.a.**	**7.1**	**7.0**
Belarus	<2.5	<2.5	n.r.	n.r.	n.r.	n.r.	n.a.	3.9	3.6	8.0	5.3	21.0	21.4	19.1	20.6	19.0	21.7	5.0	5.1
Bulgaria	5.0	<2.5	1.9	2.5	14.9	14.8	n.a.	7.1	5.6	7.0	3.8	17.6	20.6	22.5	23.6	n.a.	n.a.	11.0	11.4
Czechia	<2.5	<2.5	0.7	2.2	5.8	10.0	n.a.	2.5	2.5	5.3	6.1	21.8	26.0	20.0	21.1	n.a.	n.a.	7.3	7.6
Hungary	<2.5	<2.5	1.4	3.6	11.3	15.0	n.a.	n.a.	n.a.	n.a.	n.a.	25.2	31.7	19.6	19.7	n.a.	n.a.	8.4	8.3
Poland	<2.5	<2.5	1.8	0.9	8.9	5.4	n.a.	2.1	2.3	5.6	6.0	22.2	27.5	n.a.	n.a.	n.a.	n.a.	5.8	5.6
Republic of Moldova	32.3	<2.5	1.6	5.3	19.3	24.7	n.a.	6.8	3.9	5.4	2.9	22.9	23.0	26.0	26.1	36.4	n.a.	6.5	6.5
Romania	<2.5	<2.5	5.6	7.1	19.3	19.1	n.a.	9.3	7.7	7.9	4.5	21.9	34.0	22.1	22.7	n.a.	n.a.	9.5	8.8
Russian Federation	<2.5	<2.5	0.7	<0.5[b]	8.2	4.6[b]	n.a.	n.a.	n.a.	12.2	7.4	22.3	24.2	20.0	21.1	n.a.	n.a.	7.3	7.3
Slovakia	5.6	3.6	1.1	2.0	6.2	9.0	n.a.	n.a.	n.a.	n.a.	n.a.	20.8	26.8	22.3	23.5	n.a.	n.a.	7.5	7.8
Ukraine	<2.5	5.8	2.0	5.3	19.8	31.0	n.a.	18.2	12.3	23.6	13.6	21.8	23.6	14.4	17.7	19.7	n.a.	6.0	5.7
Northern Europe	**<2.5**	**<2.5**	**1.8**	**2.3**	**6.7**	**6.3**	**n.a.**	**3.7**	**3.0**	**8.7**	**9.7**	**22.3**	**24.2**	**10.6**	**12.0**	**n.a.**	**n.a.**	**6.3**	**6.0**
Denmark	<2.5	<2.5	1.0	1.9	5.9	7.1	n.a.	n.a.	n.a.	n.a.	n.a.	12.5	13.3	11.5	12.2	n.a.	n.a.	5.1	4.8
Estonia	<2.5	<2.5	0.9	1.0	9.5	9.3	n.a.	1.3	1.2	4.8	5.1	20.9	22.2	20.7	21.7	n.a.	n.a.	4.5	4.2
Finland	<2.5	<2.5	2.4	3.0	9.3	12.6	n.a.	n.a.	n.a.	n.a.	n.a.	19.3	21.5	9.7	10.9	n.a.	n.a.	4.1	4.1
Iceland	<2.5	<2.5	1.7	1.9	6.4	7.0	n.a.	n.a.	n.a.	n.a.	n.a.	18.7	21.2	9.4	10.3	n.a.	n.a.	3.8	4.0
Ireland	<2.5	<2.5	3.4	1.6	8.9	4.2	n.a.	n.a.	n.a.	n.a.	n.a.	25.0	28.3	10.9	12.1	n.a.	n.a.	5.5	5.6
Latvia	<2.5	<2.5	0.6	1.5	9.9	10.2	1.6[g]	2.4	1.8	10.3	6.4	21.7	24.3	20.9	21.6	n.a.	n.a.	4.5	4.2

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2021–23[4] (%)	2014–16 (%)	2021–23 (%)	2014–16 (%)	2021–23 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2019 (%)	2012[6] (%)	2022[7] (%)	2012 (%)	2020 (%)
Lithuania	<2.5	<2.5	2.5	1.3	15.3	6.1	4.8[g]	5.4	4.5	8.0	4.7	23.0	25.4	18.8	19.9	n.a.	n.a.	4.7	4.4
Norway	<2.5	<2.5	1.1	1.4	4.8	6.8	n.a.	n.a.	n.a.	n.a.	n.a.	16.5	19.1	10.7	12.0	n.a.	n.a.	4.7	4.4
Sweden	<2.5	<2.5	0.8	1.8	4.5	6.0	n.a.	n.a.	n.a.	n.a.	n.a.	14.6	15.3	11.7	13.6	n.a.	n.a.	4.2	4.1
United Kingdom of Great Britain and Northern Ireland	<2.5	<2.5	1.9	2.5	6.3	5.7	0.3[g]	n.a.	n.a.	9.7	11.3	24.8	26.8	9.4	11.1	n.a.	n.a.	7.1	6.8
Southern Europe	**<2.5**	**<2.5**	**1.4**	**1.5**	**7.4**	**6.5**	**n.a.**	**4.6**	**3.9**	**8.7**	**8.3**	**18.2**	**18.9**	**13.5**	**15.1**	**n.a.**	**n.a.**	**8.0**	**8.2**
Albania	8.9	4.5	10.0	8.2	38.8	32.2	1.6	16.4	8.3	22.4	13.4	17.5	23.4	21.6	24.8	37.1	36.5	6.0	6.0
Andorra	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	16.7	18.1	10.6	12.1	n.a.	n.a.	9.1	9.4
Bosnia and Herzegovina	<2.5	<2.5	1.5	2.8	9.6	13.3	n.a.	9.2	8.0	18.7	9.4	17.3	21.2	23.8	24.4	18.2	n.a.	5.2	5.2
Croatia	<2.5	<2.5	0.6	1.4	6.5	7.9	n.a.	n.a.	n.a.	n.a.	n.a.	23.0	30.6	20.4	21.0	n.a.	n.a.	5.0	5.0
Greece	<2.5	<2.5	2.6	1.5[b]	15.8	6.4[b]	n.a.	2.0	2.2	15.8	14.6	24.6	28.0	12.8	15.1	n.a.	n.a.	10.9	11.4
Italy	<2.5	<2.5	n.a.	<0.5[b]	n.a.	2.0[b]	n.a.	n.a.	n.a.	n.a.	n.a.	16.1	17.3	11.8	13.6	n.a.	n.a.	7.1	7.2
Malta	<2.5	<2.5	1.5	2.0	5.8	8.2	n.a.	n.a.	n.a.	n.a.	n.a.	30.3	32.3	12.3	13.7	n.a.	n.a.	7.0	7.2
Montenegro	5.6	<2.5	2.1	2.5	12.6	12.3	2.2	8.4	8.2	15.8	8.0	14.8	18.0	16.1	17.2	19.3	19.5	6.4	6.2
North Macedonia	5.0	<2.5	3.6	4.8	15.1	20.2	3.4	5.8	3.7	13.6	9.9	22.2	27.5	17.2	19.3	23.0	27.5	8.2	8.3
Portugal	<2.5	<2.5	4.1	3.3	14.7	12.3	1.1[g]	3.8	3.1	8.2	8.9	18.7	21.8	12.0	13.2	n.a.	n.a.	8.4	8.9
Serbia	2.6	<2.5	1.7	3.0	11.4	13.0	2.6	5.9	4.6	15.6	9.9	18.2	22.5	21.8	22.8	13.4	23.6	6.0	6.2
Slovenia	<2.5	<2.5	0.9	0.9	12.3	7.9	n.a.	n.a.	n.a.	n.a.	n.a.	16.3	19.4	20.2	21.8	n.a.	n.a.	6.2	6.3
Spain	<2.5	<2.5	1.1	1.5	7.1	6.9	n.a.	n.a.	n.a.	n.a.	n.a.	18.9	15.7	12.0	13.4	n.a.	n.a.	9.5	9.6

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2021–23[4] (%)	2014–16 (%)	2021–23 (%)	2014–16 (%)	2021–23 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2019 (%)	2012[6] (%)	2022[7] (%)	2012 (%)	2020 (%)
Western Europe	**<2.5**	**<2.5**	**1.3**	**1.8**	**5.2**	**5.6**	**n.a.**	**2.8**	**2.6**	**5.0**	**5.1**	**16.3**	**15.8**	**9.6**	**11.6**	**n.a.**	**n.a.**	**7.0**	**6.8**
Austria	<2.5	<2.5	1.1	1.8	5.5	4.9	n.a.	n.a.	n.a.	n.a.	n.a.	14.2	15.4	11.5	13.0	n.a.	n.a.	6.7	6.3
Belgium	<2.5	<2.5	n.a.	2.0	n.a.	7.3	n.a.	2.8	2.4	3.6	4.0	17.8	20.0	11.3	13.6	n.a.	n.a.	7.0	6.8
France	<2.5	<2.5	1.6	2.3	6.8	7.9	n.a.	n.a.	n.a.	n.a.	n.a.	11.7	9.7	8.8	10.6	n.a.	n.a.	7.5	7.4
Germany	<2.5	<2.5	1.0	1.5	4.1	4.0	0.4[g]	1.5	2.1	3.4	3.1	20.5	20.4	9.6	11.7	n.a.	n.a.	6.9	6.7
Luxembourg	<2.5	<2.5	1.8	0.6	4.7	2.6	n.a.	n.a.	n.a.	n.a.	n.a.	18.2	18.4	9.0	10.2	n.a.	n.a.	7.5	7.7
Netherlands (Kingdom of the)	<2.5	<2.5	1.5	1.9	5.7	5.5	n.a.	1.5	1.6	4.1	5.1	13.8	14.5	10.9	12.8	n.a.	n.a.	6.1	5.7
Switzerland	<2.5	<2.5	1.5	1.1	4.8	2.5	n.a.	n.a.	n.a.	n.a.	n.a.	11.8	12.1	9.6	11.3	n.a.	n.a.	6.4	6.4

NOTES:
n.a. = data not available; n.r. = not reported;
– = not applicable.
<2.5 = prevalence of undernourishment less than 2.5 percent; <0.5 = prevalence of severe food insecurity less than 0.5 percent.
1. Regional estimates are included when more than 50 percent of population is covered. To reduce the margin of error, estimates are presented as three-year averages.
2. FAO estimates of the number of people living in households where at least one adult has been found to be food insecure.
3. Country-level results are presented only for those countries for which estimates are based on official national data (see note b) or as provisional estimates, based on FAO data collected through the Gallup© World Poll for countries whose national relevant authorities expressed no objection to their publication. Note that consent to publication does not necessarily imply validation of the estimate by the national authorities involved and that the estimate is subject to revision as soon as suitable data from official national sources are available. Global, regional and subregional aggregates are based on data collected in approximately 150 countries.
4. The estimates referring to the middle of the projected ranges for the years 2020 to 2022 were used to calculate the three-year averages.
5. For regional estimates, values correspond to the model predicted estimates for 2022. For countries, the latest data available from 2016 to 2023 are used.
6. Regional estimates are included when more than 50 percent of population is covered. For countries, the latest data available from 2005 to 2012 are used.
7. Regional estimates are included when more than 50 percent of population is covered. For countries, the latest data available from 2016 to 2022 are used.
* Wasting under five years of age; regional aggregates exclude Japan.
** The Northern America wasting estimates are derived applying mixed-effect models with subregions as fixed effects; data were available only for the United States of America, preventing the estimation of standard errors (and confidence intervals). Further details on the methodology are described in De Onis, M., Blössner, M., Borghi, E., Frongillo, E.A. & Morris, R. 2004. Estimates of global prevalence of childhood underweight in 1990 and 2015. *Journal of the American Medical Association*, 291(21): 2600–2606. https://doi.org/10.1001/jama.291.21.2600. Model selection is based on best fit.

a. Consecutive low population coverage; interpret with caution.
b. Based on official national data.
c. For years when official national data are not available, the estimates are integrated with FAO data. See **Annex 1B** for further details.
d. Results based on data collected by FAO through the Gallup© World Poll (see **Annex 1B** for methodology) are provisional and will be revised soon, as the National Institute of Statistics and Informatics (INEI) has made great progress in adapting and incorporating the Food Insecurity Experience Scale module in the National Household Survey (Encuesta Nacional de Hogares – ENAHO).
e. Most recent input data are from before 2000; interpret with caution.
f. The UNICEF–WHO low birthweight estimates are derived through standard methodology applied to all countries to ensure comparability and are not the official statistics of the Government of India. India's most recent national official low birthweight prevalence is 18.2 percent from the 2019–2021 National Family Health Survey–5 (NFHS-5), which is used as the basis of the UNICEF–WHO global estimation model to support cross-country comparability.
g. This estimate has been adjusted because the original estimate did not cover the full age range or the data source was only representative of rural areas.
h. The estimate for Palestine reflects the situation before the conflict erupted at the end of 2023.

SOURCES: Data for undernourishment and food insecurity are from FAO. 2024. *FAOSTAT: Suite of Food Security Indicators*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/FS. Licence: CC-BY-4.0; data for stunting, wasting and overweight are based on UNICEF, WHO & World Bank. 2023. *Levels and trends in child malnutrition. UNICEF / WHO / World Bank Group Joint Child Malnutrition Estimates – Key findings of the 2023 edition*. New York, USA, UNICEF, Geneva, Switzerland, WHO and Washington, DC, World Bank. https://data.unicef.org/resources/jme-report-2023, http://www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition; data for adult obesity are based on WHO. 2024. *Global Health Observatory (GHO) data repository: Prevalence of obesity among adults, BMI ≥ 30, age-standardized. Estimates by country*. [Accessed on 24 July 2024]. https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-=-30-(age-standardized-estimate)-(-). Licence: CC-BY-4.0; data for anaemia are based on WHO. 2021. WHO global anaemia estimates, 2021 edition. In: *WHO*. [Cited 24 July 2024]. https://www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children; data for exclusive breastfeeding are based on UNICEF. 2024. Infant and young child feeding. In: *UNICEF*. [Cited 24 July 2024]. https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding; data for low birthweight are from UNICEF & WHO. 2023. Low birthweight. In: *UNICEF*. [Cited 24 July 2024]. https://data.unicef.org/topic/nutrition/low-birthweight; UNICEF & WHO. 2023. Joint low birthweight estimates. In: *WHO*. [Cited 24 July 2024]. https://www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-low-birthweight-estimates

TABLE A1.2 PROGRESS TOWARDS THE SUSTAINABLE DEVELOPMENT GOALS AND GLOBAL NUTRITION TARGETS: NUMBER OF PEOPLE WHO ARE AFFECTED BY UNDERNOURISHMENT, MODERATE OR SEVERE FOOD INSECURITY AND SELECTED FORMS OF MALNUTRITION; NUMBER OF INFANTS EXCLUSIVELY BREASTFED AND NUMBER OF BABIES BORN WITH LOW BIRTHWEIGHT

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2021–23[4] (millions)	2014–16 (millions)	2021–23 (millions)	2014–16 (millions)	2021–23 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2022[7] (millions)	2012 (millions)	2020 (millions)
WORLD	**788.3**	**722.0**	**568.0**	**868.6**	**1 611.1**	**2 311.7**	**45.0**	**177.9**	**148.1**	**37.0**	**37.0**	**591.4**	**880.7**	**519.5**	**570.8**	**25.7**	**31.3**	**21.6**	**19.8**
Least developed countries	**198.6**	**248.2**	**182.4**	**248.1**	**477.3**	**644.3**	**11.1**	**52.5**	**51.7**	**4.2**	**5.1**	**22.7**	**50.0**	**83.5**	**101.3**	**6.5**	**9.0**	**4.9**	**5.2**
Landlocked developing countries	**93.9**	**110.5**	**75.1**	**106.5**	**211.9**	**292.4**	**3.3**	**24.7**	**22.8**	**2.9**	**3.0**	**22.7**	**41.4**	**34.3**	**42.4**	**3.3**	**4.4**	**2.3**	**2.5**
Small Island Developing States	**10.3**	**11.7**	**16.9**	**16.3**	**35.6**	**37.9**	**0.2**	**1.3**	**1.3**	**0.4**	**0.5**	**7.7**	**11.2**	**4.6**	**4.9**	**0.2**	**0.2**	**0.2**	**0.2**
Low-income countries	**129.7**	**201.9**	**124.1**	**180.7**	**322.1**	**453.9**	**7.3**	**36.1**	**36.9**	**3.4**	**3.6**	**17.4**	**35.0**	**47.1**	**58.4**	**4.2**	**6.2**	**3.2**	**3.5**
Lower-middle-income countries	**445.3**	**432.1**	**350.0**	**564.0**	**867.4**	**1 376.4**	**30.5**	**112.7**	**89.3**	**12.3**	**13.2**	**140.3**	**250.0**	**302.7**	**336.1**	**13.0**	**16.6**	**14.0**	**12.6**
Upper-middle-income countries	**199.6**	**71.5**	**69.6**	**94.4**	**311.0**	**363.1**	**3.5**	**25.9**	**19.1**	**16.1**	**15.3**	**213.3**	**337.3**	**131.7**	**135.6**	**6.2**	**6.0**	**3.3**	**2.7**
High-income countries	**n.r.**	**n.r.**	**18.0**	**21.7**	**94.9**	**98.4**	**0.2**	**2.7**	**2.5**	**5.0**	**4.8**	**210.0**	**258.4**	**36.3**	**39.0**	**n.a.**	**n.a.**	**1.1**	**1.0**
Low-income food-deficit countries	**180.4**	**260.8**	**172.6**	**251.5**	**444.3**	**630.1**	**9.2**	**47.6**	**46.9**	**5.2**	**5.6**	**32.7**	**63.8**	**71.1**	**86.3**	**5.6**	**8.4**	**4.2**	**4.6**
AFRICA	**184.6**	**284.0**	**207.0**	**308.7**	**556.1**	**823.9**	**12.2**	**61.3**	**63.1**	**8.8**	**10.2**	**74.1**	**123.9**	**103.1**	**122.7**	**6.8**	**10.3**	**5.8**	**6.2**
Northern Africa	**14.6**	**19.4**	**22.4**	**30.4**	**65.4**	**86.9**	**1.8**	**6.2**	**6.3**	**3.1**	**3.6**	**34.3**	**51.2**	**17.6**	**18.9**	**1.1**	**1.0**	**0.8**	**0.8**
Algeria	2.0	n.r.	5.2	2.5	9.0	8.5	0.1	0.5	0.4	0.6	0.6	4.7	6.9	3.4	3.6	0.1	0.1	0.1	0.1
Egypt	4.6	9.4	8.2	11.5	27.1	33.1	n.a.	2.8	2.5	1.8	2.3	20.8	30.4	6.9	7.0	0.6	0.5	n.a.	n.a.
Libya	0.3	0.8	0.7	1.4	1.8	2.6	n.a.	0.2	0.3	0.2	0.2	1.2	1.7	0.5	0.6	n.a.	n.a.	n.a.	n.a.

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1,2,3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2021–23[4] (millions)	2014–16 (millions)	2021–23 (millions)	2014–16 (millions)	2021–23 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2022[7] (millions)	2012 (millions)	2020 (millions)
Morocco	1.5	2.6	n.r.	n.r.	n.r.	n.r.	0.1[g]	0.5	0.4	0.3	0.2	3.7	5.6	2.7	2.9	0.1	0.1	0.1	0.1
Sudan	–	5.3	n.r.	n.r.	n.r.	n.r.	n.a.	2.1	2.6	0.1	0.2	2.1	4.2	3.1	3.8	0.3	n.a.	n.a.	n.a.
Tunisia	0.4	0.4	1.1	1.4	2.1	3.3	<0.1	0.1	0.1	0.1	0.2	1.8	2.4	0.9	1.0	<0.1	<0.1	<0.1	<0.1
Northern Africa (excluding Sudan)	**8.9**	**14.1**	**17.3**	**21.5**	**49.6**	**61.4**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**32.0**	**46.6**	**14.5**	**15.1**	**0.9**	**0.8**	**0.6**	**0.6**
Sub-Saharan Africa	**170.0**	**264.6**	**184.5**	**278.3**	**490.7**	**737.0**	**10.3**	**55.1**	**56.8**	**5.7**	**6.6**	**38.2**	**68.8**	**85.4**	**103.8**	**5.6**	**9.2**	**5.0**	**5.4**
Eastern Africa	**96.5**	**137.3**	**86.4**	**120.8**	**230.1**	**309.5**	**3.5**	**23.6**	**21.8**	**2.4**	**2.6**	**8.7**	**19.8**	**26.5**	**33.8**	**3.1**	**4.5**	**2.0**	**2.1**
Burundi	n.a.	n.a.	n.a.	2.7[b]	n.a.	9.1[b]	0.1[g]	1.1	1.2	<0.1	0.1	0.1	0.3	0.7	1.0	0.1	0.2	0.1	0.1
Comoros	0.1	0.1	n.a.	0.2	n.a.	0.7	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	<0.1	n.a.	<0.1	<0.1
Djibouti	0.3	0.1	n.a.	0.2	n.a.	0.6	<0.1[g]	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	<0.1	n.a.	n.a.	n.a.
Eritrea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.3	0.2	<0.1	<0.1	<0.1	0.1	0.3	0.3	<0.1	n.a.	<0.1	<0.1
Ethiopia	28.7	27.3	14.9	24.3	57.6	72.8	1.2	6.4	6.3	0.4	0.5	0.7	1.9	4.8	6.6	0.8	1.1	n.a.	n.a.
Kenya	10.1	18.7	7.0[b,c]	15.1[c]	23.8[b,c]	39.4[c]	0.3	2.0	1.3	0.3	0.3	1.8	3.7	3.1	3.9	0.2	0.4	0.2	0.1
Madagascar	6.3	11.8	n.a.	4.4	n.a.	20.3	0.3	1.7	1.6	0.1	0.1	0.3	0.7	2.0	2.5	0.2	0.2	0.2	0.2
Malawi	2.7	4.1	8.1[b,c]	10.9[b,c]	13.2[b,c]	16.7[b,c]	0.1	1.2	1.0	0.1	0.1	0.3	0.8	1.1	1.4	0.2	0.2	0.1	0.1
Mauritius	0.1	0.1	<0.1	0.1	0.2	0.4	n.a.	<0.1[e]	<0.1[e]	<0.1[e]	<0.1[e]	0.2	0.2	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Mozambique	6.8	8.2	n.r.	n.r.	n.r.	n.r.	0.2	1.9	2.0	0.2	0.3	0.7	1.7	2.9	3.5	0.2	0.3	0.2	0.2
Rwanda	3.3	4.3	n.r.	n.r.	n.r.	n.r.	<0.1	0.7	0.6	0.1	0.1	0.1	0.4	0.5	0.5	0.1	0.2	<0.1	<0.1
Seychelles	<0.1	n.r.	<0.1[b]	<0.1[c]	<0.1[b]	<0.1[c]	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	<0.1	<0.1
Somalia	7.3	9.0	n.a.	7.7	n.a.	14.0	n.a.	0.7	0.6	0.1	0.1	0.5	1.2	1.2	1.5	<0.1	0.1	n.a.	n.a.
South Sudan	–	2.1	n.a.	6.9[b]	n.a.	9.5[b]	n.a.	0.5	0.4	0.1	0.1	0.3	0.5	0.8	0.9	0.1	n.a.	n.a.	n.a.
Uganda	5.2	17.4	8.1[c]	10.9[c]	24.9[c]	33.6[c]	0.3	2.1	1.8	0.2	0.3	0.6	1.8	2.5	3.4	0.4	0.5	n.a.	n.a.

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1] 2004–06 (millions)	NUMBER OF UNDERNOURISHED PEOPLE[1] 2021–23[4] (millions)	NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3] 2014–16 (millions)	NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3] 2021–23 (millions)	NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3] 2014–16 (millions)	NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3] 2021–23 (millions)	NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING 2022[5] (millions)	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED 2012 (millions)	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED 2022 (millions)	NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT 2012 (millions)	NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT 2022 (millions)	NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE 2012 (millions)	NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE 2022 (millions)	NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA 2012 (millions)	NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA 2019 (millions)	NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED 2012[6] (millions)	NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED 2022[7] (millions)	NUMBER OF BABIES WITH LOW BIRTHWEIGHT 2012 (millions)	NUMBER OF BABIES WITH LOW BIRTHWEIGHT 2020 (millions)
United Republic of Tanzania	11.2	15.6	10.8[c]	16.6[c]	25.7[c]	38.1[c]	0.3	3.2	3.3	0.4	0.5	1.7	4.1	4.4	5.3	0.4	0.7	0.2	0.2
Zambia	5.7	7.1	n.r.	n.r.	n.r.	n.r.	0.1	1.1	1.0	0.2	0.2	0.5	1.1	1.0	1.4	0.2	0.2	0.1	0.1
Zimbabwe	3.6	6.2	5.0	4.3	9.2	11.5	0.1	0.7	0.5	0.1	0.1	0.7	1.2	1.0	1.1	0.1	0.1	0.1	0.1
Middle Africa	**37.5**	**56.6**	**n.a.**	**73.8**	**n.a.**	**150.4**	**1.9**	**10.0**	**12.9**	**1.2**	**1.6**	**4.6**	**8.8**	**14.6**	**17.2**	**0.8**	**1.6**	**0.8**	**0.9**
Angola	10.2	8.3	n.a.	11.3[c]	n.a.	28.2[c]	n.a.	1.5	2.7	0.1	0.2	1.0	2.0	2.6	3.3	n.a.	n.a.	0.2	0.2
Cameroon	2.7	1.6	5.1	7.1	11.5	16.6	0.2	1.2	1.2	0.3	0.5	1.2	2.1	2.1	2.5	0.1	0.2	0.1	0.1
Central African Republic	1.6	1.3	n.a.	3.5	n.a.	4.5	0.1	0.4	0.4	<0.1	<0.1	0.1	0.2	0.5	0.5	<0.1	<0.1	<0.1	<0.1
Chad	3.5	6.2	4.6[c]	6.5	9.6[c]	13.6	0.3	1.0	1.1	0.1	0.1	0.3	0.5	1.4	1.6	<0.1	<0.1	n.a.	n.a.
Congo	1.1	1.6	n.a.	2.3[b]	n.a.	4.8[b]	n.a.	0.2	0.1	<0.1	<0.1	0.2	0.3	0.6	0.6	<0.1	n.a.	<0.1	<0.1
Democratic Republic of the Congo	18.0	36.6	n.a.	41.3	n.a.	79.4	1.0	5.7	7.3	0.6	0.7	1.5	3.1	7.1	8.2	0.5	1.0	0.4	0.4
Equatorial Guinea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.1	<0.1	<0.1	<0.1	0.1	0.2	0.1	0.1	<0.1	n.a.	n.a.	n.a.
Gabon	0.2	0.5	n.r.	n.r.	n.r.	n.r.	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.3	0.2	0.3	<0.1	<0.1	<0.1	<0.1
Sao Tome and Principe	<0.1	<0.1	n.a.	<0.1	n.a.	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Southern Africa	**2.7**	**6.4**	**5.8**	**7.5**	**13.7**	**16.5**	**0.2**	**1.5**	**1.6**	**0.8**	**0.8**	**10.7**	**13.4**	**4.7**	**5.5**	**n.a.**	**0.2**	**0.2**	**0.2**
Botswana	0.4	0.6	0.4[c]	0.7[b, c]	1.1[c]	1.4[b, c]	n.a.	0.1	0.1	<0.1	<0.1	0.2	0.3	0.2	0.2	<0.1	<0.1	<0.1	<0.1
Eswatini	0.1	0.1	n.a.	0.2[b]	n.a.	0.7[b]	n.a.	<0.1	<0.1	<0.1	<0.1	0.1	0.2	0.1	0.1	<0.1	n.a.	<0.1	<0.1
Lesotho	n.a.	n.a.	n.a.	0.8[c]	n.a.	1.3[c]	<0.1	0.1	0.1	<0.1	<0.1	0.2	0.3	0.1	0.2	<0.1	<0.1	<0.1	<0.1
Namibia	0.4	0.6	0.7[c]	0.8[c]	1.2[c]	1.5[c]	n.a.	0.1	0.1	<0.1	<0.1	0.2	0.3	0.1	0.2	<0.1	n.a.	<0.1	<0.1
South Africa	1.7	4.9	n.a.	5.0[b, c]	n.a.	11.6[b, c]	0.2[g]	1.3	1.3	0.7	0.7	10.0	12.3	4.2	4.8	n.a.	0.2	0.2	0.2

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1,2,3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2021–23[4] (millions)	2014–16 (millions)	2021–23 (millions)	2014–16 (millions)	2021–23 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2022[7] (millions)	2012 (millions)	2020 (millions)
Western Africa	**33.3**	**64.2**	**40.2**	**76.2**	**142.3**	**260.6**	**4.6**	**19.9**	**20.5**	**1.3**	**1.7**	**13.4**	**25.2**	**39.6**	**47.3**	**1.4**	**2.8**	**2.0**	**2.1**
Benin	0.9	1.4	1.1[c]	2.1[b,c]	6.0[c]	8.4[b,c]	0.2	0.6	0.7	<0.1	<0.1	0.4	0.8	1.3	1.5	0.1	0.1	0.1	0.1
Burkina Faso	2.4	3.5	n.a.	1.6[b]	n.a.	9.2[b]	0.4	1.0	0.8	0.1	0.1	0.3	0.8	2.0	2.5	0.1	0.2	0.1	0.1
Cabo Verde	0.1	0.1	n.a.	<0.1[b]	n.a.	0.2[b]	n.a.	<0.1[e]	<0.1[e]	n.a.	n.a.	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.
Côte d'Ivoire	3.7	2.7	1.5[c]	2.5[b,c]	8.0[c]	11.1[b,c]	0.3	1.1	0.9	0.1	0.1	0.9	1.7	2.6	3.2	<0.1	0.2	0.2	0.2
Gambia	0.3	0.6	n.a.	0.7	n.a.	1.6	<0.1	0.1	0.1	<0.1	<0.1	0.1	0.2	0.3	0.3	<0.1	<0.1	<0.1	<0.1
Ghana	2.5	2.1	1.5[b,c]	2.8[b,c]	11.1[b,c]	14.2[b,c]	0.3	0.9	0.6	0.1	0.1	1.5	2.5	2.9	2.7	0.2	0.2	0.1	0.1
Guinea	1.5	1.4	n.r.	n.r.	n.r.	n.r.	0.1	0.6	0.6	0.1	0.1	0.3	0.7	1.3	1.5	<0.1	0.1	n.a.	n.a.
Guinea-Bissau	0.2	0.7	n.a.	0.2[b]	n.a.	1.3[b]	<0.1	0.1	0.1	<0.1	<0.1	0.1	0.1	0.2	0.2	<0.1	<0.1	<0.1	<0.1
Liberia	1.1	2.0	1.8	2.0	3.7	4.3	<0.1	0.2	0.2	<0.1	<0.1	0.2	0.5	0.4	0.5	<0.1	<0.1	<0.1	<0.1
Mali	1.7	2.2	n.a.	0.6[b]	n.a.	4.5[b]	0.4	1.0	1.0	0.1	0.1	0.6	1.2	2.0	2.6	0.1	0.2	n.a.	n.a.
Mauritania	0.3	0.4	0.2[c]	0.6[c]	1.0[c]	2.9[c]	0.1[g]	0.2	0.2	<0.1	<0.1	0.3	0.6	0.4	0.5	<0.1	<0.1	n.a.	n.a.
Niger	2.6	3.5	n.a.	2.0[b]	n.a.	13.2[b]	0.6	1.7	2.4	<0.1	0.1	0.3	0.7	1.8	2.4	0.1	0.1	n.a.	n.a.
Nigeria	9.9	39.4	20.3[b,c]	49.4[b,c]	63.8[b,c]	161.4[b,c]	2.2	11.4	12.1	0.8	0.8	7.3	13.6	20.9	25.5	0.5	1.3	n.a.	n.a.
Senegal	2.0	0.8	1.1[c]	0.7[b,c]	5.6[c]	5.1[b,c]	0.2	0.4	0.4	<0.1	0.1	0.5	0.9	1.8	2.1	0.1	0.1	0.1	0.1
Sierra Leone	2.6	2.4	2.0[b,c]	2.8	5.5[b,c]	7.6	0.1	0.4	0.3	<0.1	0.1	0.2	0.3	0.8	0.9	<0.1	0.1	<0.1	<0.1
Togo	1.5	1.1	1.2[c]	1.0[b,c]	4.5[c]	5.0[b,c]	0.1	0.3	0.3	<0.1	<0.1	0.3	0.5	0.8	0.9	0.1	0.1	<0.1	<0.1
Sub-Saharan Africa (including Sudan)	**170.0**	**270.0**	**189.7**	**287.2**	**506.5**	**762.4**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**40.3**	**73.1**	**88.6**	**107.6**	**5.9**	**9.5**	**5.2**	**5.6**
ASIA*	**542.4**	**385.2**	**299.5**	**468.5**	**793.1**	**1 177.6**	**31.6**	**106.8**	**76.6**	**18.2**	**17.7**	**192.9**	**353.9**	**350.2**	**379.1**	**15.0**	**16.7**	**13.7**	**11.8**
Central Asia	**8.2**	**2.4**	**1.2**	**3.3**	**6.4**	**13.9**	**0.2**	**1.1**	**0.7**	**0.6**	**0.4**	**8.0**	**12.4**	**5.2**	**5.3**	**0.2**	**0.3**	**0.1**	**0.1**
Kazakhstan	1.1	n.r.	n.a.	0.1[b]	n.a.	0.4[b]	n.a.	0.2	0.1	0.2	0.2	1.9	2.4	1.3	1.3	0.1	n.a.	<0.1	<0.1
Kyrgyzstan	0.4	0.4	n.a.	<0.1[c]	n.a.	0.5[c]	<0.1[g]	0.1	0.1	0.1	0.1	0.7	1.1	0.5	0.6	<0.1	<0.1	<0.1	<0.1

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2021–23[4] (millions)	2014–16 (millions)	2021–23 (millions)	2014–16 (millions)	2021–23 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2022[7] (millions)	2012 (millions)	2020 (millions)
Tajikistan	2.6	0.9	0.4	0.7	1.6	2.8	0.1	0.3	0.2	0.1	<0.1	0.8	1.4	0.6	0.8	<0.1	<0.1	<0.1	<0.1
Turkmenistan	0.2	0.3	n.a.	n.a.	n.a.	n.a.	<0.1	0.1	<0.1	<0.1	<0.1	0.6	0.9	0.4	0.4	<0.1	<0.1	<0.1	<0.1
Uzbekistan	3.8	n.r.	n.r.	n.r.	n.r.	n.r.	0.1	0.4	0.3	0.2	0.2	4.0	6.8	2.4	2.2	0.1	0.1	<0.1	<0.1
Eastern Asia*	**106.9**	**n.r.**	**16.5**	**16.7**	**98.5**	**103.6**	**1.1**	**7.7**	**3.7**	**6.6**	**6.4**	**55.1**	**106.4**	**65.4**	**62.8**	**2.9**	**2.2**	**1.2**	**0.8**
China	94.6	n.r.	n.r.	n.r.	n.r.	n.r.	1.7	6.7	3.1	6.2	6.0	48.0	94.3	56.1	54.0	2.5	1.9	1.0	0.6
China, mainland	93.5	n.r.	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Taiwan Province of China	1.0	0.9	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
China, Hong Kong SAR	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
China, Macao SAR	0.1	0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Democratic People's Republic of Korea	8.3	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.4	0.3	<0.1	<0.1	1.2	2.2	2.1	2.2	0.1	0.1	n.a.	n.a.
Japan	n.r.	4.2	n.r.	1.5	3.3	6.8	n.a.	0.3	0.2	0.1	0.1	4.2	5.9	5.3	4.8	n.a.	n.a.	0.1	0.1
Mongolia	0.7	n.r.	n.a.	n.r.	n.a.	0.2[c]	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.5	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Republic of Korea	n.r.	n.r.	n.r.	0.5	2.4[b]	3.0	<0.1[g]	<0.1	<0.1	0.2	0.1	1.6	3.3	1.8	1.6	n.a.	n.a.	<0.1	<0.1
Eastern Asia (excluding China and Japan)	**10.1**	**14.3**	**0.6**	**0.9**	**5.5**	**6.0**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**3.1**	**5.9**	**4.0**	**4.0**	**n.a.**	**0.2**	**0.1**	**0.1**
South-eastern Asia	**94.5**	**40.8**	**12.7**	**18.6**	**94.3**	**115.8**	**4.3**	**17.2**	**14.4**	**3.6**	**4.1**	**25.0**	**48.0**	**41.7**	**47.4**	**1.9**	**2.5**	**1.5**	**1.4**
Brunei Darussalam	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	n.a.	n.a.	<0.1	<0.1

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2021–23[4] (millions)	2014–16 (millions)	2021–23 (millions)	2014–16 (millions)	2021–23 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2022[7] (millions)	2012 (millions)	2020 (millions)
Cambodia	2.4	0.8	2.6	2.3	7.5	8.5	0.2	0.6	0.4	<0.1	0.1	0.2	0.5	1.9	2.1	0.1	0.1	<0.1	<0.1
Indonesia	42.2	19.9	1.8[b]	n.r.	15.5[b]	13.6[b]	2.4	8.3	6.9	2.2	2.4	10.0	21.6	18.3	22.3	1.0	1.1	0.5	0.4
Lao People's Democratic Republic	1.3	0.4	n.a.	0.5	n.a.	2.7	0.1	0.3	0.2	<0.1	<0.1	0.2	0.4	0.6	0.8	<0.1	<0.1	<0.1	<0.1
Malaysia	0.8	n.r.	2.4	2.0	5.4	5.7	0.3	0.4	0.6	0.2	0.1	3.2	5.4	2.4	2.8	n.a.	0.1	0.1	0.1
Myanmar	13.8	2.9	n.a.	3.7	n.a.	17.4	0.3[g]	1.4	1.1	0.1	<0.1	1.8	2.8	5.7	6.3	0.1	0.2	0.1	0.1
Philippines	12.6	6.9	n.a.	6.8[c]	n.a.	51.0[c]	0.6	3.7	3.5	0.4	0.6	3.4	6.5	4.2	3.5	0.4	0.5	0.5	0.5
Singapore	n.a.	n.a.	<0.1	0.1	0.2	0.5	n.a.	<0.1	<0.1	<0.1	<0.1	0.4	0.7	0.2	0.2	n.a.	n.a.	<0.1	<0.1
Thailand	7.9	4.0	n.a.	1.0[b, c]	n.a.	5.2[b, c]	0.2	0.6	0.4	0.4	0.3	5.3	8.9	4.1	4.2	<0.1	0.1	0.1	0.1
Timor-Leste	0.3	0.2	n.a.	0.1	n.a.	0.7	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Viet Nam	12.7	5.1	n.a.	2.0[c]	n.a.	10.6[c]	0.3	1.8	1.4	0.3	0.6	0.5	1.5	4.3	5.3	0.1	0.3	0.1	0.1
Southern Asia	**315.0**	**284.8**	**243.5**	**390.3**	**512.6**	**829.9**	**25.1**	**75.3**	**53.7**	**5.0**	**4.9**	**63.4**	**130.8**	**218.4**	**241.0**	**8.9**	**10.5**	**10.2**	**8.8**
Afghanistan	8.4	12.5	5.0	12.6	15.2	33.3	0.2	2.3	2.2	0.3	0.2	1.4	3.9	2.5	3.8	n.a.	0.4	n.a.	n.a.
Bangladesh	19.2	20.3	20.9	19.5	50.9	52.3	1.6	6.0	3.9	0.3	0.3	2.4	6.2	14.9	16.8	1.0	0.8	0.7	0.7
Bhutan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	<0.1	n.a.	<0.1	<0.1
India	246.5	194.6	n.r.	n.r.	n.r.	n.r.	21.9	52.5	36.1	2.8	3.2	33.6	71.4	171.5	187.3	5.9	7.2	7.7	6.3[f]
Iran (Islamic Republic of)	3.8	5.8	7.8	5.7	39.2	35.3	0.3	0.4	0.3	0.3	0.2	11.2	15.6	5.1	5.5	0.4	0.3	n.a.	n.a.
Maldives	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Nepal	4.5	1.7	2.9	4.1	8.2	11.3	0.2	1.2	0.8	<0.1	<0.1	0.5	1.4	2.6	3.2	0.2	0.2	0.1	0.1
Pakistan	29.7	48.8	1.9[c]	35.6[c]	29.6[c]	105.8[c]	2.1	12.5	10.1	1.3	0.8	14.1	31.0	19.8	22.4	1.1	1.5	n.a.	n.a.
Sri Lanka	2.8	0.9	0.1[c]	0.3[c]	1.2[c]	2.5[c]	0.3	0.3	0.2	<0.1	<0.1	0.8	1.7	1.8	1.8	0.1	0.1	0.1	0.1

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2021–23[4] (millions)	2014–16 (millions)	2021–23 (millions)	2014–16 (millions)	2021–23 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2022[7] (millions)	2012 (millions)	2020 (millions)
Southern Asia (excluding India)	**68.5**	**90.2**	**38.7**	**77.9**	**144.7**	**240.9**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**30.3**	**59.9**	**46.8**	**53.7**	**3.1**	**3.3**	**2.6**	**2.5**
Western Asia	**17.9**	**35.2**	**25.6**	**39.6**	**81.4**	**114.4**	**1.0**	**5.3**	**3.9**	**2.5**	**2.0**	**46.5**	**65.3**	**19.6**	**22.5**	**0.9**	**0.9**	**0.7**	**0.7**
Armenia	0.4	n.r.	n.a.	n.r.	n.a.	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	0.5	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Azerbaijan	0.4	n.r.	n.r.	<0.1	0.6	1.3	n.a.	0.2	0.1	0.1	0.1	1.4	2.0	0.9	0.9	<0.1	n.a.	<0.1	<0.1
Bahrain	n.a.	n.a.	n.r.	n.r.	n.r.	n.r.	n.a.	<0.1[e]	<0.1[e]	n.a.	n.a.	0.3	0.4	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Cyprus	0.1	n.r.	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	0.2	0.2	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.
Georgia	0.2	0.1	0.3	0.3	1.2	1.2	<0.1	<0.1	<0.1	<0.1	<0.1	0.8	1.0	0.3	0.2	<0.1	<0.1	<0.1	<0.1
Iraq	4.7	7.2	n.r.	n.r.	n.r.	n.r.	0.2	1.0	0.6	0.5	0.4	6.1	10.1	2.3	2.8	0.1	0.2	0.1	0.1
Israel	n.r.	n.r.	0.1[b]	0.3[c]	0.9[b]	1.1[c]	n.a.	n.a.	n.a.	n.a.	n.a.	1.1	1.4	0.2	0.3	n.a.	n.a.	<0.1	<0.1
Jordan	0.3	2.0	n.r.	n.r.	n.r.	n.r.	<0.1	0.1	0.1	0.1	0.1	1.5	2.7	0.6	1.0	<0.1	<0.1	<0.1	<0.1
Kuwait	n.r.	n.r.	0.2	0.1	0.5	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	1.0	1.3	0.2	0.2	n.a.	n.a.	<0.1	<0.1
Lebanon	0.5	0.5	n.a.	0.6	n.a.	2.2	<0.1	0.1	<0.1	<0.1	<0.1	0.9	1.1	0.4	0.5	n.a.	<0.1	<0.1	<0.1
Oman	0.3	0.3	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	0.1	<0.1	<0.1	0.6	1.0	0.2	0.3	n.a.	<0.1	<0.1	<0.1
Palestine	n.a.	n.a.	n.a.	0.2[b, h]	n.a.	1.4[b, h]	<0.1	0.1	0.1	<0.1	0.1	0.7	1.1	0.3	0.4	<0.1	<0.1	<0.1	<0.1
Qatar	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1[e]	<0.1[e]	<0.1[e]	<0.1[e]	0.6	1.0	0.1	0.1	<0.1	n.a.	<0.1	<0.1
Saudi Arabia	1.1	1.1	n.r.	n.r.	n.r.	n.r.	0.1[g]	0.4	0.4	0.3	0.3	7.1	10.3	1.9	2.3	n.a.	n.a.	n.a.	n.a.
Syrian Arab Republic	1.2	7.6	n.r.	n.r.	n.r.	n.r.	n.a.	0.8	0.5	0.5	0.2	3.8	4.6	1.7	1.5	0.1	0.1	n.a.	n.a.
Türkiye	2.6	n.r.	n.r.	n.r.	n.r.	n.r.	0.1	0.6	0.4	0.7	0.5	15.3	20.6	n.a.	n.a.	0.3	0.3	0.2	0.2
United Arab Emirates	0.3	0.3	n.a.	0.1[b, c]	n.a.	0.9[b, c]	n.a.	n.a.	n.a.	n.a.	n.a.	2.2	2.5	0.4	0.5	n.a.	n.a.	<0.1	<0.1
Yemen	5.4	13.3	n.a.	n.a.	13.0	24.4	n.a.	2.0	1.7	0.1	0.1	1.2	2.5	3.7	4.6	n.a.	n.a.	n.a.	n.a.

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1,2,3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2021–23[4] (millions)	2014–16 (millions)	2021–23 (millions)	2014–16 (millions)	2021–23 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2022[7] (millions)	2012 (millions)	2020 (millions)
Central Asia and Southern Asia	**323.2**	**287.2**	**244.7**	**393.6**	**518.9**	**843.8**	**25.3**	**76.4**	**54.3**	**5.6**	**5.3**	**71.3**	**143.2**	**223.5**	**246.3**	**9.2**	**10.8**	**10.3**	**8.9**
Eastern Asia and South-eastern Asia*	**201.4**	**62.8**	**29.2**	**35.3**	**192.8**	**219.5**	**5.4**	**25.0**	**18.3**	**10.2**	**10.4**	**80.3**	**154.6**	**107.1**	**110.2**	**4.8**	**4.8**	**2.7**	**2.2**
Western Asia and Northern Africa	**32.4**	**54.6**	**48.0**	**70.0**	**146.7**	**201.2**	**2.8**	**11.5**	**10.2**	**5.6**	**5.6**	**80.7**	**116.5**	**37.2**	**41.4**	**2.1**	**1.9**	**1.5**	**1.5**
LATIN AMERICA AND THE CARIBBEAN	**49.7**	**43.4**	**43.8**	**70.1**	**156.1**	**206.6**	**0.7**	**6.8**	**5.7**	**3.9**	**4.2**	**91.4**	**141.4**	**29.6**	**29.6**	**1.8**	**2.0**	**1.0**	**0.9**
Caribbean	**7.2**	**7.3**	**n.a.**	**12.2**	**n.a.**	**26.4**	**0.1**	**0.5**	**0.4**	**0.2**	**0.2**	**5.5**	**7.6**	**3.0**	**3.1**	**0.1**	**0.1**	**0.1**	**0.1**
Antigua and Barbuda	n.a.	n.a.	n.a.	<0.1	n.a.	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	<0.1	<0.1
Bahamas	n.a.	n.a.	n.a.	<0.1	n.a.	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	0.1	0.1	<0.1	<0.1	n.a.	n.a.	<0.1	<0.1
Barbados	<0.1	<0.1	n.a.	<0.1	n.a.	<0.1	n.a.	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.
Cuba	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	0.1	0.1	1.5	2.0	0.6	0.5	<0.1	<0.1	<0.1	<0.1
Dominica	<0.1	<0.1	n.a.	<0.1	n.a.	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.
Dominican Republic	1.8	0.5	2.5[b]	2.1[b, c]	5.6[b]	5.2[b, c]	<0.1	0.1	0.1	0.1	0.1	1.4	2.2	0.7	0.7	<0.1	<0.1	<0.1	<0.1
Grenada	n.a.	n.a.	n.a.	<0.1[b]	n.a.	<0.1[b]	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.
Haiti	4.6	5.8	n.a.	4.9	n.a.	9.6	<0.1	0.3	0.2	<0.1	<0.1	0.5	0.8	1.3	1.4	0.1	0.1	n.a.	n.a.
Jamaica	0.2	0.2	0.7	0.8	1.3	1.6	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	0.7	0.1	0.2	<0.1	n.a.	<0.1	<0.1
Puerto Rico	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.0	1.1	0.2	0.1	n.a.	n.a.	n.a.	n.a.
Saint Kitts and Nevis	n.a.	n.a.	n.a.	<0.1	n.a.	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.
Saint Lucia	n.a.	n.a.	<0.1[b]	<0.1	<0.1[b]	<0.1	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	n.a.	<0.1	<0.1

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2021–23[4] (millions)	2014–16 (millions)	2021–23 (millions)	2014–16 (millions)	2021–23 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2022[7] (millions)	2012 (millions)	2020 (millions)
Saint Vincent and the Grenadines	<0.1	<0.1	n.a.	<0.1	n.a.	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.
Trinidad and Tobago	0.1	0.2	n.a.	0.2	n.a.	0.7	n.a.	<0.1	<0.1	<0.1	<0.1	0.3	0.3	0.1	0.1	<0.1	n.a.	<0.1	<0.1
Central America	**11.1**	**10.5**	**10.6**	**14.1**	**48.3**	**52.6**	**0.1**	**2.9**	**2.5**	**1.1**	**1.0**	**28.5**	**42.5**	**6.7**	**7.0**	**0.4**	**0.5**	**0.4**	**0.3**
Belize	<0.1	<0.1	n.a.	<0.1[b]	n.a.	0.2[b]	n.a.	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	n.a.	<0.1	<0.1
Costa Rica	0.1	n.r.	<0.1[c]	0.1[c]	0.6[c]	0.8[c]	<0.1	<0.1	<0.1	<0.1	<0.1	0.8	1.2	0.2	0.2	<0.1	<0.1	<0.1	<0.1
El Salvador	0.5	0.4	0.9	1.0	2.6	3.0	n.a.	0.1	0.1	<0.1	<0.1	1.0	1.4	0.2	0.2	<0.1	<0.1	<0.1	<0.1
Guatemala	2.5	2.3	2.6	3.8	6.8	10.7	<0.1	0.9	0.8	0.1	0.1	1.7	2.9	0.4	0.3	0.1	0.1	0.1	0.1
Honduras	1.6	2.1	1.3[c]	2.8	3.9[c]	5.8	<0.1	0.2	0.2	0.1	0.1	1.1	2.0	0.4	0.5	<0.1	<0.1	<0.1	<0.1
Mexico	4.4	3.9	4.1[b]	3.8[b]	30.0[b]	26.4[b]	0.1	1.5	1.2	0.8	0.7	22.2	32.3	5.1	5.3	0.2	0.3	0.2	0.2
Nicaragua	1.2	1.4	n.r.	n.r.	n.r.	n.r.	n.a.	0.1	0.1	<0.1	0.1	1.0	1.5	0.2	0.3	<0.1	n.a.	<0.1	<0.1
Panama	0.7	0.2	n.r.	n.r.	n.r.	n.r.	<0.1	0.1	0.1	<0.1	<0.1	0.7	1.1	0.2	0.2	n.a.	n.a.	<0.1	<0.1
South America	**31.4**	**25.6**	**19.6**	**43.8**	**81.5**	**127.6**	**0.4**	**3.4**	**2.8**	**2.6**	**3.0**	**57.4**	**91.2**	**19.9**	**19.5**	**1.4**	**1.4**	**0.6**	**0.5**
Argentina	1.4	1.4	2.5	5.9	8.3	16.4	0.1	0.3	0.3	0.4	0.4	7.7	11.6	1.3	1.3	0.1	n.a.	0.1	<0.1
Bolivia (Plurinational State of)	2.6	2.8	n.r.	n.r.	n.r.	n.r.	<0.1	0.3	0.1	0.1	0.1	1.3	2.2	0.7	0.7	0.1	0.1	<0.1	<0.1
Brazil	11.7	8.4	1.5[b, c]	14.3[b, c]	27.2[b, c]	39.7[b, c]	0.5	1.0	1.0	1.2	1.4	27.2	45.7	10.1	9.2	0.6	0.6	0.2	0.2
Chile	0.5	n.r.	0.5[c]	0.7[b, c]	1.9[c]	3.4[b, c]	n.a.	<0.1	<0.1	0.1	0.1	3.8	5.9	0.4	0.4	n.a.	n.a.	<0.1	<0.1
Colombia	4.7	2.2	2.3[c]	2.8[b, c]	9.4[c]	16.3[b, c]	0.1	0.5	0.4	0.2	0.2	5.7	9.1	2.8	2.9	0.2	0.1	0.1	0.1
Ecuador	3.0	2.5	1.0[b, c]	2.3[c]	3.4[b, c]	6.6[c]	0.1	0.4	0.3	0.1	0.2	2.0	3.4	0.7	0.8	n.a.	n.a.	<0.1	<0.1
Guyana	0.1	n.r.	n.a.	<0.1[b]	n.a.	0.2[b]	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2	0.1	0.1	<0.1	<0.1	<0.1	<0.1

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1,2,3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2021–23[4] (millions)	2014–16 (millions)	2021–23 (millions)	2014–16 (millions)	2021–23 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2022[7] (millions)	2012 (millions)	2020 (millions)
Paraguay	0.4	0.3	<0.1[c]	0.4[b, c]	0.5[c]	1.8[b, c]	<0.1	0.1	<0.1	0.1	0.1	0.9	1.5	0.4	0.4	<0.1	<0.1	<0.1	<0.1
Peru	5.0	2.4	4.1[d]	6.9[d]	11.4[d]	17.6[d]	<0.1	0.6	0.3	0.2	0.3	3.6	6.4	1.6	1.8	0.2	0.2	0.1	<0.1
Suriname	<0.1	0.1	n.a.	<0.1	n.a.	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Uruguay	0.1	n.r.	n.a.	<0.1[b, c]	n.a.	0.5[b, c]	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	0.9	0.1	0.1	n.a.	<0.1	<0.1	<0.1
Venezuela (Bolivarian Republic of)	2.1	5.0	n.r.	n.r.	n.r.	n.r.	n.a.	0.4	0.2	0.2	0.2	4.4	4.3	1.6	1.8	n.a.	n.a.	0.1	<0.1
OCEANIA	**2.3**	**3.3**	**3.5**	**4.5**	**9.0**	**11.2**	**n.a.**	**0.7**	**0.8**	**0.4**	**0.6**	**6.9**	**9.6**	**1.3**	**1.6**	**n.a.**	**n.a.**	**0.1**	**0.1**
Australia and New Zealand	**n.r.**	**n.r.**	**0.8**	**1.3**	**3.0**	**4.2**	**n.a.**	**0.1**	**0.1**	**0.2**	**0.4**	**5.5**	**7.6**	**0.5**	**0.6**	**n.a.**	**n.a.**	**<0.1**	**<0.1**
Australia	n.r.	n.r.	0.7	1.1	2.6	3.4	n.a.	<0.1	0.1	0.2	0.3	4.5	6.2	0.4	0.5	n.a.	n.a.	<0.1	<0.1
New Zealand	n.r.	n.r.	0.1	0.2	0.5	0.8	n.a.	n.a.	n.a.	n.a.	n.a.	1.0	1.4	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Oceania excluding Australia and New Zealand	**2.0**	**3.1**	**2.7**	**3.2**	**5.9**	**7.0**	**0.1[a]**	**0.6**	**0.7**	**0.1**	**0.2**	**1.3**	**2.0**	**0.8**	**1.0**	**0.1**	**0.1**	**0.1**	**0.1**
Melanesia	**1.9**	**3.1**	**n.a.**	**3.1**	**n.a.**	**6.7**	**n.a.**	**0.6**	**0.7**	**0.1**	**0.2**	**1.0**	**1.6**	**0.8**	**0.9**	**0.1**	**0.1**	**0.1**	**0.1**
Fiji	<0.1	0.1	n.a.	<0.1	n.a.	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2	0.1	0.1	n.a.	<0.1	<0.1	<0.1
New Caledonia	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Papua New Guinea	1.8	2.8	n.a.	2.7	n.a.	5.8	n.a.	0.5	0.6	0.1	0.2	0.8	1.2	0.6	0.8	0.1	0.1	<0.1	<0.1
Solomon Islands	0.1	0.1	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	<0.1	n.a.	<0.1	<0.1
Vanuatu	<0.1	<0.1	n.a.	<0.1	n.a.	<0.1	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	n.a.	<0.1	<0.1
Micronesia	**<0.1**	**<0.1**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**0.1**	**0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**
Kiribati	<0.1	<0.1	n.a.	<0.1	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Marshall Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1,2,3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2021–23[4] (millions)	2014–16 (millions)	2021–23 (millions)	2014–16 (millions)	2021–23 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2022[7] (millions)	2012 (millions)	2020 (millions)
Micronesia (Federated States of)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.
Nauru	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.
Palau	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	<0.1	<0.1
Polynesia	**<0.1**	**<0.1**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**0.2**	**0.3**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**
American Samoa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cook Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	<0.1	<0.1
French Polynesia	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.1	0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Niue	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.
Samoa	<0.1	<0.1	n.a.	<0.1	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.
Tokelau (Associate Member)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tonga	n.a.	n.a.	n.a.	<0.1[b]	n.a.	<0.1[b]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.
Tuvalu	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.
NORTHERN AMERICA AND EUROPE	**n.r.**	**n.r.**	**14.3**	**16.8**	**96.8**	**92.4**	**n.a.**	**2.6**	**2.1**	**5.6**	**4.3**	**215.1**	**250.5**	**33.7**	**36.2**	**n.a.**	**n.a.**	**0.9**	**0.8**
Northern America**	**n.r.**	**n.r.**	**3.7**	**3.3**	**35.8**	**34.0**	**<0.1**	**0.6**	**0.7**	**1.9**	**1.7**	**96.1**	**119.2**	**8.1**	**9.8**	**0.6**	**0.5**	**0.3**	**0.3**
Bermuda	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Canada	n.r.	n.r.	n.a.	0.6[c]	n.a.	3.3[c]	n.a.	n.a.	n.a.	0.2	0.2	6.8	8.2	0.7	0.9	n.a.	n.a.	<0.1	<0.1
Greenland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
United States of America	n.r.	n.r.	3.5[b]	2.7[b]	34.0[b]	30.7[b]	<0.1	0.5	0.7	1.7	1.5	89.2	110.9	7.4	8.9	0.5	0.5	0.3	0.3

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2021–23[4] (millions)	2014–16 (millions)	2021–23 (millions)	2014–16 (millions)	2021–23 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2022[7] (millions)	2012 (millions)	2020 (millions)
Europe	**n.r.**	**n.r.**	**10.6**	**13.5**	**61.0**	**58.3**	**n.a.**	**2.1**	**1.4**	**3.7**	**2.6**	**118.0**	**129.0**	**25.5**	**26.5**	**n.a.**	**n.a.**	**0.6**	**0.5**
Eastern Europe	**n.r.**	**n.r.**	**4.3**	**5.3**	**32.8**	**30.8**	**n.a.**	**1.2**	**0.8**	**2.0**	**1.1**	**52.9**	**59.2**	**14.1**	**14.0**	**n.a.**	**n.a.**	**0.3**	**0.2**
Belarus	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.a.	<0.1	<0.1	<0.1	<0.1	1.7	1.6	0.5	0.4	<0.1	<0.1	<0.1	<0.1
Bulgaria	0.4	n.r.	0.1	0.2	1.1	1.0	n.a.	<0.1	<0.1	<0.1	<0.1	1.1	1.2	0.4	0.4	n.a.	n.a.	<0.1	<0.1
Czechia	n.r.	n.r.	<0.1	0.2	0.6	1.0	n.a.	<0.1	<0.1	<0.1	<0.1	1.9	2.2	0.5	0.5	n.a.	n.a.	<0.1	<0.1
Hungary	n.r.	n.r.	0.1	0.4	1.1	1.5	n.a.	n.a.	n.a.	n.a.	n.a.	2.1	2.6	0.5	0.4	n.a.	n.a.	<0.1	<0.1
Poland	n.r.	n.r.	0.7	0.3	3.4	2.2	n.a.	<0.1	<0.1	0.1	0.1	7.0	9.0	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1
Republic of Moldova	1.3	n.r.	<0.1	0.2	0.6	0.8	n.a.	<0.1	<0.1	<0.1	<0.1	0.6	0.6	0.3	0.3	<0.1	n.a.	<0.1	<0.1
Romania	n.r.	n.r.	1.1	1.4	3.8	3.8	n.a.	0.1	0.1	0.1	<0.1	3.6	5.4	1.1	1.0	n.a.	n.a.	<0.1	<0.1
Russian Federation	n.r.	n.r.	1.0	n.r.	11.9	6.7[b]	n.a.	n.a.	n.a.	1.0	0.6	26.0	27.7	7.3	7.2	n.a.	n.a.	0.1	0.1
Slovakia	0.3	0.2	<0.1	0.1	0.3	0.5	n.a.	n.a.	n.a.	n.a.	n.a.	0.9	1.2	0.3	0.3	n.a.	n.a.	<0.1	<0.1
Ukraine	n.r.	2.3	0.9	2.1	8.9	12.4	n.a.	0.5	0.2	0.6	0.2	8.1	7.7	1.6	1.8	0.1	n.a.	<0.1	<0.1
Northern Europe	**n.r.**	**n.r.**	**1.8**	**2.4**	**6.9**	**6.7**	**n.a.**	**0.2**	**0.2**	**0.5**	**0.5**	**17.7**	**20.4**	**2.5**	**2.8**	**n.a.**	**n.a.**	**0.1**	**0.1**
Denmark	n.r.	n.r.	<0.1	0.1	0.3	0.4	n.a.	n.a.	n.a.	n.a.	n.a.	0.6	0.6	0.1	0.2	n.a.	n.a.	<0.1	<0.1
Estonia	n.r.	n.r.	<0.1	<0.1	0.1	0.1	n.a.	<0.1	<0.1	<0.1	<0.1	0.2	0.2	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Finland	n.r.	n.r.	0.1	0.2	0.5	0.7	n.a.	n.a.	n.a.	n.a.	n.a.	0.8	1.0	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Iceland	n.r.	n.r.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.1	<0.1	<0.1	n.a.	n.a.	<0.1	<0.1
Ireland	n.r.	n.r.	0.2	<0.1	0.4	0.2	n.a.	n.a.	n.a.	n.a.	n.a.	0.9	1.1	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Latvia	n.r.	n.r.	<0.1	<0.1	0.2	0.2	<0.1[g]	<0.1	<0.1	<0.1	<0.1	0.4	0.4	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Lithuania	n.r.	n.r.	<0.1	<0.1	0.5	0.2	<0.1[g]	<0.1	<0.1	<0.1	<0.1	0.6	0.6	0.1	0.1	n.a.	n.a.	<0.1	<0.1

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2021–23[4] (millions)	2014–16 (millions)	2021–23 (millions)	2014–16 (millions)	2021–23 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2022[7] (millions)	2012 (millions)	2020 (millions)
Norway	n.r.	n.r.	<0.1	<0.1	0.2	0.4	n.a.	n.a.	n.a.	n.a.	n.a.	0.6	0.8	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Sweden	n.r.	n.r.	<0.1	0.2	0.4	0.6	n.a.	n.a.	n.a.	n.a.	n.a.	1.1	1.3	0.3	0.3	n.a.	n.a.	<0.1	<0.1
United Kingdom of Great Britain and Northern Ireland	n.r.	n.r.	1.2	1.7	4.1	3.8	<0.1[g]	n.a.	n.a.	0.4	0.4	12.4	14.3	1.4	1.7	n.a.	n.a.	0.1	<0.1
Southern Europe	**n.r.**	**n.r.**	**2.1**	**2.2**	**11.4**	**9.9**	**n.a.**	**0.4**	**0.2**	**0.7**	**0.5**	**22.8**	**23.6**	**4.8**	**5.0**	**n.a.**	**n.a.**	**0.1**	**0.1**
Albania	0.3	0.1	0.3	0.2	1.1	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.5	0.2	0.2	<0.1	<0.1	<0.1	<0.1
Andorra	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	<0.1	<0.1
Bosnia and Herzegovina	n.r.	n.r.	<0.1	<0.1	0.3	0.4	n.a.	<0.1	<0.1	<0.1	<0.1	0.5	0.6	0.2	0.2	<0.1	n.a.	<0.1	<0.1
Croatia	n.r.	n.r.	<0.1	<0.1	0.3	0.3	n.a.	n.a.	n.a.	n.a.	n.a.	0.8	1.0	0.2	0.2	n.a.	n.a.	<0.1	<0.1
Greece	n.r.	n.r.	0.3	0.2[b]	1.7	0.7[b]	n.a.	<0.1	<0.1	0.1	0.1	2.2	2.4	0.3	0.3	n.a.	n.a.	<0.1	<0.1
Italy	n.r.	n.r.	n.a.	n.r.	n.a.	1.2[b]	n.a.	n.a.	n.a.	n.a.	n.a.	8.0	8.6	1.6	1.7	n.a.	n.a.	<0.1	<0.1
Malta	n.r.	n.r.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	0.1	0.1	<0.1	<0.1	n.a.	n.a.	<0.1	<0.1
Montenegro	<0.1	n.r.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
North Macedonia	0.1	n.r.	<0.1	0.1	0.3	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.5	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Portugal	n.r.	n.r.	0.4	0.3	1.5	1.3	<0.1[g]	<0.1	<0.1	<0.1	<0.1	1.6	1.9	0.3	0.3	n.a.	n.a.	<0.1	<0.1
Serbia	0.3	n.r.	0.2	0.3	1.1	1.2	<0.1	<0.1	<0.1	0.1	<0.1	1.1	1.3	0.5	0.5	<0.1	<0.1	<0.1	<0.1
Slovenia	n.r.	n.r.	<0.1	<0.1	0.3	0.2	n.a.	n.a.	n.a.	n.a.	n.a.	0.3	0.3	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Spain	n.r.	n.r.	0.5	0.7	3.3	3.3	n.a.	n.a.	n.a.	n.a.	n.a.	7.2	6.2	1.4	1.4	n.a.	n.a.	<0.1	<0.1

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2021–23[4] (millions)	2014–16 (millions)	2021–23 (millions)	2014–16 (millions)	2021–23 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2022[7] (millions)	2012 (millions)	2020 (millions)
Western Europe	**n.r.**	**n.r.**	**2.4**	**3.6**	**10.0**	**10.9**	**n.a.**	**0.3**	**0.2**	**0.5**	**0.5**	**25.0**	**25.2**	**4.1**	**4.8**	**n.a.**	**n.a.**	**0.1**	**0.1**
Austria	n.r.	n.r.	<0.1	0.2	0.5	0.4	n.a.	n.a.	n.a.	n.a.	n.a.	1.0	1.1	0.2	0.3	n.a.	n.a.	<0.1	<0.1
Belgium	n.r.	n.r.	n.a.	0.2	n.a.	0.9	n.a.	<0.1	<0.1	<0.1	<0.1	1.6	1.9	0.3	0.3	n.a.	n.a.	<0.1	<0.1
France	n.r.	n.r.	1.0	1.5	4.3	5.1	n.a.	n.a.	n.a.	n.a.	n.a.	5.8	5.0	1.2	1.5	n.a.	n.a.	0.1	0.1
Germany	n.r.	n.r.	0.8	1.3	3.3	3.4	<0.1[g]	0.1	0.1	0.1	0.1	13.9	14.2	1.7	2.0	n.a.	n.a.	<0.1	0.1
Luxembourg	n.r.	n.r.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	0.1	0.1	<0.1	<0.1	n.a.	n.a.	<0.1	<0.1
Netherlands (Kingdom of the)	n.r.	n.r.	0.3	0.3	1.0	1.0	n.a.	<0.1	<0.1	<0.1	<0.1	1.8	2.1	0.4	0.5	n.a.	n.a.	<0.1	<0.1
Switzerland	n.r.	n.r.	0.1	<0.1	0.4	0.2	n.a.	n.a.	n.a.	n.a.	n.a.	0.8	0.9	0.2	0.2	n.a.	n.a.	<0.1	<0.1

NOTES:

n.a. = data not available; n.r. = data not reported. In the case of the number of undernourished, this is because the prevalence is less than 2.5 percent; – = not applicable. <0.1 = less than 100 000 people.
1. Regional estimates are included when more than 50 percent of population is covered. To reduce the margin of error, estimates are presented as three-year averages.
2. FAO estimates of the number of people living in households where at least one adult has been found to be food insecure.
3. Country-level results are presented only for those countries for which estimates are based on official national data (see note b) or as provisional estimates, based on FAO data collected through the Gallup© World Poll for countries whose national relevant authorities expressed no objection to their publication. Note that consent to publication does not necessarily imply validation of the estimate by the national authorities involved and that the estimate is subject to revision as soon as suitable data from official national sources are available. Global, regional and subregional aggregates are based on data collected in approximately 150 countries.
4. The estimates referring to the middle of the projected ranges for the years 2020 to 2022 were used to calculate the three-year averages.
5. For regional estimates, values correspond to the model predicted estimates for 2022. For countries, the latest data available from 2016 to 2023 are used.
6. Regional estimates are included when more than 50 percent of population is covered. For countries, the latest data available from 2005 to 2012 are used.
7. Regional estimates are included when more than 50 percent of population is covered. For countries, the latest data available from 2016 to 2022 are used.
* Wasting under five years of age; regional aggregates exclude Japan.
** The Northern America wasting estimates are derived applying mixed-effect models with subregions as fixed effects; data were available only for the United States of America, preventing the estimation of standard errors (and confidence intervals). Further details on the methodology are described in De Onis, M., Blössner, M., Borghi, E., Frongillo, E.A. & Morris, R. 2004. Estimates of global prevalence of childhood underweight in 1990 and 2015. *Journal of the American Medical Association*, 291(21): 2600–2606. https://doi.org/10.1001/jama.291.21.2600. Model selection is based on best fit.

a. Consecutive low population coverage; interpret with caution.
b. Based on official national data.
c. For years when official national data are not available, the estimates are integrated with FAO data. See **Annex 1B** for further details.
d. Results based on data collected by FAO through the Gallup© World Poll (see **Annex 1B** for methodology) are provisional and will be revised soon, as the National Institute of Statistics and Informatics (INEI) has made great progress in adapting and incorporating the Food Insecurity Experience Scale module in the National Household Survey (Encuesta Nacional de Hogares – ENAHO).
e. Most recent input data are from before 2000, interpret with caution.
f. The UNICEF–WHO low birthweight estimates are derived through standard methodology applied to all countries to ensure comparability and are not the official statistics of the Government of India. India's most recent national official low birthweight prevalence is 18.2 percent from the 2019–2021 National Family Health Survey–5 (NFHS-5), which is used as the basis of the UNICEF–WHO global estimation model to support cross-country comparability.
g. This estimate has been adjusted because the original estimate did not cover the full age range or the data source was only representative of rural areas.
h. The estimate for Palestine reflects the situation before the conflict erupted at the end of 2023.

SOURCES: Data for undernourishment and food insecurity are from FAO. 2024. *FAOSTAT: Suite of Food Security Indicators*. [Accessed on 24 July 2024]. https://www.fao.org/faostat/en/#data/FS. Licence: CC-BY-4.0; data for stunting, wasting and overweight are based on UNICEF, WHO & World Bank. 2023. *Levels and trends in child malnutrition. UNICEF / WHO / World Bank Group Joint Child Malnutrition Estimates – Key findings of the 2023 edition*. New York, USA, UNICEF, Geneva, Switzerland, WHO and Washington, DC, World Bank. https://data.unicef.org/resources/jme-report-2023, http://www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition; data for adult obesity are based on WHO. 2024. *Global Health Observatory (GHO) data repository: Prevalence of obesity among adults, BMI ≥ 30, age-standardized. Estimates by country*. [Accessed on 24 July 2024]. https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-=-30-(age-standardized-estimate)-(-). Licence: CC-BY-4.0; data for anaemia are based on WHO. 2021. WHO global anaemia estimates, 2021 edition. In: *WHO*. [Cited 24 July 2024]. https://www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children; data for exclusive breastfeeding are based on UNICEF. 2024. Infant and young child feeding. In: *UNICEF*. [Cited 24 July 2024]. https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding; data for low birthweight are from UNICEF & WHO. 2023. Low birthweight. In: *UNICEF*. [Cited 24 July 2024]. https://data.unicef.org/topic/nutrition/low-birthweight; UNICEF & WHO. 2023. Joint low birthweight estimates. In: *WHO*. [Cited 24 July 2024]. https://www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-low-birthweight-estimates

TABLE A1.3 PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY, AND SEVERE FOOD INSECURITY ONLY, BY DEGREE OF URBANIZATION IN 2023

	Prevalence of severe food insecurity			Prevalence of moderate or severe food insecurity		
	Rural	Peri-urban (%)	Urban	Rural	Peri-urban (%)	Urban
WORLD	**11.3**	**12.0**	**9.0**	**31.9**	**29.9**	**25.5**
AFRICA	**22.9**	**22.4**	**19.9**	**60.2**	**59.9**	**54.3**
Northern Africa	13.0	9.8	12.6	40.0	29.8	34.0
Sub-Saharan Africa	23.9	25.2	22.4	62.4	66.5	61.2
Eastern Africa	24.1	25.9	21.7	63.9	68.0	60.4
Middle Africa	42.1	42.8	33.7	79.8	81.4	74.9
Southern Africa	13.6	10.8	9.4	31.1	24.5	21.7
Western Africa	17.0	20.4	19.2	57.0	66.0	61.6
ASIA	**9.2**	**11.8**	**8.1**	**26.6**	**27.2**	**21.6**
Central Asia	2.6	4.1	3.1	14.8	17.4	16.4
Eastern Asia	1.3	1.3	0.8	12.0	5.0	5.5
South-eastern Asia	3.2	3.4	2.4	19.3	19.6	13.8
Southern Asia	18.5	21.4	17.0	40.9	43.7	38.3
Western Asia	13.2	17.5	11.2	41.1	46.7	32.5
Western Asia and Northern Africa	*13.1*	*13.5*	*11.8*	*40.6*	*37.8*	*33.2*
LATIN AMERICA AND THE CARIBBEAN	**10.9**	**10.4**	**7.6**	**32.2**	**30.7**	**26.0**
Caribbean	33.2	35.5	28.6	65.3	68.2	58.4
Latin America	9.6	7.5	6.3	30.2	26.5	24.0
Central America	11.8	8.7	4.9	37.8	31.1	21.8
South America	8.5	7.0	6.8	26.4	24.4	24.8
OCEANIA	**5.1**	**4.6**	**4.7**	**15.3**	**16.6**	**15.8**
NORTHERN AMERICA AND EUROPE	**1.5**	**1.6**	**1.8**	**8.5**	**8.2**	**9.7**
Europe	1.8	2.0	2.2	8.6	8.1	8.6
Eastern Europe	2.2	2.1	1.9	12.5	11.3	10.6
Northern Europe	2.0	4.0	2.9	8.1	8.3	7.3
Southern Europe	1.3	1.1	1.3	6.6	5.9	6.1
Western Europe	1.4	1.7	2.7	4.5	5.4	8.1
Northern America	0.9	0.7	1.2	8.3	8.4	11.8
COUNTRY INCOME GROUP						
Low-income countries	24.9	28.5	22.8	63.7	69.5	59.9
Lower-middle-income countries	17.8	18.7	16.1	45.6	43.6	40.7
Upper-middle-income countries	3.5	2.6	2.7	16.4	9.9	11.7
High-income countries	1.5	2.1	2.2	7.8	8.3	9.4

SOURCE: FAO. 2024. *FAOSTAT: Suite of Food Security Indicators*. [Accessed on 24 July 2024]. www.fao.org/faostat/en/#data/FS.

TABLE A1.4 PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY, AND SEVERE FOOD INSECURITY ONLY, AMONG ADULT MEN AND WOMEN IN 2023

	Prevalence of severe food insecurity		Prevalence of moderate or severe food insecurity	
	Men	Women	Men	Women
	(%)		(%)	
WORLD	**9.2**	**10.0**	**25.4**	**26.7**
AFRICA	**20.6**	**21.3**	**56.1**	**57.2**
Northern Africa	10.7	12.5	31.3	35.0
Sub-Saharan Africa	23.2	23.6	62.6	62.7
Eastern Africa	23.6	24.5	64.7	64.3
Middle Africa	38.1	37.5	77.0	78.0
Southern Africa	10.0	11.5	23.5	25.7
Western Africa	18.9	18.8	61.3	61.7
ASIA	**8.8**	**9.9**	**23.1**	**24.2**
Central Asia	3.7	3.2	16.2	16.7
Eastern Asia	1.2	0.9	7.0	5.6
South-eastern Asia	2.9	2.8	16.1	17.1
Southern Asia	17.4	20.8	38.8	42.8
Western Asia	13.5	12.3	35.4	37.7
Western Asia and Northern Africa	*12.3*	*12.4*	*33.6*	*36.5*
LATIN AMERICA AND THE CARIBBEAN	**7.8**	**9.2**	**25.1**	**30.3**
Caribbean	n.a.	n.a.	n.a.	n.a.
Latin America	6.4	7.7	22.7	28.1
Central America	6.7	8.0	24.8	30.6
South America	6.3	7.5	21.9	27.2
OCEANIA	**10.1**	**9.1**	**25.6**	**24.8**
NORTHERN AMERICA AND EUROPE	**1.9**	**1.7**	**8.0**	**9.2**
Europe	2.4	2.0	7.9	8.3
Eastern Europe	1.8	2.1	9.8	11.9
Northern Europe	3.7	2.4	8.3	7.2
Southern Europe	1.0	1.6	4.7	7.5
Western Europe	2.5	1.4	7.0	5.2
Northern America	0.8	1.2	8.2	11.5

SOURCE: FAO. 2024. *FAOSTAT: Suite of Food Security Indicators*. [Accessed on 24 July 2024]. www.fao.org/faostat/en/#data/FS. Licence: CC-BY-4.0.

TABLE A1.5 THE COST OF A HEALTHY DIET BY REGION, SUBREGION, COUNTRY AND COUNTRY INCOME GROUP, 2017–2021

Regions/subregions/ countries/territories	Cost of a healthy diet					
	2017	2018	2019	2020	2021	2022
	(PPP dollars per person per day)					
WORLD	**3.13**	**3.17**	**3.25**	**3.35**	**3.56**	**3.96**
Low-income countries	**2.94**	**2.93**	**2.95**	**3.02**	**3.33**	**3.48**
Lower-middle-income countries	**3.23**	**3.29**	**3.35**	**3.49**	**3.77**	**4.20**
Upper-middle-income countries	**3.30**	**3.36**	**3.46**	**3.54**	**3.74**	**4.20**
High-income countries	**3.01**	**3.07**	**3.16**	**3.26**	**3.41**	**3.78**
AFRICA	**3.07**	**3.09**	**3.12**	**3.18**	**3.41**	**3.74**
Northern Africa	**3.33**	**3.42**	**3.48**	**3.42**	**3.44**	**3.78**
Algeria	4.06	4.13	4.10	4.06	4.36	4.89
Egypt	3.83	3.88	3.88	3.73	3.88	4.55
Libya	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Morocco	2.60	2.64	2.65	2.69	2.79	3.14
Sudan	2.53	2.70	2.96	2.82	2.12	1.86
Tunisia	3.66	3.74	3.82	3.83	4.03	4.46
Sub-Saharan Africa	**3.04**	**3.05**	**3.07**	**3.15**	**3.41**	**3.73**
Eastern Africa*	**3.08**	**3.03**	**3.04**	**3.13**	**3.49**	**3.79**
Burundi	3.34	3.13	3.11	3.29	3.50	3.97
Comoros	4.56	n.a.	n.a.	n.a.	4.55	n.a.
Djibouti	2.79	2.86	2.98	3.10	3.27	3.71
Eritrea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Ethiopia	2.83	2.86	2.99	3.10	3.37	3.72
Kenya	2.79	2.77	2.85	2.91	3.13	3.54
Madagascar	3.03	3.16	3.20	3.23	3.43	3.75
Malawi	2.46	2.53	2.70	2.84	3.03	3.43
Mauritius	3.43	3.52	3.56	3.74	3.92	4.39
Mozambique	2.81	2.77	2.84	2.97	3.26	3.60
Rwanda	3.09	2.94	3.01	3.20	3.22	3.80
Seychelles	3.51	3.47	3.46	3.32	3.62[a]	3.88[a]
Somalia	n.a.	n.a.	n.a.	n.a.	4.14	n.a.
South Sudan	n.a.	n.a.	n.a.	n.a.	3.97	n.a.
Uganda	3.12	3.08	3.04	3.03	3.15	3.60
United Republic of Tanzania	2.20	2.25	2.27	2.32	2.43	2.70
Zambia	2.73	2.79	2.88	2.92	3.20	3.53
Zimbabwe	3.46	n.r.	n.r.	n.r.	n.r.	n.r.
Middle Africa	**3.14**	**3.12**	**3.12**	**3.17**	**3.33**	**3.67**
Angola	3.44	3.41	3.46	3.65	4.00	4.41[a]
Cameroon	2.58	2.65	2.70	2.77	2.95	3.39
Central African Republic	2.96	3.03	3.08	3.12	3.27	3.53
Chad	2.75	2.66	2.59	2.74	2.86	3.27
Congo	3.02	3.05	3.04	3.09	3.27	3.64

TABLE A1.5 (Continued)

Regions/subregions/ countries/territories	Cost of a healthy diet					
	2017	2018	2019	2020	2021	2022
	(PPP dollars per person per day)					
Democratic Republic of the Congo	4.30	3.80[a]	3.52[a]	3.30[a]	3.32[a]	3.53[a]
Equatorial Guinea	3.67	3.75	3.79	3.83	3.97	4.32
Gabon	3.25	3.30	3.38	3.43	3.61	3.96
Sao Tome and Principe	2.33	2.41	2.48	2.57	2.72	2.99
Southern Africa	**3.27**	**3.28**	**3.34**	**3.45**	**3.66**	**3.97**
Botswana	3.13	3.09	3.10	3.20	3.31	3.56
Eswatini	3.36	3.29	3.33	3.34[a]	3.47[a]	3.69[a]
Lesotho	3.52	3.62	3.74	3.98	4.31	4.68
Namibia	3.28	3.33	3.41	3.55	3.79	4.16
South Africa	3.05	3.08	3.12	3.19	3.39	3.74
Western Africa	**2.88**	**2.96**	**2.99**	**3.08**	**3.28**	**3.65**
Benin	2.84	2.94	2.93	2.97	3.23	3.42
Burkina Faso	2.67	2.78	2.73	2.82	3.04	3.57
Cabo Verde	3.20	3.26	3.32	3.40	3.51	4.07
Côte d'Ivoire	2.45	2.52	2.63	2.71	2.93	3.27
Gambia	2.65	2.71	2.75	2.80	3.00	3.31
Ghana	3.45	3.54	3.62	3.70	3.89	4.29
Guinea	2.26	2.39	2.48	2.56	2.75	3.06
Guinea-Bissau	2.95	3.03	3.11	3.20	3.44	3.73
Liberia	3.08	3.09	3.18[a]	3.37[a]	3.34[a]	3.50[a]
Mali	2.87	3.00	2.93	3.02	3.19	3.58
Mauritania	3.73	3.86	3.95	3.99	4.27	4.86
Niger	3.22	3.17	3.15	3.28	3.56	3.96
Nigeria	2.88	3.01	3.12	3.24	3.49	3.83
Senegal	2.66	2.73	2.77	2.83	2.98	3.38
Sierra Leone	2.69	2.80	2.70	2.74	3.00	3.32
Togo	2.46	2.50	2.52	2.59	2.86	3.18
ASIA	**3.23**	**3.29**	**3.38**	**3.54**	**3.84**	**4.20**
Central Asia	**3.14**	**3.19**	**3.31**	**3.52**	**3.78**	**4.14**
Kazakhstan	2.12	2.15	2.24	2.35	2.52	2.79[a]
Kyrgyzstan	3.23	3.19	3.25	3.46	3.81	4.20
Tajikistan	3.11	3.12[a]	3.29[a]	3.57[a]	3.71[a]	3.90[a]
Turkmenistan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Uzbekistan	4.11	4.30	4.48	4.71	5.09	5.67
Eastern Asia	**4.12**	**4.29**	**4.37**	**4.59**	**4.87**	**5.34**
China, mainland	2.68	2.74	2.91	3.11	3.08	3.35
Taiwan Province of China	3.99	n.a.	n.a.	n.a.	4.97	n.a.
China, Hong Kong SAR	3.64	3.81	3.93	4.13	4.43	4.88
China, Macao SAR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

TABLE A1.5 (Continued)

Regions/subregions/ countries/territories	Cost of a healthy diet					
	2017	2018	2019	2020	2021	2022
	(PPP dollars per person per day)					
Democratic People's Republic of Korea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Japan	5.48	5.65	5.57	5.80	5.91	6.54
Mongolia	4.21	4.33	4.54	4.74	5.26	5.86
Republic of Korea	4.73	4.92	4.90	5.18	5.57	6.09
South-eastern Asia	**3.53**	**3.62**	**3.70**	**3.83**	**4.02**	**4.35**
Brunei Darussalam	3.98	4.11	4.17	4.25	4.48	4.90
Cambodia	3.72	3.81	3.89	4.00	4.18	4.50
Indonesia	3.69	3.82	3.83	3.98	4.22	4.64
Lao People's Democratic Republic	3.80	3.86	3.99	4.17	4.34	4.65
Malaysia	2.99	3.08	3.16	3.28	3.41	3.77
Myanmar	3.71	3.79	3.86	3.94[a]	4.25[a]	4.56[a]
Philippines	3.38	3.51	3.57	3.62	3.84	4.10
Singapore	2.83	2.92	2.99	3.12	3.24	3.48
Thailand	4.03	4.10	4.25	4.39	4.53	4.93
Timor-Leste	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Viet Nam	3.14	3.20	3.30	3.56	3.69	3.96
Southern Asia	**3.28**	**3.35**	**3.45**	**3.59**	**3.84**	**4.28**
Afghanistan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Bangladesh	3.03	3.13	3.18	3.22	3.37	3.64
Bhutan	4.07	4.26	4.38	4.66	4.96	5.28
India	2.86	2.87	2.92	3.01	3.11	3.36
Iran (Islamic Republic of)	3.01	3.21	3.64	3.60	4.17	5.13
Maldives	3.45	3.50	3.53	3.72	3.95	4.36
Nepal	3.30	3.34	3.41	3.52	3.69	3.97
Pakistan	2.92	2.91	2.97	3.16	3.34	3.76
Sri Lanka	3.58	3.58	3.54	3.79	4.13	4.77
Western Asia	**2.67**	**2.74**	**2.82**	**2.98**	**3.37**	**3.70**
Armenia	3.21	3.28	3.36	3.37	3.66	4.11
Azerbaijan	2.87	2.93	3.00	3.09	3.28	3.74
Bahrain	3.07	3.15	3.25	3.48	3.67	4.22
Cyprus	2.89	2.93	3.04	3.14	3.19	3.53
Georgia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Iraq	3.38	3.47	3.54	3.54	3.67	4.03
Israel	2.51	2.58	2.60	2.61	2.75	3.02
Jordan	2.94	2.98	3.01	3.12	3.22	3.45
Kuwait	2.17	2.21	2.25	2.34	2.59	2.89
Lebanon	1.47	1.49	1.53	2.97	5.01	6.76[a]
Oman	2.32	2.34	2.41	2.49	2.59	2.87
Palestine	2.62	2.66	2.74	2.63	2.58	2.98
Qatar	2.31	2.36	2.42	2.51	2.63	2.82
Saudi Arabia	2.49	2.65	2.82	3.00	3.22	3.52

TABLE A1.5 (Continued)

Regions/subregions/ countries/territories	Cost of a healthy diet					
	2017	2018	2019	2020	2021	2022
	(PPP dollars per person per day)					
Syrian Arab Republic	n.a.	n.a.	n.a.	n.a.	5.11	n.a.
Türkiye	3.44	3.58	3.87	3.71	3.82	4.50
United Arab Emirates	2.42	2.50	2.55	2.74	2.86	3.14
Yemen	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
LATIN AMERICA AND THE CARIBBEAN	**3.61**	**3.68**	**3.76**	**3.87**	**4.08**	**4.56**
Caribbean	**4.03**	**4.16**	**4.27**	**4.41**	**4.63**	**5.16**
Antigua and Barbuda	3.93	4.11	4.20	4.31	4.48	4.97
Aruba	3.47	3.68	3.97	4.09[a]	4.20[a]	4.71[a]
Bahamas	4.28	4.39	4.36	4.49	4.66	5.41
Barbados	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
British Virgin Islands	3.53	3.37[a]	3.59[a]	3.52[a]	3.74[a]	3.80[a]
Cuba	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cayman Islands	3.58	3.52[a]	3.32[a]	3.56[a]	3.72[a]	3.83[a]
Curaçao	3.02	3.15	3.31	3.41[a]	3.68[a]	4.10[a]
Dominica	4.30	4.46	4.56	4.67	4.91[a]	5.32[a]
Dominican Republic	3.33	3.41	3.54	3.67	3.91	4.31
Grenada	4.52	4.65	4.72	4.87	5.12	5.70
Haiti	3.93	4.07	4.28	4.49	4.81	5.26
Jamaica	4.94	5.08	5.29	5.52	5.82	6.42
Puerto Rico	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Saint Kitts and Nevis	3.35	3.55	3.70	3.80	3.94	4.58
Saint Lucia	3.44	3.59	3.71	3.79	3.87	4.15
Saint Vincent and the Grenadines	4.34	4.45	4.51	4.68	4.94	5.56
Sint Maarten (Dutch part)	4.46	4.79[a]	4.81[a]	4.90[a]	5.23[a]	5.50[a]
Trinidad and Tobago	3.91	4.01	4.07	4.21	4.51	5.08
Turks and Caicos Islands	2.81	2.90	2.97	3.07	3.23	3.55
Central America	**3.24**	**3.30**	**3.37**	**3.42**	**3.60**	**4.05**
Belize	2.51	2.55	2.60	2.66	2.83	3.10
Costa Rica	3.54	3.57	3.67	3.55	3.67	4.27
El Salvador	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Guatemala	2.43	2.58	2.73	2.85	3.00	3.31
Honduras	3.63	3.69	3.68	3.77	3.89	4.37
Mexico	2.90	2.97	2.98	3.07	3.29	3.89
Nicaragua	3.67	3.73	3.77	3.84	4.07	4.61
Panama	3.99	4.03	4.13	4.22	4.42	4.82
South America**	**3.42**	**3.44**	**3.52**	**3.61**	**3.84**	**4.29**
Argentina	3.32	n.r.	n.r.	n.r.	n.r.	n.r.
Bolivia (Plurinational State of)	3.50	3.60	3.72	3.70	3.87	4.20
Brazil	3.22	3.21	3.30	3.53	3.84	4.25
Chile	3.38	3.52	3.66	3.79	3.86	4.54
Colombia	2.84	2.87	2.95	3.15	3.34	4.13

TABLE A1.5 (Continued)

Regions/subregions/ countries/territories	Cost of a healthy diet (PPP dollars per person per day)					
	2017	2018	2019	2020	2021	2022
Ecuador	2.50	2.52	2.56	2.62	2.72	2.99
Guyana	4.63	4.74	4.83	4.89	5.12	5.53
Paraguay	3.68	3.77	3.78	3.81	4.15	4.70
Peru	3.28	3.26	3.30	3.33	3.55	4.00
Suriname	4.42	4.65[a]	4.75	5.11	5.42	5.82
Uruguay	2.87	2.96	3.04	3.19	3.31	3.64
Venezuela (Bolivarian Republic of)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
OCEANIA	**2.74**	**2.74**	**2.85**	**2.95**	**3.12**	**3.46**
American Samoa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Australia	2.33	2.36	2.40	2.51	2.58	2.90
Cook Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Fiji	3.24	3.30	3.46	3.51	3.91	4.28
French Polynesia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Kiribati	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Marshall Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Micronesia (Federated States of)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Nauru	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
New Caledonia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
New Zealand	2.65	2.57	2.70	2.83	2.86	3.21
Niue	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Palau	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Papua New Guinea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Samoa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Solomon Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tokelau (Associate Member)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tonga	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tuvalu	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Vanuatu	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
NORTHERN AMERICA AND EUROPE	**2.77**	**2.82**	**2.95**	**3.02**	**3.12**	**3.57**
Northern America	**2.73**	**2.69**	**2.72**	**2.77**	**2.77**	**2.96**
Bermuda	2.95	2.74[a]	2.78[a]	2.69[a]	2.46[a]	2.35[a]
Canada	3.08	3.13	3.19	3.33	3.48	3.89
Greenland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
United States of America	2.17	2.18	2.20	2.28	2.36	2.63
Europe	**2.77**	**2.83**	**2.97**	**3.04**	**3.15**	**3.61**
Eastern Europe	**2.83**	**2.90**	**3.04**	**3.15**	**3.26**	**3.75**
Belarus	3.13	3.18	3.26	3.26	3.42	3.74
Bulgaria	3.39	3.47	3.66	3.80	3.94	4.74
Czechia	2.81	2.83	2.97	3.00	3.13	3.63
Hungary	3.36	3.45	3.60	3.69	3.71	4.51
Poland	2.95	3.03	3.25	3.38	3.43	3.91

TABLE A1.5 (Continued)

Regions/subregions/ countries/territories	Cost of a healthy diet					
	2017	2018	2019	2020	2021	2022
	(PPP dollars per person per day)					
Republic of Moldova	2.35	2.46	2.57	2.69	2.87	3.17
Romania	2.79	2.84	3.03	3.17	3.24	3.66
Russian Federation	2.25	2.28	2.33	2.44	2.63	2.90
Slovakia	2.46	2.53	2.68	2.89	2.98	3.54
Ukraine	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Northern Europe	**2.62**	**2.66**	**2.77**	**2.84**	**2.90**	**3.28**
Denmark	2.20	2.26	2.34	2.41	2.49	2.73
Estonia	3.14	3.21	3.35	3.43	3.41	3.88
Finland	2.53	2.61	2.72	2.81	2.88	3.29
Iceland	2.37	2.41	2.52	2.70	2.78	3.02
Ireland	2.33	2.27	2.30	2.22	2.24	2.48
Latvia	3.04	3.03	3.19	3.28	3.35	3.97
Lithuania	2.85	2.87	3.04	3.07	3.15	3.72
Norway	3.32	3.43	3.53	3.61	3.63	4.01
Sweden	2.71	2.77	2.91	3.00	3.10	3.56
United Kingdom of Great Britain and Northern Ireland	1.70	1.75	1.83	1.86	1.93	2.12
Southern Europe	**3.11**	**3.18**	**3.35**	**3.39**	**3.55**	**4.15**
Albania	3.04	3.13	3.32	3.40	3.55	4.19
Andorra	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Bosnia and Herzegovina	4.07	4.13	4.34	4.34	4.57	5.53
Croatia	3.31	3.35	3.44	3.53	3.66	4.21
Greece	2.93	2.99	3.10	3.13	3.25	3.74
Italy	2.74	2.83	3.01	3.09	3.19	3.61
Malta	3.35	3.49	3.75	3.74	3.94	4.44
Montenegro	3.21	3.24	3.49	3.43	3.67	4.49
North Macedonia	3.29	3.30	3.48	3.51	3.86	4.60
Portugal	2.64	2.73	2.85	2.87	2.99	3.52
Serbia	3.56	3.64	3.84	3.85	3.99	4.62
Slovenia	2.60	2.70	2.85	2.98	3.02	3.44
Spain	2.53	2.57	2.70	2.75	2.91	3.35
Western Europe	**2.33**	**2.42**	**2.52**	**2.60**	**2.68**	**3.01**
Austria	2.06	2.11	2.19	2.30	2.43	2.76
Belgium	2.00	2.07	2.16	2.28	2.32	2.56
France	2.58	2.65	2.83	2.94	3.04	3.42
Germany	2.64	2.76	2.87	2.97	3.10	3.56
Luxembourg	2.46	2.59	2.62	2.62	2.70	2.99
Netherlands (Kingdom of the)	2.21	2.27	2.39	2.49	2.54	2.90
Switzerland	2.39	2.45	2.55	2.59	2.65	2.85

NOTES: PPP = purchasing power parity. n.a. = data not available. n.r. = data not reported.* Includes Zimbabwe. ** Includes Argentina. [a] PPP was imputed.

SOURCE: FAO. 2024. *FAOSTAT: Cost and Affordability of a Healthy Diet (CoAHD)*. [Accessed on 24 July 2024]. www.fao.org/faostat/en/#data/CAHD.

TABLE A1.6 UNAFFORDABILITY OF A HEALTHY DIET BY REGION, SUBREGION, COUNTRY AND COUNTRY INCOME GROUP, 2017–2022

Regions/subregions/ countries/territories	Proportion of the population unable to afford a healthy diet (%)						Number of people unable to afford a healthy diet (millions)					
	2017	2018	2019	2020	2021	2022	2017	2018	2019	2020	2021	2022
WORLD	**40.3**	**38.0**	**36.4**	**37.9**	**36.4**	**35.4**	**3 062.3**	**2 916.1**	**2 823.4**	**2 968.0**	**2 876.4**	**2 826.3**
Low-income countries	**73.9**	**72.6**	**72.3**	**73.0**	**72.0**	**71.5**	**453.9**	**457.8**	**468.9**	**487.0**	**493.5**	**503.2**
Lower-middle-income countries	**59.3**	**55.5**	**52.9**	**55.5**	**54.2**	**52.6**	**1 771.4**	**1 683.8**	**1 624.8**	**1 729.9**	**1 711.2**	**1 676.9**
Upper-middle-income countries	**28.2**	**25.7**	**24.2**	**24.8**	**22.2**	**21.5**	**769.7**	**707.7**	**668.9**	**690.5**	**620.1**	**601.2**
High-income countries	**8.4**	**8.2**	**7.6**	**7.6**	**6.7**	**6.3**	**102.9**	**101.0**	**94.4**	**94.0**	**83.7**	**79.0**
AFRICA	**65.1**	**64.6**	**64.1**	**65.1**	**64.6**	**64.8**	**822.4**	**836.5**	**851.4**	**885.3**	**900.2**	**924.8**
Northern Africa	**36.9**	**38.1**	**37.0**	**35.7**	**31.7**	**31.5**	**87.7**	**92.4**	**91.4**	**89.9**	**81.2**	**81.9**
Algeria	17.8	17.0	16.4	18.3	18.7	19.7	7.3	7.1	7.0	7.9	8.3	8.8
Egypt	53.0	54.2	49.4	44.9	42.3	44.4	53.9	56.2	52.2	48.3	46.2	49.3
Libya	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Morocco	13.0	12.4	11.7	13.8	12.0	12.7	4.6	4.5	4.3	5.1	4.4	4.8
Sudan	45.2	50.0	56.7	56.3	41.6	33.7	18.4	21.0	24.5	25.0	19.0	15.8
Tunisia	7.7	7.2	6.9	8.1	7.3	7.3	0.9	0.9	0.8	1.0	0.9	0.9
Sub-Saharan Africa	**71.6**	**70.7**	**70.3**	**71.7**	**72.0**	**72.2**	**734.7**	**744.2**	**760.0**	**795.4**	**819.0**	**842.9**
Eastern Africa*	**73.6**	**72.5**	**72.3**	**73.2**	**73.5**	**73.7**	**305.5**	**308.7**	**316.1**	**329.0**	**339.1**	**348.6**
Burundi	89.6	87.9	87.2	88.1	88.3	89.6	10.0	10.1	10.4	10.8	11.1	11.6
Comoros	63.5	n.a.	n.a.	n.a.	60.8	n.a.	0.5	n.a.	n.a.	n.a.	0.5	n.a.
Djibouti	54.5	53.0	52.5	53.4	52.7	53.6	0.6	0.6	0.6	0.6	0.6	0.6
Eritrea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Ethiopia	59.3	55.5	54.5	54.2	55.2	54.1	64.2	61.6	62.2	63.5	66.3	66.7
Kenya	71.7	72.0	73.7	77.0	78.8	79.2	35.1	36.0	37.5	40.0	41.8	42.8
Madagascar	92.8	93.0	92.7	93.8	93.6	93.6	24.3	25.0	25.5	26.5	27.1	27.7
Malawi	84.6	85.5	87.1	88.5	88.7	89.6	15.1	15.7	16.4	17.1	17.6	18.3
Mauritius	15.1	14.2	13.3	18.6	17.8	17.5	0.2	0.2	0.2	0.2	0.2	0.2
Mozambique	84.9	85.3	86.5	88.6	89.2	89.3	24.3	25.1	26.2	27.6	28.6	29.4
Rwanda	80.1	76.6	74.9	78.0	74.6	75.7	9.8	9.6	9.6	10.3	10.0	10.4
Seychelles	40.0	40.2	36.3	40.1	38.8	45.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Somalia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
South Sudan	n.a.	n.a.	n.a.	n.a.	92.8	n.a.	n.a.	n.a.	n.a.	n.a.	10.0	n.a.
Uganda	74.3	73.0	72.1	72.0	71.4	72.5	29.8	30.3	31.0	32.0	32.7	34.2

TABLE A1.6 (Continued)

Regions/subregions/ countries/territories	Proportion of the population unable to afford a healthy diet (%)						Number of people unable to afford a healthy diet (millions)					
	2017	2018	2019	2020	2021	2022	2017	2018	2019	2020	2021	2022
United Republic of Tanzania	76.4	76.0	75.1	75.6	75.2	75.5	43.0	44.1	45.0	46.7	47.8	49.4
Zambia	77.8	78.0	79.0	80.5	81.3	81.7	13.5	13.9	14.5	15.2	15.8	16.4
Zimbabwe	74.9	n.r.	n.r.	n.r.	n.r.	n.r.	11.0	n.r.	n.r.	n.r.	n.r.	n.r.
Middle Africa	**78.1**	**77.7**	**77.5**	**78.6**	**78.7**	**78.8**	**131.3**	**134.7**	**138.7**	**145.1**	**149.8**	**154.5**
Angola	62.7	65.1	66.8	70.1	71.7	72.2	18.9	20.4	21.6	23.4	24.7	25.7
Cameroon	52.4	52.3	52.5	53.7	54.3	55.9	12.8	13.1	13.5	14.2	14.8	15.6
Central African Republic	86.9	86.1	85.7	86.1	86.5	86.7	4.3	4.4	4.5	4.6	4.7	4.8
Chad	63.0	60.4	57.1	59.1	59.0	60.8	9.5	9.4	9.2	9.8	10.1	10.8
Congo	74.2	75.0	74.8	77.7	78.2	79.1	3.9	4.1	4.2	4.4	4.6	4.7
Democratic Republic of the Congo	94.8	93.4	93.1	93.1	92.4	91.4	79.9	81.4	83.7	86.5	88.6	90.5
Equatorial Guinea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Gabon	32.0	32.6	33.1	34.8	36.3	37.3	0.7	0.7	0.7	0.8	0.8	0.9
Sao Tome and Principe	49.0	48.7	48.8	49.0	49.3	51.3	0.1	0.1	0.1	0.1	0.1	0.1
Southern Africa	**61.5**	**60.9**	**60.9**	**62.6**	**61.7**	**61.6**	**39.8**	**39.9**	**40.4**	**42.1**	**42.0**	**42.2**
Botswana	63.5	61.9	61.3	61.5	61.2	60.3	1.5	1.5	1.5	1.6	1.6	1.6
Eswatini	68.9	67.6	67.0	67.5	65.1	65.0	0.8	0.8	0.8	0.8	0.8	0.8
Lesotho	69.9	71.0	72.1	75.9	76.3	76.3	1.5	1.6	1.6	1.7	1.7	1.8
Namibia	57.8	58.0	58.5	62.2	59.7	57.1	1.4	1.4	1.4	1.5	1.5	1.5
South Africa	61.0	60.5	60.4	62.1	61.2	61.2	34.6	34.7	35.1	36.5	36.4	36.6
Western Africa	**68.3**	**67.3**	**66.6**	**68.4**	**68.8**	**69.3**	**258.0**	**260.8**	**264.8**	**279.2**	**288.1**	**297.5**
Benin	78.5	69.9	63.2	61.6	60.2	56.8	9.1	8.3	7.8	7.8	7.8	7.6
Burkina Faso	64.9	62.1	58.8	59.7	59.1	63.1	12.9	12.7	12.3	12.8	13.1	14.3
Cabo Verde	30.0	28.9	27.3	35.5	33.4	30.5	0.2	0.2	0.2	0.2	0.2	0.2
Côte d'Ivoire	53.5	49.2	46.7	48.9	49.6	49.7	13.3	12.5	12.2	13.1	13.6	14.0
Gambia	42.4	41.3	40.6	43.2	43.6	44.0	1.0	1.0	1.0	1.1	1.2	1.2
Ghana	65.2	64.1	62.7	63.6	62.7	63.0	19.7	19.8	19.8	20.5	20.6	21.1
Guinea	37.4	36.9	36.1	35.8	36.8	37.4	4.6	4.6	4.6	4.7	5.0	5.2
Guinea-Bissau	62.5	61.6	58.9	62.6	63.8	64.0	1.2	1.2	1.2	1.3	1.3	1.3
Liberia	64.5	63.9	66.0	69.9	66.3	64.1	3.1	3.1	3.3	3.6	3.4	3.4
Mali	55.2	52.3	47.8	53.0	55.6	58.7	10.7	10.4	9.8	11.3	12.2	13.3

TABLE A1.6 (Continued)

Regions/subregions/ countries/territories	Proportion of the population unable to afford a healthy diet 2017	2018	2019 (%)	2020	2021	2022	Number of people unable to afford a healthy diet 2017	2018	2019 (millions)	2020	2021	2022
Mauritania	49.9	49.9	50.4	52.1	54.4	55.2	2.1	2.1	2.2	2.3	2.5	2.6
Niger	85.8	83.9	83.2	84.7	86.8	86.3	18.7	18.9	19.5	20.6	21.9	22.6
Nigeria	74.3	75.1	76.0	78.0	78.5	78.7	143.8	149.0	154.5	162.5	167.4	172.0
Senegal	54.3	48.7	47.1	48.6	47.5	49.5	8.2	7.6	7.5	8.0	8.0	8.6
Sierra Leone	62.2	62.3	58.2	60.5	61.8	62.5	4.8	4.9	4.7	5.0	5.2	5.4
Togo	62.4	54.2	50.2	52.0	54.0	54.6	4.9	4.4	4.1	4.4	4.7	4.8
ASIA	**43.3**	**39.5**	**37.0**	**39.0**	**36.5**	**35.1**	**1 967.5**	**1 813.7**	**1 714.5**	**1 819.3**	**1 712.0**	**1 655.9**
Central Asia	**21.2**	**18.5**	**17.6**	**19.1**	**17.1**	**16.3**	**15.1**	**13.4**	**12.9**	**14.3**	**13.0**	**12.6**
Kazakhstan	9.3	6.3	6.9	6.6	5.2	5.6	1.7	1.2	1.3	1.3	1.0	1.1
Kyrgyzstan	40.9	34.0	31.0	41.0	36.7	35.9	2.5	2.1	2.0	2.6	2.4	2.4
Tajikistan	37.8	34.3	33.9	35.7	32.5	28.6	3.4	3.1	3.2	3.4	3.2	2.9
Turkmenistan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Uzbekistan	19.7	18.0	16.4	17.3	15.7	15.0	6.3	5.8	5.4	5.8	5.3	5.2
Eastern Asia	**25.7**	**22.4**	**20.3**	**21.2**	**16.5**	**16.3**	**424.4**	**371.4**	**336.8**	**353.3**	**275.3**	**271.4**
China	27.9	24.1	21.7	22.7	17.4	17.3	401.6	349.4	316.0	330.6	253.8	251.8
China, mainland	28.2	24.4	22.0	23.0	17.6	17.5	398.1	346.2	313.1	327.6	251.3	249.3
Taiwan Province of China	5.3	n.a.	n.a.	n.a.	4.5	n.a.	1.2	n.a.	n.a.	n.a.	1.1	n.a.
China, Hong Kong SAR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
China, Macao SAR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Democratic People's Republic of Korea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Japan	7.2	7.2	7.2	8.0	7.6	7.5	9.1	9.1	9.0	10.0	9.5	9.3
Mongolia	29.7	27.9	24.5	24.9	23.5	19.6	0.9	0.9	0.8	0.8	0.8	0.7
Republic of Korea	10.5	9.7	9.2	10.7	10.0	9.0	5.4	5.0	4.8	5.6	5.2	4.7
South-eastern Asia	**38.4**	**36.8**	**35.3**	**36.9**	**37.3**	**36.3**	**250.0**	**242.2**	**234.2**	**247.4**	**251.9**	**247.0**
Brunei Darussalam	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cambodia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Indonesia	51.4	48.9	47.1	46.8	46.6	46.5	135.9	130.7	127.1	127.2	127.6	128.0
Lao People's Democratic Republic	59.2	57.7	56.9	58.7	58.0	57.1	4.1	4.1	4.1	4.3	4.3	4.3
Malaysia	4.0	3.4	2.6	3.1	2.8	1.8	1.3	1.1	0.9	1.0	0.9	0.6
Myanmar	47.6	44.4	43.5	50.1	57.4	56.3	24.9	23.4	23.1	26.7	30.9	30.5
Philippines	48.1	46.9	45.7	51.9	51.4	48.1	51.3	50.9	50.4	58.2	58.5	55.6

TABLE A1.6 (Continued)

Regions/subregions/ countries/territories	Proportion of the population unable to afford a healthy diet 2017	2018	2019 (%)	2020	2021	2022	Number of people unable to afford a healthy diet 2017	2018	2019 (millions)	2020	2021	2022
Singapore	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Thailand	21.1	21.9	19.6	19.7	18.3	16.4	14.9	15.6	14.0	14.1	13.1	11.7
Timor-Leste	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Viet Nam	11.2	10.1	8.5	9.3	9.6	9.4	10.5	9.6	8.1	9.0	9.4	9.2
Southern Asia	**64.2**	**58.6**	**54.8**	**57.9**	**55.8**	**53.1**	**1 221.4**	**1 128.3**	**1 068.0**	**1 141.1**	**1 110.5**	**1 066.3**
Afghanistan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Bangladesh	65.0	61.4	58.5	55.8	51.7	48.2	105.2	100.5	96.8	93.4	87.6	82.4
Bhutan	28.9	14.1	18.0	17.4	21.5	5.3	0.2	0.1	0.1	0.1	0.2	<0.1
India	69.5	62.5	57.1	61.2	59.0	55.6	941.1	855.3	789.3	854.9	830.9	788.2
Iran (Islamic Republic of)	7.7	9.2	14.6	14.8	15.0	15.8	6.5	7.9	12.6	12.9	13.2	14.0
Maldives	4.9	3.5	2.1	8.8	3.0	1.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nepal	47.3	43.8	43.5	44.7	43.6	41.1	13.3	12.5	12.5	13.1	13.1	12.6
Pakistan	57.8	56.5	58.1	60.2	58.7	58.7	125.1	124.2	129.7	136.8	135.8	138.3
Sri Lanka	32.2	29.0	28.5	33.4	34.0	41.1	6.9	6.3	6.2	7.2	7.4	9.0
Western Asia	**20.6**	**21.0**	**22.1**	**22.0**	**21.2**	**20.0**	**56.6**	**58.4**	**62.5**	**63.2**	**61.3**	**58.7**
Armenia	49.3	49.5	53.3	53.8	54.1	54.9	1.4	1.4	1.5	1.5	1.5	1.5
Azerbaijan	0.7	0.7	0.7	1.2	0.7	0.7	0.1	0.1	0.1	0.1	0.1	0.1
Bahrain	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cyprus	4.0	2.7	2.6	2.2	2.3	1.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Georgia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Iraq	23.1	23.1	21.9	28.5	28.4	26.7	9.2	9.4	9.1	12.1	12.4	11.9
Israel	19.2	18.2	19.5	19.0	18.0	16.5	1.6	1.5	1.7	1.7	1.6	1.5
Jordan	13.0	12.9	12.9	14.4	13.6	13.0	1.3	1.3	1.4	1.6	1.5	1.5
Kuwait	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Lebanon	n.a.	n.a.	n.a.	0.1	1.8	2.9	n.a.	n.a.	n.a.	<0.1	0.1	0.2
Oman	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Palestine	5.0	5.1	5.5	6.8	5.4	4.4	0.2	0.2	0.3	0.3	0.3	0.2
Qatar	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Saudi Arabia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Syrian Arab Republic	n.a.	n.a.	n.a.	n.a.	86.2	n.a.	n.a.	n.a.	n.a.	n.a.	18.4	n.a.
Türkiye	11.7	12.3	14.7	10.9	8.7	6.1	9.6	10.2	12.3	9.1	7.4	5.2

TABLE A1.6 (Continued)

Regions/subregions/ countries/territories	Proportion of the population unable to afford a healthy diet (%)						Number of people unable to afford a healthy diet (millions)					
	2017	2018	2019	2020	2021	2022	2017	2018	2019	2020	2021	2022
United Arab Emirates	1.0	2.5	2.1	<0.1	<0.1	2.3	0.1	0.2	0.2	<0.1	<0.1	0.2
Yemen	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
LATIN AMERICA AND THE CARIBBEAN	**29.2**	**28.4**	**27.8**	**28.9**	**30.1**	**27.7**	**185.5**	**181.8**	**180.0**	**188.1**	**197.2**	**182.9**
Caribbean	**47.2**	**45.9**	**46.1**	**49.5**	**50.1**	**50.0**	**20.4**	**19.9**	**20.1**	**21.8**	**22.1**	**22.2**
Antigua and Barbuda	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Aruba	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Bahamas	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Barbados	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
British Virgin Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cuba	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cayman Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Curaçao	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Dominica	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Dominican Republic	26.9	23.4	21.8	25.7	26.1	24.8	2.9	2.5	2.4	2.8	2.9	2.8
Grenada	19.6	19.1	18.8	23.2	22.2	21.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Haiti	77.4	77.9	79.4	81.5	82.4	83.6	8.4	8.6	8.9	9.2	9.4	9.7
Jamaica	19.2	17.1	18.2	23.6	23.1	22.1	0.5	0.5	0.5	0.7	0.7	0.6
Puerto Rico	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Saint Kitts and Nevis	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Saint Lucia	8.5	8.5	8.6	12.4	9.7	8.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Saint Vincent and the Grenadines	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Sint Maarten (Dutch part)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Trinidad and Tobago	32.0	33.0	33.3	38.1	39.2	39.1	0.5	0.5	0.5	0.6	0.6	0.6
Turks and Caicos Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Central America	**30.7**	**29.8**	**27.9**	**31.9**	**27.7**	**26.3**	**52.6**	**51.5**	**48.9**	**56.3**	**49.1**	**47.1**
Belize	65.6	65.5	62.8	69.9	65.6	61.8	0.2	0.3	0.2	0.3	0.3	0.3
Costa Rica	14.3	15.1	15.2	20.9	15.1	15.9	0.7	0.8	0.8	1.1	0.8	0.8
El Salvador	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Guatemala	46.7	46.5	45.6	48.0	44.9	43.9	7.7	7.8	7.8	8.3	7.9	7.8
Honduras	39.8	39.0	38.7	43.4	38.9	39.0	3.8	3.8	3.9	4.4	4.0	4.1

TABLE A1.6 (Continued)

Regions/subregions/ countries/territories	Proportion of the population unable to afford a healthy diet						Number of people unable to afford a healthy diet					
	2017	2018	2019	2020	2021	2022	2017	2018	2019	2020	2021	2022
	(%)						(millions)					
Mexico	28.3	27.1	24.6	28.6	24.2	22.5	34.8	33.6	30.8	36.0	30.7	28.7
Nicaragua	25.0	26.9	29.2	30.6	26.8	27.3	1.6	1.8	1.9	2.1	1.8	1.9
Panama	42.3	40.1	39.4	49.9	45.1	43.5	1.7	1.7	1.7	2.1	2.0	1.9
South America**	**26.7**	**26.0**	**25.9**	**25.5**	**29.0**	**26.0**	**112.5**	**110.3**	**111.0**	**110.1**	**126.0**	**113.6**
Argentina	8.6	n.r.	n.r.	n.r.	n.r.	n.r.	3.8	n.r.	n.r.	n.r.	n.r.	n.r.
Bolivia (Plurinational State of)	14.3	13.0	9.6	10.8	8.9	8.5	1.6	1.5	1.1	1.3	1.1	1.0
Brazil	27.4	26.6	26.3	19.8	30.2	25.3	57.2	56.0	55.7	42.1	64.7	54.4
Chile	48.1	46.1	46.0	50.3	42.5	40.4	8.8	8.6	8.8	9.7	8.3	7.9
Colombia	31.7	31.6	32.7	41.2	37.9	36.6	15.3	15.6	16.4	21.0	19.5	19.0
Ecuador	23.1	23.9	24.8	30.4	27.2	25.9	3.9	4.1	4.3	5.3	4.8	4.7
Guyana	41.3	41.0	39.2	22.6	16.9	9.4	0.3	0.3	0.3	0.2	0.1	0.1
Paraguay	24.0	22.3	22.0	24.7	24.6	24.1	1.5	1.4	1.4	1.6	1.6	1.6
Peru	33.5	30.4	28.9	42.9	33.9	33.6	10.6	9.8	9.5	14.3	11.4	11.5
Suriname	19.6	18.6	18.9	24.8	25.9	25.5	0.1	0.1	0.1	0.2	0.2	0.2
Uruguay	31.1	32.6	33.3	38.2	37.8	36.1	1.1	1.1	1.1	1.3	1.3	1.2
Venezuela (Bolivarian Republic of)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
OCEANIA	**15.7**	**16.4**	**18.0**	**21.2**	**22.4**	**20.2**	**6.6**	**7.0**	**7.8**	**9.3**	**10.0**	**9.1**
American Samoa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Australia	2.9	3.2	3.2	3.5	3.2	3.2	0.7	0.8	0.8	0.9	0.8	0.8
Cook Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Fiji	45.8	47.4	52.6	62.5	66.8	59.0	0.4	0.4	0.5	0.6	0.6	0.5
French Polynesia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Kiribati	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Marshall Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Micronesia (Federated States of)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Nauru	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
New Caledonia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
New Zealand	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Niue	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Palau	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Papua New Guinea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

TABLE A1.6 (Continued)

Regions/subregions/ countries/territories	Proportion of the population unable to afford a healthy diet						Number of people unable to afford a healthy diet					
	2017	2018	2019 (%)	2020	2021	2022	2017	2018	2019 (millions)	2020	2021	2022
Samoa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Solomon Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tokelau (Associate Member)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tonga	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tuvalu	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Vanuatu	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
NORTHERN AMERICA AND EUROPE	**7.2**	**6.9**	**6.2**	**5.9**	**5.1**	**4.8**	**80.4**	**77.0**	**69.7**	**66.0**	**57.1**	**53.6**
Northern America	**4.8**	**4.5**	**4.1**	**3.2**	**2.5**	**2.5**	**17.7**	**16.8**	**15.2**	**12.1**	**9.6**	**9.5**
Bermuda	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Canada	3.2	2.7	2.7	3.2	3.0	2.7	1.2	1.0	1.0	1.2	1.1	1.1
Greenland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
United States of America	5.0	4.7	4.2	3.2	2.5	2.5	16.5	15.8	14.2	10.9	8.4	8.5
Europe	**8.4**	**8.1**	**7.3**	**7.2**	**6.4**	**5.9**	**62.7**	**60.3**	**54.5**	**53.8**	**47.5**	**44.1**
Eastern Europe	**11.0**	**11.3**	**9.9**	**9.8**	**8.4**	**8.0**	**32.5**	**33.3**	**29.2**	**28.8**	**24.5**	**23.1**
Belarus	3.2	1.9	2.4	1.2	1.0	1.0	0.3	0.2	0.2	0.1	0.1	0.1
Bulgaria	10.2	8.4	7.8	5.3	6.1	5.8	0.7	0.6	0.6	0.4	0.4	0.4
Czechia	4.8	4.2	3.7	3.9	3.8	4.2	0.5	0.4	0.4	0.4	0.4	0.4
Hungary	32.0	26.5	26.4	20.4	12.7	10.5	3.1	2.6	2.6	2.0	1.2	1.0
Poland	17.2	14.9	10.4	9.8	8.0	6.6	6.6	5.7	4.0	3.8	3.1	2.6
Republic of Moldova	11.0	9.0	9.5	14.3	10.2	11.9	0.4	0.3	0.3	0.4	0.3	0.4
Romania	52.4	68.3	63.7	66.0	59.7	55.9	10.3	13.4	12.4	12.8	11.5	11.0
Russian Federation	3.1	2.8	2.4	2.4	1.9	2.0	4.5	4.0	3.4	3.5	2.7	2.9
Slovakia	19.7	18.3	15.3	20.0	19.3	17.7	1.1	1.0	0.8	1.1	1.1	1.0
Ukraine	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Northern Europe	**4.0**	**4.0**	**3.6**	**2.9**	**3.0**	**2.7**	**4.1**	**4.2**	**3.8**	**3.1**	**3.2**	**2.8**
Denmark	0.9	1.0	1.0	1.1	0.8	0.9	0.1	0.1	0.1	0.1	<0.1	0.1
Estonia	10.9	9.5	8.2	7.5	5.1	5.1	0.1	0.1	0.1	0.1	0.1	0.1
Finland	1.0	1.1	0.7	0.6	0.8	0.8	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Iceland	0.6	0.5	0.6	0.7	0.6	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ireland	2.3	1.4	1.6	1.2	1.1	1.0	0.1	0.1	0.1	0.1	0.1	<0.1
Latvia	27.1	21.3	18.1	16.9	14.2	12.7	0.5	0.4	0.3	0.3	0.3	0.2

TABLE A1.6 (Continued)

Regions/subregions/ countries/territories	Proportion of the population unable to afford a healthy diet						Number of people unable to afford a healthy diet					
	2017	2018	2019	2020	2021	2022	2017	2018	2019	2020	2021	2022
	(%)						(millions)					
Lithuania	21.3	16.7	13.1	9.0	8.9	9.0	0.6	0.5	0.4	0.3	0.2	0.2
Norway	1.9	1.7	1.5	1.9	1.7	1.5	0.1	0.1	0.1	0.1	0.1	0.1
Sweden	3.5	4.1	3.5	2.9	3.6	3.6	0.4	0.4	0.4	0.3	0.4	0.4
United Kingdom of Great Britain and Northern Ireland	3.2	3.7	3.5	2.7	3.0	2.5	2.1	2.5	2.3	1.8	2.0	1.7
Southern Europe	**14.0**	**12.4**	**11.2**	**11.5**	**9.9**	**9.1**	**21.1**	**18.7**	**16.9**	**17.3**	**14.9**	**13.6**
Albania	24.3	17.5	15.3	14.1	12.6	12.2	0.7	0.5	0.4	0.4	0.4	0.3
Andorra	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Bosnia and Herzegovina	6.1	5.7	5.6	5.7	5.0	5.8	0.2	0.2	0.2	0.2	0.2	0.2
Croatia	27.9	23.2	19.0	18.8	15.5	13.5	1.2	1.0	0.8	0.8	0.6	0.5
Greece	30.8	28.0	24.6	24.2	21.0	18.3	3.3	3.0	2.6	2.5	2.2	1.9
Italy	10.3	10.0	8.6	9.1	7.7	6.9	6.2	6.0	5.1	5.4	4.6	4.1
Malta	4.5	4.2	3.4	3.3	2.6	2.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Montenegro	17.4	18.5	15.6	15.6	12.5	12.1	0.1	0.1	0.1	0.1	0.1	0.1
North Macedonia	23.9	21.1	19.7	21.5	19.0	19.4	0.5	0.4	0.4	0.5	0.4	0.4
Portugal	18.9	16.2	13.1	14.0	13.1	12.0	1.9	1.7	1.4	1.4	1.3	1.2
Serbia	24.2	10.2	13.1	11.6	8.7	8.1	1.8	0.8	1.0	0.9	0.6	0.6
Slovenia	3.7	2.6	2.3	2.0	1.7	1.4	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Spain	10.9	10.8	10.2	10.6	9.3	8.9	5.1	5.0	4.8	5.0	4.4	4.2
Western Europe	**2.6**	**2.1**	**2.4**	**2.4**	**2.5**	**2.3**	**5.0**	**4.0**	**4.6**	**4.6**	**4.9**	**4.5**
Austria	2.5	2.3	2.7	2.5	3.4	2.9	0.2	0.2	0.2	0.2	0.3	0.3
Belgium	2.1	1.2	1.3	1.0	0.8	0.7	0.2	0.1	0.2	0.1	0.1	0.1
France	1.9	2.2	3.4	2.8	3.3	3.1	1.2	1.4	2.2	1.8	2.2	2.0
Germany	3.5	2.2	2.0	2.5	2.5	2.2	2.9	1.9	1.7	2.1	2.1	1.9
Luxembourg	2.6	2.1	1.2	0.6	1.9	1.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Netherlands (Kingdom of the)	1.8	1.5	1.6	1.6	1.1	1.1	0.3	0.3	0.3	0.3	0.2	0.2
Switzerland	1.3	1.6	1.4	1.3	1.2	1.2	0.1	0.1	0.1	0.1	0.1	0.1

NOTES: n.a. = data not available. n.r. = data not reported.* Includes Zimbabwe. ** Includes Argentina. The global number of people unable to afford a healthy diet (NUA) estimate is obtained by multiplying the proportion of the population unable to afford a healthy diet for each of the five world regions by the total population size in each region. Calculating the global NUA estimate as the sum of the NUA estimates of other country groupings, such as those based on income levels, should be avoided.

SOURCE: FAO. 2024. *FAOSTAT: Cost and Affordability of a Healthy Diet (CoAHD).* [Accessed on 24 July 2024]. www.fao.org/faostat/en/#data/CAHD. Licence: CC-BY-4.0.

ANNEX 1B METHODOLOGICAL NOTES FOR THE FOOD SECURITY AND NUTRITION INDICATORS

PREVALENCE OF UNDERNOURISHMENT

Definition: Undernourishment is defined as the condition of an individual whose habitual food consumption is insufficient to provide, on average, the amount of dietary energy required to maintain a normal, active and healthy life.

How it is reported: The indicator (denominated "prevalence of undernourishment" [PoU]) is an estimate of the percentage of individuals in the population that are in a condition of undernourishment. National estimates are reported as three-year moving averages, to control for the low reliability of the estimates of some of the underlying parameters due to elements for which complete, reliable information is very scarce. This includes, for example, the year-to-year variation in food commodity stocks, one of the components of the annual FAO Food Balance Sheets (FBS). Regional and global aggregates, on the other hand, are reported as annual estimates, as possible estimation errors are expected not to be correlated and therefore expected to be reduced to acceptable levels when aggregating across countries.

The entire series of PoU values is revised with each new edition of this report to reflect new data and information that FAO has obtained since the release of the previous edition. As this process usually implies backward revisions of the entire PoU series, readers are advised to refrain from comparing series across different editions of this report and should always refer to the current edition of the report, including for values in past years.

Methodology: To compute an estimate of the prevalence of undernourishment in a population, the probability distribution of habitual dietary energy intake levels (expressed in kcal per person per day) for the average individual is modelled as a parametric probability density function, f(x).[1, 2] The indicator is obtained as the cumulative probability that the habitual dietary energy intake (x) is below the minimum dietary energy requirement (MDER) (i.e. the lowest limit of the range of energy requirements that is appropriate for the population's representative average individual) as in the formula below:

$$PoU = \int_{x<MDER} f(x|\theta)dx,$$

where θ is a vector of parameters that characterizes the probability density function. In the actual computations, the distribution is assumed to be lognormal and thus fully characterized by only two parameters: the mean dietary energy consumption (DEC) and its coefficient of variation (CV).

Data source: Different data sources are used to estimate the different parameters of the model.

Minimum dietary energy requirement (MDER): Human energy requirements for an individual in a given sex/age class are determined on the basis of normative requirements for basic metabolic rate per kilogram of body mass, multiplied by the ideal weights that a healthy person of that sex/age class may have, given their height, and then multiplied by a coefficient of physical activity level (PAL) to take into account physical activity.[bl] Given that both healthy body mass indices (BMIs) and normal PALs vary among active and healthy individuals of the same sex and age, a range of energy requirements apply to each sex and age group of the population. The MDER for the average individual in the population, which is the parameter used in the PoU formula, is obtained as the weighted average of the lower bounds of the energy requirement ranges for each sex and age group, using the shares of the population in each sex

bl A person is considered healthy if their BMI indicates neither underweight nor overweight. Human energy requirement norms per kilogram of body mass are given in FAO and WHO (2004).[3]

and age group as weights. Similar to the MDER, the average dietary energy requirement (ADER) (used to estimate the one component of the CV as described below) is estimated using the average values of the PAL category "Active or moderately active lifestyle".[4]

Information on the population structure by sex and age needed to compute the MDER is available for most countries in the world and for each year from the United Nations Department of Economic and Social Affairs *World Population Prospects*, revised every two years. This edition of *The State of Food Security and Nutrition in the World* uses the 2022 revision of the *World Population Prospects*.[5]

Information on the median height in each sex and age group for a given country is derived from a recent Demographic and Health Survey (DHS) or from other surveys that collect anthropometry data on children and adults. Even if such surveys do not refer to the same year for which the PoU is estimated, the impact of possible small intervening changes in median heights over the years on the MDER, and therefore on the PoU estimates, is expected to be negligible.

Dietary energy consumption (DEC): Ideally, DEC could be estimated from data on food consumption coming from nationally representative household surveys (such as Living Standards Measurement Study [LSMS] surveys or Household Consumption and Expenditure Surveys). However, only very few countries conduct such surveys on an annual basis. Thus, in FAO's PoU estimates for global monitoring, DEC values are estimated from the dietary energy supply (DES) reported in the FBS, compiled by FAO for most countries in the world.[6]

Since the last edition of this report, the FBS domain on FAOSTAT has been updated with new values of the series up to 2021 for all countries. In addition, at the time of closing this report, the FBS series were updated to 2022 for the following 68 countries, selected as a priority due to the high contribution they make to the total number of undernourished people in the world: Afghanistan, Angola, Argentina, Bangladesh, Benin, Bolivia (Plurinational State of), Brazil, Burkina Faso, Cameroon, Central African Republic, Chad, Colombia, Congo, Côte d'Ivoire, Democratic People's Republic of Korea, Democratic Republic of the Congo, Ecuador, Egypt, Ethiopia, Ghana, Guatemala, Guinea, Haiti, Honduras, India, Indonesia, Iran (Islamic Republic of), Iraq, Japan, Jordan, Kenya, Lesotho, Liberia, Madagascar, Malawi, Malaysia, Mali, Morocco, Mozambique, Myanmar, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Papua New Guinea, Peru, Philippines, Rwanda, Saudi Arabia, Senegal, Sierra Leone, Somalia, South Africa, South Sudan, Sri Lanka, Sudan, Syrian Arab Republic, Thailand, Togo, Uganda, Ukraine, United Republic of Tanzania, Venezuela (Bolivarian Republic of), Viet Nam, Yemen, Zambia and Zimbabwe. In addition, FBS DES series were updated up to 2022 for another group of 27 countries that contribute less to the total number of undernourished people: Albania, Armenia, Bahamas, Bosnia and Herzegovina, Cabo Verde, Chile, China (mainland), Costa Rica, Djibouti, Dominican Republic, El Salvador, Eswatini, Jamaica, Kuwait, Lebanon, Libya, Mauritania, Mongolia, Montenegro, Oman, Panama, Paraguay, Sao Tome and Principe, Slovakia, Timor-Leste, Tunisia and United States of America.

Per capita average DES in 2022 (for countries other than the ones listed above) and in 2023 (for all countries) are nowcast on the basis of the short-run market outlook exercises conducted by FAO to inform the World Food Situation Portal[7] and used to calculate the 2022 and 2023 values of DEC for each country.

Waste factors

This edition of the report involved updating the waste factors that are used to calculate the DEC by subtracting the percentage of waste from the DES for all countries. The percentages of food waste at distribution level have been estimated using the FBS data available on FAOSTAT.

Using the percentages given in FAO's document *Global food losses and food waste*,[8] calorie waste for each food group is calculated and summed up, with the exception that the waste factors used for cereals is 2 percent for all the regions. Finally, the total calorie waste is taken as a percentage of total calories for each year and country. The data are available up to the year 2021. For the years 2022 and 2023, the same value of the year 2021 is used.

For Somalia and Palestine, fish consumption data were missing, so waste factors have been estimated for all other food groups except fish. Guatemala and the Dominican Republic have not been updated.

Coefficient of variation (CV): The CV of habitual DEC in the population is obtained as the geometric mean of two components, labelled respectively $CV|y$ and $CV|r$:

$$CV = \sqrt{(CV|y)^2 + (CV|r)^2}$$

The first component (CV|y) refers to variability in the per capita consumption across households belonging to different sociodemographic strata, and therefore is referred to as the CV "due to income", while the second component (CV|r) captures variability across individuals, due to differences in sex, age, body mass and PAL that can be found among members of the same household. As these are the same elements that determine energy requirements, the second component is referred to as CV "due to energy requirements".

CV|y

When reliable data on food consumption are available from nationally representative household surveys, the CV due to income (CV|y) can be estimated directly. Since the last edition of this report, 14 new surveys from the following 13 countries have been processed to update the CV|y: Armenia (2022), Costa Rica (2019), Côte d'Ivoire (2022), India (2011/12 and 2022/23), Jordan (2017), Kazakhstan (2022), Maldives (2016), Mali (2022), Mexico (2022), Niger (2022), Republic of Moldova (2022), Senegal (2022) and Timor-Leste (2015). That makes for a total of 143 surveys from 69 countries for which the estimate of the CV|y is based on data from national surveys.

When no suitable survey data are available, Food Insecurity Experience Scale (FIES) data collected by FAO since 2014 are used to project the changes in the CV|y from 2015 (or from the year of the last food consumption survey, if more recent) up to 2023, based on the observed trend in severe food insecurity. The projections are based on the assumption that observed changes in the extent of severe food insecurity measured with the FIES might be indicative of equivalent changes in the PoU. To the extent that such implied changes in the PoU cannot be fully explained by the "supply-side" effects of changes in average food supplies, they can be confidently attributed to unobserved changes in the CV|y that might have occurred at the same time. Analysis of historical PoU estimates reveals that, on average, and once differences in DEC, MDER and CV|r have been controlled for, differences in the CV|y explain about one-third of the differences in PoU across time and space. Based on all this, for each country for which FIES data are available, the change in the CV|y that may have occurred from 2015, or from the date of the last available survey, is therefore estimated as the change that would generate one-third of a percentage-point change in the PoU for each observed percentage-point change in the prevalence of severe food insecurity. For all other countries, lacking any supporting evidence, the CV|y is kept constant at the last available estimate. As in the last two reports, the nowcast of the CV|y for 2020, 2021, 2022 and 2023 required special treatment to account for the effects of the COVID-19 pandemic (see Supplementary material to Chapter 2).

CV|r

The CV due to energy requirements (CV|r) represents the variability of the distribution of dietary energy requirements of a hypothetical average individual representative of a healthy population, which is also equal to the CV of the distribution of dietary energy intakes of a hypothetical average individual if everyone in the population were perfectly nourished. For estimation purposes, the distribution of dietary energy requirements of such a hypothetical average individual is assumed to be normal and its standard deviation (SD) can be estimated from any two known percentiles. We use the MDER and the ADER mentioned above to approximate the 1st and the 50th percentiles.[9, 10] The value of CV|r is then derived as the inverse cumulative standard normal distribution of the difference between the MDER and the ADER.

Challenges and limitations: While formally the state of being undernourished or not is a condition that applies to individuals, given the data usually available on a large scale, it is impossible to reliably identify which individuals in a certain group are actually undernourished. Through the statistical model described above, the indicator can only be computed with reference to a population or a group of individuals for which a sufficiently representative sample is available. The prevalence of undernourishment is thus an estimate of the percentage of individuals in that group that are in such a condition, but it cannot be further disaggregated.

Due to the probabilistic nature of the inference and the margins of uncertainty associated with estimates of each of the parameters in the model, the precision of the PoU estimates is generally low. While it is not possible to formally compute margins of error around PoU estimates, they are expected to exceed 5 percent in most cases. For this reason, FAO does not consider PoU estimates that result lower than 2.5 percent as sufficiently reliable to be reported.

It is important to note that the ranges presented for the values of the PoU in 2020, 2021, 2022 and 2023 should not be interpreted as statistical confidence intervals. Rather, they represent different scenarios used to nowcast the values of CV|y from 2020 to 2023.

Recommended readings:

FAO. 1996. Methodology for assessing food inadequacy in developing countries. In: *The Sixth World Food Survey*, pp. 114–143. Rome. https://www.fao.org/4/w0931e/w0931e16.pdf
FAO. 2003. *Proceedings: Measurement and Assessment of Food Deprivation and Undernutrition: International Scientific Symposium*. Rome.
FAO. 2014. *Advances in hunger measurement: traditional FAO methods and recent innovations*. FAO Statistics Division Working Paper, No. 14–04. Rome.
Naiken, L. 2002. *Keynote paper: FAO methodology for estimating the prevalence of undernourishment*. Paper presented at the Measurement and Assessment of Food Deprivation and Undernutrition International Scientific Symposium, Rome, 26–28 June 2002. Rome, FAO.
Wanner, N., Cafiero, C., Troubat, N. & Conforti, P. 2014. *Refinements to the FAO methodology for estimating the prevalence of undernourishment indicator.* Rome, FAO.

PREVALENCE OF FOOD INSECURITY AS MEASURED BY THE FOOD INSECURITY EXPERIENCE SCALE

Definition: Food insecurity as measured by this indicator refers to limited **access to food,** at the level of individuals or households, due to lack of money or other resources. The severity of food insecurity is measured using data collected with the Food Insecurity Experience Scale Survey Module (FIES-SM), a set of eight questions asking respondents to self-report conditions and experiences typically associated with limited access to food. For purposes of annual SDG monitoring, the questions are asked with reference to the 12 months preceding the survey.

Using sophisticated statistical techniques based on the Rasch model, the information obtained in an FIES-SM survey is validated for internal consistency and converted into a quantitative measure along a scale of severity, ranging from low to high. Based on their responses to the survey items, the individuals or households interviewed in a nationally representative survey of the population are assigned a probability of being in one of three classes: i) food secure or only marginally insecure; ii) moderately food insecure; and iii) severely food insecure, as defined by two globally set thresholds. Based on FIES data collected over three years from 2014 to 2016, FAO has established the FIES reference scale, which is used as the global standard for experience-based food-insecurity measures, and to set the two reference thresholds of severity.

SDG Indicator 2.1.2 is obtained as the cumulated probability of being in the two classes of moderate and severe food insecurity. A separate indicator (FI_{sev}) is computed by considering only the severe food insecurity class.

How it is reported: In this report, FAO provides estimates of food insecurity at two different levels of severity: moderate or severe food insecurity ($FI_{mod+sev}$), and severe food insecurity (FI_{sev}). For each of these two levels, two estimates are reported:

- the **prevalence (percent) of individuals** in the population living in households where at least one adult was found to be food insecure; and

- the estimated **number of individuals** in the population living in households where at least one adult was found to be food insecure.

Data source: Since 2014, the eight-question FIES-SM has been applied in nationally representative samples of the adult population (defined as aged 15 or older) in more than 140 countries included in the Gallup© World Poll (GWP), covering more than 90 percent of the world population. In 2023, interviews were conducted in both telephone and face-to-face modality. Telephone interviews were maintained in some countries already covered with this modality in 2020 given the high risk of community transmission from conducting face-to-face data collection during the COVID-19 pandemic.

Gallup© traditionally uses telephone surveys in Northern America, Western Europe, some parts of Asia, and Cooperation Council for the Arab States of the Gulf countries. In Central and Eastern Europe, much of Latin America, and nearly all of Asia, the Near East and Africa, an area frame design is used for face-to-face interviewing.

In most countries, samples include about 1 000 individuals, with larger samples of 3 000 individuals in India, 3 500 in China (mainland) and 2 000 in the Russian Federation. No data were collected in China (mainland) in 2023.

National government survey data were used to calculate the food insecurity prevalence estimates for at least one year for 70 countries, covering more than a quarter of the world population, by applying FAO's statistical methods to internally validate and adjust national results to the same global reference standard. Once validated, the data are used to inform or update the national series (see description below). When the population of a country accounts for a large proportion of the regional population, this may result in revision or back revision of the regional and subregional series. For this reason, comparisons of assessments across different versions of this report should be avoided, and the current version should be considered as the reference.

In this edition of the report, national government survey data from the following 70 countries were used: Afghanistan, Angola, Armenia, Belize, Benin, Botswana, Brazil, Burkina Faso, Burundi, Cabo Verde, Canada, Chad, Chile, Colombia, Congo, Costa Rica, Côte d'Ivoire, Dominican Republic, Ecuador, Fiji, Ghana, Greece, Grenada, Guinea-Bissau, Guyana, Honduras, Indonesia, Israel, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Lesotho, Malawi, Mali, Mexico, Mozambique, Namibia, Niger, Nigeria, Pakistan, Palestine, Papua New Guinea, Paraguay, Philippines, Republic of Korea, Russian Federation, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Senegal, Seychelles, Sierra Leone, South Africa, South Sudan, Sri Lanka, Sudan, Timor Leste, Togo, Tonga, Uganda, United Arab Emirates, United Republic of Tanzania, United States of America, Uruguay, Vanuatu, Viet Nam, Yemen and Zambia. National data for these countries are considered for the year or years when they are available. For the remaining years, the following strategy was followed:

- When more than one year of national data is available, the missing years are linearly interpolated.
- If only one year of data is available, missing years are informed as follows:
  - using FAO data if considered compatible with the national surveys;
  - imputed using the trend suggested by FAO data if national data are not compatible;
  - imputed using the trend of the subregion if no other reliable and timely information is available; or
  - considered constant to the level of the national survey if the subregion cannot be computed or the trend of other surveys or the subregion is not applicable to the country-specific situation considering evidence found in support of the trend (e.g. evolution of poverty, extreme poverty, employment and food inflation, among others); this applies also to countries where the prevalence of food insecurity is very low (below 3 percent at the severe level) or very high (above 85 percent at the moderate or severe level).

Given the heterogeneity of the survey sources and the small sample size of some of the FAO surveys, new data can occasionally cause a notably large increase or decrease from one year to the next. In such situations, the protocol is to look for external information for the country (data and/or reports, possibly in consultation with country experts like FAO country or regional officers) to explore whether big shocks or interventions have occurred. If the trend can be justified by supporting evidence, but seems excessive, the trend is kept but smoothed (e.g. using the three-year average). Otherwise, the same protocol used for missing years is applied (i.e. keeping the level constant or applying the subregional trend). In 2023, no FIES data were collected in China (mainland), therefore the trend was kept constant.

Methodology: The data were validated and used to construct a scale of food-insecurity severity using the Rasch model, which postulates that the probability of observing an affirmative answer by respondent i to question j is a logistic function of the distance, on an underlying scale of severity, between the position of the respondent, a_i, and that of the item, b_j.

$$Prob(X_{i,j} = \text{Yes}) = \frac{\exp(a_i - b_j)}{1 + \exp(a_i - b_j)}$$

By applying the Rasch model to the FIES data, it is possible to estimate the cross-country comparable probability of being food insecure ($p_{i,L}$) at each level of severity of food insecurity L (moderate or severe, or severe only), for each respondent i, with $0 < p_{i,L} < 1$.

The prevalence of food insecurity at each level of severity (FI_L) in the population is computed as the weighted sum of the probability of being food insecure for all respondents (i) in a sample:

$$FI_L = \Sigma p_{i,L} w_i$$

where w_i are post-stratification sampling weights that indicate the proportion of individuals or households in the national population represented by each record in the sample.

As only individuals aged 15 years or more are sampled in the GWP, the prevalence estimates directly produced from these data refer to the population aged 15 years and older. To arrive at the **prevalence and number of individuals (of all ages) in the population**, an estimate is required of the number of people living in households where at least one adult is estimated to be food insecure. This involves a multistep procedure detailed in Annex II of *Methods for estimating comparable rates of food insecurity experienced by adults throughout the world* (see link in the "Recommended readings" section, below).

Regional and global aggregates of food insecurity at moderate or severe, and severe levels, $FI_{L,r}$, are computed as:

$$FI_{L,r} = \frac{\Sigma_c FI_{L,c} \times N_c}{\Sigma_c N_c}$$

where r indicates the region, $FI_{L,c}$ is the value of FI at level L estimated for country c in the region, and N_c is the corresponding population size. When no estimate of FI_L is available for a country, it is assumed to be equal to the population-weighted average of the estimated values of the remaining countries in the same subregion. A regional aggregate is produced only if the countries for which an estimate is available cover at least 50 percent of the region's population.

Universal thresholds are defined on the FIES global standard scale (a set of item parameter values based on results from all countries covered by the GWP in 2014–2016) and converted into corresponding values on local scales. The process of calibrating each country's scale against the FIES global standard can be referred to as **equating** and permits the production of **internationally comparable** measures of food insecurity severity for individual respondents, as well as comparable national prevalence rates.

The problem stems from the fact that, when defined as a *latent* trait, the severity of food insecurity has no absolute reference against which it could be evaluated. The Rasch model enables identification of the relative position that the various items occupy on a scale that is denominated in logit units but whose "zero" is arbitrarily set, usually to correspond to the mean estimated severity. This implies that the zero of the scale changes in each application. To produce comparable measures over time and across different populations requires establishing a common scale to use as a reference and finding the formula needed to convert measures across different scales. As is the case for converting measures of temperature across difference measuring scales (such as Celsius and Fahrenheit), this requires the identification of a number of "anchoring" points. In the FIES methodology, these anchoring points are the severity levels associated with the items whose *relative* position on the scale of severity can be considered equal to that of the corresponding items on the global reference scale. The "mapping" of the measures from one scale to the other is then obtained by finding the formula that equates the mean and the standard deviation of the common items' severity levels.

Challenges and limitations: When food-insecurity prevalence estimates are based on FIES data collected in the GWP, with national sample sizes of about 1 000 individuals in most countries, confidence intervals rarely exceed 20 percent of the measured prevalence (that is, prevalence rates of 50 percent would have margins of error of up to plus or minus 5 percent). Confidence intervals are much smaller, however, when national prevalence rates are estimated using larger samples and for estimates referring to aggregates of several countries. To reduce the impact of year-to-year sampling variability, country-level estimates are presented as three-year averages, computed as averages of all available years in the considered triennia.

National government surveys are the preferred source to inform food insecurity prevalence estimates based on the FIES. However, they may not be available on a yearly basis and data may become available to FAO with some years of delay. In the absence of annual national surveys, the time series is informed using the strategy described above (see "Data source"). This may result in a back revision of the series.

Recommended readings:

FAO. 2016. *Methods for estimating comparable rates of food insecurity experienced by adults throughout the world*. Rome. https://openknowledge.fao.org/handle/20.500.14283/i4830e

FAO. 2018. Voices of the Hungry. In: *FAO*. [Cited 28 April 2020]. https://www.fao.org/in-action/voices-of-the-hungry

Cafiero, C., Viviani, S. & Nord, M. 2018. Food security measurement in a global context: The food insecurity experience scale. *Measurement*, 116: 146–152. [Cited 25 June 2024]. https://www.sciencedirect.com/science/article/pii/S0263224117307005

COST OF A HEALTHY DIET

Definition: The cost of a healthy diet is defined as the cost of purchasing the least expensive, locally available foods that may compose a diet that meets requirements for energy and food-based dietary guidelines (FBDGs) for a reference person within energy balance set at 2 330 kcal per day.

How it is reported: The indicator (denominated "cost of a healthy diet" [CoHD]) is an estimate of the average minimum cost that people must spend in a country to buy the least expensive, locally available foods needed to compose a healthy diet. For cross-country comparability, the cost of a healthy diet is converted from local currency units (LCU) to international dollars using purchasing power parity (PPP) exchange rates for private consumption. The CoHD indicator is thus reported as average **PPP dollars per person per day**.

Data source: The prices of items in each food group needed for a healthy diet are obtained using retail food price data from the International Comparison Program (ICP), coordinated by the World Bank, which estimates PPPs based on a range of internationally standardized items expressed in LCU.[11] For international comparisons, prices in LCU are converted into international dollars using PPP conversion factors for private consumption computed by the ICP and reported in the World Development Indicators (WDI) database.[12] To update the cost of a healthy diet in gap years where ICP rounds are not available, food consumer price index (CPI) data published by FAO are used.[13]

Methodology:

Method for defining a healthy diet basket

Given that the foods selected for a healthy diet vary by local context, countries have developed national FBDGs to recommend healthy dietary habits that reflect their specific cultural context and locally available foods. However, not all countries have FBDGs, and those that do often lack quantifiable recommendations in terms of food quantities and kilocalories. To address this data limitation and create a global standard of a healthy diet that reflects the commonalities in dietary guidelines worldwide, ten quantified FBDGs, representative of different world regions and compiled in recent years, have been selected. The Healthy Diet Basket (HDB) has been created to set this global standard. It is based on the average food group proportions across national FBDGs, using the median food group amounts recommended in the ten quantified FBDGs. The HDB is identified to meet a dietary energy intake of 2 330 kcal per day and consists of locally available items from six food groups: starchy staples; vegetables; fruits; animal source foods; legumes, nuts and seeds; oils and fats. Specifically, it is designed to provide 1 160 kcal from starchy staples, 110 kcal from vegetables, 160 kcal from fruits, 300 kcal from animal source foods, 300 kcal from legumes, nuts and seeds, and 300 kcal from oils and fats. The cost of a healthy diet is estimated for 169 countries from year 2017 to year 2022.

Methods for cost calculation when ICP data are available

To calculate the least-cost healthy diet, at each time and place, each ICP food item is classified into its food group, and the cheapest items that reach HDB requirements are identified. For each country, a total of 11 least-cost food items are selected in the HDB: two for starchy staples, three for vegetables, two for fruits, two for animal source foods, one for legumes, nuts and seeds, and one for oils and fats. The cost per day of each food group is calculated as the price of acquiring the selected items in that group multiplied by the quantity containing the energy content required by the HDB for that group. Finally, by summing the cost of the six food groups, the cost of a healthy diet is determined in each country.

Methods for cost update when ICP data are unavailable

The ICP is currently the only source of retail food price data for internationally standardized items, and these data are only made available once every three to four years, which does not allow for an annual updating of healthy diet costs. The last series of ICP data was released in 2024, and it refers to 2021 prices. For updating the cost indicator with reference to the years between the ICP publication cycles, food CPIs published by FAO are applied to the cost of a healthy diet in 2021 to estimate the cost in the years when ICP rounds are not available. This dataset tracks changes in monthly general and food CPIs at the national level with reference to a base year of 2015. The annual CPIs are computed as simple averages of the 12 monthly CPIs within a year. The cost of a healthy diet, $c(PPP)_t$, is estimated for missing years by multiplying each country's 2021 actual cost, expressed in LCU, by the food consumer price index (FCPI) ratio, and finally dividing by PPPs:

$$c\,(PPP)_t = \frac{c(LCU)_{2021} \times FCPI\ ratio_t}{PPP_t}$$

Where:

$$t = 2017, 2018, 2019, 2020, 2022$$

and

$$FCPI\ ratio_t = \left(\frac{FCPI_t}{FCPI_{2021}}\right).$$

For countries with missing PPP data, PPP imputations are applied using an Autoregressive Integrated Moving Average with External Explanatory Variable (ARIMAX) model. In line with the World Bank's WDI methodology for PPP extrapolations, the ratio between a country's general CPI and the CPI for the base country (in this case, the United States of America) is included in the model specification as a key predictor of PPP values. Furthermore, per capita gross domestic product (GDP) and per capita household consumption expenditure are also added as external covariates, and the Holt-Winter smoothing methodology is applied to both series to fill the gaps, if needed. The ARIMAX approach allows to estimate, for each country, several model specifications that include an autoregressive component, an integration component, a moving average, and a combination of the three. The best specification is selected when at least the estimated coefficient of the CPI ratio is statistically significant, followed by the statistical significance of the ARIMAX parameters. For countries and territories showing abnormal PPP series over time, the CPI ratio is found to be the only statistically significant coefficient to affect the variability of the PPP values. On the contrary, for countries and territories with a less volatile PPP series, the historical PPP trend also plays a role in predicting PPP values, as well as the coefficient estimates of per capita GDP and/or per capita expenditure. The ARIMAX computes the predicted values on the best specification selected for each country/territory.

Challenges and limitations: Data on internationally standardized food prices are not available every year to allow annual monitoring. A limitation of the method used to update the cost of a healthy diet is that changes in the cost depend on food CPIs and do not reflect item-specific changes in food prices, nor any differential changes in the price of different food groups.[bm] FAO, in collaboration with the World Bank, is exploring how to expand reporting of item-level prices to allow more frequent and robust monitoring of the cost of a healthy diet.

Regional and global aggregates of the cost of a healthy diet are computed using an arithmetic mean across the countries falling into each group.

Recommended readings:

Herforth, A., Bai, Y., Venkat, A., Mahrt, K., Ebel, A. & Masters, W.A. 2020. *Cost and affordability of healthy diets across and within countries. Background paper for The State of Food Security and Nutrition in the World 2020.* FAO Agricultural Development Economics Technical Study, No. 9. Rome, FAO. https://doi.org/10.4060/cb2431en

Herforth, A., Venkat, A., Bai, Y., Costlow, L., Holleman, C. & Masters, W.A. 2022. *Methods and options to monitor the cost and affordability of a healthy diet globally. Background paper to The State of Food Security and Nutrition in the World 2022.* FAO Agricultural Development Economics Working Paper, 22-03. Rome, FAO. https://doi.org/10.4060/cc1169en

Bai, Y., Conti, V., Ebel, A., Cafiero, C., Herforth, A., Rissanen, M.O., Rosero Moncayo, J. & Masters, W.A. (forthcoming). *Methods for monitoring the cost of a healthy diet based on price data from the International Comparison Program*. FAO Statistics Division Working Paper. Rome, FAO.

bm The food CPIs reflect average price changes for a basket of various food items defined in each country, which may not accurately represent the price changes of foods in the Healthy Diet Basket. As the basket is designed to include only the cheapest nutritious foods that compose a healthy diet, this means that using the aggregate food CPI may lead to an overestimation of the cost of a healthy diet.

UNAFFORDABILITY OF A HEALTHY DIET

Definition: The unaffordability of a healthy diet is defined as the inability of a household or of an individual to pay the amount of money needed to acquire the least-cost combination of locally available foods that meets the requirement for a healthy diet, after having accounted for the portion of their income they have to reserve for acquiring all basic needs other than food.

How it is reported: The main indicator (denominated **"prevalence of unaffordability" [PUA]**) is an estimate of the percentage of individuals in a population whose disposable income, net of the amount needed to acquire all basic non-food goods and services, is lower than the minimum cost of a healthy diet. National estimates are obtained by contrasting the country-specific income distributions against a threshold (r) obtained by summing the cost of a healthy diet with the relevant cost of basic non-food needs (n). Along with the PUA, the **number of people unable to afford a healthy diet (NUA)** is also computed by multiplying PUA by the reference population size.

The entire series (2017–2022) of PUA and NUA estimates are revised with each new edition of this report to reflect new cost data, new population data, and updated income distributions. As this process usually implies backward revisions of the entire PUA and NUA series, readers are advised to refrain from comparing series across different editions of this report and should always refer to the current edition of the report, including for values in past years.

Methodology: To estimate the PUA in a population, a daily per capita cost threshold is computed for each country. Due to the lack of information to determine the country-specific cost of basic non-food goods and services, differences in the non-food spending are based on the four World Bank country income classification groups. Therefore, the daily per capita cost threshold combines the cost of a healthy diet in a country i and the basic cost of non-food needs for the income group j to which country i belongs. The resulting cost threshold r_i is determined as follows:

$$r_i = c_i + n_j,$$

where c_i is the cost of a healthy diet in a country, and n_j is the cost of basic non-foods for income group *j*. The final n_i is expressed in 2017 PPP dollars, and is calculated by multiplying World Bank international poverty lines by a share of total expenditure to be reserved for non-food basic goods and services that is specific to each income group, as follows:

$$n_{\text{Low-income}} = 2.15 \times 0.37 = 0.80$$

$$n_{\text{Lower-middle-income}} = 3.65 \times 0.44 = 1.61$$

$$n_{\text{Upper-middle-income}} = 6.85 \times 0.54 = 3.70$$

$$n_{\text{High-income}} = 24.36 \times 0.54 = 13.20$$

The shares of income to be reserved for non-food goods and services are determined with reference to those reported by households that belong to the second quintile of the income distribution for low- and lower-middle-income countries, and by those in the first quintile for upper-middle- and high-income countries. These shares are derived from recent household surveys compiled by the World Bank, including real consumption information by income quintile for 71 countries from different income groups (see Supplementary material to Chapter 2).

Finally, the cost threshold r_i is compared with the country-specific income distributions x_i that reflect a household's disposable income to estimate the percentage of the population whose income falls below that threshold, as in the formula below:

$$PUA = \int_{x_i<r_i} f(x)dx \ \ where \ r_i = c_i + n_j$$

Data source: Income distributions are sourced by the World Bank Poverty and Inequality Platform and are available for around 150 countries up to 2022.[14]

Regional and global aggregates of the prevalence of unaffordability are computed as the population-weighted averages of the PUA estimated for the countries for which data are available, as follows:

$$PUA_a = \frac{\sum_i PUA_i \times N_i}{\sum_i N_i}$$

where *a* indicates the region or other aggregate, PUA_i is the value of PUA estimated for country *i* in the aggregate, and N_i is the corresponding population size. A regional aggregate is produced only if the countries for which an estimate is available cover at least 50 percent of the aggregate's population.

The number of people unable to afford a healthy diet (NUA_a) is then obtained by multiplying the average PUA_a – calculated from countries with available data – by the total population size N_a of all countries belonging to that aggregate.

$$NUA_a = PUA_a \times N_a$$

For Comoros and Taiwan Province of China, data on unaffordability are available only in 2017 and 2021. Therefore, a linear interpolation is used to estimate the values for 2018, 2019 and 2020, and the 2021 value is applied for 2022. For South Sudan and the Syrian Arab Republic, data are available only for 2021, so the 2021 value is used for all other years to calculate the aggregate statistics. In Lebanon, the 2020 value is applied to years 2017, 2018 and 2019, where information is missing. The global NUA estimate is obtained by multiplying the PUA for each of the five world regions by the total population size in each region. Calculating the global NUA estimate as the sum of the NUA estimates of other country groupings, such as those based on income levels, should be avoided. Population data are taken from the 2022 revision of the *World Population Prospects*.[5]

Challenges and limitations: In this edition of the report, method refinements are made to recognize that the cost of non-food needs varies across countries. However, due to the lack of country-specific information, the difference in non-food spending is incorporated across income groups, not yet across countries. Furthermore, besides the need to apply a correction to account for differences *across* countries, another important aspect is to recognize that the cost of a minimally dignified standard of living ($r = c + n$) also varies *within* each country. Especially for large, and diverse countries, the failure to account for such differences, and the use of a cost threshold *r* set at the national average, may result in biased estimates of unaffordability. The direction and extent of the bias will depend on the direction and the magnitude of the possible correlation that exists between income levels and the correct, location-specific threshold.

Recommended readings:
Bai, Y., Herforth, A., Cafiero C., Conti V., Rissanen, M.O., Masters, W.A & Rosero Moncayo, J. (forthcoming). *Methods for monitoring the affordability of a healthy diet*. FAO Statistics Division Working Paper. Rome, FAO.
Herforth, A., Bai, Y., Venkat, A., Mahrt, K., Ebel, A. & Masters, W.A. 2020. *Cost and affordability of healthy diets across and within countries. Background paper for The State of Food Security and Nutrition in the World 2020*. FAO Agricultural Development Economics Technical Study, No. 9. Rome, FAO. https://doi.org/10.4060/cb2431en

WASTING IN CHILDREN UNDER FIVE YEARS OF AGE

Definition: Weight (kg) for height/length (cm) <–2 SD of the WHO Child Growth Standards median.

How it is reported: This is the percentage of children aged 0 to 59 months who are <–2 SD from the median weight-for-height of the WHO Child Growth Standards. The regional and global aggregates presented are based on the report *Levels and trends in child malnutrition: UNICEF/WHO/World Bank Joint Child Malnutrition Estimates – Key findings of the 2023 edition.* The entire series of aggregates is revised with every new edition of the key findings report. Readers are advised to refrain from comparing regional and global series with prior editions of the report. Country level estimates are based on the UNICEF/WHO/World Bank Joint Child Malnutrition Estimates November 2023 dataset.

Methodology:

Country level

The Joint Child Malnutrition Estimates (JME) dataset contains the point estimate, and where available, the standard error, the 95 percent confidence bounds and the unweighted sample size. Where microdata are available, the JME dataset uses estimates that have been recalculated to adhere to the global standard definition. Where microdata are not available, reported estimates are used, except in cases where adjustments are required to standardize for:

- use of an alternate growth reference from the 2006 WHO Child Growth Standards;
- age ranges that do not include the full 0–59-month age group; and
- data sources that were only nationally representative for populations residing in rural areas.

Regional and global aggregates

The wasting prevalence data derived from national data sources in the JME March 2023 dataset were used to generate regional and global estimates from 1990 to 2022, using the JME subregional multilevel model and applying population weights for children under five years of age from the 2022 revision of the *World Population Prospects*.[5]

Data sources: Nationally representative household surveys, e.g. DHS, Multiple Indicator Cluster Surveys (MICS), Standardized Monitoring and Assessment of Relief and Transition (SMART) surveys, and LSMS surveys are the most common nationally representative data sources that specifically collect child nutrition data on height, weight and age of children under five years of age, and which can be used to generate national-level prevalence estimates for wasting. Some administrative data sources (e.g. from surveillance systems) are also included where population coverage is high.

Given that country surveys can be collected during any season, the prevalence estimate from any survey may be at a high or a low, or it may fall somewhere in between if data collection spans several seasons. Thus, the prevalence of wasting captures the situation of wasting at a specific point in time and not over an entire year. Variations in seasons across surveys make it difficult to draw inferences on trends.

Challenges and limitations: The recommended periodicity for countries to report on wasting is every three to five years; however, for some countries, data are available less frequently. While every effort has been made to maximize the comparability of statistics across countries and over time, country data may differ in terms of data collection methods, population coverage and estimation methods. Survey estimates come with levels of uncertainty due to both sampling errors and non-sampling errors (technical measurement errors, recording errors, and so on). Neither of the two sources of error has been fully taken into account for deriving estimates at the country or regional and global levels.

Recommended readings:

de Onis, M., Blössner, M., Borghi, E., Morris, R. & Frongillo, E.A. 2004. Methodology for estimating regional and global trends of child malnutrition. *International Journal of Epidemiology*, 33(6): 1260–1270. https://doi.org/10.1093/ije/dyh202

UNICEF, WHO & World Bank. 2021. *Technical notes from the background document for country consultations on the 2021 edition of the UNICEF-WHO-World Bank Joint Malnutrition Estimates. SDG Indicators 2.2.1 on stunting, 2.2.2a on wasting and 2.2.2b on overweight*. New York, USA, UNICEF. data.unicef.org/resources/jme-2021-country-consultations

UNICEF, WHO & World Bank. 2023. *Levels and trends in child malnutrition. UNICEF / WHO / World Bank Group Joint Child Malnutrition Estimates – Key findings of the 2023 edition*. New York, USA, UNICEF, Geneva, Switzerland, WHO and Washington, DC, World Bank. https://data.unicef.org/resources/jme-report-2023, http://www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition

WHO. 2014. *Comprehensive Implementation Plan on maternal, infant and young child nutrition*. Geneva, Switzerland. https://www.who.int/publications/i/item/WHO-NMH-NHD-14.1

WHO. 2024. *Nutrition Landscape Information System (NLIS) country profile indicators: interpretation guide.* Second edition. Geneva, Switzerland. https://www.who.int/publications/i/item/9789241516952

STUNTING IN CHILDREN UNDER FIVE YEARS OF AGE

Definition: Stunting is defined as height/length (cm) for age (days) <–2 SD of the WHO Child Growth Standards median.

How it is reported: This is the percentage of children aged 0 to 59 months who are <–2 SD from the median height-for-age of the WHO Child Growth Standards. The estimates presented are based on the report *Levels and trends in child malnutrition: UNICEF/WHO/World Bank Joint Child Malnutrition Estimates – Key findings of the 2023 edition.* The entire series of estimates is revised with every new edition of the key findings report. Readers are advised to refrain from comparing series with prior editions of the report.

Methodology:

Country level

The JME dataset contains the point estimate, and where available, the standard error, the 95 percent confidence bounds and the unweighted sample size. Where microdata are available, the JME dataset contains estimates that have been recalculated to adhere to the global standard definition. Where microdata are not available, reported estimates are presented, except in cases where adjustments are required to standardize for:

- use of an alternate growth reference from the 2006 WHO Child Growth Standards;
- age ranges that do not include the full 0–59-month age-group; and
- data sources that were only nationally representative for populations residing in rural areas.

Based on the JME March 2023 dataset, the prevalence of stunting was modelled at logit (log-odds) scale using a penalized longitudinal mixed model with a heterogeneous error term. The quality of the models was quantified with model-fit criteria that balance the complexity of the model with the closeness of the fit to the observed data. The proposed method has important characteristics, including non-linear time trends, regional trends, country-specific trends, covariate data and a heterogeneous error term. All countries with data contribute to estimates of the overall time trend and the impact of covariate data on the prevalence. The covariate data consisted of linear and quadratic sociodemographic index (SDI),[bn]

bn The SDI is a summary measure that identifies where countries or other geographic areas sit on the spectrum of development. Expressed on a scale of 0 to 1, SDI is a composite average of the rankings of the income per capita, average educational attainment, and fertility rates of all areas in the Global Burden of Disease study.

average health system access over the previous five years, and data source type.

Annual country-level modelled estimates from 2000 to 2022 for stunting were disseminated by the JME in 2023 for 159 countries with at least one data point in the JME country dataset (e.g. from a household survey). Modelled country estimates were also produced for an additional 46 countries, used solely for the generation of regional and global aggregates. Modelled estimates for these 46 countries are not shown because they did not have any household surveys in the JME dataset. The uncertainty intervals are important in monitoring trends, especially for countries with sparse data and where primary data sources present large sampling errors. When only sparse data are available in the most recent period, the inclusion of a survey can induce a substantial change in the predicted trajectory. For this reason, uncertainty intervals are needed to enhance trend interpretability in terms of the caution level employed. The uncertainty intervals for the estimates have been tested and validated.

Regional and global aggregates

Global and regional aggregates for all years from 2000 to 2022 were derived as the respective country averages weighted by the countries' under-five population from the 2022 revision of the *World Population Prospects*,[5] using model-based estimates for 205 countries and areas. This includes 159 countries with national data sources (e.g. household surveys) included in the JME country dataset. It also includes 46 countries with modelled estimates generated for development of regional and global aggregates but for which country-modelled estimates are not shown because they did not have any household surveys in the JME country dataset. Confidence intervals were generated based on bootstrapping methodology.

Data sources: Nationally representative household surveys (e.g. DHS, MICS, SMART surveys and LSMS surveys) are the most common nationally representative data sources that specifically collect child nutrition data on height and age of children under five, and which can be used to generate national-level prevalence estimates for stunting. Some administrative data sources (e.g. from surveillance systems) are also included where population coverage is high.

Challenges and limitations: The recommended periodicity for countries to report on stunting is every three to five years; however, for some countries, data are available less frequently. While every effort has been made to maximize the comparability of statistics across countries and over time, country data may differ in terms of data collection methods, population coverage and estimation methods. Survey estimates come with levels of uncertainty due to both sampling errors and non-sampling errors (technical measurement errors, recording errors, and so on). Neither of the two sources of error has been fully taken into account for deriving estimates at the country or regional and global levels.

Recommended readings:

GBD 2019 Risk Factors Collaborators. 2020. Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*, 396(10258): 1223–1249. https://doi.org/10.1016/s0140-6736(20)30752-2

McLain, A.C., Frongillo, E.A., Feng, J. & Borghi, E. 2019. Prediction intervals for penalized longitudinal models with multisource summary measures: An application to childhood malnutrition. *Statistics in Medicine*, 38(6): 1002–1012. https://doi.org/10.1002/sim.8024

UNICEF, WHO & World Bank. 2021. *Technical notes from the background document for country consultations on the 2021 edition of the UNICEF-WHO-World Bank Joint Malnutrition Estimates. SDG Indicators 2.2.1 on stunting, 2.2.2a on wasting and 2.2.2b on overweight*. New York, USA, UNICEF. data.unicef.org/resources/jme-2021-country-consultations

UNICEF, WHO & World Bank. 2023. *Levels and trends in child malnutrition. UNICEF / WHO / World Bank Group Joint Child Malnutrition Estimates – Key findings of the 2023 edition*. New York, USA, UNICEF, Geneva, Switzerland, WHO and Washington, DC, World Bank. https://data.unicef.org/resources/jme-report-2023, http://www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition

WHO. 2014. *Comprehensive Implementation Plan on maternal, infant and young child nutrition*. Geneva, Switzerland. https://www.who.int/publications/i/item/WHO-NMH-NHD-14.1

WHO. 2024. *Nutrition Landscape Information System (NLIS) country profile indicators: interpretation guide.* Second edition. Geneva, Switzerland. https://www.who.int/publications/i/item/9789241516952

WHO & UNICEF. 2019. *Recommendations for data collection, analysis and reporting on anthropometric indicators in children under 5 years old*. Geneva, Switzerland and New York, USA. https://www.who.int/publications/i/item/9789241515559

OVERWEIGHT IN CHILDREN UNDER FIVE YEARS OF AGE

Definition: Weight (kg) for height/length (cm) >+2 SD of the WHO Child Growth Standards median.

How it is reported: This is the percentage of children aged 0 to 59 months who are >+2 SD from the median weight-for-height of the WHO Child Growth Standards. The estimates presented are based on the report *Levels and trends in child malnutrition: UNICEF/WHO/World Bank Joint Child Malnutrition Estimates – Key findings of the 2023 edition.* The entire series of estimates is revised with every new edition of the key findings report. Readers are advised to refrain from comparing series with prior editions of the report.

Methodology:

Country level

The JME dataset contains the point estimate, and where available, the standard error, the 95 percent confidence bounds and the unweighted sample size. Where microdata are available, the JME dataset contains estimates that have been recalculated to adhere to the global standard definition. Where microdata are not available, reported estimates are presented, except in cases where adjustments are required to standardize for:

- use of an alternate growth reference from the 2006 WHO Child Growth Standards;
- age ranges that do not include the full 0–59-month age group; and
- data sources that were only nationally representative for populations residing in rural areas.

Based on the JME March 2023 dataset, the prevalence of overweight was modelled at logit (log-odds) scale using a penalized longitudinal mixed model with a heterogeneous error term. The quality of the models was quantified with model-fit criteria that balance the complexity of the model with the closeness of the fit to the observed data. The proposed method has important characteristics, including non-linear time trends, regional trends, country-specific trends, covariate data and a heterogeneous error term. All countries with data contribute to estimates of the overall time trend and the impact of covariate data on the prevalence. The covariate data consisted of linear and quadratic SDI and data source type.

Annual country-level modelled estimates from 2000 to 2022 of overweight were disseminated by the JME in 2023 for 160 countries with at least one data point included in the JME country dataset (e.g. from a household survey). Modelled country estimates were also produced for an additional 45 countries, used solely for the generation of regional and global aggregates. Modelled estimates for these 45 countries are not shown because they did not have any household surveys in the JME dataset. The uncertainty intervals are important in monitoring trends, especially for countries with sparse data and where primary data sources present large sampling errors. When only sparse data are available in the most recent period, the inclusion of a survey can induce a substantial change in the predicted trajectory. For this reason, uncertainty intervals are needed to enhance trend interpretability in terms of the caution level employed. The uncertainty intervals for the estimates have been tested and validated.

Regional and global aggregates

Global and regional aggregates for all years from 1990 to 2022 were derived as the respective country averages weighted by the countries' under-five population from the 2022 revision of the *World Population Prospects*,[5] using model-based estimates for 205 countries. This includes 160 countries with national data sources (e.g. household surveys) included in the JME country dataset. It also includes 45 countries with modelled estimates generated for development of regional and global aggregates but for which country-modelled estimates are not shown because they did not have any household surveys in the JME country dataset. Confidence intervals were generated based on bootstrapping methodology.

Data sources: Nationally representative household surveys (e.g. DHS, MICS, SMART surveys and LSMS surveys) are the most common nationally representative data sources that specifically collect child nutrition data on height, weight and age of children under five years of age, and which can be used to generate national-level prevalence estimates for overweight. Some administrative data sources (e.g. from surveillance systems) are also included where population coverage is high.

Challenges and limitations: The recommended periodicity for countries to report on overweight is every three to five years; however, for some countries, data are available less frequently. While every effort has been made to maximize the comparability of statistics across countries and over time, country data may differ in terms of data collection methods, population coverage and estimation methods. Survey estimates come with levels of uncertainty due to both sampling errors and non-sampling errors (technical measurement errors, recording errors, and so on). Neither of the two sources of error has been fully considered for deriving estimates at the country or regional and global levels.

Recommended readings:

GBD 2019 Risk Factors Collaborators. 2020. Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*, 396(10258): 1223–1249. https://doi.org/10.1016/s0140-6736(20)30752-2

McLain, A.C., Frongillo, E.A., Feng, J. & Borghi, E. 2019. Prediction intervals for penalized longitudinal models with multisource summary measures: An application to childhood malnutrition. *Statistics in Medicine*, 38(6): 1002–1012. https://doi.org/10.1002/sim.8024

UNICEF, WHO & World Bank. 2021. *Technical notes from the background document for country consultations on the 2021 edition of the UNICEF-WHO-World Bank Joint Malnutrition Estimates. SDG Indicators 2.2.1 on stunting, 2.2.2a on wasting and 2.2.2b on overweight*. New York, USA, UNICEF. data.unicef.org/resources/jme-2021-country-consultations

UNICEF, WHO & World Bank. 2023. *Levels and trends in child malnutrition. UNICEF / WHO / World Bank Group Joint Child Malnutrition Estimates – Key findings of the 2023 edition*. New York, USA, UNICEF, Geneva, Switzerland, WHO and Washington, DC, World Bank. https://data.unicef.org/resources/jme-report-2023, http://www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition

WHO. 2014. *Comprehensive Implementation Plan on maternal, infant and young child nutrition*. Geneva, Switzerland. https://www.who.int/publications/i/item/WHO-NMH-NHD-14.1

WHO. 2024. *Nutrition Landscape Information System (NLIS) country profile indicators: interpretation guide.* Second edition. Geneva, Switzerland. https://www.who.int/publications/i/item/9789241516952

WHO & UNICEF. 2019. *Recommendations for data collection, analysis and reporting on anthropometric indicators in children under 5 years old*. Geneva, Switzerland and New York, USA. https://www.who.int/publications/i/item/9789241515559

EXCLUSIVE BREASTFEEDING

Definition: Exclusive breastfeeding for infants under six months of age is defined as receiving only breastmilk and no additional food or drink, not even water.

How it is reported: This is the percentage of infants aged 0 to 5 months who are fed exclusively on breastmilk with no additional food or drink, not even water, in the 24 hours preceding the survey.

The estimates presented are from UNICEF. 2024. Infant and young child feeding. In: *UNICEF*. [Cited 24 July 2024]. https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding

Methodology:

Country level

This indicator is defined as breastfeeding with no other food or drink, not even water. Estimates are based on a recall of the previous day's feeding to a cross-section of infants 0 to 5 months of age.

$$\frac{\textit{Infants 0–5 months of age who received only breastmilk during the previous day}}{\textit{Infants 0–5 months of age}}$$

Breastfeeding by a wet nurse, feeding of expressed breastmilk and feeding of donor human milk all count as being fed breastmilk. Prescribed medicines, oral rehydration solution, vitamins and minerals are not counted as fluids or foods. However, herbal fluids and similar traditional medicines are counted as fluids, and infants who consume these are not exclusively breastfed.

Regional and global aggregates

For 2012, the regional and global exclusive breastfeeding estimates were generated using the most recent estimate available for each country between 2005 and 2012. Similarly, 2022 estimates were developed using the most recent estimate available for each country between 2016 and 2022. Global and regional estimates are calculated as weighted averages of the prevalence of exclusive breastfeeding in each country, using the total number of infants aged 0 to 5 months (defined as half of the population aged zero) from the 2022 revision of the *World Population Prospects* (2012 for the baseline and 2022 for the current) as weights.[5] Estimates are presented in the cases where the available data represent at least 50 percent of corresponding regions' total number of infants aged 0 to 5 months, unless otherwise noted.

Data sources: Data are collected through nationally representative household surveys such as DHS and MICS. The estimates are based on questions about liquid and food intake of children aged 0–23 months in the 24 hours preceding the survey.

Challenges and limitations: While a high proportion of countries collect data for exclusive breastfeeding, data are particularly lacking from high-income countries. The recommended periodicity of reporting on exclusive breastfeeding is every three to five years. However, for some countries, data are reported less frequently, meaning changes in feeding patterns are often not detected for several years after the change occurs.

Regional and global averages may be affected depending on which countries had data available for the periods considered in this report.

Using the previous day's feeding as a basis may cause the proportion of exclusively breastfed infants to be overestimated, as some infants who may have been given other liquids or foods irregularly may not have received these on the day before the survey.

Recommended readings:

UNICEF. 2024. Infant and young child feeding. In: *UNICEF*. [Cited 24 July 2024]. https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding

WHO. 2014. *Comprehensive implementation plan on maternal, infant and young child nutrition*. Geneva, Switzerland. https://www.who.int/publications/i/item/WHO-NMH-NHD-14.1

WHO. 2024. *Nutrition Landscape Information System (NLIS) country profile indicators: interpretation guide.* Second edition. Geneva, Switzerland. https://www.who.int/publications/i/item/9789241516952

WHO & UNICEF. 2021. *Indicators for assessing infant and young child feeding practices: definitions and measurement methods.* Geneva, Switzerland, and New York, USA. https://www.who.int/publications/i/item/9789240018389

LOW BIRTHWEIGHT

Definition: Low birthweight is defined as a weight at birth of less than 2 500 g.

How it is reported: This is the percentage of newborns weighing less than 2 500 g (less than 5.51 lbs) at birth. The estimates presented are from the 2023 edition of the UNICEF and WHO *Joint low birthweight estimates.* As the entire series of estimates is revised with every new edition, readers are advised to refrain from comparing series with prior editions.

Methodology:

Country level

Nationally representative low birthweight data, including survey and administrative data sources, were collated from 2000 to 2020 from 158 countries. Data quality criteria and adjustment methods were applied to develop the final set of country data to be included in the modelling exercise. Country data are reviewed prior to entry into the dataset for coverage and quality and adjusted to account for biases due to birthweight missingness and heaping. To be included, birthweights available from administrative data needed to cover at least 80 percent of the 2022 revision of the *World Population Prospects*[5] estimated live births for that year. For national household surveys to be included in the dataset, they must have:

- a birthweight in the dataset for a minimum of 30 percent of the sample;
- a minimum of 200 birthweights in the dataset;
- no indication of severe data heaping or implausible distribution – this means that: i) ≤55 percent of all birthweights can fall on the three most frequent birthweights (i.e. if 3 000 g, 3 500 g and 2 500 g were the three most frequent birthweights, when added together, they would have to make up ≤55 percent of all birthweights in the dataset); ii) ≤10 percent of all birthweights are ≥4 500 g; and iii) ≤5 percent of birthweights fall on tail ends of <500 g or >5 000 g; and
- undergone an adjustment for missing birthweights and heaping.

Estimates of low birthweight prevalence at the national level were predicted from a Bayesian multilevel regression model. The model is fit on the logit (log-odds) scale to ensure that proportions are bounded between zero and one, and then back-transformed and multiplied by 100 to obtain prevalence estimates.

Hierarchical random country-specific intercepts (countries within regions within global) accounted for the correlation within and between regions. Penalized splines were used as temporal smoothing across the time series, meaning that country-level non-linear time trends were captured without random variation affecting the trend. The final covariates included in the model were: gross national income PPP per person,[bo] the prevalence of underweight among female adults, the adult female literacy rate, the modern contraception prevalence rate and the percentage of urban population.

bo Measured in constant 2017 international dollars.

Data quality categories were used to apply bias shifts and additional variance terms. These bias shifts were applied to administrative data from lower quality categories, which approximated the expected bias from heaping that was already accounted for in the survey adjustment. The additional variance was based on the data quality category of the administrative data, and the weighting between administrative and survey data if the country had both.

Standard diagnostic checks were done to assess for convergence and sampling efficiency. Cross-validation was implemented, averaging over 200 random splits of 20 percent test data, 80 percent training data. Sensitivity analyses were undertaken including checks on covariates, bias method, temporal smoothing, and non-informative priors. All models were fitted in R statistical software and the R packages "rjags" and "R2jags".[15, 16]

The model included all 2040 country-years of data meeting the inclusion criteria and generated annual estimates from 2000 to 2020 with 95 percent credible intervals for the 195 countries and areas with either low birthweight input data or covariate data. Only estimates for countries and areas with data are reported. For the 37 (out of 195) countries with no data or data not meeting inclusion criteria, the final model was used to predict estimates of the prevalence of low birthweight based on country intercepts and time trends estimated from the region- and country-level covariates for all country years.

Regional and global aggregates

Regional and global aggregates are produced using all estimates from all 195 countries and areas weighted by estimated live births for that year from the 2022 revision of the *World Population Prospects.*[5]

Data sources: Nationally representative estimates of low birthweight prevalence can be derived from a range of sources, broadly defined as national administrative data or representative household surveys. National administrative data are those coming from national systems including civil registration and vital statistics systems, national health management information systems and birth registries. National household surveys such as DHS and MICS which contain information about birthweight as well as key related indicators including maternal perception of size at birth are also an important source of data on low birthweight, especially in contexts where birthweights are not recorded and/or data heaping is a problem.

Challenges and limitations: A major limitation of monitoring low birthweight globally is the lack of birthweight data for many of the world's children. There is a notable bias, with children born to poorer, less educated, rural mothers and families being less likely to have a recorded birthweight when compared with their richer, urban counterparts with more highly educated mothers. Close to one out of three surveys containing birthweight data were not included, primarily due to missingness or poor data quality, and mostly from low-income countries in regions with a high risk of low birthweight.

As newborns with missing birthweights have risk factors for low birthweight, estimates that do not represent these children may be lower than the true value. Furthermore, poor data quality regarding excessive heaping on multiples of 500 g or 100 g exists in data from low- and middle-income countries which can further underestimate low birthweight. The methods applied in the current database to adjust for missing birthweights and heaping in survey estimates are meant to address this problem. A limitation of current methods is that individual-level data are not available for administrative data, and these data cannot be directly adjusted to remove bias from heaping and missingness.

The geographical groupings used in the modelling may not be appropriate for epidemiological or economic regional outliers. In all, the estimates for 37 (out of 195) countries without input data may have been affected. In addition, the confidence limits of the regional and global estimates may be artificially small given that about half of the modelled countries had a country-specific effect generated at random for each bootstrap prediction, some of which were positive and others negative, making the relative uncertainty at the regional and global levels less than that at the country level.

Recommended readings:

Blanc, A. & Wardlaw, T. 2005. Monitoring low birth weight: An evaluation of international estimates and an updated estimation procedure. *Bulletin World Health Organization*, 83(3): 178–185. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2624216

Chang, K.T., Carter, E.D., Mullany, L.C., Khatry, S.K., Cousens, S., An, X., Krasevec, J. *et al.* 2022. Validation of MINORMIX approach for estimation of low birthweight prevalence using a rural Nepal dataset. *The Journal of Nutrition*, 152(3): 872–879. https://doi.org/10.1093/jn/nxab417

Okwaraji, Y.B., Krasevec, J., Bradley, E., Conkle, J., Stevens, G.A., Gatica-Domínguez, G., Ohuma, E.O. *et al.* 2024. National, regional, and global estimates of low birthweight in 2020, with trends from 2000: a systematic analysis. *The Lancet*, 403(10431): 1071–1080. https://doi.org/10.1016/S0140-6736(23)01198-4

UNICEF & WHO. 2023. Low birthweight. In: *UNICEF.* [Cited 24 July 2024]. https://data.unicef.org/topic/nutrition/low-birthweight

UNICEF & WHO. 2023. Joint low birthweight estimates. In: *WHO.* [Cited 24 July 2024]. https://www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-low-birthweight-estimates

ADULT OBESITY

Definition: Body mass index ≥30.0 kg/m². The BMI is the weight-to-height ratio commonly used to classify the nutritional status of adults. It is calculated as the body weight in kilograms divided by the square of the body height in metres (kg/m²). Obesity includes individuals with BMI equal to or higher than 30 kg/m².

How it is reported: Percentage of the population over 18 years of age with BMI ≥30.0 kg/m² weighted by sex and standardized by age. The estimates presented are based on WHO. 2024. *Global Health Observatory (GHO) data repository: Prevalence of obesity among adults, BMI ≥ 30, age-standardized. Estimates by country.* [Accessed on 24 July 2024]. https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi--30-(age-standardized-estimate)-(-). Licence: CC-BY-4.0.

The entire series of estimates is revised with every new update. Readers are advised to refrain from comparing the current series with prior updates.

Methodology:

Country level

A Bayesian hierarchical regression model, fitted using a Markov Chain Monte Carlo (MCMC) sample, with inference made using posterior MCMC samples, was applied to estimate the trends in the prevalence of different BMI categories by sex, age, country and year from 1990 to 2022. Countries were organized into 20 regions and 8 super regions, primarily based on geography and national income. The model had a hierarchical structure in which estimates for each country and year were informed by its own data, if available, and by data from other years within the same country and from other countries, especially those in the same region and super-region with data for similar time periods. The model included non-linear time trends through a combination of linear and second-order random walk terms, all modelled hierarchically. The age association of BMI was modelled using a cubic spline to allow for non-linear age patterns, which might vary across countries. The coefficients of the splines were modelled hierarchically and were allowed to vary over time to reflect the changing age associations. Age standardization was performed by taking the weighted means of age-sex-specific estimates, using age weights from the WHO standard population.[17]

Regional and global aggregates

Global and regional prevalence estimates are calculated as population-weighted averages of the constituent countries.

Data sources: Population-based studies with measurements of height and weight such as nationally representative household surveys constitute most of the data sources for monitoring adult obesity.

Challenges and limitations: Body mass index is an imperfect measure of the extent and distribution of body fat, but is widely available in population-based surveys, and is used in clinical practice; it is also correlated with the more complex and costly dual-energy x-ray absorptiometry.

Some countries had few data sources and three countries had no data source. Estimates for these countries were informed to a larger degree by data from other countries through geographical hierarchy.

There were also differences in data availability by age group, with fewer data available for older adults (≥65 years), which increased the uncertainty of estimates for that age group.

Recommended readings:

Ahmad, O.B., Boschi-Pinto, C., Lopez, A.D., Murray, C.J., Lozano, R. & Inoue, M. 2001. *Age standardization of rates: A new WHO standard*. GPE Discussion Paper Series 31. Geneva, Switzerland, WHO. https://cdn.who.int/media/docs/default-source/gho-documents/global-health-estimates/gpe_discussion_paper_series_paper31_2001_age_standardization_rates.pdf

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Sixty-Sixth World Health Assembly. 2013. *Follow-up to the Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases*. https://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R10-en.pdf?ua=1

WHO. 2022. *Updated Appendix 3 of the WHO Global NCD Action Plan 2013-2030*. Technical Annex (version dated 26 December 2022). Geneva, Switzerland. https://cdn.who.int/media/docs/default-source/ncds/mnd/2022-app3-technical-annex-v26jan2023.pdf?sfvrsn=62581aa3_5

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WHO. 2024. *Nutrition Landscape Information System (NLIS) country profile indicators: interpretation guide.* Second edition. Geneva, Switzerland. https://www.who.int/publications/i/item/9789241516952

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ANAEMIA IN WOMEN AGED 15 TO 49 YEARS

Definition: Percentage of women aged 15 to 49 years with a haemoglobin concentration of less than 120 g/L for non-pregnant women and lactating women, and less than 110 g/L for pregnant women, adjusted for altitude and smoking.

How it is reported: Percentage of women aged 15 to 49 years with a haemoglobin concentration below 110 g/L for pregnant women and below 120 g/L for non-pregnant women. The estimates presented are based on WHO. 2021. WHO global anaemia estimates, 2021 edition. In: *WHO*. [Cited 24 July 2024]. https://www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children. The entire series of estimates is revised with every new edition. Readers are advised to refrain from comparing the current series with prior editions.

Methodology:

Country level

The 2021 edition of anaemia estimates in women aged 15 to 49 years, by pregnancy status, included data sources from the Micronutrients Database, part of the WHO Vitamin and Mineral Nutrition Information System (VMNIS) and from anonymized individual-level data which span from 1995 to 2019. Adjustments of data on blood haemoglobin concentrations for altitude were carried out when relevant (i.e. the country has a high-altitude population) and adjustments for smoking done when feasible. Biologically implausible haemoglobin values (<25 g/L or >200 g/L) were excluded.

A Bayesian hierarchical mixture model was used to estimate haemoglobin distributions and systematically address missing data, non-linear time trends, and representativeness of data sources. Briefly, the model calculated estimates for each country and year, informed by data derived from that same country and year where available, data from other years within the same country, and data from other countries during similar time periods, especially countries in the same region. The model borrows data, to a greater extent, when data are non-existent or weakly informative, and to a lesser extent for data-rich countries and regions. The resulting estimates are also informed by covariates that help predict blood haemoglobin concentrations (e.g. sociodemographic index, meat supply [kcal/capita], mean BMI for women, and log of under-five mortality for children). The uncertainty ranges (credibility intervals) reflect the major sources of uncertainty, including sampling error, non-sampling error due to issues in sample design/measurement, and uncertainty from making estimates for countries and years without data.

Regional and global aggregates

Global and regional prevalence estimates are calculated as population-weighted averages of the constituent countries.

Data sources: The preferable data source is population-based surveys. Data from surveillance systems may be used under some circumstances, but recorded diagnoses are typically underestimated. The Micronutrients Database of the WHO VMNIS compiles and summarizes data on the micronutrient status of populations from various other sources, including data collected from the scientific literature and through collaborators, including WHO regional and country offices, United Nations organizations, ministries of health, research and academic institutions, and non-governmental organizations. In addition, anonymized individual-level data are obtained from multicountry surveys, including DHS, Malaria Indicator Surveys and Reproductive Health Surveys.

Challenges and limitations: Despite a high proportion of countries having nationally representative survey data for anaemia, there is still a lack of reporting on this indicator, especially in high-income countries. As a result, the estimates may not fully capture the variation across countries and regions, thus tending to "shrink" towards global means when data are sparse.

Recommended readings:

Stevens, G.A., Paciorek, C.J., Flores-Urrutia, M.C., Borghi, E., Namaste, S., Wirth, J.P., Suchdev, P.S., Ezzati, M., Rohner, F., Flaxman, S.R. & Rogers, L.M. 2022. National, regional, and global estimates of anaemia by severity in women and children for 2000–19: a pooled analysis of population-representative data. *The Lancet Global Health*, 10(5): e627–e639. https://doi.org/10.1016/S2214-109X(22)00084-5

WHO. 2011. *Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System*. Geneva, Switzerland. https://apps.who.int/iris/bitstream/handle/10665/85839/WHO_NMH_NHD_MNM_11.1_eng.pdf

WHO. 2014. *Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition*. Geneva, Switzerland. https://www.who.int/publications/i/item/WHO-NMH-NHD-14.1

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WHO. 2024. Nutrition Landscape Information System (NLIS) Country Profile. In: *WHO*. [Cited 20 April 2023]. https://www.who.int/data/nutrition/nlis/country-profile

WHO. 2024. Nutrition Data Portal. In: *WHO*. [Cited 6 April 2024]. https://platform.who.int/nutrition/nutrition-portals ■

ANNEX 2
GLOSSARY

Acute food insecurity
Food insecurity found in a specified area at a specific point in time and of a severity that threatens lives or livelihoods, or both, regardless of the causes, context or duration. It has relevance in providing strategic guidance to actions that focus on short-term objectives to prevent, mitigate or decrease severe food insecurity.[18]

Affordability
The ability of people to buy foods in their local environment. In this report, cost refers to what people have to pay to secure a healthy diet, while affordability refers to the cost relative to a person's income, minus other required expenses. In **Section 2.2**, unaffordability is determined by comparing the cost of a healthy diet plus the cost of basic non-food goods and services with income distributions available in the Poverty and Inequality Platform (PIP) of the World Bank. This allows for a computation of the percentage and number of people in each country who are not able to afford a healthy diet.[bp]

Agrifood systems
A term increasingly used in the context of transforming food systems for sustainability and inclusivity, agrifood systems encompass both agricultural and food systems and focus on both food and non-food agricultural products, with clear overlaps. Agrifood systems encompass the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products. They comprise all food products that originate from crop and livestock production, forestry, fisheries and aquaculture, as well as the broader economic, societal and natural environments in which these diverse production systems are embedded.

bp See Supplementary material to Chapter 2 for the full description of the methodology.

Animal source foods
All types of meat, poultry, fish, shellfish, insects, grubs, eggs, milk, cheese, yoghurt and other milk products.[19, 20]

Blended finance
The strategic use of development finance for the mobilization of additional finance towards sustainable development in developing countries. It attracts commercial capital towards projects that contribute to sustainable development, while providing financial returns to investors.[21]

Bond
A debt investment in which an investor lends money to an entity (typically corporate or governmental) that borrows the funds for a defined period of time at a variable or fixed interest rate. Bonds are used by companies, municipalities, states and sovereign governments to raise money and finance a variety of projects and activities.[22]

Capital markets
A subset of financial markets that specifically deal with the buying and selling of equity and debt securities.[23]

Commercial finance
Finance related to activities of commercial business operations to earn profits. Non-commercial activities can be conducted by non-profit organizations or government agencies.[24]

Concessional loans
Loans that are extended on terms substantially more generous than market loans. The concessions are achieved either through interest rates below those available on the market or by grace periods, or a combination of these two.[22]

Climate
Climate is usually defined in a narrow sense as the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years.[25]

Climate change
A change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer.[25]

Climate extreme (extreme weather or climate event)
The occurrence of a value of a weather or climate variable above (or below) a threshold value near the upper (or lower) ends of the range of observed values of the variable. For simplicity, both extreme weather events and extreme climate events are referred to collectively as "climate extremes".[26]

Climate shocks
Climate shocks include not only those disturbances in the usual pattern of rainfall and temperatures but also complex events like droughts and floods. Equivalent to the concept of a natural hazard or stress, they are exogenous events that can have a negative impact on food security and nutrition, depending on the vulnerability to the shock of an individual, a household, a community or systems.[27–30]

Climate variability
Variations in the mean state and other statistics (standard deviations, the occurrence of extremes, and so on) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability) or to variations in natural or anthropogenic external forcing (external variability).[25]

Conflict
Conflict as used in this report is defined as struggles between interdependent groups that have either actual or perceived incompatibilities with respect to needs, values, goals, resources or intentions. This definition includes (but is broader than) armed conflict – that is, organized collective violent confrontations between at least two groups, either state or non-state actors.

Debt
An amount of money borrowed by one party from another. Many corporations and individuals use debt as a method of making large purchases that they would not be able to afford under normal circumstances. A debt arrangement gives the borrowing party permission to borrow money on the condition that it must pay back the sum at a later date, usually with interest.[22]

Debt-based financing
When a firm raises money for working capital or capital expenditures by selling debt instruments to individuals and/or institutional investors. In return for lending the money, the individuals or institutions become creditors and receive a promise that the principal and interest on the debt will be repaid.[22]

Debt swap
The cancellation of (part of the) external debt of a country in exchange for the debtor government's commitment to mobilize domestic resources (local currency or another asset, such as bonds, privatized public assets) for an agreed purpose on agreed terms. The cancellation of external debt usually comes at a discount from the face value.[31]

Diet quality (or healthy diets)
Comprising four key aspects: diversity (within and across food groups), adequacy (sufficiency of all essential nutrients compared to requirements), moderation (foods and nutrients that are related to poor health outcomes) and balance (energy and macronutrient intake). Foods consumed should be safe.

Dietary energy requirements
The amount of dietary energy, measured in kilojoules or kilocalories (often referred to as calories), required by an individual to maintain body functions, health and normal activity. Dietary energy requirements are dependent upon age, sex, body size and level of physical activity. Additional energy is required to support optimal growth and development in children and in women during pregnancy, and for milk production during lactation, consistent with the good health of mother and child.

Domestic private investment
A measure of the amount of money that domestic businesses invest within their own country. It can be represented with the accounting equation: non-residential investment + residential investment + change in inventories.[32]

Domestic public expenditure
Government expenditure (or spending) as reported by central governments. Public sector enterprises are included to the extent that their budgets are reported in national budgets. Subnational government budgets are not included, although transfers they may receive from central governments are included in national budgets.

Drought
A period of abnormally dry weather lasting long enough to cause a serious hydrological imbalance.[25]

Due diligence
The necessary assessment of the past performance, reputation and future plans of a prospective partner, private sector entity, or other organization with regard to various business practices and principles to evaluate the risks and benefits of working together. This assessment of a prospective partner would normally involve, at a minimum, examining their social, environmental and financial track records.[22]

Economic downturn
A period of decline in economic activity or negative growth as measured by the growth rate in real GDP. It is a synonym for economic recession, a temporary or short-term downturn in economic growth. In the analyses and figures presented in this report, an economic downturn is identified using the year as a period of reference.

Economic shock
An unexpected or unpredictable event that is external to the specific economy and can either harm or boost it. A global financial crisis causing bank lending or credit to fall, or an economic downturn in a major trading partner of a country both reflect demand-side shocks that can have multiple effects on spending and investment. A steep rise in oil and gas prices, natural disasters that result in sharp falls in production, or conflict that disrupts trade and production, are examples of supply-side shocks.

Economic slowdown
Economic activity that is growing at a slower pace compared to the previous period. An economic slowdown occurs when real GDP growth declines from one period to another, but it is still positive.

Energy-dense foods
Food with a high content of calories (energy) with respect to its mass or volume.

Equity
The value of an asset minus the amount of all liabilities on that asset. It can be represented with the accounting equation: assets – liabilities = equity.[22]

Equity-based finance
The contribution of capital to a company or project through the purchase of shares, stocks or similar documents. Equity investors purchase shares with the expectation that shares or stocks will rise in value through appreciation, and/or generate capital gains from the company. In the development finance context, equity investments provide developmental support and long-term growth capital that private enterprises need. The objective is to exit the investment with a return of at least the initial capital, if not enhanced values to invest elsewhere.[22]

Extreme poverty
Refers to the percentage of people living on less than USD 2.15 a day (2017 PPP prices) in a country in a given year.[33]

Extreme weather or climate event
The occurrence of a value of a weather or climate variable above (or below) a threshold value near the upper (or lower) ends of the range of observed values of the variable. Many weather and climate extremes are the result of natural **climate variability**, and natural decadal or multidecadal variations in the climate provide the backdrop for anthropogenic **climate changes**. Even if there were no anthropogenic changes in climate, a wide variety of natural weather and climate extremes would still occur.

Finance, financing
The process of providing funds for business activities, making purchases or investing. The funds may or may not be provided

conditional upon a certain return (interests, dividends, and so on) and/or reimbursement (of debt principal).[34]

Fiscal subsidies

Budget transfers made by governments in the context of policy measures, projects and programmes to individual actors of the food and agriculture sector, such as farmers (fiscal subsidies to producers) or consumers (fiscal subsidies to consumers). Fiscal subsidies to producers aim to reduce production costs or increase farm income and can be granted depending on output, input use or use of other factors of production. Fiscal subsidies to consumers include transfers under social protection programmes (given to final consumers) and food subsidies to lower the cost of food (provided to intermediaries such as processors, traders, transporters).

Flood

The overflowing of the normal confines of a stream or other body of water, or the accumulation of water over areas not normally submerged. Floods include river (fluvial) floods, flash floods, urban floods, pluvial floods, sewer floods, coastal floods and glacial lake outburst floods.[25]

Food environment

The physical, economic, political and sociocultural context in which consumers engage with agrifood systems to make decisions about acquiring, preparing and consuming food.[35]

Food Insecurity Experience Scale

An experience-based food security scale used to produce a measure of access to food at different levels of severity that can be compared across contexts. It relies on data obtained by asking people, directly in surveys, about the occurrence of conditions and behaviours that are known to reflect constrained access to food.

Food security

A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Based on this definition, four food security dimensions can be identified: food availability, economic and physical access to food, food utilization, and stability over time. The concept of food security is evolving to also recognize the centrality of agency and sustainability (see **Food security dimensions** [e] and [f] below for the definition of these two additional dimensions).

Food security dimensions

In this report, food security dimensions refer to the four traditional dimensions of food security:

a. Availability – This dimension addresses whether or not food is actually or potentially physically present, including aspects of production, food reserves, markets and transportation, and wild foods.
b. Access – If food is actually or potentially physically present, the next question is whether or not households and individuals have sufficient physical and economic access to that food.
c. Utilization – If food is available and households have adequate access to it, the next question is whether or not households are maximizing the consumption of adequate nutrition and energy. Sufficient energy and nutrient intake by individuals is the result of good caring and feeding practices, food preparation, dietary diversity and intra-household distribution of food, and access to clean water, sanitation and health care. Combined with good biological utilization of food consumed, this determines the nutritional status of individuals.
d. Stability – If the dimensions of availability, access and utilization are sufficiently met, stability is the condition in which the whole system is stable, thus ensuring that households are food secure at all times. Stability issues can refer to short-term instability (which can lead to acute food insecurity) or medium- to long-term instability (which can lead to chronic food insecurity). Climatic, economic, social and political factors can all be a source of instability.

The report also refers to two additional dimensions of food security that are proposed by the High Level Panel of Experts of the Committee on World Food Security; however, they are not formally agreed upon by FAO or others, and an agreed upon language has not been negotiated. However, due to their relevance in the context of this report, they are included here. These two additional dimensions of food security are reinforced in conceptual and legal understandings of the right to food and are currently referred to and defined as follows:

e. Agency refers to the capacity of individuals or groups to make their own decisions about what foods they eat, what foods they produce, and how that food is produced, processed and distributed within food systems; and to their ability to engage in processes that shape food system policies and governance.[64]
f. Sustainability refers to the long-term ability of agrifood systems to provide food security and nutrition in a way that does not compromise the economic, social and environmental bases that generate food security and nutrition for future generations.[36]

Foreign direct investment
Investment made by a private entity resident in one economy in an enterprise resident in another. The investment must involve a long-term relationship and reflect a lasting interest and control, it must be an equity investment (or reinvested earnings or intracompany loan) rather than an intercompany loan, and it must be made directly rather than through capital markets.

Funding
The money that lenders and equity holders provide to a business for daily and long-term needs. A company's capital funding consists of both debt (bonds) and equity (stock). The business uses this money for operating capital. The bond and equity holders expect to earn a return on their investment in the form of interest, dividends and stock appreciation.[37]

Governance
Formal and informal rules, organizations and processes through which public and private actors articulate their interests and make and implement decisions.[38]

Guarantee
A risk-sharing agreement under which a guarantor agrees to pay part or the entire amount due on a loan, equity or other instrument to a lender/investor in the event of non-payment by the borrower, or loss of value in case of investment.[22]

Hazard
A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.[39]

Healthy diets
See **diet quality** definition.

Health taxes
Excise taxes levied on products that have a negative public health impact. These are taxes targeting specific products, such as foods of high energy density and minimal nutritional value, to increase their relative cost compared to nutritious foods, thus reducing their consumption and preventing or mitigating these negative health outcomes while generating resources for government budgets.[40]

Healthy food environments
Food environment refers to the physical, economic, sociocultural and policy conditions that shape access, affordability, safety and food preferences. Healthy food environments are safe and supportive food environments that provide physical access to nutritious foods for healthy diets that reduce the risk of all forms of malnutrition, including undernutrition, overweight, obesity and diet-related non-communicable diseases.[36, 41] Many elements of the food environment determine dietary patterns, while culture, language, culinary practices, knowledge and consumption patterns, food preferences, beliefs and values all relate to the way food is sourced, generated, produced and consumed.[42]

Highly processed foods
Foods that have been industrially prepared, including those from bakeries and catering outlets, and which require no or minimal domestic preparation apart from heating and cooking (such as bread, breakfast cereals, cheese, commercial sauces, canned foods including jams, commercial cakes, processed meats, biscuits and sauces).[43] Highly processed foods can contain very high quantities of salt, free sugars and saturated or trans fats, and these products, when consumed in high amounts, can undermine diet quality.

Hunger

An uncomfortable or painful physical sensation caused by insufficient consumption of dietary energy. In this report, the term hunger is synonymous with chronic undernourishment and is measured by the prevalence of undernourishment.

Impact investing

Investing that aims to generate specific beneficial social or environmental effects in addition to financial gain. Impact investing is a subset of socially responsible investing and actively seeks to make a positive impact by investing, for example, in non-profits that benefit the community or in clean technology enterprises. Core characteristics include intentionality (i.e. an investor intends to have a positive impact); return expectation on capital, or at a minimum, return of capital; and measurement of social and environmental impacts.[22]

International portfolio investments

A type of investment that consists of securities and other financial assets held by investors in another country.[44]

Macronutrients

The major source of energy and bulk (volume) in our diets, macronutrients are needed in large quantities (in gram range). They include carbohydrates, proteins and fats. They are a main source of dietary energy, which is measured in calories. Obtaining sufficient energy is essential for everyone in order to maintain body growth, development and good health. Carbohydrates, proteins and fats, in addition to providing energy, each have very specific functions in the body and must be supplied in sufficient amounts to carry out those functions.

Malnutrition

An abnormal physiological condition caused by inadequate, unbalanced or excessive intake of macronutrients and/or micronutrients. Malnutrition includes undernutrition (child stunting and wasting, and vitamin and mineral deficiencies), as well as overweight and obesity.

Mezzanine finance

A hybrid of debt and equity financing that gives the lender the right to convert to an equity interest in the company in case of default.[22]

Micronutrients

Including vitamins and minerals, micronutrients are required in very small (micro) but specific amounts. Vitamins and minerals in foods are necessary for the body to grow, develop and function properly, and are essential for our health and well-being. Our bodies require a number of different vitamins and minerals, each of which has a specific function in the body and must be supplied in different, sufficient amounts.

Moderate food insecurity

The level of severity of food insecurity, based on the Food Insecurity Experience Scale, at which people face uncertainties about their ability to obtain food and have been forced to reduce, at times during the year, the quality and/or quantity of food they consume due to lack of money or other resources. It thus refers to a lack of consistent access to food, which diminishes dietary quality, disrupts normal eating patterns, and can have negative consequences for nutrition, health and well-being.

Multilateral development bank

A financial institution established by multiple member countries and which falls under international law. The owners of multilateral development banks are national governments and other international institutions and organizations.[45]

Nutrition transition

As incomes rise and populations become more urban, diets high in complex carbohydrates and fibre give way to more energy-dense diets high in fats, sugars and/or salt. These global dietary trends are accompanied by a demographic transition with a shift towards increased life expectancy and reduced fertility rates. At the same time, disease patterns move away from infectious and nutrient-deficiency diseases towards higher rates of overweight and obesity and diet-related non-communicable diseases including coronary heart disease, stroke, diabetes and some types of cancer.

Nutritional status
The physiological state of an individual that results from the relationship between nutrient intake and requirements and the body's ability to digest, absorb and use these nutrients.

Nutritious foods
Safe foods that contribute essential nutrients such as vitamins and minerals (micronutrients), fibre and other components to healthy diets that are beneficial for growth, and health and development, guarding against malnutrition. In nutritious foods, the presence of nutrients of public health concern including saturated fats, free sugars, and salt/sodium is minimized, industrially produced trans fats are eliminated, and salt is iodized.

Other official flows
Official sector transactions that do not meet official development assistance criteria.

Official development assistance
Government aid designed to promote the economic development and welfare of developing countries and that meets a minimum grant element requirement.[46]

Overweight and obesity
Body weight that is above normal for height as a result of an excessive accumulation of fat. It is usually a manifestation of expending less energy than is consumed. In adults, overweight is defined as a body mass index (BMI) of 25 kg/m^2 or more, and obesity as a BMI of 30 kg/m^2 or more. In children under five years of age, overweight is defined as weight-for-height greater than 2 standard deviations above the WHO Child Growth Standards median, and obesity as weight-for-height greater than 3 standard deviations above the WHO Child Growth Standards median.[47]

Portfolio
A grouping of financial assets such as stocks, bonds, commodities, currencies and cash equivalents, as well as their fund counterparts, including mutual, exchange-traded and closed funds.[22]

Prevalence of undernourishment
An estimate of the proportion of the population that lacks enough dietary energy for a healthy, active life. It is FAO's traditional indicator used to monitor hunger at the global and regional level, as well as SDG Indicator 2.1.1.

Private equity
An alternative investment class that invests in or acquires private companies that are not listed on a public stock exchange.[48]

Private funding
Funding provided by private entities, whether on commercial terms or not.

Project finance
A form of financing projects, primarily based on claims against the financed asset or project rather than on the sponsor of the project.

Public funding
Funding provided by public entities (e.g. domestic and foreign governments, international organizations).

Remittance
Private, voluntary monetary and non-monetary (social or in-kind) transfers made by migrants and diaspora, individually or collectively, to people or communities not necessarily in their areas of origin. They can be cross-border or in the home country.

Resilience
The ability of individuals, households, communities, cities, institutions, systems and societies to prevent, resist, absorb, adapt, respond and recover positively, efficiently and effectively when faced with a wide range of risks, while maintaining an acceptable level of functioning and without compromising long-term prospects for sustainable development, peace and security, human rights and well-being for all.[49]

Risk
The probability or likelihood of the occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur. Risk to food insecurity is the probability of food insecurity resulting from interactions between a natural or human-induced hazard, shock or stress and vulnerable conditions.

Security
A fungible, negotiable financial instrument that holds some type of monetary value. A security can represent ownership in a corporation in the form of stock, a creditor relationship with a governmental body or a corporation represented by owning that entity's bond, or rights to ownership as represented by an option.[50]

Severe food insecurity
The level of severity of food insecurity at which people have likely run out of food, experienced hunger and, at the most extreme, gone for days without eating, putting their health and well-being at grave risk, based on the Food Insecurity Experience Scale.

Staple foods
Foods eaten regularly, and in such quantities as to constitute the dominant part of the diet and supply a major proportion of total dietary energy. The main kinds of staple foods are cereals (e.g. rice, maize, wheat, rye, barley, oats, millet, sorghum), roots and tubers (e.g. potatoes, cassava, yams) and legumes (e.g. beans, lentils, soybean).[20]

Stunting
Low height-for-age, reflecting a past episode or episodes of sustained undernutrition. In children under five years of age, stunting is defined as height-for-age less than –2 standard deviations below the WHO Child Growth Standards median.

Unaffordability
See **affordability** definition.

Undernourishment
The condition in which an individual's habitual food consumption is insufficient to provide the amount of dietary energy required to maintain a normal, active and healthy life. For the purposes of this report, hunger is defined as being synonymous with chronic undernourishment. The prevalence of undernourishment is used to measure hunger.

Undernutrition
The outcome of poor nutritional intake in terms of quantity and/or quality, and/or poor absorption and/or poor biological use of nutrients consumed as a result of repeated instances of disease. It includes being underweight for one's age, too short for one's age (stunted), dangerously thin for one's height (suffering from wasting) or deficient in vitamins and minerals (suffering from micronutrient deficiency).

Venture capital
Start-up or growth equity capital or loan capital provided by private investors (venture capitalists) or specialized financial institutions (development finance houses or venture capital firms). Also called risk capital. Venture capital is a type of funding for a new or growing business. The venture capital firm gives funding to the start-up company in exchange for equity in the start-up. This is most commonly found in high growth technology industries like biotech and software.[22]

Vulnerability
The conditions determined by physical, social, economic and environmental factors or processes that increase the susceptibility of an individual, community, assets or systems to the impacts of hazards.[39] Vulnerability to food insecurity is the range of conditions that increase the susceptibility of a household to the impact on food security in case of a shock or hazard.

Wasting
Low weight-for-height, generally the result of weight loss associated with a recent period of inadequate dietary energy intake and/or disease. In children under five years of age, wasting is defined as weight-for-height less than –2 standard deviations below the WHO Child Growth Standards median.

Weather
Conditions of the atmosphere over a short period of time (minutes to days), whereas climate is how the atmosphere behaves over relatively longer periods of time (the long-term average of weather over time). The difference between weather and climate is a measure of time (see above definitions for climate, climate change, climate variability and climate extremes).[51]

NOTES

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NOTES ON GEOGRAPHIC REGIONS IN STATISTICAL TABLES IN CHAPTER 2 AND ANNEXES 1

Countries revise their official statistics regularly for past periods as well as for the latest reporting period. The same holds for statistics presented in this report. Whenever this happens, estimates are revised accordingly. Therefore, users are advised to refer to changes in estimates over time only within the same edition of *The State of Food Security and Nutrition in the World* and refrain from comparing data published in editions for different years.

Geographic regions

This publication follows the composition of geographic regions as presented by the Statistics Division of the United Nations Secretariat primarily for use in its publications and databases (https://unstats.un.org/unsd/methodology/m49). The assignment of countries or areas to specific groupings is for statistical convenience and does not imply any assumption regarding political or other affiliation of countries or territories by the United Nations. Please refer to the list below for the country composition of each region in the tables of **Chapter 2** and **Annex 1**.

Countries, areas and territories for which there were insufficient or unreliable data for conducting the assessment are not reported and not included in the aggregates. Specifically, with respect to the M49 classification:

- **Northern Africa:** In addition to the countries listed in the table, PoU and food insecurity based on the FIES include an estimate for the territory of Western Sahara. Child wasting, stunting and overweight, low birthweight, adult obesity, exclusive breastfeeding and anaemia estimates exclude the territory of Western Sahara.
- **Eastern Africa:** This grouping excludes Chagos Archipelago, French Southern Territories, Mayotte and Réunion.
- **Western Africa:** This grouping excludes Saint Helena.
- **Asia and Eastern Asia:** Low birthweight and child wasting aggregates exclude Japan.
- **Caribbean:** This grouping excludes Anguilla, Aruba, Bonaire, British Virgin Islands, Cayman Islands, Curaçao, Guadeloupe, Martinique, Montserrat, Saint Barthélemy, Saint Martin (French Part), Sint Eustatius and Saba, Sint Maarten (Dutch part), and Turks and Caicos Islands. Adult obesity, child wasting, low birthweight and exclusive breastfeeding exclude Puerto Rico and United States Virgin Islands.
- **South America:** This grouping excludes Bouvet Island, Falkland Islands (Malvinas), French Guyana, and South Georgia and the South Sandwich Islands.
- **Australia and New Zealand:** This grouping excludes Christmas Island, Cocos (Keeling) Islands, Heard Island and McDonald Islands, and Norfolk Island.
- **Melanesia:** Anaemia, child wasting, stunting and overweight, low birthweight and exclusive breastfeeding estimates exclude New Caledonia.
- **Micronesia:** Adult obesity, anaemia, child wasting, low birthweight and exclusive breastfeeding estimates exclude Guam, Northern Mariana Islands and US Minor Outlying Islands. Aggregates for child stunting and overweight exclude only US Minor Outlying Islands.
- **Polynesia:** This grouping excludes Pitcairn, and Wallis and Futuna Islands. Adult obesity, child wasting, low birthweight and exclusive breastfeeding estimates exclude American Samoa, French Polynesia and Tokelau (Associate Member). Aggregates for child stunting and overweight exclude only French Polynesia.
- **Northern America:** This grouping excludes Saint Pierre and Miquelon. Adult obesity, anaemia, low birthweight and exclusive breastfeeding aggregates also exclude Bermuda and Greenland. Aggregates for wasting are based only on data for the United States of America.
- **Northern Europe:** This grouping excludes Åland Islands, Channel Islands, Faroe Islands (Associate Member), Isle of Man, and Svalbard and Jan Mayen Islands.
- **Southern Europe:** This grouping excludes Gibraltar, Holy See and San Marino. However, anaemia, child stunting, overweight and low birthweight estimates include San Marino.
- **Western Europe:** This grouping excludes Liechtenstein and Monaco. However, child stunting, overweight, anaemia and low birthweight estimates include Monaco.

Other groupings

Least developed countries, landlocked developing countries and Small Island Developing States groupings include the countries as presented by the Statistics Division of the United Nations (https://unstats.un.org/unsd/methodology/m49).

Small Island Developing States: Estimates for child stunting, wasting and overweight, adult obesity, exclusive breastfeeding and low birthweight exclude Anguilla, Aruba, Bonaire, Sint Eustatius and Saba, British Virgin Islands, Curaçao, French Polynesia, Montserrat, New Caledonia and Sint Maarten (Dutch part). In addition, estimates for child wasting, adult obesity, exclusive breastfeeding and low birthweight also exclude American Samoa and Puerto Rico.

High-income, upper-middle-income, lower-middle-income and low-income countries include the countries as presented by the World Bank classification for the 2023/24 fiscal year (https://datahelpdesk.worldbank.org/knowledgebase/articles/906519).

Low-income food-deficit countries (2023): Afghanistan, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Congo, Democratic People's Republic of Korea, Democratic Republic of the Congo, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kenya, Kyrgyzstan, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nepal, Nicaragua, Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, South Sudan, Sudan, Syrian Arab Republic, Tajikistan, Togo, Uganda, United Republic of Tanzania, Uzbekistan, Yemen and Zimbabwe.

Composition of geographic regions (countries and territories)

AFRICA

Northern Africa: Algeria, Egypt, Libya, Morocco, Sudan, Tunisia and Western Sahara.

SUB-SAHARAN AFRICA

Eastern Africa: Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Rwanda, Seychelles, Somalia, South Sudan, Uganda, United Republic of Tanzania, Zambia and Zimbabwe.
Middle Africa: Angola, Cameroon, Central African Republic, Chad, Congo, Democratic Republic of the Congo, Equatorial Guinea, Gabon, and Sao Tome and Principe.
Southern Africa: Botswana, Eswatini, Lesotho, Namibia and South Africa.
Western Africa: Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo.

ASIA

Central Asia: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.
Eastern Asia: China, Democratic People's Republic of Korea, Japan, Mongolia and Republic of Korea.
South-eastern Asia: Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste and Viet Nam.
Southern Asia: Afghanistan, Bangladesh, Bhutan, India, Iran (Islamic Republic of), Maldives, Nepal, Pakistan and Sri Lanka.
Western Asia: Armenia, Azerbaijan, Bahrain, Cyprus, Georgia, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syrian Arab Republic, Türkiye, United Arab Emirates and Yemen.

LATIN AMERICA AND THE CARIBBEAN

Caribbean: Antigua and Barbuda, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago.

LATIN AMERICA

Central America: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama.
South America: Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela (Bolivarian Republic of).

OCEANIA

Australia and New Zealand: Australia and New Zealand.

OCEANIA EXCLUDING AUSTRALIA AND NEW ZEALAND

Melanesia: Fiji, New Caledonia, Papua New Guinea, Solomon Islands and Vanuatu.
Micronesia: Kiribati, Marshall Islands, Micronesia (Federated States of), Nauru and Palau.
Polynesia: American Samoa, Cook Islands, French Polynesia, Niue, Samoa, Tokelau, Tonga and Tuvalu.

NORTHERN AMERICA AND EUROPE

Northern America: Bermuda, Canada, Greenland and United States of America.

EUROPE

Eastern Europe: Belarus, Bulgaria, Czechia, Hungary, Poland, Republic of Moldova, Romania, Russian Federation, Slovakia and Ukraine.
Northern Europe: Denmark, Estonia, Finland, Iceland, Ireland, Latvia, Lithuania, Norway, Sweden, and United Kingdom of Great Britain and Northern Ireland.
Southern Europe: Albania, Andorra, Bosnia and Herzegovina, Croatia, Greece, Italy, Malta, Montenegro, North Macedonia, Portugal, Serbia, Slovenia and Spain.
Western Europe: Austria, Belgium, France, Germany, Luxembourg, Netherlands (Kingdom of the) and Switzerland.

THE STATE OF THE WORLD

2024 THE STATE OF FOOD SECURITY AND NUTRITION IN THE WORLD

FINANCING TO END HUNGER, FOOD INSECURITY AND MALNUTRITION IN ALL ITS FORMS

Six years away from 2030, hunger and food insecurity trends are not yet moving in the right direction to achieve the goal of ending hunger and food insecurity (SDG Target 2.1) by 2030. The indicators of progress towards global nutrition targets similarly show that the world is not on track to eliminate all forms of malnutrition (SDG Target 2.2). Billions of people still lack access to nutritious, safe and sufficient food. The challenges are many, but progress in many countries provides hope that it is possible to get back on track towards a world free of hunger and malnutrition.

Previous editions of this report have identified the major drivers and underlying structural factors behind these trends and provided evidence-based policy recommendations to revert them, which have been grouped into six transformative pathways that countries can adopt, depending on the drivers and factors they are facing.

However, transiting through any of the six transformative pathways will require proper financing for food security and nutrition, the theme of this year's report. Although there is a broad agreement on the urgent need to increase financing for food security and nutrition, the same cannot be said for a common understanding regarding how this financing should be defined and tracked. This year the report provides a long-awaited definition of financing for food security and nutrition and guidance for its implementation.

The report underlines that the data available are not enough to provide a full picture of the current financing flows that are contributing to meet SDG Targets 2.1 and 2.2 and of the gap that must be filled to fully meet them by 2030. The data for global official development flows are standardized and public, but a comprehensive and comparable analysis of global public spending on food and agriculture is challenged by data gaps, and private financing flows for food security and nutrition are even more difficult to track.

The report provides timely and relevant recommendations regarding the efficient use of innovative financing tools and reforms to the food security and nutrition financing architecture. Establishing a common ground on how food security and nutrition financing is defined, along with methods for its tracking, measurement and implementation, is an important first step towards sustainably increasing the financing flows needed to end hunger, food insecurity and all forms of malnutrition, and to ensure access to healthy diets for all, today and tomorrow. To this end, insights of this report are particularly important in light of the next Summit of the Future in September 2024 and the Fourth International Conference on Financing for Development in June and July 2025.

The State of Food Security and Nutrition in the World 2024
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Food and Agriculture Organization of the United Nations

IFAD International Fund for Agricultural Development

unicef

WFP World Food Programme

World Health Organization

2023

THE STATE OF FOOD SECURITY AND NUTRITION IN THE WORLD

URBANIZATION, AGRIFOOD SYSTEMS TRANSFORMATION AND HEALTHY DIETS ACROSS THE RURAL–URBAN CONTINUUM

This flagship publication is part of **The State of the World** series of the Food and Agriculture Organization of the United Nations.

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THAILAND. Green sprouts with a city backdrop – urban and peri-urban agriculture in action.

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2023 THE STATE OF FOOD SECURITY AND NUTRITION IN THE WORLD

URBANIZATION, AGRIFOOD SYSTEMS TRANSFORMATION AND HEALTHY DIETS ACROSS THE RURAL–URBAN CONTINUUM

Food and Agriculture Organization of the United Nations
International Fund for Agricultural Development | United Nations Children's Fund
United Nations World Food Programme | World Health Organization

Rome, 2023

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FOREWORD

This report brings our organizations together again to reaffirm that, if we do not redouble and better target our efforts, our goal of ending hunger, food insecurity and malnutrition in all its forms by 2030 will remain out of reach. Although the world is recovering from the global pandemic, this is occurring unevenly across and within countries. On top of this, the world is grappling with the consequences of the ongoing war in Ukraine, which has shaken food and energy markets.

Agrifood systems remain highly vulnerable to shocks and disruptions arising from conflict, climate variability and extremes, and economic contraction. These factors, combined with growing inequities, keep challenging the capacity of agrifood systems to deliver nutritious, safe and affordable diets for all. These major drivers of food insecurity and malnutrition are our "new normal". We have no option but to redouble our efforts to transform agrifood systems and leverage them towards reaching the Sustainable Development Goal 2 (SDG 2) targets.

Global hunger is still far above pre-pandemic levels. It is estimated that between 690 and 783 million people in the world faced hunger in 2022. This is 122 million more people than before the COVID-19 pandemic. Nonetheless, the increase in global hunger observed in the last two years has stalled and, in 2022, there were about 3.8 million fewer people suffering from hunger than in 2021. The economic recovery from the pandemic has contributed to this, but there is no doubt that the modest progress has been undermined by rising food and energy prices magnified by the war in Ukraine. There is no room for complacency, though, as hunger is still on the rise throughout Africa, Western Asia and the Caribbean.

No doubt, achieving the SDG target of Zero Hunger by 2030 poses a daunting challenge. Indeed, it is projected that almost 600 million people will still be facing hunger in 2030. This is 119 million more people than in a scenario in which neither the COVID-19 pandemic nor the war in Ukraine had occurred, and around 23 million people more than in a scenario where the war had not happened.

Unfortunately, our worries are not only due to hunger. In 2022, 2.4 billion people, comprising relatively more women and people living in rural areas, did not have access to nutritious, safe and sufficient food all year round. The persisting impact of the pandemic on people's disposable income, the rising cost of a healthy diet and the overall rise in inflation also continued to leave billions without access to an affordable healthy diet. Millions of children under five years of age continue to suffer from stunting (148 million), wasting (45 million) and overweight (37 million). Despite progress in reducing child undernutrition – both stunting and wasting – the world is not on track to achieve the associated 2030 targets, and neither is any region on track to attain the 2030 target for low birthweight, so closely linked to the nutrition of women before and during pregnancy. Steady progress is only seen on levels of exclusive breastfeeding.

These numbers and trends may be a considerable disappointment for us, but for the children and people affected, they constitute an underlying fact of their lives, and this fuels our determination to keep finding solutions. Since 2017, when signs of increasing hunger first began to appear, our organizations, through this report, have provided in-depth analysis of the major drivers behind these concerning trends and evidence-based policy recommendations to address them.

FOREWORD

We have repeatedly highlighted that the intensification and interaction of conflict, climate extremes and economic slowdowns and downturns, combined with highly unaffordable nutritious foods and growing inequalities, are pushing us off track to meet the SDG 2 targets. While we must remain steadfast in taking bold targeted actions to build resilience against these adversities, other important megatrends must be considered.

Urbanization, for example, is one such megatrend that features as the theme of this year's report. By 2050, almost seven in ten people are projected to live in cities; but even today, this proportion is approximately 56 percent. Urbanization is shaping agrifood systems in ways we can only understand through a rural–urban continuum lens, encompassing everything from food production, food processing, and food distribution, marketing and procurement, to consumer behaviour. Due to population growth, small and intermediate cities and rural towns are increasingly bridging the space between rural areas and large metropolises. Hence, in our efforts to end hunger, food insecurity and malnutrition in an urbanizing world, we can no longer operate on the traditional assumption of a rural–urban divide.

As the world is urbanizing, food demand and supply are changing rapidly across the rural–urban continuum, challenging our traditional thinking. In some contexts, food purchases are no longer high only among urban households but also among rural households living far from an urban centre. Moreover, consumption of highly processed foods is also increasing in peri-urban and rural areas of some countries, whereas consumption of vegetables, fruits, and fats and oils is becoming more uniform across the rural–urban continuum. These important changes are affecting people's food security and nutrition in ways that differ depending on where they live across this continuum.

To overcome the challenges and seize the opportunities that urbanization creates, our actions, policy interventions and investments will have to be informed by a clear understanding of how the rural–urban continuum and agrifood systems interact, and how, given such interaction, urbanization affects access to affordable healthy diets, and consequently food security and nutrition. The policy approach must go beyond rural or urban silos and administrative borders and will require strong and well-coordinated governance mechanisms and institutions.

The theme of this year's report is also timely and relevant for several other reasons. The policy recommendations can inform countries on what programmes, investments and actions can be effective and innovative for meeting the SDG 2 targets in the context of urbanization. They are also relevant for the achievement of other SDGs, including not only SDG 11 (Sustainable Cities and Communities), but also SDG 1 (No Poverty), SDG 3 (Good Health and Well-Being), SDG 10 (Reduced Inequalities) and SDG 12 (Responsible Consumption and Production).

Recent discussions at the United Nations General Assembly have raised the importance of achieving Sustainable Cities and Communities (SDG 11), as this is closely related to other important interconnected issues, including poverty eradication, climate action, migration, land degradation, economic prosperity and creation of peaceful societies. Nonetheless, the related links between urbanization and the affordability of healthy diets, and the resulting implications for food security and nutrition, have not been explored in these discussions, and we hope this report helps bridge this important gap. The report's theme is also aligned with the New Urban Agenda, endorsed by the United Nations General Assembly in 2016, and represents a unique contribution to create awareness about the importance of improving access to affordable healthy diets as a critical component in pursuing sustainable urbanization.

Finally, we hope that this report informs other ongoing efforts, clearly those of the coalitions of action established after the United Nations Food Systems Summit as we move towards the global stocktaking meeting to review progress in implementing the outcomes of the Summit on 24–26 July 2023, not least the Urban Food Systems Coalition, the Coalition of Action on Healthy Diets from Sustainable Food Systems for Children and All, the School Meals Coalition, and the Zero Hunger Coalition; as well as the Scaling Up Nutrition Movement. ■

Qu Dongyu
FAO Director-General

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WFP Executive Director

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WHO Director-General

METHODOLOGY

The State of Food Security and Nutrition in the World 2023 has been prepared by the FAO Agrifood Economics Division in collaboration with the Statistics Division of the Economic and Social Development stream and a team of technical experts from the Food and Agriculture Organization of the United Nations (FAO), the International Fund for Agricultural Development (IFAD), the United Nations Children's Fund (UNICEF), the World Food Programme (WFP) and the World Health Organization (WHO).

A senior advisory team consisting of designated senior managers of the five UN publishing partners guided the production of the report. Led by FAO, this team decided on the outline of the report and defined its thematic focus. Further, it gave oversight to the technical writing team composed of experts from each of the five co-publishing agencies. Background technical papers were prepared to support the research and data analysis undertaken by the members of the writing team.

The writing team produced a number of interim outputs, including an annotated outline, first draft and final draft of the report. These were reviewed, validated and cleared by the senior advisory team at each stage in the preparation process. The final report underwent a rigorous technical review by senior management and technical experts from different divisions and departments within each of the five UN agencies, both at headquarters and decentralized offices. Finally, the report underwent executive review and clearance by the heads of agency of the five co-publishing partners.

ACKNOWLEDGEMENTS

The State of Food Security and Nutrition in the World 2023 was jointly prepared by the Food and Agriculture Organization of the United Nations (FAO), the International Fund for Agricultural Development (IFAD), the United Nations Children's Fund (UNICEF), the World Food Programme (WFP) and the World Health Organization (WHO).

The publication was carried out under the direction of Marco V. Sánchez Cantillo and José Rosero Moncayo, with the overall coordination of Cindy Holleman, the Editor of the publication, and the overall guidance of Máximo Torero Cullen, all of whom are from the FAO Economic and Social Development stream. The development of the report was guided by a Steering Committee consisting of agency representatives from the five co-publishing partners: Marco V. Sánchez Cantillo (Chair), Sara Savastano (IFAD), Victor Aguayo (UNICEF), Arif Husain (WFP) and Francesco Branca (WHO). Tisorn Songsermsawas (IFAD), Chika Hayashi and Vilma Tyler (UNICEF), Eric Branckaert (WFP) and Luz De Regil (WHO) contributed to the coordination and provided technical support. Valuable comments and final approval of the report were provided by the executive heads and senior staff of the five co-authoring agencies.

Chapter 1 of the report was written by Cindy Holleman (FAO), with inputs from Marco V. Sánchez Cantillo, Anne Kepple, José Rosero Moncayo, Lynnette Neufeld, Pilar Santacoloma and Trudy Wijnhoven (FAO), Sarah Lowder (IFAD), Eric Branckaert (WFP), Chika Hayashi (UNICEF), and Katrina Lundberg and Karen McColl (WHO).

Chapter 2 of the report was coordinated by Anne Kepple (FAO). Section 2.1 was written by Carlo Cafiero, Anne Kepple, José Rosero Moncayo and Sara Viviani with key inputs from Piero Conforti, Valentina Conti and Firas Yassin (FAO). Section 2.2 was written by Valentina Conti, with inputs from Veronica Boero, Carlo Cafiero, Anne Kepple and Michele Vollaro (FAO), and Yan Bai (World Bank). Olivier Lavagne d'Ortigue (FAO) provided data visualization and editorial support for Sections 2.1 and 2.2. Section 2.3 was written by Robert Johnston and Chika Hayashi (UNICEF), with inputs from Julia Krasevec, Vrinda Mehra and Yoshito Kawakatsu (UNICEF), Elaine Borghi, Richard Kumapley, Katrina Lundberg and Karen McColl (WHO), and Anne Kepple (FAO). Nona Reuter (UNICEF) provided support for data visualization in Section 2.3. José Rosero Moncayo provided technical guidance and editorial support to the sections of this chapter.

Chapter 3 of the report was written by Cindy Holleman and Sophie de Bruin (FAO), with inputs from Giovanni Carrasco Azzini, Andrea Cattaneo, Lucia Latino, Theresa McMenomy, Pilar Santacoloma, Kostas Stamoulis and Trudy Wijnhoven (FAO), Florence A. Benn, Alessandra Garbero and Sarah Lowder (IFAD), Vilma Tyler (UNICEF), Sabrina Kuri and Isis Nuñez Ferrera (WFP), Katrina Lundberg, Karen McColl, Lina Mahy and Marjolein Smit-Mwanamwenge (WHO), and Tom Reardon and Lenis Saweda Onipede Liverpool-Tasie (Michigan State University). Marco V. Sánchez Cantillo provided technical guidance and editorial support to the sections of this chapter.

Chapter 4 of the report was coordinated by Cindy Holleman (FAO). Section 4.1 was written by Cindy Holleman (FAO), with inputs from Michael Dolislager (Messiah University), and Lenis Saweda Onipede Liverpool-Tasie and Tom Reardon (Michigan State University). Further inputs were provided by Agnieszka Balcerzak, Carlo Cafiero, Giles Hanley-Cook, Bridget Holmes, Adeeba Ishaq, Lucia Latino, Ana Moltedo, Lynnette Neufeld, Pilar Santacoloma and Trudy Wijnhoven (FAO), Sarah Lowder, Jyotsna Puri and Alessandro Rosi (IFAD), Isis Nuñez Ferrera (WFP), Vilma Tyler (UNICEF), and Katrina Lundberg and Karen McColl (WHO). Section 4.2 was written by Lucia Latino and Cindy Holleman (FAO), with inputs from Carlo Cafiero, Adeeba Ishaq, Anne Kepple, Ana Moltedo, Pilar Santacoloma,

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Chapter 5 of the report was coordinated by Giovanni Carrasco Azzini (FAO). Section 5.1 was written by Giovanni Carrasco Azzini and Kostas Stamoulis (FAO), with inputs from Cindy Holleman, Pilar Santacoloma and Trudy Wijnhoven (FAO), Aslihan Arslan, Daniel Higgins, Sarah Lowder, Athur Mabiso, Robson Mutandi, Joyce Njoro and Victoria Wise (IFAD), and Kaia Engesveen, Ceyhun Gungor, Katrina Lundberg, Karen McColl and Simone Moraes Raszl (WHO). Section 5.2 was written by Preetmoninder Lidder and Giovanni Carrasco Azzini (FAO), with inputs from Pilar Santacoloma, Kostas Stamoulis and Trudy Wijnhoven (FAO), Ilaria Firmian, Marup Hossain, Sarah Lowder and Vibhuti Mendiratta (IFAD), and Katrina Lundberg, Karen McColl, Ceyhun Gungor, Simone Moraes Raszl, Lina Mahy and Marjolein Smit-Mwanamwenge (WHO). The section benefited from an internal call for agrifood technologies and innovation case studies, in which contributions were received from Elena Aguayo, Manuel Anta, Vittorio Fattori, Patrizia Fracassi, Pablo García Campos, Elena Ilie, Keya Mukherjee, Jia Ni, Cortney Price, Rosa Rolle, Ana Rueda Garcia, Ti Kian Seow, Beate Scherf, Emma Siliprandi and Elvira Uccello (FAO), and Kalpana Beesabathuni, Klaus Kraemer and Srujith Lingala (Sight and Life). Section 5.3 was written by Cecilia Marocchino, Ana Puhac and Marcello Vicovaro (FAO), with inputs from Giovanni Carrasco Azzini, Stepanka Gallatova, Kostas Stamoulis and Ny You (FAO), Sarah Lowder and Tisorn Songsermsawas (IFAD), and Katrina Lundberg and Karen McColl (WHO). The section benefited from an internal call for governance experiences at subnational and local levels, in which contributions were received from Giaime Berti, Carmen Zuleta Ferrari, Sara Granados, Gareth Haysom, Joao Intini, Betina Bergmann Madsen, Guido Santini, Fernando Castro Verastegui and Rebeccah Wanjiru (FAO). Marco V. Sánchez Cantillo provided technical guidance and editorial support to the sections of this chapter.

Chapter 6 of the report was written by Marco V. Sánchez Cantillo, with inputs from Giovanni Carrasco Azzini, Cindy Holleman, Anne Kepple and José Rosero Moncayo (FAO).

Numerous colleagues from different technical units and departments across the five co-publishing agencies provided valuable technical comments and input to the report. An agency-wide technical clearance process facilitated a comprehensive review by many technical experts from the five co-authoring agencies. Listing each of the contributions would be challenging and furthermore increase the risk of important omissions.

Data inputs

Firas Yassin and Sara Viviani (FAO) were responsible for preparing undernourishment and food security data, respectively, in Section 2.1 and Annex 1A, with inputs from Filippo Gheri, Adeeba Ishaq, Talent Manyani, Ana Moltedo, María Rodríguez and Abdul Sattar, and under the supervision of Carlo Cafiero (FAO). Supporting data were provided by the Food Balance Sheets team, led by Salar Tayyib of the FAO Statistics Division. Carlo Cafiero prepared the 2030 projections of undernourishment, with the assistance of Adeeba Ishaq and with key input provided by David Laborde (FAO). Valentina Conti (FAO) was responsible for preparing the analysis of the cost and affordability of a healthy diet in Section 2.2 and Annex 3, with inputs from Veronica Boero, Carlo Cafiero and Michele Vollaro (FAO), and Samuel Kofi Tetteh Baah, Yan Bai, Daniel Gerszon Mahler, Nishant Yonzan and Christoph Lakner (World Bank). Vrinda Mehra, Robert Johnston, Julia Krasevec and Chika Hayashi (UNICEF) were responsible for the analyses in Section 2.3. Vrinda Mehra and Julia Krasevec (UNICEF), and Richard Kumapley and Monica Flores (WHO) were responsible for consolidating nutrition data in Annex 2. The systematic literature review of evidence from scientific studies for Sections 3.2 and 5.1 was conducted using an integrated research tool developed by FAO's Data Lab for Statistical Innovation and implemented by Marco Scarnò, with Carola Fabi, Craig Matadeen and Christian Mongeau (FAO). The demand analysis in Section 4.1 was conducted by Michael Dolislager (Messiah University), with inputs from Lenis Saweda Onipede Liverpool-Tasie and Tom Reardon (Michigan State University), and Agnieszka Balcerzak, Giles Hanley-Cook, Cindy Holleman, Bridget Holmes, Lynnette Neufeld and Trudy Wijnhoven (FAO). Caleb Reichert (Messiah University) provided geospatial analysis and mapping used in Sections 4.1 and 4.2. Lucia Latino conducted the analysis of the subnational cost and affordability of a heathy diet in Section 4.2, with inputs from Carlo Cafiero, Cindy Holleman and Ana Moltedo (FAO). Sara Viviani (FAO) conducted the survey analysis for the calculation of moderate or severe food insecurity based on the Food Insecurity Experience Scale in Section 4.2, with inputs from Vaishali Bansal (FAO). Yoshito Kawakatsu and Robert Johnston (UNICEF) conducted the survey analysis for the calculation of the malnutrition indicators in Section 4.2.

Support for report production came from Andrew Park (consulting editor) and Daniela Verona in the FAO Economic and Social Development stream.

The FAO Meeting Branch and Language Branch of the Governing Bodies Servicing Division carried out the translations, in addition to the contributors mentioned above. The translations of the report benefited from a technical review by Ahmad Sadiddin and Firas Yassin (Arabic), Li Lan (Chinese), Olivier Lavagne d'Ortigue, Thibault Meilland and Aurelien Mellin (French), Evgeniya Koroleva (Russian), and Verónica Boero and Giovanni Carrasco Azzini (Spanish), all of whom are from FAO.

The FAO Publications and Library Branch of the Office of Communications provided editorial support, design and layout, as well as production coordination, for editions in all six official languages.

ABBREVIATIONS

AARR	average annual rate of reduction
ADER	average dietary energy requirement
ARIMAX	Autoregressive Integrated Moving Average with External Explanatory Variable
BMI	body mass index
CEA	controlled environment agriculture
CoAHD	cost and affordability of a healthy diet
CONSIAL	Food System Council of Metropolitan Lima
CPI	consumer price index
CV	coefficient of variation
CV|r	CV due to energy requirements
CV|y	CV due to income
DEC	dietary energy consumption
DEGURBA	Degree of Urbanization
DES	dietary energy supply
DHS	demographic and health survey
EUROSTAT	Statistical Office of the European Union
FAO	Food and Agriculture Organization of the United Nations
FBDGs	food-based dietary guidelines
FBS	Food Balance Sheet
FIES	Food Insecurity Experience Scale
FIES-SM	Food Insecurity Experience Scale Survey Module
$\mathbf{FI_{mod+sev}}$	prevalence of moderate or severe food insecurity
$\mathbf{FI_{sev}}$	prevalence of severe food insecurity
FLAG	food liaison advisory group
FOP	front-of-package
GDP	gross domestic product
GHS-POP	Global Human Settlement Population
GIFT	Global Individual Food consumption data Tool
GRFC	Global Report on Food Crises
GWP	Gallup© World Poll
HDB	Healthy Diet Basket
HICs	high-income countries
ICP	International Comparison Program
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
ILO	International Labour Organization
IMF	International Monetary Fund
IPC/CH	Integrated Food Security Phase Classification/Cadre Harmonisé
JME	Joint Child Malnutrition Estimates
LICs	low-income countries
LMICs	lower-middle-income countries
LSMS	Living Standards Measurement Study
LUPPA	Urban Laboratory of Public Food Policies
MDER	minimum dietary energy requirement
MICs	middle-income countries
NCD	non-communicable disease
NoU	number of undernourished
OECD	Organisation for Economic Co-operation and Development

PAL	physical activity level
pdf	probability density function
PEAC	Strategic Food Plan for Catalonia
PIP	Poverty and Inequality Platform
3PL	third-party logistics
PoU	prevalence of undernourishment
PPP	purchasing power parity
R&D	research and development
RUFSAT	Rapid Urban Food Systems Appraisal Tool
SD	standard deviation
SDGs	Sustainable Development Goals
SICTs	small and intermediate cities and towns
SMEs	small and medium enterprises
UMICs	upper-middle-income countries
UN	United Nations
UN-Habitat	United Nations Human Settlements Programme
UNICEF	United Nations Children's Fund
UPA	urban and peri-urban agriculture
URCA	Urban Rural Catchment Areas
URCAs	urban–rural catchment areas
WDI	world development indicators
WFP	World Food Programme
WHA	World Health Assembly
WHO	World Health Organization
WPP	World Population Prospects
WTO	World Trade Organization

KEY MESSAGES

➔ Global hunger, measured by the prevalence of undernourishment (Sustainable Development Goal [SDG] Indicator 2.1.1), remained relatively unchanged from 2021 to 2022 but is still far above pre-COVID-19-pandemic levels, affecting around 9.2 percent of the world population in 2022 compared with 7.9 percent in 2019.

➔ It is estimated that between 691 and 783 million people in the world faced hunger in 2022. Considering the midrange (about 735 million), 122 million more people faced hunger in 2022 than in 2019, before the global pandemic.

➔ From 2021 to 2022, progress was made towards reducing hunger in Asia and in Latin America, but hunger is still on the rise in Western Asia, the Caribbean and all subregions of Africa.

➔ It is projected that almost 600 million people will be chronically undernourished in 2030. This is about 119 million more than in a scenario in which neither the pandemic nor the war in Ukraine had occurred, and around 23 million more than if the war in Ukraine had not happened. This points to the immense challenge of achieving the SDG target to eradicate hunger, particularly in Africa.

➔ The prevalence of moderate or severe food insecurity at the global level (SDG Indicator 2.1.2) remained unchanged for the second year in a row after increasing sharply from 2019 to 2020. About 29.6 percent of the global population – 2.4 billion people – were moderately or severely food insecure in 2022, of which about 900 million (11.3 percent of people in the world) were severely food insecure.

➔ Worldwide, food insecurity disproportionately affects women and people living in rural areas. Moderate or severe food insecurity affected 33.3 percent of adults living in rural areas in 2022 compared with 28.8 percent in peri-urban areas and 26.0 percent in urban areas. The gender gap in food insecurity at the global level, which had widened in the wake of the pandemic, narrowed from 3.8 percentage points in 2021 to 2.4 percentage points in 2022.

➔ More than 3.1 billion people in the world – or 42 percent – were unable to afford a healthy diet in 2021. While this represents an overall increase of 134 million people compared to 2019, before the pandemic, the number of people unable to afford a healthy diet actually fell by 52 million people from 2020 to 2021.

➔ Worldwide in 2022, an estimated 148.1 million children under five years of age (22.3 percent) were stunted, 45 million (6.8 percent) were wasted, and 37 million (5.6 percent) were overweight. The prevalence of stunting and wasting was higher in rural areas, while overweight was slightly more prevalent in urban areas.

➔ Steady progress has been made on increasing exclusive breastfeeding for the first six months of life and reducing stunting among children under five years of age, but the world is still not on track to achieve the 2030 targets. Child overweight and low birthweight have changed little, and the prevalence of wasting is more than double the 2030 target.

➔ Increasing urbanization, with almost seven in ten people projected to live in cities by 2050, is driving changes in agrifood systems across the rural–urban continuum. These changes represent both challenges and opportunities to ensure everyone has access to affordable healthy diets.

➔ Challenges include a greater availability of cheaper, convenience, pre-prepared and fast foods, often energy dense and high in fats, sugars and/or salt that can contribute to malnutrition; insufficient availability of vegetables and fruits to meet the daily requirements of healthy diets for everyone; exclusion of small farmers from formal value chains; and loss of lands and natural capital due to urban expansion.

➔ But urbanization also presents opportunities, as it results in longer, more formal and complex food value chains that expand income-generating activities in off-farm employment, especially for women and youth, and increase the variety of nutritious foods. Farmers often gain better access to agricultural inputs and services as urban areas grow closer to rural areas.

- Understanding the changes occurring throughout agrifood systems (i.e. from food production, food processing, and food distribution and procurement, to consumer behaviour) requires a rural–urban continuum lens, reflecting the growing connectivity and interlinkages across urban, peri-urban and rural areas.

- While already quite advanced in Asia and Latin America, changes in food demand and supply across the rural–urban continuum are accelerating in Africa, where the shares of the population that are food insecure and unable to afford a healthy diet are among the highest in the world. Here the expansive growth in off-farm employment and interconnected food markets and food supply chains is driving a diet transition across the rural–urban continuum.

- New evidence for 11 Western, Eastern and Southern African countries challenges the traditional thinking that food purchases make up a small share of rural households' food consumption in Africa. Food purchases are high among urban households in these countries, but they are also surprisingly high across the rural–urban continuum, even among rural households living far from an urban centre.

- New evidence also challenges the conventional thinking that purchase patterns between urban and rural areas differ markedly. In the 11 African countries studied, although consumption of processed foods, including highly processed foods, is higher in urban areas, it only declines gradually moving to peri-urban and rural areas. Moreover, consumption of vegetables, fruits, and fats and oils is fairly uniform across the rural–urban continuum relative to total food consumption.

- The affordability of a healthy diet is becoming more critical to households living in peri-urban and rural areas because they rely more on food purchases. In the 11 African countries studied, despite the lower cost of a healthy diet in these areas, affordability is still lower than in urban centres. Low-income households living in peri-urban and rural areas are especially disadvantaged, as they would need to more than double their food expenditure to secure a healthy diet.

- In many of these African countries studied, food security is not exclusively a rural problem, as moderate or severe food insecurity across urban areas (large, intermediate and small cities and towns) and peri-urban areas (less than 1 hour travel to large, intermediate and small cities) is similar to and sometimes even slightly higher than in rural areas.

- The prevalence of child overweight is at risk of increasing with the emerging problem of high consumption of highly processed foods and food away from home in urban centres, which is increasingly spreading into peri-urban and rural areas.

- Increasing access to affordable healthy diets and achieving food security and nutrition for all require a policy approach and legislation that leverage the increasing connectivity between rural and peri-urban areas and cities of various sizes.

- The closer linkages among agrifood systems segments create opportunities for win–win situations in terms of greater economic development and access to affordable healthy diets, which can be seized through investments in infrastructure, public goods and enhanced capacities that improve rural–urban connectivity. Such investments should support the essential role of small and medium enterprises in agrifood systems, particularly in small and intermediate cities and towns.

- Public investment in research and development needs to be increased to develop technologies and innovations for healthier food environments and for increasing the availability and affordability of nutritious foods. Technology can be particularly important to boost the capacity of urban and peri-urban agriculture to supply nutritious foods in cities and towns.

- Leveraging connectivity across the rural–urban continuum will require adequate governance mechanisms and institutions to coordinate coherent investment beyond sectoral and administrative boundaries. To this end, subnational governments can play a key role in designing and implementing policies beyond the traditional top-down approach. Approaches to agrifood systems governance should ensure policy coherence among local, regional and national settings through the engagement of relevant agrifood systems stakeholders at all levels.

EXECUTIVE SUMMARY

This year, the update to the global assessment of food security and nutrition reflects a particular moment in history. While the pandemic, the ensuing economic rebound, the war in Ukraine, and soaring prices of food, agricultural inputs and energy have all played out differently across regions with differing impacts, new estimates indicate hunger is no longer on the rise at the global level but is still far above pre-COVID-19-pandemic levels and far off track to achieve Sustainable Development Goal (SDG) 2.

As past editions of this report have highlighted, the intensification of the major drivers of food insecurity and malnutrition – conflict, climate extremes, economic slowdowns and downturns, and growing inequality – often occurring in combination, is challenging our efforts to achieve the SDGs. There is no question these threats will continue, requiring that we remain steadfast to build resilience against them. However, there are still important megatrends that must be fully understood when devising policies to meet the SDG 2 targets.

One such megatrend, and the focus of this year's report, is urbanization. As urbanization increases, rural and urban areas are becoming more intertwined, and the spatial distinction between them is becoming more fluid. The changing pattern of population agglomerations across this rural–urban continuum is driving changes throughout agrifood systems, creating both challenges and opportunities to ensure everyone has access to affordable healthy diets.

After presenting the latest updates of the food security and nutrition situation around the world, the report then examines the drivers, patterns and dynamics of urbanization through a rural–urban continuum lens and presents new analysis on how urbanization is changing food supply and demand across the rural–urban continuum. Complementing this, further analyses for selected countries explore differences in the cost and affordability of a healthy diet, and in food insecurity and different forms of malnutrition across the rural–urban continuum.

Building on these insights, the report identifies policies, investments and new technologies to address the challenges, and capitalize on the opportunities, that urbanization brings for ensuring access to affordable healthy diets for everyone, across the rural–urban continuum.

FOOD SECURITY AND NUTRITION AROUND THE WORLD

Food security indicators – latest updates and progress towards ending hunger and ensuring food security

The global assessment of the state of food security and nutrition in 2022 is a snapshot of the world still recovering from a global pandemic and now grappling with the consequences of the war in Ukraine, which has rattled food and energy markets. Encouraging signs of economic recovery from the pandemic and projections of a decline in poverty and hunger have been tempered by rising food and energy prices.

Global hunger in 2022, measured by the prevalence of undernourishment (SDG Indicator 2.1.1), remained far above pre-pandemic levels. The proportion of the world population facing chronic hunger in 2022 was about 9.2 percent, compared with 7.9 percent in 2019. After increasing sharply in 2020 in the midst of the global pandemic, and rising more slowly in 2021 to 9.3 percent, the prevalence of undernourishment ceased to increase from 2021 to 2022. It is estimated that hunger affected between 691 million and 783 million people in the world in 2022. Considering the projected midrange (about 735 million in 2022), 122 million more people faced hunger in 2022 than in 2019, before the pandemic.

The economic recovery from the pandemic helped to stem the rising tide of hunger at least at the global level. However, the positive effect could have been even larger without the countervailing winds caused by the global repercussions of the war in Ukraine and rising prices of food, agricultural inputs and energy, together with other drivers of food insecurity such as conflicts and weather-related events.

The relative lack of change in hunger at the global level from 2021 to 2022 hides substantial differences at the regional level. Progress was made towards reducing hunger in most subregions in Asia and in Latin America, but hunger is still on the rise in Western Asia, the Caribbean and all subregions of Africa. The proportion of the population facing hunger is much larger in Africa compared with the other regions of the world – nearly 20 percent compared with 8.5 percent in Asia, 6.5 percent in Latin America and the Caribbean, and 7.0 percent in Oceania.

Updated projections show that almost 600 million people will be chronically undernourished in 2030, pointing to the immense challenge of achieving the SDG target to eradicate hunger. This is about 119 million more undernourished people than in a scenario in which neither the pandemic nor the war in Ukraine had occurred, and around 23 million more than in a scenario in which the war had not happened.

SDG Target 2.1 challenges the world not only to end hunger, but also to work to ensure access for all people to safe, nutritious and sufficient food all year round. SDG Indicator 2.1.2 – the prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES) – tracks progress towards this ambitious goal.

New estimates of the prevalence of food insecurity based on the FIES confirm that for 2022 no progress was made on food insecurity at the global level. Following a sharp increase from 2019 to 2020, the global prevalence of moderate or severe food insecurity remained unchanged for the second year in a row, far above pre-COVID-19-pandemic levels. In 2022, an estimated 29.6 percent of the global population – 2.4 billion people – were moderately or severely food insecure, meaning they did not have access to adequate food. This is still 391 million more people than in 2019, before the pandemic.

The prevalence of moderate or severe food insecurity rose slightly in Africa and in Northern America and Europe, and decreased non-significantly in Asia from 2021 to 2022. The only region showing encouraging progress was Latin America and the Caribbean, mainly in South America, although the food security situation deteriorated in the Caribbean subregion.

A comparison of food insecurity in rural, peri-urban and urban populations at the global, regional and subregional levels using the Degree of Urbanization (DEGURBA) classification, a new international standard, shows that at the global level, food security improves as the degree of urbanization increases. Moderate or severe food insecurity affected 33.3 percent of adults living in rural areas in 2022 compared with 28.8 percent in peri-urban areas and 26.0 percent in urban areas.

Persistent gender inequalities are revealed by the new FIES data. Food insecurity is more prevalent among adult women than men in every region of the world, although the gap narrowed considerably at the global level from 2021 to 2022. In 2022, 27.8 percent of adult women were moderately or severely food insecure, compared with 25.4 percent of men, and the proportion of women facing severe food insecurity was 10.6 percent compared with 9.5 percent of men.

Cost and affordability of a healthy diet

The revised analysis presented in this year's report shows that almost 3.2 billion people worldwide could not afford a healthy diet in 2020, with a slight improvement in 2021 (a decrease of 52 million people). The cost of a healthy diet increased globally by 6.7 percent between 2019 and 2021, with a notable single-year increase of 4.3 percent in 2021. The cost increased by more than 5 percent between 2020 and 2021 in Africa, Asia, Latin America and the Caribbean, and Oceania, but only marginally in Northern America and Europe.

In many countries, the increase in the cost of a healthy diet occurred in combination with a decline in disposable income following the persisting effects of the pandemic. Lockdowns, economic downturns, and other pandemic-related disruptions in 2020 led to job losses and reduced incomes for many people, affecting low-income households the most as they spend a higher share of income on food.

A slight turnaround occurred in 2021, when the number of people unable to afford a healthy diet declined by 52 million compared to 2020, but this is still 134 million more people than in 2019 before the pandemic. Most of the people unable to afford a healthy diet in 2021 lived in Southern Asia, and in Eastern and Western Africa.

The state of nutrition: progress towards global nutrition targets

Nutrition is mentioned specifically in SDG 2 but is central to the achievement of all 17 SDGs. This section presents an assessment of progress towards global nutrition targets for stunting, wasting and overweight among children under five years of age, exclusive breastfeeding and low birthweight. Updated data were not available for anaemia in women aged 15 to 49 years and for adult obesity.

Stunting, the condition of being too short for one's age, undermines the physical and cognitive development of children. Stunting and other forms of undernutrition early in life may also predispose children to being overweight and developing non-communicable diseases (NCDs) later in life. Globally, the prevalence of stunting among children under five years of age has declined steadily, from an estimated 33.0 percent (204.2 million) in 2000 to 22.3 percent (148.1 million) in 2022.

Child wasting is a life-threatening condition caused by insufficient nutrient intake, poor nutrient absorption and/or frequent or prolonged illness. Affected children are dangerously thin, with weakened immunity and a higher risk of mortality. The prevalence of wasting among children under five years of age declined from 8.7 percent in 2000 to 6.8 percent in 2022. The estimated number of children with wasting declined from 54.1 million in 2000 to 45.0 million in 2022.

Children who are overweight or obese face both immediate and potentially long-term health impacts, including a higher risk of NCDs later in life. Child overweight has been on the rise in many countries, hastened by increasingly inadequate levels of physical activity and increased access to highly processed foods. Globally, the prevalence of overweight among children under five years of age showed a non-significant increase from 5.3 percent (33.0 million) in 2000 to 5.6 percent (37.0 million) in 2022.

The latest estimate for low birthweight revealed that 14.7 percent of newborns (19.8 million) were born with low birthweight (less than 2 500 g) in 2020, a non-significant decline from the 16.6 percent (22.1 million) in 2000. Infants born weighing less than 2 500 g are approximately 20 times more likely to die than those with adequate birthweight, and those who survive face long-term development and health consequences.

Optimal breastfeeding practices, including exclusive breastfeeding for the first six months of life, are critical for child survival and the promotion of health and cognitive development. Globally, the prevalence of exclusive breastfeeding among infants under six months of age has risen from 37.0 percent (24.3 million) in 2012 to 47.7 percent (31.2 million) in 2021. Worldwide, over half of all infants under six months of age did not receive the protective benefits of exclusive breastfeeding.

Low- and lower-middle-income countries bear the greatest burden of stunting, wasting and low birthweight but also have the largest proportion of exclusively breastfed children. Most overweight children live in these country income groups. At the global level, the prevalence of stunting and wasting was higher in rural areas than in urban areas while overweight was more commonly found in urban areas.

The results from these analyses help to identify vulnerable population groups, contributing to evidence to inform decision-making and effective action through the appropriate targeting and design of policies and programmes. Sound nutrition is fundamental to the achievement of the Sustainable Development Goals and must be central in government policy and supported by key stakeholders, including civil society and the private sector.

URBANIZATION IS TRANSFORMING AGRIFOOD SYSTEMS AND AFFECTING ACCESS TO AFFORDABLE HEALTHY DIETS ACROSS THE RURAL–URBAN CONTINUUM

Drivers, patterns and dynamics of urbanization

Urbanization is the result of urban population growth, urban expansion (i.e. reclassification of rural areas to peri-urban or urban) and migration from rural to urban areas. This process is fast-changing, context specific and driven by intertwined factors.

Many parts of the world have rapidly urbanized, with the urban share of the world's population rising from 30 percent in 1950 to 57 percent in 2021. It is projected to reach 68 percent by 2050. In most regions, this has been largely driven by structural transformation, which entails an economic transformation from mainly agriculture to a more diversified national economy, in the process attracting rural people to urban areas.

While urbanization often goes hand in hand with economic growth and structural transformation, this does not hold for all countries and regions. Urbanization without economic growth can be linked to poor rural living conditions, including poverty, lack of employment or underemployment, lack of infrastructure, lack of access to services, and food insecurity.

Another factor that may contribute to urbanization is climate change and/or environmental degradation, which can affect rural-to-urban migration movements. Populations that depend on natural resources for their livelihoods can be compelled to migrate to urban areas in search of work, due to the effects of climate change and biodiversity loss. There is also an increasing occurrence of forced displacement from rural areas to urban areas, often as a result of disasters and/or conflict.

With urban expansion and improving road and communication infrastructure across larger parts of rural areas, the distinction between rural and urban areas is increasingly blurred. A large share of the new urban dwellers are expected to live in peri-urban areas, as well as in small cities and interconnected towns. Increasingly, rural and urban areas are less separate spaces in their own right, but rather two ends of a spectrum, connected via numerous linkages across a rural–urban continuum.

Almost half of the global population (47 percent) live in peri-urban areas (less than 1 hour to large, intermediate and small cities or towns) and rural areas (1 to 2 hours or more to an urban centre). Given the increasing connectivity of peri-urban and rural areas and the convergence of high food purchases in both, it is clear that peri-urban and rural markets are significant drivers of agrifood systems transformation.

The degree of connectivity between rural and urban areas shapes agrifood systems, and thus the availability of affordable healthy diets, and the livelihoods of urban and rural primary producers, processors and traders. Depending on where urban growth takes place, whether in large, intermediate and small cities or towns, there will be different effects on rural populations' access to services, markets and inputs. A rural–urban continuum framework is therefore critical to understand the links between urbanization and agrifood systems changes and how these changes are affecting the availability and affordability of healthy diets, and in turn, food security and nutrition.

Urbanization affects agrifood systems, creating challenges and opportunities to ensure access to affordable healthy diets

Urbanization, combined with other contextual factors such as rising incomes, growing employment and changing lifestyles, is driving changes throughout agrifood systems across the rural–urban continuum. Increases in food demand in urban areas are occurring simultaneously with increases in the amount of food that agrifood systems have to produce, process and distribute, which, together with changes in consumer behaviour, are being seen across the rural–urban continuum. These changes may also lead to disparities across the rural–urban continuum, with both positive and negative effects on the availability and affordability of healthy diets, and in turn, on food security and nutrition outcomes.

One of the most important pathways through which urbanization is driving changes in agrifood systems is through a shift in **consumer behaviour and diets**. Higher average incomes, combined with changing lifestyles and employment, are driving a diet transition characterized by changes in the types and quantities of food consumed, with diets shifting beyond traditional grains into dairy, fish, meat, vegetables and fruits. There is a diffusion of food purchases in rural areas, more so than is commonly understood. The diet in these areas has shifted from mainly home-produced foods to increasingly market-purchased products.

However, urbanization has also contributed to the spread and consumption of processed and highly processed foods, which are increasingly cheaper and more readily available and marketed. Changes in the lifestyles and employment profiles of both women and men, as well as increasing commuting times, are resulting in greater demand for convenience, pre-prepared and fast foods. The diet transition is also occurring in rural areas, though lagged and to a lesser extent compared to urban and peri-urban areas.

Urbanization is also leading to changes in **midstream and downstream food supply chains**, which have become longer, more formal and more complex following rising consumer demand and increased regulation of agrifood systems. Importantly, growing midstream and downstream activities provide important off-farm employment opportunities, which can provide steady and liveable incomes, increasing the affordability of healthy diets.

Supply-side factors, coupled with an increase in demand for readily available foods, have contributed to a substantial expansion of supermarkets and hypermarkets that use modern food technology. While these markets can be linked to increased access to nutritious foods – through reduced waste, enhanced sanitation and reduced adverse effects of seasonality, for example – they have also been associated with increased supply of energy-dense and highly processed foods.

Urbanization, in particular, by increasing the connectivity of rural and urban areas, also affects agrifood systems through changes in **agricultural production**. While urbanization is often associated with a diversification of diets, the availability of vegetables and fruits, in particular, is insufficient to meet the daily dietary requirements in almost every region of the world.

As urban areas become better connected to rural areas, rural producers may also have better access to agricultural inputs and services, allowing for improved productivity that typically increases income levels. However, urban expansion can lead to land-use change. In some countries, farmers receive high compensation for selling their land, whereas in others, dispossession of agricultural land is not compensated, resulting in loss of livelihoods and potential issues around land rights.

Access to affordable healthy diets is generally better and food security and nutrition levels are higher in cities than in rural areas because of the better availability of food, higher average purchasing power in urban areas, and better access to health care, education and other services that are essential for health and nutrition. However, this does not always hold true given the transformations underway in agrifood systems, the stark inequalities that exist within urban populations, and the increasingly spatial and functional connectivity between cities, towns and rural catchment areas.

THE INTERPLAY OF FOOD SUPPLY AND DEMAND AND THE COST AND AFFORDABILITY OF HEALTHY DIETS ACROSS THE RURAL–URBAN CONTINUUM

Understanding food supply and demand across the rural–urban continuum

Urbanization, combined with rising incomes, increases in the opportunity cost of time related to work, lifestyle changes and demographic shifts, is changing food demand. These factors together with many supply-side considerations, including food pricing, marketing and promotion, among others, in turn are changing agrifood systems, so there is a reinforcing compounding effect on the food produced, supplied and consumed.

Most notably, rapid urbanization is leading to rising and changing food demand, and shifts in patterns of food supply – especially in sub-Saharan Africa and Southern Asia, the two regions exhibiting the highest urbanization rates. Projections of overall food expenditure estimate an approximate 2.5-fold increase in sub-Saharan Africa and a 1.7-fold increase in Southern Asia by 2050.

Analysis of food demand, defined as household food consumption (at market value), across the rural–urban continuum in selected countries was conducted and revealed interesting patterns. This was made possible by applying the newly available geospatial Urban Rural Catchment Areas (URCA) dataset combined with georeferenced data from nationally representative Living Standards Measurement Study (LSMS) surveys. For reasons of data availability, the surveys used covered the period 2018/19 for Benin, Burkina Faso, Côte d'Ivoire, Ethiopia, Guinea-Bissau, Mali, the Niger, Nigeria, Senegal and Togo, and 2019/20 for Malawi.

Given it is expected that diets become more diversified with higher levels of food consumption, income and employment, the 11 countries were classified into two groups according to their food budget (i.e. the market value of their total food consumption per capita per day): high-food-budget countries (average 2.3 PPP dollars per capita per day) and low-food-budget countries (average 1.6 PPP dollars per capita per day).

New empirical evidence from this analysis, challenges traditional thinking and reveals important food consumption patterns, including dietary convergence across the rural–urban continuum. For example, across the 11 countries, food purchases form the majority of total food consumption in value terms, including food for home consumption and food away from home.

While high shares of food purchases in urban areas are to be expected (78–97 percent), shares are surprisingly high even for rural households living 1 to 2 hours from a small city or town (56 percent on average) and for those living more than 2 hours travel to any urban centre (52 percent on average). The finding that in most of the countries analysed, the "majority" of household food consumption in rural households comes from purchases is a major deviation from the traditional image of rural subsistence households.

Own production never becomes the main source for food – not even in rural areas. In rural areas, the average share of own production represents only 37 percent and 33 percent of total consumption in high- and low-food-budget countries, respectively. Given that rural households in the 11 African countries do not produce the majority of the food value they consume, the affordability of healthy diets is equally critical across the rural–urban continuum.

While the diffusion of processed foods, including highly processed foods, is already advanced in Asia and Latin America, it is spreading quickly in Africa as well. In the 11 African countries studied, the analysis clearly shows a diffusion of purchases of processed foods across the rural–urban continuum. While highly processed foods are a small proportion of total purchases and their consumption is higher in urban areas, the results highlight the penetration of highly processed foods in rural areas, even those living 1 to 2 hours or more from a city or town. The econometric analysis indicates that higher levels of household income and more non-farm employment are associated with a higher consumption value share of highly processed foods in the 11 African countries.

In the 11 African countries, looking at household food composition in terms of the value shares of food consumption by food group, a diet transition is clearly occurring across the rural–urban continuum, with increases in the consumption of more expensive food items, like animal source foods and fruits. The econometric analysis indicates that animal source food consumption value shares are strongly driven by income across the rural–urban continuum, while the consumption value shares of fruits and vegetables are driven more by access and availability.

Cost and affordability of a healthy diet, and food security and nutrition across the rural–urban continuum

On average, across the 11 countries in Africa analysed, the cost of a healthy diet in urban centres is much higher (on average 1.2 times higher) than in peri-urban areas and it then decreases the smaller the city size and moving closer to rural areas. The higher cost of animal source foods, compared to the other food groups, drives up the cost of a healthy diet across the rural–urban continuum, especially in urban and remote rural areas.

The cost of a healthy diet exceeds average food expenditure for low- and middle-income households in both high- and low-food-budget countries in the 11 countries analysed. Low-income households living in peri-urban and rural areas are especially disadvantaged, as they would need to more than double their current expenditure on food to secure a healthy diet.

Although the cost of a healthy diet in peri-urban areas is lower than in urban areas, this does not translate into a more affordable healthy diet in the former. On average, the percentage of the population unable to afford a healthy diet in peri-urban areas is 1.5 times higher than in urban centres and similar to rural areas.

An analysis of food insecurity based on the FIES for 9 of the 11 African countries shows that in many of these countries, the prevalence of moderate or severe food insecurity in urban and peri-urban areas is similar to that in rural areas, and in some cases, slightly higher, indicating that food insecurity is not exclusively a rural problem.

The prevalence of malnutrition across the ten URCA categories was only estimated for 3 of the 11 countries, due to data limitations. In the three countries (Benin, Nigeria and Senegal), generally the prevalence of stunting in children under five years of age gradually increases as cities become smaller and as one moves away from urban centres.

The prevalence of wasting in children under five years of age is lower than that of stunting in all three countries and exhibits less evident trends across the rural–urban continuum. Nevertheless, there are hints of increased wasting in some peri-urban and rural areas in Nigeria and Senegal. Similarly, the prevalence overweight among children is low in all countries and does not present a clear trend across the rural–urban continuum. However, it is worth noting there is a suggestion towards lower overweight in peri-urban areas and higher overweight in some rural areas compared to urban areas.

POLICIES AND SOLUTIONS TO LEVERAGE AGRIFOOD SYSTEMS TRANSFORMATION FOR HEALTHY DIETS ACROSS THE RURAL–URBAN CONTINUUM

The increased links across the rural–urban continuum coupled with closer interactions between the components of agrifood systems create a number of opportunities and challenges for the availability and affordability of healthy diets. Such interactions also create a number of policy and programme entry points to support agrifood systems transformation towards affordable healthy diets.

Policies and investments for healthy diets across the rural–urban continuum

Supporting healthier food outlets will be key for enabling access to healthy diets, as this has shown positive impacts on dietary quality. Policy incentives are necessary to encourage shops to stock and sell greater amounts of fresh and minimally processed foods, for instance, by improving their cold storage facilities, while the availability of healthier food outlets in particular areas across the rural–urban continuum can be improved through land-use planning and zoning regulations; tax credits or exemptions; and licensing agreements.

In urban and peri-urban settings, an estimated 2.5 billion people worldwide consume street foods every day, which are especially convenient for low-income workers and households who may not have the resources, facilities and/or time to prepare dishes at home. However, street foods do not always contribute to healthy diets. There are multiple infrastructure and regulatory gaps that need to be addressed to improve the nutritional quality and safety of these foods. These include ensuring a supply of water of acceptable quality for food preparation, clean places for preparation and consumption of food, sanitary facilities for workers, training for street vendors and consumer education.

Given that one-fourth of the global population live in peri-urban areas of small and intermediate cities and towns (SICTs), investing in these can have a more significant impact on healthy diets for their populations compared to the benefits that trickle down from growth in large cities. Addressing some of the challenges faced by SICTs can allow agrifood systems to be the driver of inclusive rural development, and create development opportunities for small and medium enterprises (SMEs).

The presence of processed foods in household diets across the whole rural–urban continuum constitutes a driving force for the expansion of the services provided by SMEs. Strengthening their efficiency and expansion can also contribute to gains in production of nutritious foods, and a parallel reduction in the cost of food for consumers.

Building rural infrastructure, including quality rural and feeder roads to connect remote farms and enterprises to main road networks, is essential for unlocking the productive potential of SICTs and their catchment areas. Other public investments to support linkages between (mainly small) farms and SMEs could include warehousing, cold storage, dependable electrification, access to digital tools and water supply.

Finally, considering that the availability of fruits and vegetables per capita per day is insufficient to meet the requirements of a healthy diet in most parts of the world, it is essential to boost the production of nutritious foods and, in general terms, support the diversification of food production.

Technology and innovation: a key enabler for agrifood systems transformation under urbanization

In an urbanizing world, the strategic deployment of technology and innovation can be a critical catalyst of agrifood systems transformation.

Countries have varied needs and capacities, and while there is a plethora of technologies and innovations available, no single "silver bullet" technology or innovation will meet all needs in all contexts across the rural–urban continuum.

Whether these technologies and innovations are inclusive for all depends not only on their adoption and impact, but also on how research and development (R&D) is shaped. Between 1981 and 2016, there was a doubling of global public investment in agricultural R&D, with significant increases in larger middle-income countries (MICs); however, smaller lower-middle-income countries (LMICs) continue to have insufficient investment compared to other components of general services support such as infrastructure investments.

In urbanizing contexts, where consumers are increasingly exposed to highly processed foods, different technological and innovative food environment solutions can contribute to reducing their consumption. For instance, behavioural science is an essential innovation that enables governments, scientists and the public to work together to develop evidence-based approaches to increase access to affordable healthy diets, as well as empower consumers to choose healthy diets.

As already noted, urbanization is leading to a growing demand for packaged and pre-prepared foods. Innovations in food packaging can maintain the quality, safety and nutritional value of food products, meet consumer needs and preferences, reduce food loss and waste, and reduce the cost of nutritious foods, especially across longer distribution chains.

Finally, there are numerous technologies and innovations that can be leveraged for enhancing productivity in rural, urban and peri-urban areas, as well as for closing the productivity gap in LMICs, especially in the face of the climate crisis and the disappearance of natural resources. For example, vertical farming requires only a small plot of land and can be carried out indoors, allowing for the cultivation of food in urban and industrial spaces, and leading to shorter supply chains.

Integrated planning and governance mechanisms across the rural–urban continuum

Transformative policies, technologies and innovations require adequate governance mechanisms that, while engaging multiple actors, can coherently address the challenges and leverage the opportunities created in agrifood systems under urbanization.

Due to the multisectoral nature of the challenges and opportunities that urbanization creates across the rural–urban continuum, subnational governments are important actors for formulating and implementing coherent policies that go beyond agrifood systems and outside normal administrative borders. These governments are in close contact with local stakeholders and can ensure that policies are adapted to local conditions by promoting advantages and addressing bottlenecks.

An important starting point towards streamlining governance across the rural–urban continuum is the development of locally based agreements between multiple administrative zones and multistakeholder platforms and networks. Among such mechanisms, food policy councils serve as advisory bodies to local or subnational governments, support policy design and implementation, promote stakeholder engagement, and facilitate monitoring and evaluation of progress in policy implementation, effectiveness, efficiency and impact.

The design and implementation of local agrifood systems policies, investments and legislation for addressing multiple agrifood systems challenges and opportunities requires working outside "silos" and bridging the gaps between policy areas in order to achieve systemic changes.

Policy coherence at national and subnational levels remains a key challenge in establishing the appropriate enabling environment. Therefore, these policies and investments will require strong multilevel governance across national and regional agrifood systems policies. The establishment of national networks engaging various levels of governments appears an important starting point to initiate such multilevel governance mechanisms.

CONCLUSION

Hunger at the global level did not worsen between 2021 and 2022, but there are many places in the world where hunger is on the rise – where people are still struggling to recover income losses in the wake of the COVID-19 pandemic, or have been hit by climbing food and energy prices, or whose lives and livelihoods have been disrupted by conflicts or extreme weather events. Progress on important indicators of child nutrition is to be celebrated, and some regions are on track to achieve some of the nutrition targets by 2030. However, rising overweight and obesity in many countries portends growing burdens of non-communicable diseases.

Urbanization has featured as the theme of this year's report. With almost seven in ten people projected to live in cities by 2050, this megatrend is shaping agrifood systems and, as a consequence, their capacity to deliver affordable healthy diets for all and to help eradicate hunger, food insecurity and malnutrition.

A key conclusion is that the ways in which urbanization is shaping agrifood systems can only be understood through a rural–urban continuum lens; the simple concept of a rural–urban divide is no longer useful to understand the growing links across urban, peri-urban and rural areas. This growing connectivity across the rural–urban continuum is a key aspect today to understand the functioning of value chains. Only then can the challenges and the opportunities that urbanization creates for agrifood systems be clearly mapped onto appropriate policy, technology and investment solutions.

Implementing these solutions requires that the agrifood systems governance mechanisms and institutions cross sectoral and administrative boundaries and rely on subnational and local governments. Local governments in particular are fundamental actors in leveraging multilevel and multistakeholder mechanisms that, as shown with concrete examples in this report, have proved effective in implementing essential policies and solutions for making healthy diets available and affordable for all. ■

UZBEKISTAN
A woman street vendor selling different varieties of apples along the road in the rural Jizzakh region.
©FAO/Lazizkhon Tashbekov

CHAPTER 1
INTRODUCTION

This report regularly monitors global, regional and national progress towards the targets of ending both hunger and food insecurity (Sustainable Development Goal [SDG] Target 2.1) and all forms of malnutrition (SDG Target 2.2) in the context of the 2030 Agenda for Sustainable Development. This year, the global assessment of the state of food security and nutrition in 2022 reflects a particular moment in history. In 2022, the world was beginning to recover from the COVID-19 pandemic when the war broke out in Ukraine, shaking commodity and energy markets. The pandemic, the ensuing economic rebound, the war in Ukraine, and the soaring prices of food, agricultural inputs and energy due in part to the war have all played out differently across regions and populations, with differing impacts on hunger and food insecurity. While new estimates presented in **Chapter 2** indicate hunger was no longer on the rise at the global level in 2022, this indicator was still far above pre-COVID-19-pandemic levels. Moreover, food crises were still unfolding in many parts of the world. Many population groups were not buoyed up by the economic recovery or were bearing the brunt of higher prices of food, inputs and energy – or both. For these reasons, we are still far off track to meet the SDG 2 targets.

Beyond the global assessment of food security and nutrition in 2022, this report provides in-depth analysis of the major drivers behind these trends which are challenging our efforts to achieve the SDGs in the context of the 2030 Agenda. Past editions have repeatedly highlighted the intensification of the major drivers of food insecurity and malnutrition – conflict, climate extremes, economic slowdowns and downturns, and growing inequality – often occurring in combination, which have pushed us off track to meet the SDG 2 targets. There is no question these threats will continue, requiring that we remain steadfast in taking bold actions to build resilience against them. However, there are still important megatrends that must be factored into the analysis to fully understand the challenges to and opportunities for meeting the SDG 2 targets.

One such megatrend, and the thematic focus of this year's report, is urbanization. As urbanization increases, rural and urban areas are becoming more intertwined, and the spatial distinction between them is becoming more fluid. Population growth in small and medium-sized cities and rural towns now increasingly "bridges" the space between the rural hinterland and large metropolises.[1, 2] The changing pattern of population agglomerations across this rural–urban continuum is driving changes throughout agrifood systems, creating both challenges and opportunities to ensure everyone has access to affordable healthy diets. Overcoming the challenges and leveraging the opportunities will require actions and policy interventions that are informed by a clear understanding of how the rural–urban continuum and agrifood systems interact.

While rates of urbanization vary across countries, with the rate of any given country often linked to its stage of structural transformation, urbanization overall is accelerating. By 2050, almost seven in ten people are projected to live in cities; but even today this proportion is already approximately 56 percent.[a] In low- and middle-income countries, the urban population is growing more than three times faster than the rural population (3.08 percent compared with 0.89 percent annually, from 2015 to 2020).[3] By 2030, the urban population in these countries is projected to exceed 4 billion; that is, it will have more than doubled in size since the year 2000. In contrast, the rural population of low- and middle-income countries is projected to increase much less, to at least 3 billion by 2050 – only slightly higher than the 2.95 billion figure of 2000. While rural populations are still increasing rapidly in some regions such as the African drylands, in most other regions rural populations are declining, including in Latin America and Europe.

The areas currently experiencing the most rapid urbanization are those where the link between urbanization, economic growth and structural transformation is weaker – regions like sub-Saharan Africa and Southern Asia, which have some of the highest numbers of individuals who are hungry, food insecure and malnourished. These two subregions are projected to experience the most rapid increases in urbanization, while at the same time facing the biggest challenges regarding poverty, food insecurity and access to affordable healthy diets. Sub-Saharan Africa's urban population is projected to almost quadruple in size by 2050, reaching 1.3 billion, compared with 306 million in 2010.[4] At the same time, the rural population is projected to increase less rapidly but still profoundly, from 540 million in 2010 to 909 million in 2050. In Asia, the urban population is projected to increase by 83 percent, from 1.9 billion to 3.5 billion, while the rural population is projected to decline by 540 million, from 2.3 billion to 1.8 billion. But in Southern Asia, the urban population is projected to more than double, increasing by 120 percent, from 555 million to 1.3 billion.

Urbanization arises from a combination of rural push factors (e.g. poverty, inequitable land distribution, environmental degradation, and forced displacement due to disasters or conflict) and urban pull factors (e.g. urban employment, higher wages, better social services and educational opportunities), which vary depending on the country and specific context. This leads to increased food supply and demand, direct and indirect land-use change, and more complex agrifood market linkages among producers, midstream supply chain processors and distributors, and consumers.[5] While living in urban areas has often been associated with higher standards of living overall, these areas may also have pockets of abject poverty compared to rural areas, and their services are often stretched to the limit. This can result in lack of access to affordable healthy diets, as well as increases in poverty and food insecurity and multiple forms of malnutrition.

Across the entire rural–urban continuum, the majority of food consumed is purchased from markets. Hence, the type of diet that households consume is determined by cost and affordability,

a The United Nations Department of Economic and Social Affairs (UN DESA) does not apply its own definition of "urban" population, but instead follows the definition used in each country. The definitions are generally those used by national statistical offices in carrying out the latest available census. Each country applies its own population criteria for classifying cities as urban.[3]

which in turn depend on the structure of agrifood systems, including food supply and value-added chains. These factors must be taken into consideration in designing effective policies and investments to ensure rural, peri-urban and urban populations have access to affordable healthy diets. A policy approach that goes beyond sectoral silos and administrative borders will be needed to shape how regions urbanize and affect agrifood systems across the rural–urban continuum.

After presenting the main trends in the global assessment of food security and nutrition, and the cost and affordability of a healthy diet around the world (**Chapter 2**), this report explores the linkages between urbanization and changing agrifood systems across the rural–urban continuum.

To begin, **Chapter 3** examines the drivers, patterns and dynamics of urbanization through a rural–urban continuum lens. It presents a conceptual framework showing the pathways through which urbanization is affecting agrifood systems, and in turn enabling or hampering access to affordable healthy diets, with implications for food security and malnutrition in all its forms.

Looking at this process, one of the key transitions that stands out occurs through the interplay of food supply and demand, as well as the resulting changes in what people are eating across the rural–urban continuum. To better understand this, **Chapter 4** presents new analysis precisely on how urbanization is changing food demand, utilizing a unique Urban Rural Catchment Areas (URCA) global dataset combined with georeferenced household survey data. This is followed by additional analysis for selected countries exploring differences in the cost and affordability of a healthy diet, and in food insecurity and different forms of malnutrition across the rural–urban continuum.

Finally, building on the insights from the previous chapters, **Chapter 5** identifies the policies, new technologies, and associated investments that can be adapted to address the challenges – and capitalize on the opportunities – that urbanization brings for ensuring access to affordable healthy diets for everyone, across the rural–urban continuum. The chapter describes the governance mechanisms and institutions that are needed to achieve a more coherent and integrated approach for implementing these policies and solutions.

Such timely evidence and recommendations are relevant to the New Urban Agenda, endorsed by the United Nations General Assembly in 2016, as well as other global processes such as the United Nations Food Systems Summit and the establishment of the Urban Food Systems Coalition in 2021. They are also considered highly relevant for the efforts towards achieving SDGs beyond Zero Hunger, not least SDG 11 (Sustainable Cities and Communities), but also SDG 1 (No Poverty), SDG 3 (Good Health and Well-being), SDG 10 (Reduced Inequalities) and SDG 12 (Responsible Consumption and Production). ■

KENYA
Fresh vegetables for sale in Limuru vegetable market – addressing the root causes of migration by creating employment opportunities in agribusiness.
©FAO/Luis Tato

CHAPTER 2
FOOD SECURITY AND NUTRITION AROUND THE WORLD

The global assessment of the state of food security and nutrition in 2022 presented in this edition of the report is a snapshot of the world still recovering from a global pandemic and now grappling with the consequences of the war in Ukraine, which has further rattled food and energy markets. The impact of the COVID-19 pandemic on lives and livelihoods was devastating, producing a global economic recession that ended three decades of global progress in poverty reduction, contributing to an estimated increase of close to 90 million people facing hunger in just one year (from 2019 to 2020). The year 2021 marked a partial recovery from the pandemic-induced contractions that was highly uneven, across countries and within countries; the pace of recovery was much slower in low- and lower-middle-income countries, and disadvantaged segments of the population everywhere were still struggling to recover from the income losses suffered during the peak of the pandemic the previous year. This contributed to a further increase of about 38 million in the estimated number of people experiencing hunger in 2021. In February 2022, just as the weight of the pandemic was beginning to lift, the war in Ukraine erupted involving two major producers of agricultural commodities in the world, sending shockwaves through commodity and energy markets, weakening the recovery and adding even greater uncertainty.[1]

It is in this context of continued slow and uneven recovery from the pandemic and global repercussions of the war in Ukraine that this assessment of the state of food security and nutrition in 2022 is presented. Encouraging signs of economic recovery from the pandemic and projections of a decline in poverty and hunger have been tempered by rising prices of food, agricultural inputs and energy.

This chapter presents an annual update of the global assessment of food security and nutrition up to the year 2022 and a report on progress towards meeting Sustainable Development Goal (SDG) 2 with a special focus on SDG Targets 2.1 and 2.2: end hunger and ensure access by all people to safe, nutritious and sufficient food all year round; and end all forms of malnutrition by 2030.

Section 2.1 presents an assessment of progress towards achieving the SDG 2 targets for hunger and food insecurity. It includes global, regional and subregional updates of the two Target 2.1 indicators: the prevalence of undernourishment (PoU) and the prevalence of moderate or severe food insecurity based on the Food Insecurity Experience Scale (FIES), revised up to 2022 based on the most recent data available to FAO at the time of writing this report. Updated projections of what the global PoU may be in 2030 are also provided. A comparison of the food insecurity status of men and women is presented, as well as, for the first time, a look at differences in food insecurity among rural, peri-urban and urban populations.

Section 2.2 presents updated estimates of the indicators of the cost and affordability of a healthy diet (CoAHD). These indicators provide evidence regarding people's economic access to diverse, nutritious foods, which is one critical aspect of achieving healthy diets. In this year's edition of the report, the cost and affordability indicators are updated to 2021. Lack of recent data on estimated income distributions, purchasing power parities (PPPs), and detailed food prices at the country level prevents an update to 2022.

Section 2.3 presents an assessment of the state of nutrition and progress towards the global nutrition targets defined by the World Health Assembly (WHA) in 2012 and the 2030 Agenda for Sustainable Development (SDG 2.2). Updates are provided for five nutrition targets: low birthweight, exclusive breastfeeding, and stunting, wasting and overweight in children under five years of age.

2.1 FOOD SECURITY INDICATORS – LATEST UPDATES AND PROGRESS TOWARDS ENDING HUNGER AND ENSURING FOOD SECURITY

KEY MESSAGES

➔ Global hunger, measured by the prevalence of undernourishment (PoU) (SDG Indicator 2.1.1), remained relatively unchanged from 2021 to 2022 but is still far above pre-COVID-19-pandemic levels, affecting around 9.2 percent of the world population in 2022 compared with 7.9 percent in 2019.

➔ It is estimated that between 691 and 783 million people in the world faced hunger in 2022. Considering the midrange (about 735 million), 122 million more people faced hunger in 2022 than in 2019, before the pandemic.

➔ The economic recovery from the pandemic observed in 2021 slowed in 2022. Rising prices of food, agricultural inputs and energy, magnified by the impact of the war in Ukraine, undermined the recovery of employment and incomes of the most vulnerable people, hindering a decline in hunger.

➔ The relative lack of change in hunger between 2021 and 2022 at the global level hides substantial differences at the regional and subregional levels. While progress was made towards reducing hunger in Asia and in Latin America, hunger was still on the rise in Western Asia, the Caribbean and all subregions of Africa.

➔ The PoU in Africa rose from 19.4 percent in 2021 to 19.7 percent in 2022, driven mostly by increases in Northern and Southern Africa. The number of people facing hunger in Africa has increased by 11 million people since 2021 and by more than 57 million people since the outbreak of the pandemic.

➔ The PoU in Asia fell from 8.8 percent in 2021 to 8.5 percent in 2022 – a decrease of more than 12 million people, mostly in Southern Asia. However, this is still 58 million above pre-pandemic levels. There were improvements in every subregion except Western Asia, where the PoU increased from 10.2 percent in 2021 to 10.8 percent in 2022.

➔ A turnaround also occurred in Latin America and the Caribbean, where the PoU fell from 7.0 percent in 2021 to 6.5 percent in 2022 – a decrease of 2.4 million in the number of people facing hunger, but still 7.2 million more than in 2019. The decrease was driven by South America and masks a notable increase in the Caribbean, from 14.7 percent in 2021 to 16.3 percent in 2022.

➔ A much larger proportion of the population in Africa faces hunger compared to the other regions of the world – nearly 20 percent compared with 8.5 percent in Asia, 6.5 percent in Latin America and the Caribbean, and 7.0 percent in Oceania.

➔ It is projected that almost 600 million people will be chronically undernourished in 2030, pointing to the immense challenge of achieving the SDG target to eradicate hunger. This is about 119 million more than in a scenario in which neither the pandemic nor the war in Ukraine had occurred, and around 23 million more than if the war in Ukraine had not happened. Most progress is expected to occur in Asia, whereas no progress is foreseen in Latin America and the Caribbean, and hunger is projected to increase significantly in Africa by 2030.

➔ Following a sharp increase from 2019 to 2020, the prevalence of moderate or severe food insecurity at the global level (SDG Indicator 2.1.2) remained unchanged for the second year in a row but was still far above the pre-pandemic level of 25.3 percent. About 29.6 percent of the global population – 2.4 billion people – were moderately or severely food insecure in 2022, 391 million more than in 2019.

➔ The prevalence of severe food insecurity at the global level declined slightly from 11.7 percent in 2021 to 11.3 percent in 2022, the equivalent of 27 million fewer people. However, the number of severely food-insecure people was still about 900 million in 2022, which is 180 million more than in 2019.

➔ The prevalence of moderate or severe food insecurity rose slightly in Africa and in Northern America and Europe, and decreased non-significantly in Asia from 2021 to 2022. The only region showing encouraging progress is Latin America and the Caribbean, where moderate or severe food insecurity decreased from 40.3 percent in 2021 to 37.5 percent in 2022, the equivalent of 16.5 million fewer people in one year, mainly in South America.

➔ A comparison of food insecurity among rural, peri-urban and urban populations reveals that global food insecurity, at both levels of severity, is lower in urban areas. Moderate or severe food insecurity affected 33.3 percent of adults living in rural areas in 2022 compared with 28.8 percent in peri-urban areas and 26.0 percent in urban areas.

➔ Food insecurity affects women more than men in every region of the world. However, the gender gap in food insecurity at the global level, which had widened in the wake of the COVID-19 pandemic, narrowed from 3.8 percentage points in 2021 to 2.4 percentage points in 2022, suggesting that the disproportionate impacts of the pandemic on women's food insecurity have eased globally and in some regions. The gender gap diminished notably in Asia and in Latin America and the Caribbean, but widened in Africa and in Northern America and Europe.

Estimates of how many people are facing hunger in the world are always the best possible approximations given the information available. The COVID-19 pandemic disrupted normal data collection activities in 2020 and 2021, creating additional challenges for the assessment of the state of food insecurity in the world and inducing greater uncertainty around the estimates. While the main effects of the pandemic have receded, and data collection activities have begun to normalize, data reporting by countries was still not fully back up to speed by 2022. Thus, estimates of the global PoU (SDG Indicator 2.1.1) are presented as ranges beginning in 2020 to reflect the additional uncertainty since the pandemic.

As always, the PoU estimates for the most recent year (2022) are obtained by nowcasting the values of the three needed parameters using the most recent information available to FAO regarding the food supply and based on reasonable assumptions on the extent of inequality in access to food (**Annex 2, Section A**).

The assessments of the prevalence of moderate or severe food insecurity based on the FIES (SDG Indicator 2.1.2) are informed by official estimates as reported by countries, whenever available, and by FAO estimates based on data collected annually by the Organization through data collection service providers in over 140 different countries (see **Annex 1B**).

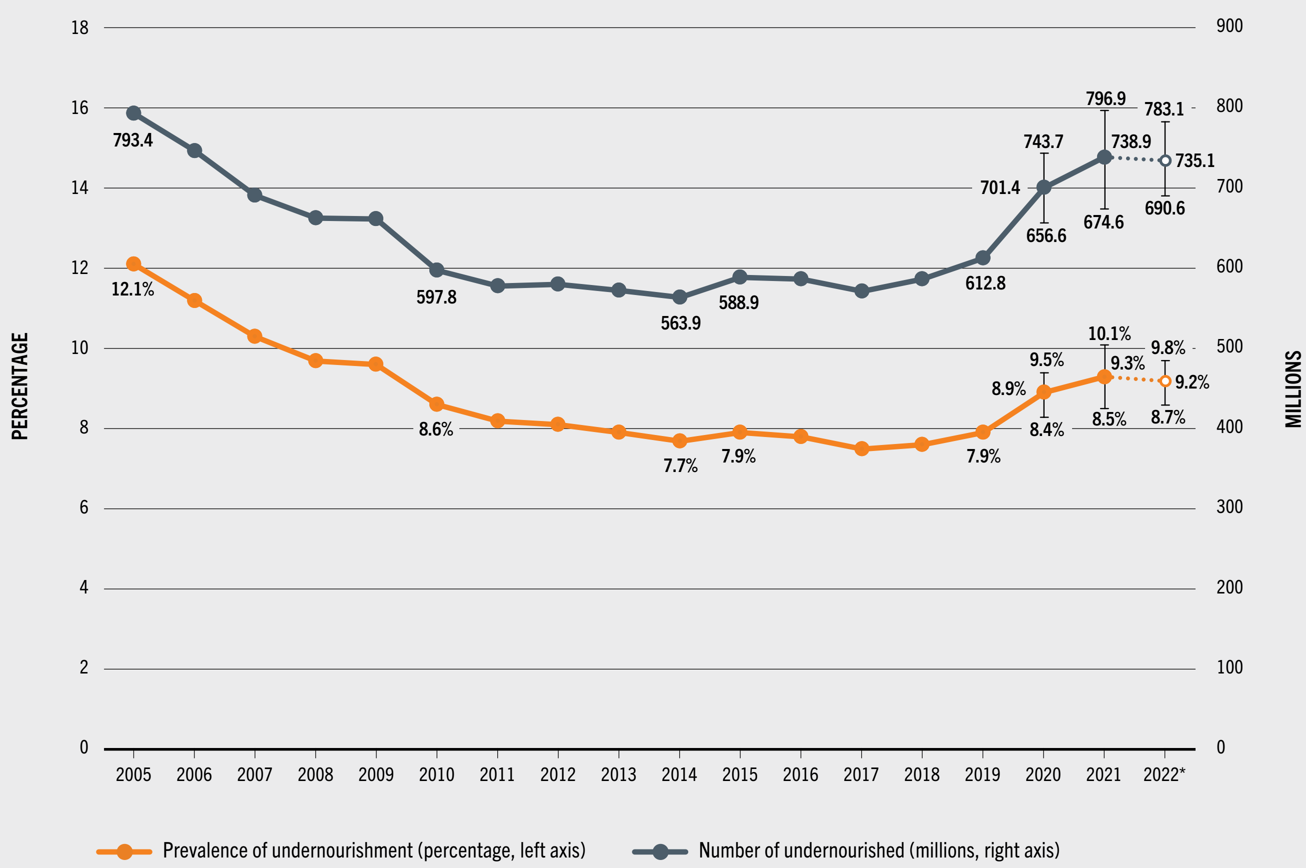
SDG Indicator 2.1.1 Prevalence of undernourishment

The assessment of global hunger in 2022, measured by the PoU (SDG Indicator 2.1.1), reveals that it remained far above pre-pandemic levels. The proportion of the world population facing chronic hunger in 2022 was about 9.2 percent, compared with 7.9 percent in 2019 (Figure 1). After increasing sharply in 2020 in the midst of the global pandemic, and rising more slowly in 2021 to 9.3 percent, the PoU ceased to increase from 2021 to 2022, providing some hope of a possible turnaround.[b]

It is estimated that hunger affected between 691 and 783 million people in the world in 2022.

b The entire series of PoU values is revised with each new edition of this report to reflect new data and information that FAO has obtained since the release of the previous edition. As this process usually implies backward revisions of the entire PoU series, readers should refrain from comparing series across different editions of this report and should always refer to the current edition, including for values in past years.

FIGURE 1 **GLOBAL HUNGER REMAINED VIRTUALLY UNCHANGED FROM 2021 TO 2022 BUT IS STILL FAR ABOVE PRE-COVID-19-PANDEMIC LEVELS**



NOTES: * Projections based on nowcasts for 2022 are illustrated by dotted lines. Bars show lower and upper bounds of the estimated range.
SOURCE: FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS

Considering the projected midrange (about 735 million in 2022), 122 million more people faced hunger in 2022 than in 2019, before the pandemic.

The relative lack of change in hunger at the global level from 2021 to 2022 hides substantial differences at the regional level (Table 1, Table 2 and Figure 2). Many places in the world are still facing serious food crises (Box 1). Hunger has been on the rise in **Africa** since 2010, with a sharp increase in all subregions in 2020 followed by a gentler rise in 2021. In 2022, the PoU in Africa continued to rise from 19.4 percent in 2021 to 19.7 percent – the equivalent of 11 million more people in one year and nearly 57 million more since the outbreak of the pandemic. Moreover, hunger increased throughout all subregions of Africa in 2022. The PoU in Northern Africa rose from 6.9 percent to 7.5 percent, equivalent to nearly 2 million more people facing hunger in 2022. In sub-Saharan Africa, hunger increased from 22.2 percent to 22.5 percent, which translates into 9 million more people compared to 2021. The largest increase in PoU occurred in Southern Africa, at 1.1 percentage points, followed by Middle Africa with an increase of 0.6 percentage points. Marginal increases of 0.1 percentage points occurred in Western and Eastern Africa from 2021 to 2022.

TABLE 1 PREVALENCE OF UNDERNOURISHMENT, 2005–2022

	Prevalence of undernourishment (%)									
	2005	2010	2015	2016	2017	2018	2019	2020*	2021*	2022*
WORLD	**12.1**	**8.6**	**7.9**	**7.8**	**7.5**	**7.6**	**7.9**	**8.9**	**9.3**	**9.2**
AFRICA	**19.2**	**15.1**	**15.8**	**16.6**	**16.5**	**16.6**	**17.0**	**18.7**	**19.4**	**19.7**
Northern Africa	6.2	4.7	5.4	5.7	6.0	6.0	5.8	6.0	6.9	7.5
Sub-Saharan Africa	22.5	17.6	18.2	19.1	18.9	19.1	19.5	21.6	22.2	22.5
Eastern Africa	31.7	23.8	24.6	26.2	26.2	26.0	26.7	28.1	28.4	28.5
Middle Africa	31.9	22.5	23.3	24.7	23.7	24.4	24.8	27.6	28.5	29.1
Southern Africa	5.1	7.2	9.3	8.3	7.8	7.7	8.3	9.5	10.0	11.1
Western Africa	12.2	10.8	10.6	10.7	10.6	11.1	11.0	13.7	14.5	14.6
ASIA	**13.9**	**9.3**	**8.0**	**7.5**	**7.0**	**7.1**	**7.4**	**8.5**	**8.8**	**8.5**
Central Asia	13.8	6.6	4.0	3.8	3.5	3.1	2.8	3.3	3.2	3.0
Eastern Asia	6.8	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
South-eastern Asia	17.3	11.1	7.5	6.5	5.8	5.5	5.3	5.3	5.3	5.0
Southern Asia	20.2	15.4	14.0	12.9	12.2	12.3	13.3	15.6	16.4	15.6
Western Asia	7.9	6.5	9.1	10.0	9.8	10.3	10.3	10.5	10.2	10.8
Western Asia and Northern Africa	*7.1*	*5.7*	*7.4*	*8.0*	*8.1*	*8.3*	*8.2*	*8.4*	*8.7*	*9.2*
LATIN AMERICA AND THE CARIBBEAN	**9.3**	**6.2**	**5.3**	**6.1**	**5.8**	**5.9**	**5.6**	**6.5**	**7.0**	**6.5**
Caribbean	18.4	14.7	13.2	13.5	13.2	14.0	14.2	15.2	14.7	16.3
Latin America	8.6	5.6	4.7	5.5	5.2	5.3	4.9	5.9	6.4	5.8
Central America	8.1	6.8	6.7	6.2	6.1	6.1	5.1	4.8	5.0	5.1
South America	8.8	5.1	3.9	5.2	4.9	5.0	4.9	6.3	7.0	6.1
OCEANIA	**6.9**	**6.5**	**6.2**	**6.1**	**6.1**	**6.4**	**6.4**	**6.0**	**6.6**	**7.0**
NORTHERN AMERICA AND EUROPE	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5

NOTES: * Projected values are based on the projected midranges. The full ranges of the 2020, 2021 and 2022 values can be found in **Annex 2**. For country compositions of each regional/subregional aggregate, see Notes on geographic regions in statistical tables at the end of the report.
SOURCE: FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS

In terms of numbers of people facing hunger, these percentage-point increases are equivalent to about 1 million more people in Southern Africa, 3 million more in Middle Africa and also in Eastern Africa, and 2 million more in Western Africa. All subregions in Africa registered either a prevalence or a number of undernourished people well above pre-pandemic levels.

The PoU estimate for **Asia** for 2022 points to a turnaround in the trend of hunger, which had been on the rise in the region since 2017. The PoU fell from 8.8 percent in 2021 to 8.5 percent in 2022 – a decrease of more than 12 million people, mostly in Southern Asia. However, this is still 58 million above pre-pandemic levels. Every subregion except Western Asia experienced a turnaround, with the largest improvement in Southern Asia, the subregion with the highest PoU (15.6 percent in 2022). In Western Asia, more than 2 million additional people were facing hunger in 2022 compared to 2021 – an increase of 0.6 percentage points, from 10.2 percent to 10.8 percent.

A turnaround also occurred in **Latin America and the Caribbean**, where the PoU fell from 7.0 percent in 2021 to 6.5 percent in 2022 –

TABLE 2 NUMBER OF UNDERNOURISHED PEOPLE, 2005–2022

	Number of undernourished people (millions)									
	2005	2010	2015	2016	2017	2018	2019	2020*	2021*	2022*
WORLD	**793.4**	**597.8**	**588.9**	**586.4**	**571.8**	**586.8**	**612.8**	**701.4**	**738.9**	**735.1**
AFRICA	**178.2**	**159.2**	**189.6**	**204.1**	**207.9**	**215.6**	**225.1**	**254.7**	**270.6**	**281.6**
Northern Africa	11.7	9.8	12.3	13.4	14.4	14.6	14.4	15.1	17.6	19.5
Sub-Saharan Africa	166.5	149.5	177.3	190.7	193.5	201.0	210.6	239.6	253.0	262.0
Eastern Africa	94.2	81.5	96.8	106.1	108.6	110.8	116.9	126.4	131.2	134.6
Middle Africa	36.3	30.1	36.7	40.1	39.8	42.3	44.4	51.0	54.2	57.0
Southern Africa	2.8	4.2	5.9	5.3	5.1	5.1	5.5	6.4	6.8	7.6
Western Africa	33.2	33.6	37.9	39.2	40.1	42.9	43.8	55.8	60.8	62.8
ASIA	**551.9**	**392.8**	**357.8**	**336.0**	**319.3**	**325.2**	**343.9**	**396.2**	**414.1**	**401.6**
Central Asia	8.2	4.2	2.8	2.6	2.5	2.2	2.0	2.5	2.4	2.3
Eastern Asia	104.2	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
South-eastern Asia	97.6	66.7	47.9	41.6	37.4	36.5	35.0	35.2	36.0	34.1
Southern Asia	325.4	267.9	260.3	242.8	232.2	236.2	258.6	307.7	326.0	313.6
Western Asia	16.6	15.4	24.1	27.0	27.0	28.7	29.1	30.0	29.6	31.6
Western Asia and Northern Africa	*28.3*	*25.2*	*36.3*	*40.4*	*41.3*	*43.3*	*43.6*	*45.1*	*47.2*	*51.2*
LATIN AMERICA AND THE CARIBBEAN	**51.9**	**36.7**	**32.9**	**38.2**	**36.6**	**37.9**	**36.0**	**42.3**	**45.6**	**43.2**
Caribbean	7.4	6.1	5.6	5.8	5.7	6.1	6.2	6.7	6.5	7.2
Latin America	44.6	30.6	27.3	32.4	30.9	31.8	29.8	35.6	39.1	36.0
Central America	11.7	10.6	11.2	10.5	10.4	10.5	9.0	8.5	8.9	9.1
South America	32.8	20.0	16.1	21.9	20.5	21.3	20.8	27.1	30.3	26.8
OCEANIA	**2.3**	**2.4**	**2.5**	**2.5**	**2.5**	**2.7**	**2.8**	**2.7**	**2.9**	**3.2**
NORTHERN AMERICA AND EUROPE	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**	**n.r.**

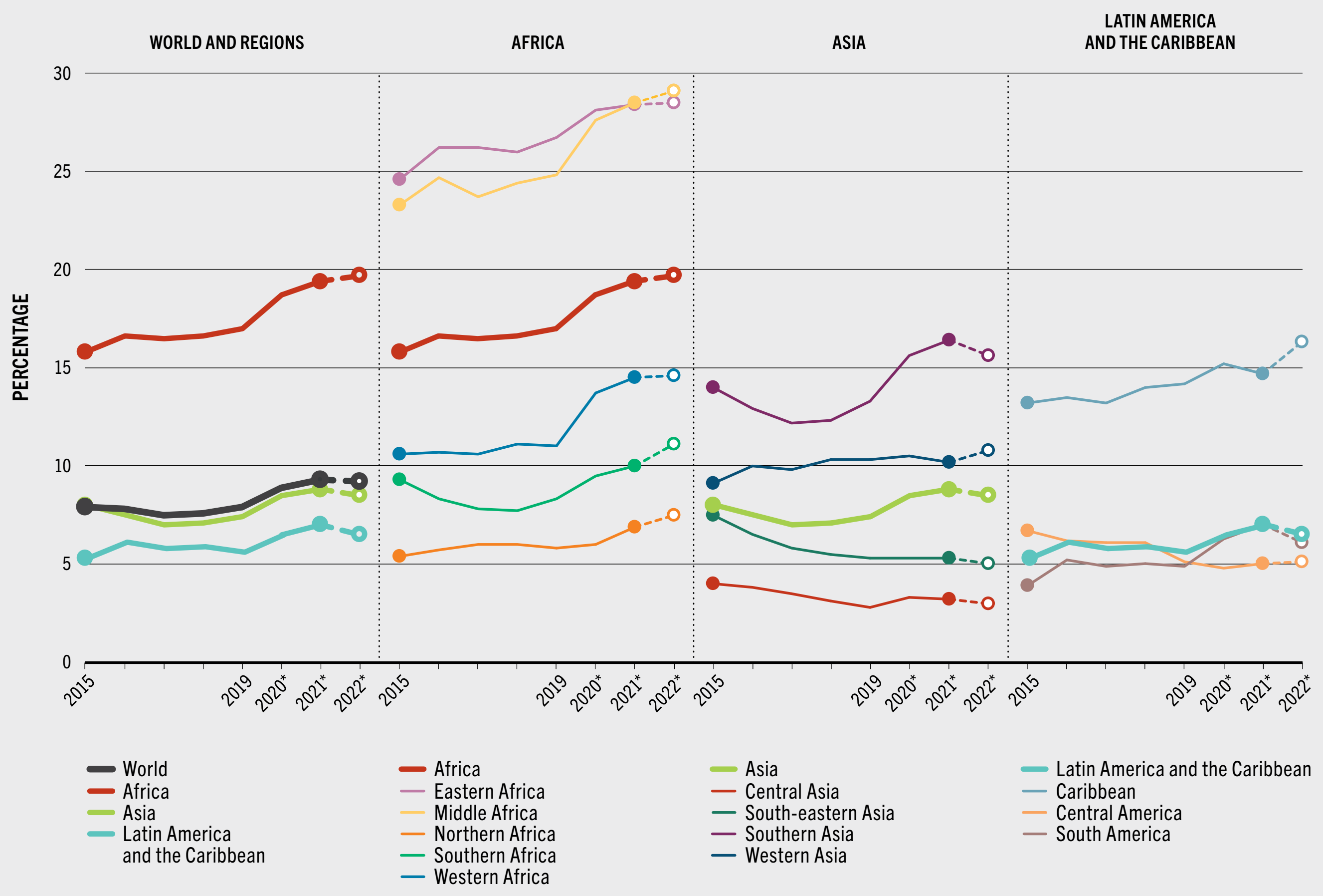
NOTES: * Projected values are based on the projected midranges. The full ranges of the 2020, 2021 and 2022 values can be found in **Annex 2**.
n.r. = not reported, as the prevalence is less than 2.5 percent. Regional totals may differ from the sum of subregions, due to rounding and non-reported values. For country compositions of each regional/subregional aggregate, see Notes on geographic regions in statistical tables at the end of the report.
SOURCE: FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS

a decrease of more than 2.4 million in the number of people facing hunger, though still 7.2 million more compared to 2019. There was a sharp increase in the Caribbean subregion from 14.7 percent in 2021 to 16.3 percent in 2022. However, notable improvements occurred in South America in the same period, where the PoU decreased from 7.0 percent to 6.1 percent, equivalent to 3.5 million people, but still 6 million above 2019 levels.

The proportion of the population facing hunger is much larger in Africa compared to the other regions of the world – nearly 20 percent compared with 8.5 percent in Asia, 6.5 percent in Latin America and the Caribbean, and 7.0 percent in Oceania (Table 1).

While the regional prevalence estimates reveal the magnitude of the burden of hunger in each region, converting them into numbers of people indicates where most of the people facing hunger in the world live (Table 2 and Figure 3). While the PoU in Asia is less than half that in Africa, Asia is nevertheless home to the majority of people facing hunger – 402 million, representing

FIGURE 2 PROGRESS WAS MADE TOWARDS REDUCING HUNGER IN MOST SUBREGIONS IN ASIA AND IN LATIN AMERICA, BUT HUNGER IS STILL ON THE RISE IN WESTERN ASIA, THE CARIBBEAN AND ALL SUBREGIONS OF AFRICA



NOTES: Eastern Asia is not shown because the prevalence of undernourishment has been consistently below 2.5 percent since 2010. * Values are based on the projected midranges. The full ranges of the 2020, 2021 and 2022 values can be found in **Annex 2**.
SOURCE: FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS

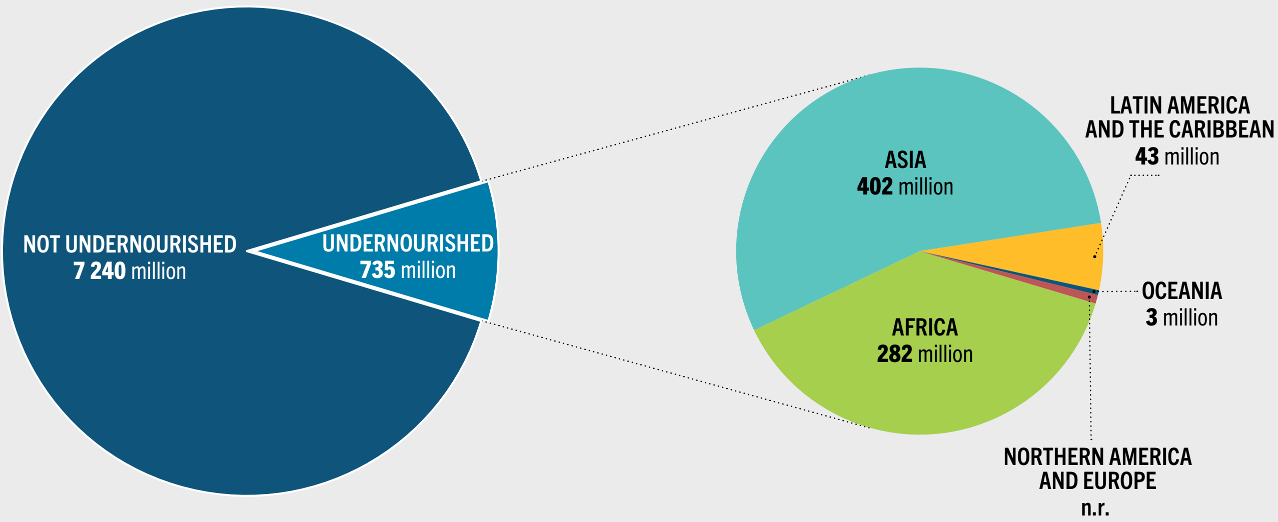
55 percent of the total number of undernourished people in 2022. About 38 percent (282 million) of undernourished people live in Africa and about 6 percent (43 million) in Latin America and the Caribbean.

Economic recovery hampered by new challenges to food security

At the end of 2021, global food security was on high alert due to lingering effects of the COVID-19 pandemic as well as new and ongoing conflicts and weather-related shocks. A combination of an unequal economic recovery after a dramatic decrease in economic activity observed in 2020, and rising food, fuel and transportation prices produced by the recovery itself, thwarted progress in food security.

Just as global economic conditions appeared to be more favourable for 2022 and the prospects of a reduction in hunger and food insecurity towards pre-pandemic levels seemed possible, the outbreak of the war in Ukraine sent another shock through the global economy. As a result,

FIGURE 3 IN 2022, ASIA WAS HOME TO 55 PERCENT (402 MILLION) OF THE PEOPLE IN THE WORLD AFFECTED BY HUNGER, WHILE MORE THAN 38 PERCENT (282 MILLION) LIVED IN AFRICA



NOTES: Projected values are based on the projected midranges. The full ranges of the projected 2022 values can be found in **Annex 2**.
n.r. = not reported, as the prevalence is less than 2.5 percent.
SOURCE: FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS

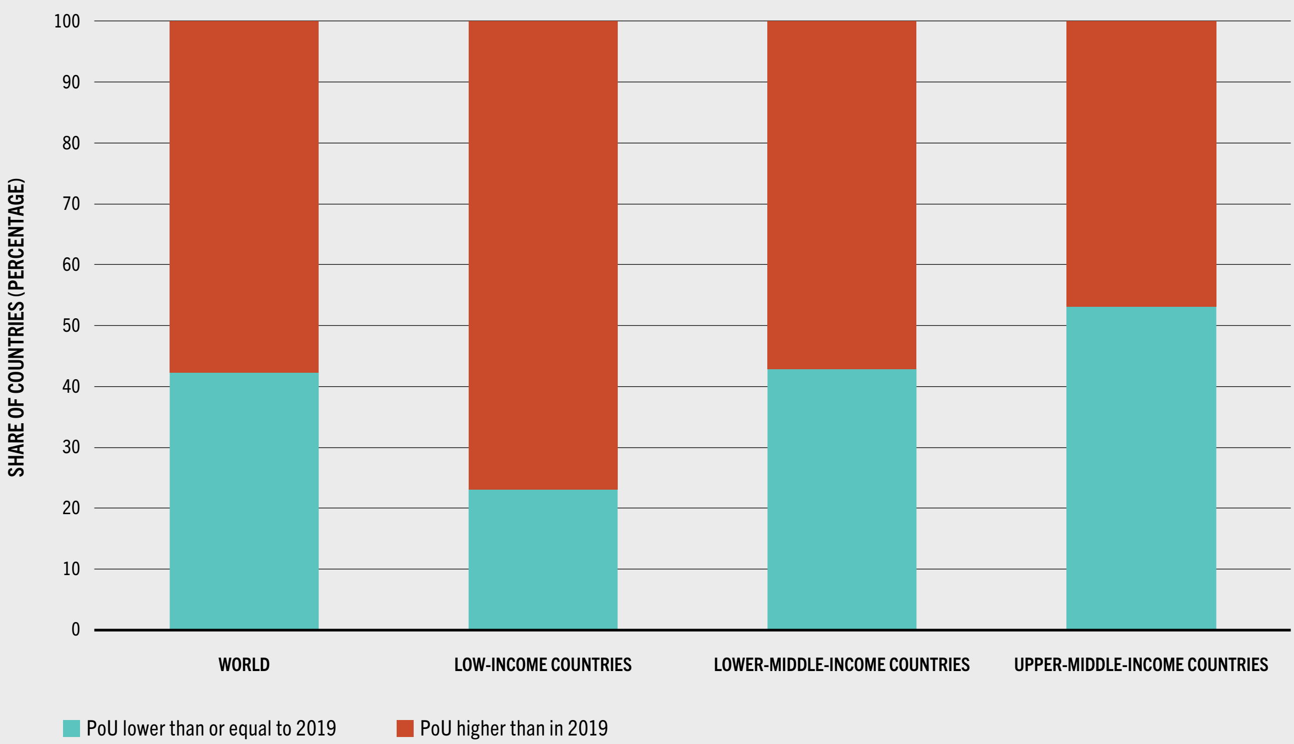
the recovery observed in 2021 slowed further in 2022 and global gross domestic product (GDP) grew in 2022 by 3.4 percent, one percentage point more slowly than predicted at the beginning of 2023.[3]

The shock caused by the war acted mainly through the global food and agricultural markets, as it involved two major global producers of agricultural commodities: the Russian Federation and Ukraine. In 2021, either the Russian Federation or Ukraine (or both) ranked among the top three global exporters of wheat, maize, rapeseed, cake of sunflower seed, and sunflower oil.[c, 4] The Russian Federation is also a prominent exporter of fertilizers. In this context, one of the main impacts of the war has been to increase international prices of food.

c The two countries combined accounted for 19 percent of global output of barley, 14 percent of wheat, and 4 percent of maize, between 2016/17 and 2020/21. Their contribution to the global production of oilseeds was particularly important for sunflower oil, with just over half of world output, on average, originating in the two countries during this period.

Although global food commodity prices were rising steadily even before the war, the added uncertainty induced by the war contributed to a surge in food prices. The FAO Food Price Index jumped to an all-time high in March 2022, and although the index steadily declined throughout the year, it remained much higher than before the pandemic.[5] As a result of the high international food prices, import costs of food rose, affecting especially countries that are highly dependent on food imports. The world food import bill was estimated to have reached an all-time high in 2022 of nearly USD 2 trillion, an increase of 10 percent (nearly USD 181 billion) from the 2021 level, driven mostly by higher prices.[6] World fertilizer prices also soared, mainly as a result of rising energy and natural gas prices. The global agricultural input import bill was estimated to increase by 48 percent in 2022 to USD 424 billion.[7] All of these factors have contributed to higher prices of food at the local and national levels, which in turn have contributed heavily to overall inflation. Inflation rose throughout 2022 in almost all economies,

FIGURE 4 THE PREVALENCE OF UNDERNOURISHMENT (PoU) IS STILL HIGHER IN 2022 THAN BEFORE THE PANDEMIC IN 58 PERCENT OF COUNTRIES, AND THE SITUATION IS WORSE IN LOW-INCOME COUNTRIES (77 PERCENT)



SOURCE: FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS

and global headline inflation exceeded 9 percent in the second half of the year, the highest level since 1995.[8]

In this context, global trends in hunger reflect the combination of two factors interplaying at the household level. First, an income effect produced by the economic recovery in 2022 likely contributed to an increase in household disposable income and improved access to food, particularly for the poorest households that suffered heavy income losses during the pandemic. Globally, employment increased by 2.3 percent in 2022 from a meagre annual growth of 0.2 percent in the period from 2020 to 2021.[9] Employment growth was faster in low-income countries (LICs) and lower-middle-income countries (LMICs) than in upper-middle-income countries (UMICs) and high-income countries (HICs). Concomitantly, global unemployment declined significantly in 2022 to 205 million, down from 216 million in 2021 and 235 million in 2020, but still above its 2019 level.[9]

The second factor affecting the trend in hunger is the price effect. Increases in food prices and general inflation can erode income gains and worsen access to food. In the short term, this is particularly true for the poorest segments of the population who spend a larger share of their income on food. In the long term, however, some households may manage to adapt their consumption patterns to lessen the impacts, and poor rural populations engaged in

BOX 1 HOW DOES THE EVIDENCE ON CHRONIC FOOD INSECURITY ALIGN WITH THE EVIDENCE ON ACUTE FOOD INSECURITY IN FOOD CRISIS COUNTRIES?

The evidence presented in this report points to the fact that, although the prevalence of undernourishment (PoU) at the global level remained relatively unchanged from 2021 to 2022, hunger was on the rise in many parts of the world. The negative impacts on food security of the war in Ukraine (and other conflicts), soaring food prices and extreme weather events were felt more strongly in some places than in others. Consistent with this, the most recent edition of the *Global Report on Food Crises* (GRFC)[2] reinforces these conclusions.

The GRFC and this report are both multipartnership efforts that provide international assessments of food security; however, their objectives and geographical scope are distinct, and they rely on different data and methodologies. On the one hand, this report has the broad objective of monitoring chronic food insecurity in the entire world, on a regular basis, by reporting on SDG Indicators 2.1.1 and 2.1.2. Chronic food insecurity is defined as a structural, long-term situation of food deprivation. The PoU, for example, measures hunger (chronic undernourishment) defined as the long-term or persistent inability to meet minimum dietary energy requirements and, within a country, it is estimated to be representative of the whole population. The GRFC, on the other hand, focuses more narrowly on acute food insecurity in countries experiencing food crises for the purpose of guiding immediate humanitarian response. Acute food insecurity refers to a short-term (possibly temporary) inability to meet dietary energy requirements, related to sporadic crises that may sometimes be protracted and are of a severity that threatens lives or livelihoods. Assessments of food insecurity prioritize the use of the Integrated Food Security Phase Classification/ *Cadre Harmonisé* (IPC/CH), applied in a set of countries that are susceptible to food crisis situations and, therefore, potentially in need of humanitarian assistance.* These assessments are not statistical measurements, but rather the result of a process of convergence of evidence reached by a country team of analysts, based on the most recent available information from various sources. Within a country, rough estimates of the number of people facing crisis levels of acute food insecurity are presented that refer to the specific populations covered by the analysis, and not necessarily to the whole population at the national level.

Because of these conceptual and measurement differences, a direct comparison of figures from both reports is not possible. However, acute and chronic food insecurity are not unrelated phenomena. Repeated shocks and persistent crises can provoke situations of chronic food insecurity. Because of this, one expects some alignment, at least in trends, of the results of the two reports.

Having this in mind, the 2023 GRFC[2] points to an increase of around 37 million people facing acute food insecurity (IPC/CH Phase 3 or above) from 2021 to 2022 in the same 48 countries analysed in both years.** That is equivalent to an increase in the prevalence of acute food insecurity from 21.8 percent to 22.5 percent of the analysed population. An analysis of hunger (PoU) restricted to the same group of 48 countries analysed by the GRFC shows an increase of 14 million in the number of people facing chronic undernourishment, equivalent to an increase in the PoU from 20.8 percent to 21.3 percent of the combined populations of those 48 countries (Figure A). This reveals convergence in the assessments of the trends and points to the existence of persistent food crises in many parts of the world, reinforcing the need to better understand the nexus between acute and chronic food insecurity, particularly in food crisis countries.

NOTES: * When recent IPC/CH is not available, alternative sources are used such as the Consolidated Approach for Reporting Indicators of Food Security or the Famine Early Warning Systems Network. These are used to approximate populations facing crisis or worse (IPC/CH 3+).
** In the 48 countries analysed in both years in the GRFC, there were differences in analysis coverage at the country level, resulting in a 15.5 percent increase in the analysed population between the two years in these countries.

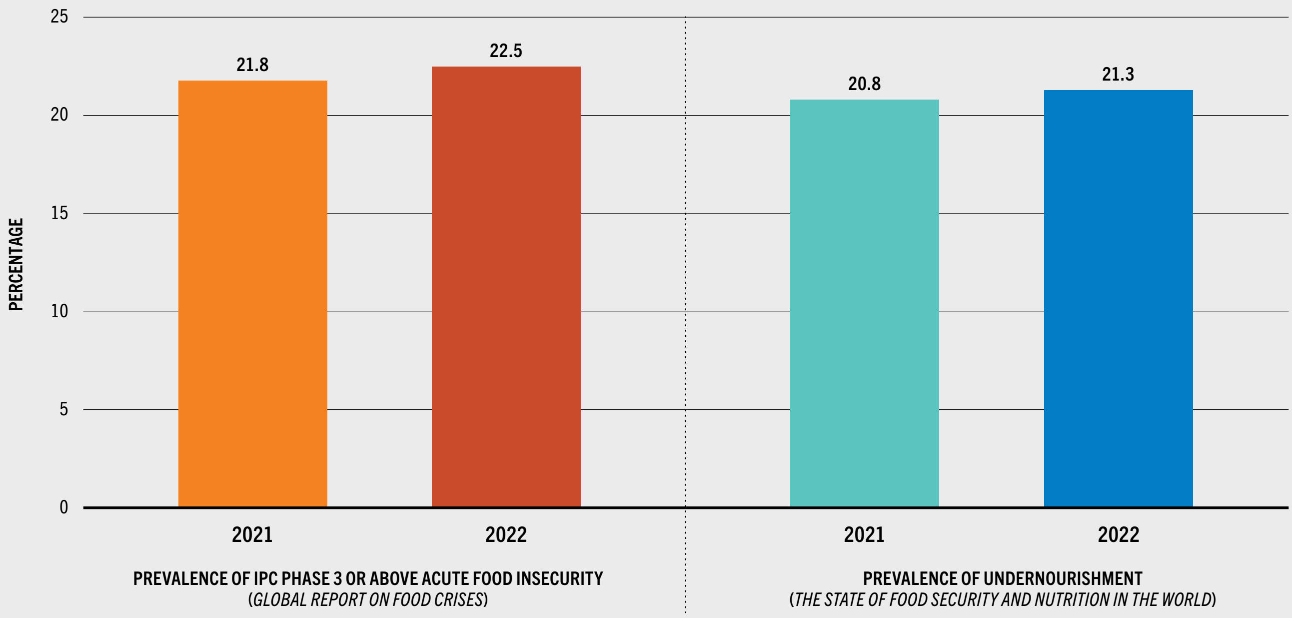
agriculture may even benefit from higher prices for their agricultural products.[d, 10]

The stalled situation in global hunger observed for 2022 is thus the result of the interaction of these two factors. The economic recovery helped to stem the rising tide of hunger at least at the global level. However, the positive effect could have been even greater without the countervailing winds caused by the global

d Poverty assessments conducted during the food price crises of 2008 and 2011 demonstrated that higher food prices have the potential to boost agricultural income growth and wages.[10]

BOX 1 (Continued)

FIGURE A ESTIMATES OF ACUTE FOOD INSECURITY FROM THE GRFC AND OF CHRONIC UNDERNOURISHMENT BASED ON THE PoU IN THE SAME 48 COUNTRIES SHOW SIMILAR TRENDS FROM 2021 TO 2022



SOURCES: Food Security Information Network & Global Network Against Food Crises. 2023. *Global Report on Food Crises (GRFC) 2023*. Rome. www.fsinplatform.org/global-report-food-crises-2023; FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS

repercussions of the war in Ukraine and the price inflation for food, agricultural inputs and energy, together with other drivers of food insecurity such as conflicts and weather-related events. As a result, hunger remains far above pre-pandemic levels globally and in all regions.

At the regional level, this dynamic of income and price effect is visible in multiple subregions, with varying results. In **Southern Africa**, for instance, the uptick of hunger in 2022 stemmed from increasing inflation, following the upsurge in international commodity prices, as well as domestic challenges such as persistently high levels of unemployment and vulnerability to shocks.[11] Although there was sustained GDP growth in 2022, this often did not translate into improved socioeconomic conditions for the poor. Agricultural production, at the same time, suffered from severe droughts and floods, and the surge in international fertilizer prices. In **Middle Africa**, the increase in hunger has mainly resulted from food inflation and increasing food import bills, as well as extreme climate events, which have counteracted the positive effects of economic growth, driven by buoyant oil export revenues in some countries.[11]

In **Western Asia**, many countries benefited from increased oil revenues, but these did not always translate into lower levels of hunger in 2022. Political instability in some countries and conflicts have continued to disrupt food supplies, markets and distribution systems, resulting in higher food prices and food shortages. In addition, domestic inflation has soared in several countries, making access to food more difficult.[12] In **Southern Asia**, on the other hand, the outcome of sustained economic growth, especially in agriculture, has likely prevailed over inflation, thus contributing to an overall improvement in food security conditions. More than one country in the region has also enacted policy measures that have contributed to this overall improvement, including supplying fertilizers to farmers, providing cereal subsidies to vulnerable population groups, and reducing customs duties on imported cereals.[13]

In the **Caribbean**, more than one small island developing state has suffered from high food inflation and increased import bills, given the widespread dependence of the subregion on imported food and agricultural products. At the same time, export revenues have been declining in key sectors, including tourism, resulting in reduced disposable income and increased food insecurity.[14] On the contrary, the observed decline in hunger in 2022 in **South America**, a net exporter of food and agricultural products, stemmed largely from positive development in labour markets, which counteracted the surge in inflation, as well as from social protection policies.[14] Additionally, some countries in the region have benefited from the surge in oil and gas prices that boosted export revenues. This has translated into improved public budget resources (which could be used to finance social protection programmes) and investment in agriculture and food distribution systems.

At the country level, these countervailing forces have played out in different ways with unequal impacts on trends in hunger. A comparison across country income groups of changes in the PoU between 2019 and 2022 shows that LICs are still struggling the most to recover. Globally, 58 percent of countries had a PoU in 2022 that was still above pre-pandemic levels. However, the percentage is much higher in LICs; 77 percent of LICs have not returned to PoU levels observed in 2019, in contrast to 47 percent of UMICs (Figure 4).

The halt in the rise in global hunger observed in 2022 is also consistent with nowcasts of poverty available for 2022.[10] Projections for 2022 are that, despite an expected reduction in poverty between 2021 and 2022, the pace of reduction will further stall given the downward revised prospects of global growth in 2022 and higher prices of food, agricultural inputs and energy. It is estimated that the number of people in extreme poverty will have decreased by 5 million from 2021 to 2022, based on a scenario that takes into consideration the relatively greater impact of high food inflation among the poor.

Towards ending hunger (SDG Target 2.1): projections to 2030

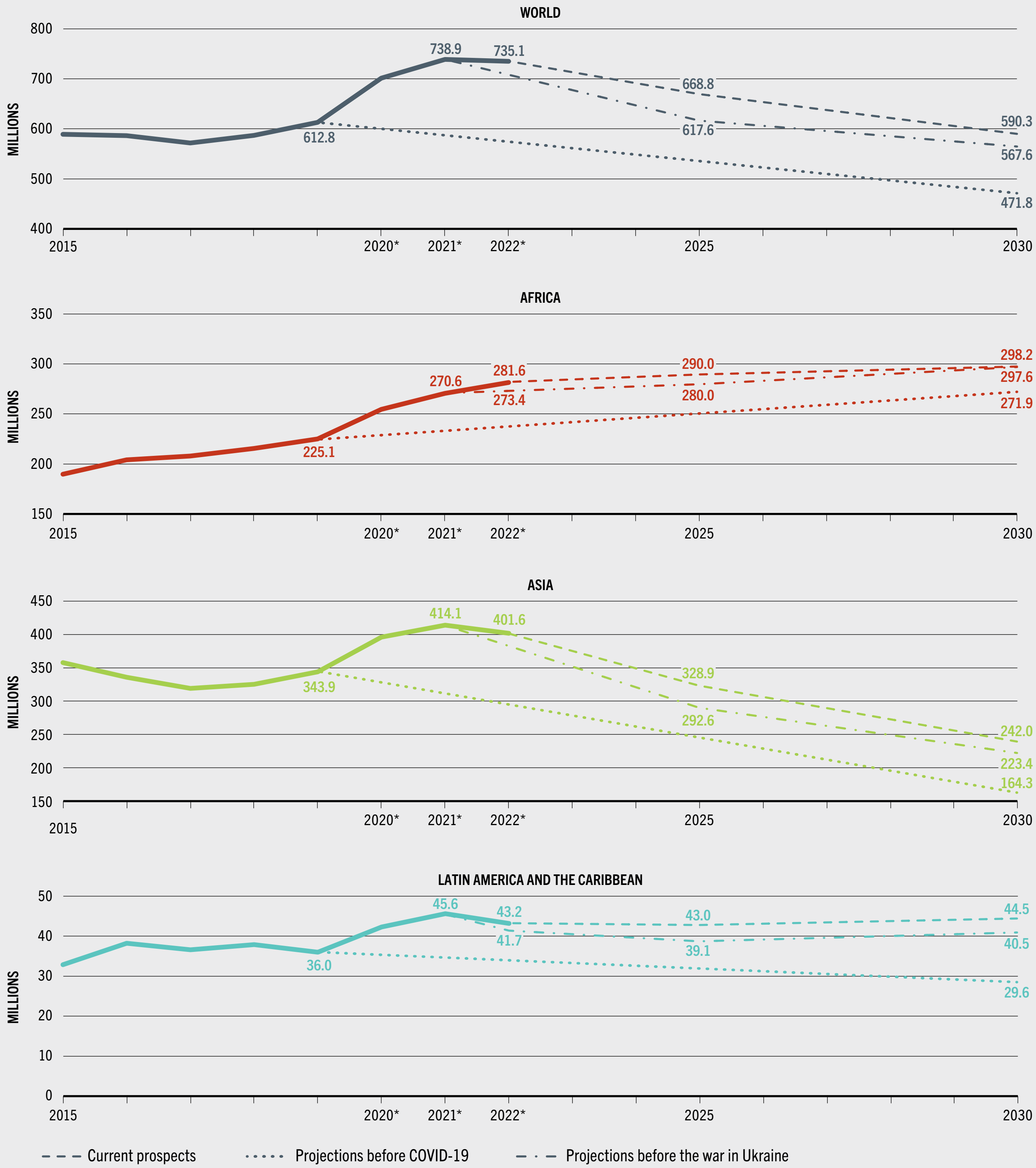
As in previous editions of the report, an exercise was conducted to project how many people may be facing hunger in 2030 based on what can be inferred from available forecasts of fundamental demographic and economic variables. The projections were obtained by separately projecting each of the parameters that inform the model used to estimate the PoU (see **Annex 2, Section B**).

Trajectories are presented under three scenarios: "current prospects", which aims to capture current projections of the PoU in 2030 based on the world economic prospects presented in the April 2023 edition of the International Monetary Fund World Economic Outlook database;[3] "projections before COVID-19", calibrated to reflect the situation of the world economy before the pandemic, as described by the *World Economic Outlook* published in October 2019;[15] and "projections before the war in Ukraine", which does the same but considering the October 2021 edition of the same publication[16] before the outbreak of the war.

The current scenario shows that almost 600 million people will be chronically undernourished in 2030, pointing to the immense challenge of achieving the SDG target to eradicate hunger (Figure 5). This is about 119 million more undernourished people than in the scenario in which neither the pandemic nor the war in Ukraine had occurred (the "projections before COVID-19" scenario) and around 23 million more than in the scenario where the war had not happened (the "projections before the war in Ukraine" scenario). The latter provides an indication of the additional setback the war may have caused in the global fight against hunger.

Figure 5 also shows how the situation is currently expected to evolve in Asia, Africa, and Latin America and the Caribbean. The different trajectories are evident, demonstrating that practically all the progress in the fight against hunger is expected to be made in Asia, where the number of undernourished is projected to fall from the current 402 million to 242 million people by 2030. The number of undernourished

FIGURE 5 PROJECTED NUMBERS OF UNDERNOURISHED INDICATE THAT THE WORLD IS FAR OFF TRACK TO ACHIEVE ZERO HUNGER BY 2030



NOTE: * The 2020, 2021 and 2022 values are based on the projected midranges which can be found in **Annex 2**.
SOURCE: Authors' (FAO) own elaboration.

is expected to remain constant in Latin America and the Caribbean and to increase significantly in Africa, where it is projected that close to 300 million people may be facing hunger in 2030. Much stronger efforts are needed to address the fundamental structural problems that afflict the African continent.

SDG Indicator 2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale

SDG Target 2.1 challenges the world not only to end hunger, but also to work to ensure access for all people to safe, nutritious and sufficient food all year round. SDG Indicator 2.1.2 – the prevalence of moderate or severe food insecurity in the population, based on the FIES – tracks progress towards this ambitious goal.

New estimates of the prevalence of food insecurity based on the FIES confirm that for 2022 no progress was made on food insecurity at the global level. Following a sharp increase from 2019 to 2020, the global prevalence of moderate or severe food insecurity remained unchanged for the second year in a row, far above pre-COVID-19-pandemic levels (Figure 6 and Table 3). In 2022, an estimated 29.6 percent of the global population – 2.4 billion people – were moderately or severely food insecure, meaning they did not have access to adequate food (Table 3 and Table 4). This is still 391 million more people than in 2019, before the pandemic, and 745 million more compared to 2015 when the 2030 Sustainable Development Agenda was launched.

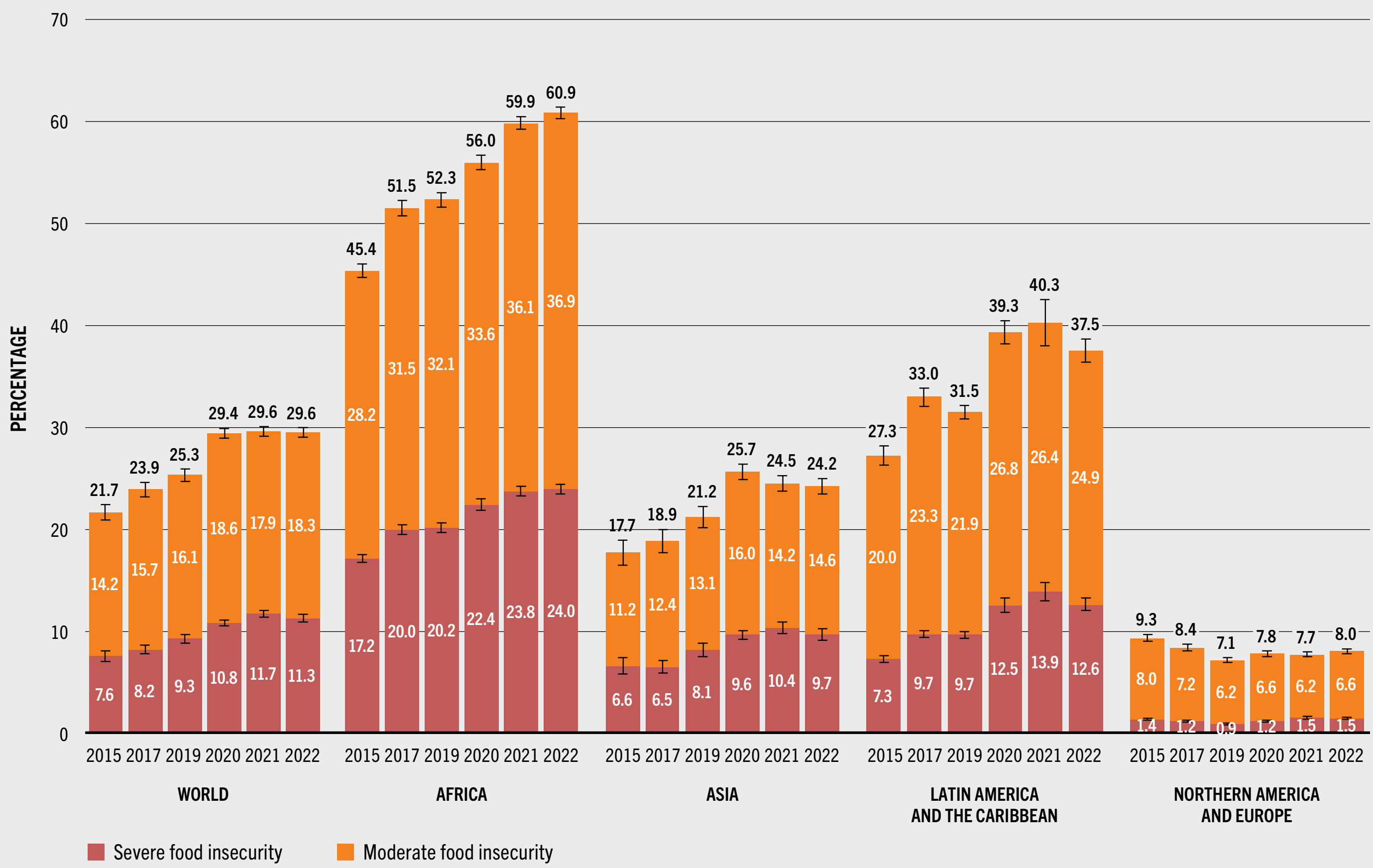
More than one-third (38 percent) of people facing moderate or severe food insecurity in the world in 2022 – over 900 million – were severely food insecure, indicating that they had run out of food at times during the year and, at worst, gone an entire day or more without eating. The prevalence of severe food insecurity at the global level showed a marginal decline from 11.7 percent in 2021 to 11.3 percent in 2022, the equivalent of 27 million fewer people (Figure 6, Table 3 and Table 4). While it is encouraging that the upward trend in severe food insecurity of the past six years has not continued, the global prevalence is still far above pre-pandemic levels – equivalent to 180 million more people compared to 2019 (Table 3 and Table 4). At the global level, the slight decrease in severe food insecurity, and unchanged prevalence of moderate or severe food insecurity, suggest that the gravity of the food insecurity situation of some people may have transitioned from severe to moderate from 2021 to 2022.

As expected, the global trends in the prevalence of severe food insecurity are similar to the trends for the PoU (Table 1). This is because people experiencing severe food insecurity are unlikely to be able to acquire enough food to continuously fulfil their dietary energy requirements, and thus may become chronically undernourished. Both indicators provide evidence regarding the proportion of the population facing severe constraints on food access, albeit based on very different methodologies and sources of data (see **Annex 1B**).

Despite the lack of change in the prevalence of food insecurity at the global level, there were divergent trends at the regional level. Improvements in some regions were offset by worsening situations in others (Figure 6, Table 3 and Table 4).

The prevalence of moderate or severe food insecurity in **Africa** increased by one percentage point in one year to 60.9 percent in 2022. The increase is much smaller compared to the previous year, when it rose by 4 percentage points. From 2021 to 2022, the prevalence of moderate or severe food insecurity rose in Eastern Africa, Middle Africa and Southern Africa by 2.4, 3.0 and 1.2 percentage points, respectively. The prevalence in 2022 ranged from 25.9 percent in Southern Africa to 78.4 percent in Middle Africa. The increase in moderate or severe food insecurity in Africa from 2021 to 2022 is mostly due to more people facing moderate food insecurity, as the rise in severe food insecurity in the region was marginal. Nevertheless, nearly one in four people in Africa (24.0 percent) was facing severe food insecurity in 2022. The prevalence of severe food insecurity rose in Northern Africa, Middle Africa, Southern Africa and Western Africa by 0.8, 1.3, 1.5 and 0.3 percentage points, respectively – the equivalent of 2.4 million more people in Northern Africa, 4.8 million more in Middle

FIGURE 6 MODERATE OR SEVERE FOOD INSECURITY REMAINED UNCHANGED AT THE GLOBAL LEVEL FROM 2021 TO 2022, WITH WORSENING FOOD INSECURITY LEVELS IN AFRICA AND IN NORTHERN AMERICA AND EUROPE, AND IMPROVEMENTS IN ASIA AND IN LATIN AMERICA AND THE CARIBBEAN



NOTE: Differences in totals are due to rounding of figures to the nearest decimal point.
SOURCE: FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS

Africa, 1.1 million more in Southern Africa, and 3.6 million more in Western Africa facing severe food insecurity in 2022 compared to 2021.

A non-significant decrease in food insecurity was registered in **Asia**, where 24.2 percent of the population was facing moderate or severe food insecurity in 2022 compared with 24.5 percent in 2021. The situation improved somewhat in Central Asia and Western Asia, where the prevalence of moderate or severe food insecurity fell by 2.7 and 3.2 percentage points, respectively, even as severe food insecurity increased slightly in Western Asia. Moderate or severe food insecurity remained virtually unchanged in the other subregions of Asia, although there are still large differences in prevalence between subregions. The percentage of people facing moderate or severe food insecurity ranged from 6.2 percent in Eastern Asia to 40.3 percent in Southern Asia, which is home to more than one-third of the world's moderately or severely food-insecure population – about 809 million people. Southern Asia also has the highest prevalence of severe food insecurity on the continent, although this did decrease »

TABLE 3 PREVALENCE OF FOOD INSECURITY AT SEVERE LEVEL ONLY, AND AT MODERATE OR SEVERE LEVEL, BASED ON THE FOOD INSECURITY EXPERIENCE SCALE, 2015–2022

	Prevalence of severe food insecurity (%)						Prevalence of moderate or severe food insecurity (%)					
	2015	2017	2019	2020	2021	2022	2015	2017	2019	2020	2021	2022
WORLD	**7.6**	**8.2**	**9.3**	**10.8**	**11.7**	**11.3**	**21.7**	**23.9**	**25.3**	**29.4**	**29.6**	**29.6**
AFRICA	**17.2**	**20.0**	**20.2**	**22.4**	**23.8**	**24.0**	**45.4**	**51.5**	**52.3**	**56.0**	**59.9**	**60.9**
Northern Africa	9.0	10.5	8.7	9.5	11.2	12.0	26.2	33.1	28.8	30.2	34.0	32.4
Sub-Saharan Africa	19.1	22.2	22.8	25.4	26.6	26.6	49.8	55.8	57.7	61.8	65.7	67.2
Eastern Africa	22.0	26.1	25.0	28.1	28.7	27.7	56.8	64.6	63.5	66.5	66.8	69.2
Middle Africa	n.a.	n.a.	n.a.	36.0	37.8	39.1	n.a.	n.a.	n.a.	70.1	75.4	78.4
Southern Africa	9.0	9.4	9.3	11.0	11.0	12.5	21.7	22.1	22.1	24.7	24.7	25.9
Western Africa	11.4	14.3	16.6	19.9	21.7	22.0	39.8	46.2	51.7	59.0	66.7	66.4
ASIA	**6.6**	**6.5**	**8.1**	**9.6**	**10.4**	**9.7**	**17.7**	**18.9**	**21.2**	**25.7**	**24.5**	**24.2**
Central Asia	1.4	2.8	2.3	4.8	5.0	4.6	9.1	13.9	13.5	17.8	20.1	17.4
Eastern Asia	0.8	1.7	1.3	2.0	1.0	1.0	5.9	10.0	7.4	7.8	6.1	6.2
South-eastern Asia	1.9	2.0	1.8	2.1	2.6	2.6	14.5	15.7	14.5	15.5	16.9	16.8
Southern Asia	13.2	11.8	16.3	18.8	21.0	19.4	27.7	26.1	34.3	43.1	40.6	40.3
Western Asia	9.0	9.6	8.9	9.6	10.2	10.3	30.9	30.9	29.9	35.1	38.7	35.5
Western Asia and Northern Africa	*9.0*	*10.0*	*8.8*	*9.5*	*10.7*	*11.1*	*28.7*	*31.9*	*29.4*	*32.8*	*36.5*	*34.1*
LATIN AMERICA AND THE CARIBBEAN	**7.3**	**9.7**	**9.7**	**12.5**	**13.9**	**12.6**	**27.3**	**33.0**	**31.5**	**39.3**	**40.3**	**37.5**
Caribbean	n.a.	n.a.	n.a.	32.4	25.7	28.2	n.a.	n.a.	n.a.	65.4	59.5	60.6
Latin America	5.5	8.1	8.2	11.1	13.0	11.5	24.8	30.9	29.4	37.5	38.9	35.9
Central America	6.7	6.3	7.3	7.3	8.0	8.6	30.3	27.9	28.2	34.2	34.1	34.5
South America	5.0	8.9	8.5	12.7	15.1	12.7	22.6	32.1	29.9	38.8	40.9	36.4
OCEANIA	**2.6**	**4.1**	**3.8**	**2.6**	**4.5**	**3.4**	**10.0**	**14.4**	**13.6**	**12.1**	**13.0**	**13.0**
NORTHERN AMERICA AND EUROPE	**1.4**	**1.2**	**0.9**	**1.2**	**1.5**	**1.5**	**9.3**	**8.4**	**7.1**	**7.8**	**7.7**	**8.0**
Europe	1.6	1.4	1.0	1.4	1.9	1.9	8.8	8.3	6.9	7.5	7.8	8.2
Eastern Europe	1.5	1.1	0.8	1.4	1.7	2.0	11.7	10.3	8.3	10.2	10.5	10.9
Northern Europe	1.8	2.2	1.0	1.2	1.8	2.0	6.8	6.0	5.1	4.2	4.5	6.6
Southern Europe	1.7	2.0	1.6	2.4	2.8	1.6	9.6	10.6	8.7	9.3	8.6	7.5
Western Europe	1.4	0.9	0.7	0.8	1.7	1.8	5.0	4.6	4.3	3.9	4.9	5.7
Northern America	1.0	0.8	0.8	0.7	0.7	0.7	10.3	8.6	7.6	8.3	7.5	7.7

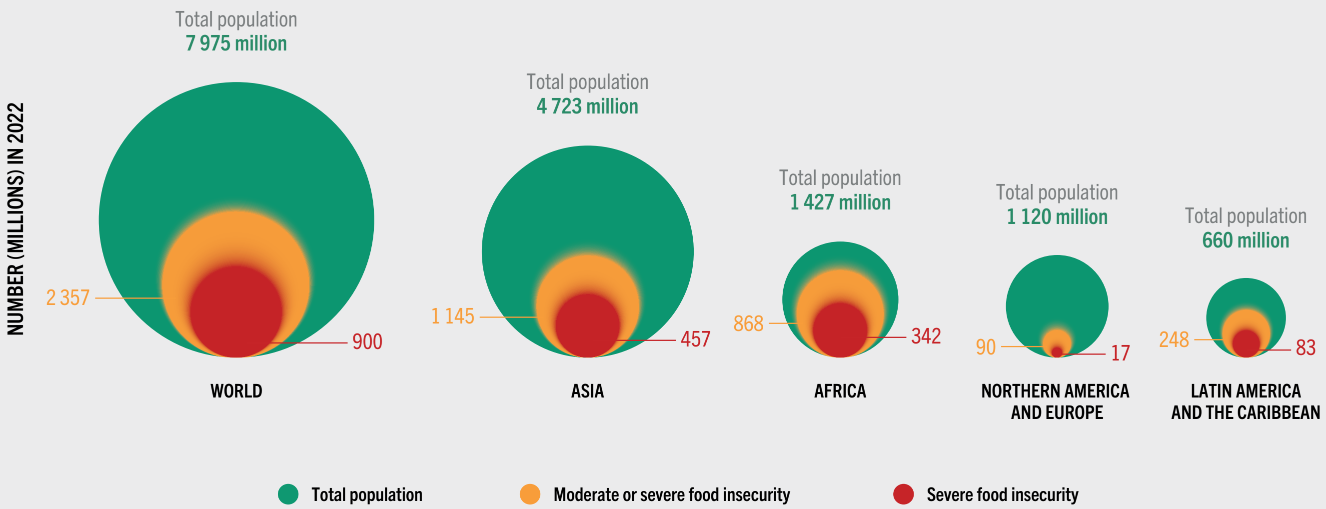
NOTES: n.a. = not available, as data are available only for a limited number of countries, representing less than 50 percent of the population in the region. The estimates for Latin America and the Caribbean from 2014 to 2019 include Caribbean countries whose combined populations represent only 30 percent of the population of that subregion, while the 2020, 2021 and 2022 estimates include Caribbean countries whose combined populations represent between 60 percent and 65 percent of the subregional population. The countries included in the 2022 estimate for the Caribbean subregion are: Antigua and Barbuda, Bahamas, Barbados, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago.
SOURCE: FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS

TABLE 4 NUMBER OF PEOPLE EXPERIENCING FOOD INSECURITY AT SEVERE LEVEL ONLY, AND AT MODERATE OR SEVERE LEVEL, BASED ON THE FOOD INSECURITY EXPERIENCE SCALE, 2015–2022

	Number of severely food-insecure people (millions)						Number of moderately or severely food-insecure people (millions)					
	2015	2017	2019	2020	2021	2022	2015	2017	2019	2020	2021	2022
WORLD	**561.5**	**623.8**	**719.8**	**850.7**	**927.3**	**900.1**	**1 612.4**	**1 817.0**	**1 966.4**	**2 307.2**	**2 342.5**	**2 356.9**
AFRICA	**206.3**	**252.2**	**268.1**	**305.0**	**331.1**	**341.8**	**544.8**	**650.6**	**695.0**	**761.7**	**834.5**	**868.3**
Northern Africa	20.5	25.0	21.5	23.8	28.7	31.1	59.9	78.8	71.2	75.9	86.9	84.3
Sub-Saharan Africa	185.8	227.2	246.6	281.2	302.4	310.6	484.9	571.9	623.7	685.8	747.6	783.9
Eastern Africa	86.6	108.2	109.3	126.2	132.1	130.9	223.5	267.9	277.9	298.8	308.2	327.4
Middle Africa	n.a.	n.a.	n.a.	66.5	71.9	76.7	n.a.	n.a.	n.a.	129.4	143.5	153.7
Southern Africa	5.7	6.1	6.2	7.4	7.5	8.6	13.8	14.3	14.7	16.6	16.8	17.8
Western Africa	41.0	53.9	66.1	81.1	90.8	94.4	142.7	174.5	205.7	240.8	279.1	285.1
ASIA	**293.7**	**295.0**	**377.3**	**449.5**	**486.1**	**456.9**	**791.0**	**857.4**	**981.8**	**1 196.8**	**1 151.5**	**1 144.9**
Central Asia	1.0	2.0	1.7	3.6	3.8	3.5	6.3	9.9	9.9	13.3	15.3	13.4
Eastern Asia	12.4	27.9	21.4	33.4	17.0	16.0	95.7	164.3	123.0	129.0	102.3	103.4
South-eastern Asia	11.9	13.3	12.2	13.9	17.7	17.8	92.5	101.9	96.0	104.0	114.2	114.4
Southern Asia	244.7	225.4	316.9	371.3	417.9	389.2	514.7	496.6	668.1	849.8	807.6	809.2
Western Asia	23.8	26.4	25.1	27.4	29.7	30.3	81.8	84.6	84.8	100.7	112.1	104.4
Western Asia and Northern Africa	*44.3*	*51.4*	*46.6*	*51.2*	*58.4*	*61.4*	*141.7*	*163.4*	*156.0*	*176.6*	*199.0*	*188.7*
LATIN AMERICA AND THE CARIBBEAN	**45.3**	**61.7**	**62.5**	**81.8**	**91.1**	**83.4**	**169.8**	**209.7**	**203.8**	**256.4**	**264.3**	**247.8**
Caribbean	n.a.	n.a.	n.a.	14.2	11.4	12.5	n.a.	n.a.	n.a.	28.7	26.3	26.9
Latin America	32.0	48.2	49.3	67.5	79.7	70.8	144.0	183.1	177.6	227.7	238.0	220.8
Central America	11.2	10.9	12.8	12.9	14.3	15.4	50.7	47.8	49.3	60.3	60.6	61.9
South America	20.8	37.3	36.5	54.7	65.5	55.4	93.3	135.3	128.3	167.4	177.4	159.0
OCEANIA	**1.1**	**1.7**	**1.7**	**1.1**	**2.0**	**1.5**	**4.0**	**6.0**	**5.9**	**5.3**	**5.8**	**5.9**
NORTHERN AMERICA AND EUROPE	**15.1**	**13.2**	**10.3**	**13.3**	**17.0**	**16.5**	**102.8**	**93.3**	**79.8**	**87.0**	**86.4**	**90.0**
Europe	11.6	10.4	7.3	10.5	14.3	13.8	65.6	61.7	51.5	56.1	58.1	61.1
Eastern Europe	4.5	3.2	2.4	4.0	4.9	5.7	34.3	30.3	24.4	29.9	30.6	31.4
Northern Europe	1.9	2.2	1.0	1.3	1.9	2.1	7.0	6.3	5.4	4.4	4.7	7.1
Southern Europe	2.5	3.1	2.4	3.6	4.3	2.4	14.7	16.2	13.4	14.2	13.1	11.4
Western Europe	2.7	1.8	1.4	1.6	3.2	3.6	9.6	8.9	8.3	7.7	9.6	11.2
Northern America	3.5	2.9	3.0	2.7	2.7	2.8	37.2	31.5	28.4	30.9	28.3	28.9

NOTES: n.a. = not available, as data are available only for a limited number of countries, representing less than 50 percent of the population in the region. The estimates for Latin America and the Caribbean from 2014 to 2019 include Caribbean countries whose combined populations represent only 30 percent of the population of that subregion, while the 2020, 2021 and 2022 estimates include Caribbean countries whose combined populations represent between 60 percent and 65 percent of the subregional population. The countries included in the 2022 estimate for the Caribbean subregion are: Antigua and Barbuda, Bahamas, Barbados, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago.
SOURCE: FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS

FIGURE 7 THE CONCENTRATION AND DISTRIBUTION OF FOOD INSECURITY BY SEVERITY DIFFER GREATLY ACROSS THE REGIONS OF THE WORLD



SOURCE: FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS

» by 1.6 percentage points from 2021 to 2022, the equivalent of 28.7 million people.

Latin America and the Caribbean showed encouraging progress in 2022, as the proportion of the population facing moderate or severe food insecurity decreased from 40.3 percent in 2021 to 37.5 percent in 2022, the equivalent of 16.5 million fewer people in one year. The improvement was driven by a decrease in South America, from 40.9 percent in 2021 to 36.4 percent in 2022. The prevalence of severe food insecurity also declined in South America, from 15.1 percent in 2021 to 12.7 percent in 2022. In Central America and the Caribbean, on the other hand, the food security situation deteriorated from 2021 to 2022. In the Caribbean, which is the subregion most affected by food insecurity, the prevalence of moderate or severe food insecurity increased from 59.5 percent to 60.6 percent, and severe food insecurity increased from 25.7 percent to 28.2 percent.

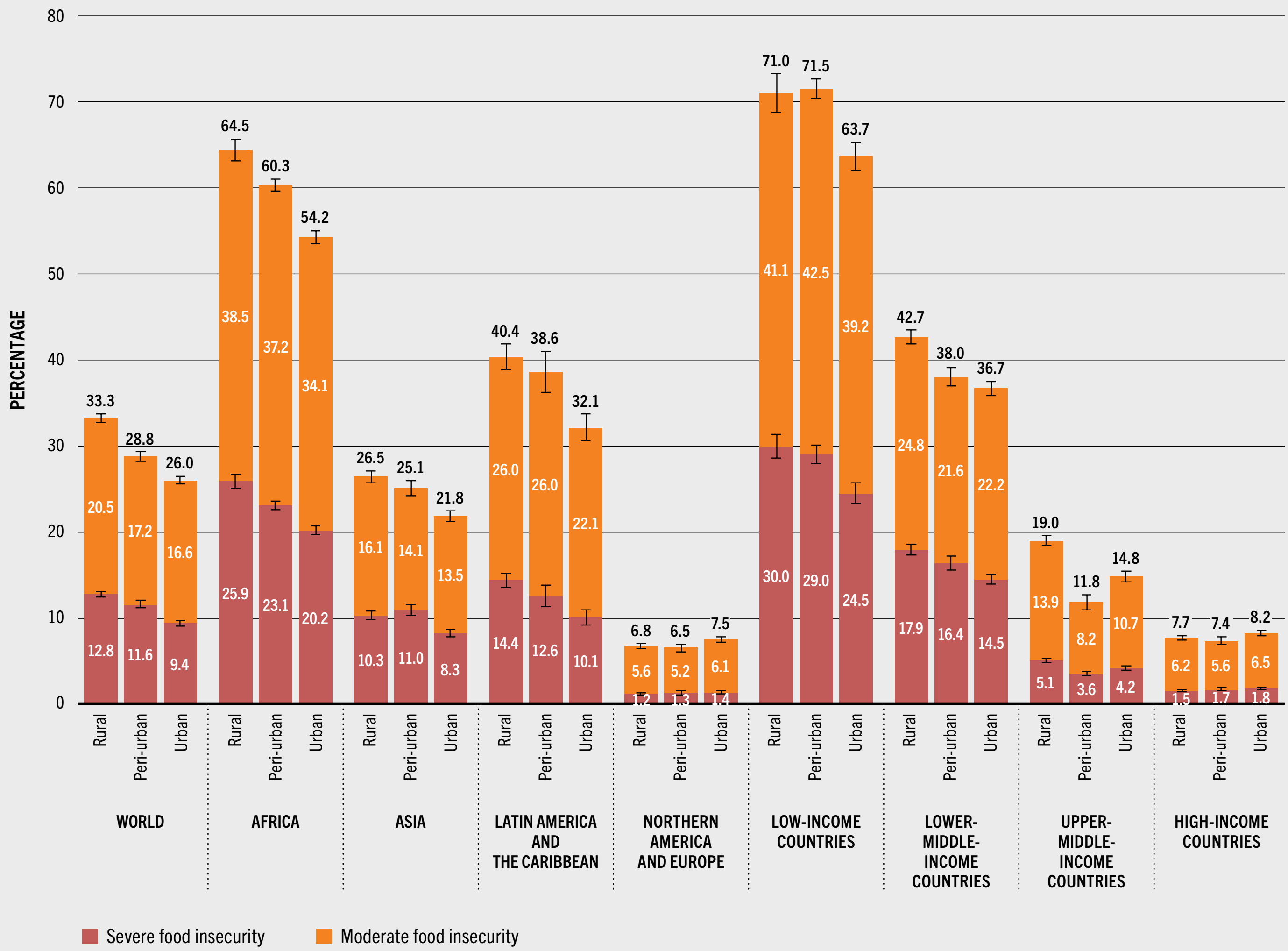
In **Oceania**, the prevalence of moderate or severe food insecurity was 13.0 percent in 2022. An estimated 3.4 percent of the population in Oceania was facing severe food insecurity in 2022, down from 4.5 percent in 2021.

In **Northern America and Europe**, the prevalence of moderate or severe food insecurity rose slightly in 2022 to 8.0 percent, while severe food insecurity remained unchanged. Moderate or severe food insecurity increased by approximately 2 percentage points in Northern Europe, reaching 6.6 percent in 2022, whereas the prevalence of moderate or severe food insecurity decreased by about 1 percentage point in Southern Europe to 7.5 percent.

It is interesting to compare how the regions have fared in the fight against hunger since the pandemic emerged in late 2019. Three years later, parts of Asia and Latin America appear to be rebounding, whereas Africa is still struggling to turn things around. Regardless, food insecurity levels in all regions are still far above pre-pandemic levels.

Figure 7 shows that, of a total of 2.4 billion people in the world facing food insecurity in 2022, nearly half (1.1 billion) were in Asia; 37 percent (868 million) were in Africa; 10.5 percent (248 million) lived in Latin America and the Caribbean; and around 4 percent (90 million) were in Northern America and Europe. The figure also illustrates the different proportions of severe food insecurity in relation to moderate or severe food insecurity across regions. Severe food insecurity represents a larger share of the combined total of moderate plus severe food insecurity in Africa, Asia, and Latin America and the Caribbean – 39.4 percent, 39.9 percent and 33.5 percent, respectively – compared with 18.8 percent in Northern America and Europe.

FIGURE 8 FOOD INSECURITY, AT BOTH LEVELS OF SEVERITY, IS HIGHER IN RURAL AREAS THAN IN URBAN AREAS IN ALL REGIONS EXCEPT NORTHERN AMERICA AND EUROPE



SOURCE: FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS

Differences in food insecurity across rural, peri-urban and urban areas

The availability of georeferenced FIES data collected by FAO in 2022 has made it possible to present, for the first time, a comparison of food insecurity in rural, peri-urban and urban populations at the global, regional and subregional levels.[e] The Degree of Urbanization (DEGURBA) classification, a new international standard, was used to distinguish among populations living in: i) rural areas; ii) towns and semi-dense areas (peri-urban areas); and iii) cities (urban areas), based on population density and size, in a globally comparable way.[f, 17] The prevalence of food insecurity among adults within each group was then calculated.

Results show that at the global level, food security improves as the degree of urbanization increases

e See **Annex 2, Section C** for details on the methods used to obtain disaggregated estimates.

f The DEGURBA classification was developed by the Statistical Office of the European Union (EUROSTAT), the International Labour Organization (ILO), FAO, the Organisation for Economic Co-operation and Development (OECD), the United Nations Human Settlements Programme (UN-Habitat) and the World Bank and was approved at the 51st session of the UN Statistical Commission in March 2020 (see Box 2 in **Chapter 3**).[17] This differs from the Urban Rural Catchment Areas (URCA) criteria used for the analyses of subsets of countries in **Chapter 4** (see Box 3).

FIGURE 9 GLOBALLY AND IN EVERY REGION, THE PREVALENCE OF FOOD INSECURITY IS HIGHER AMONG WOMEN THAN AMONG MEN

SOURCE: FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS

(Figure 8).[g] Moderate or severe food insecurity affected 33.3 percent of adults living in rural areas in 2022 compared with 28.8 percent in peri-urban areas and 26.0 percent in urban areas. The prevalence of severe food insecurity was 12.8 percent in rural areas, 11.6 percent among peri-urban residents, and 9.4 percent among urban residents.

At the regional level, the differences across regions are interesting. Africa clearly follows the global pattern of worsening food security when moving from urban, to peri-urban, to rural areas. In Asia and Latin America and the Caribbean, food insecurity is significantly higher in rural areas compared to urban areas, at both levels of severity, but the differences between peri-urban and rural areas are less clear. In Northern America and Europe, on the other hand, food insecurity, at both levels of severity is worse in urban areas than in rural areas.

These differences in regional patterns may be partially explained by looking at rural–urban differences in food insecurity by DEGURBA through a country income group lens (Figure 8). In LICs, rural and peri-urban populations

g See Table A1.3 in **Annex 1A** for prevalence of moderate or severe food insecurity, and severe food insecurity only, by degree of urbanization in 2022 by region and subregion.

are more food insecure compared to urban populations, whereas in LMICs, food insecurity is highest in rural areas but only marginally worse in peri-urban than in urban areas. The situation is markedly different in UMICs and HICs. Among UMICs, the prevalence of food insecurity, at both levels of severity, is highest in rural areas and lowest in peri-urban areas. In HICs, on the other hand, it is the urban population that is at higher risk of moderate or severe food insecurity, with virtually no difference for severe food insecurity.

Gender differences in food insecurity

Persistent gender inequalities are revealed by the new FIES data. Food insecurity is more prevalent among adult women than men in every region of the world. The gender gap in food insecurity at the global level widened considerably in 2020 and 2021 in the wake of the COVID-19 pandemic, as women were more affected by job and income losses and bore a larger responsibility for additional, unpaid caregiving duties.[18, 19] Women living in rural areas were even more likely to be food insecure,[20] as job and income losses were much higher for women than for men particularly in agrifood systems.[21] In 2021, the gender gap reached 3.8 percentage points, with 28.6 percent of women in the world being moderately or severely food insecure compared with 24.8 percent of men (Figure 9).

For 2022, the food insecurity gap between men and women appears to have narrowed considerably at the global level, which may partially reflect a return of women to economic activities as pandemic-related restrictions were eased, and a weakening of the disproportionate impacts of the pandemic on women's food insecurity. In 2022, 27.8 percent of adult women were moderately or severely food insecure, compared with 25.4 percent of men, and the proportion of women facing severe food insecurity was 10.6 percent compared with 9.5 percent of men. The difference in the prevalence of moderate or severe food insecurity between men and women decreased from 3.8 percentage points in 2021 to 2.4 percentage points in 2022, and the gap for severe food insecurity narrowed from 2.4 to 1.1 percentage points (Figure 9).[h]

h See Table A1.4 in **Annex 1A** for prevalence of moderate or severe food insecurity, and severe food insecurity only, among adult men and women in 2022 by region and subregion. See **Annex 2**, **Section C** for the methodology.

There were encouraging improvements in the gender gap in both Asia and Latin America and the Caribbean from 2021 to 2022. The gap narrowed by more than 2 percentage points for moderate or severe food insecurity in both regions, and by about 2 and 1.3 percentage points for severe food insecurity in Asia and in Latin America and the Caribbean, respectively. In Africa and in Northern America and Europe, however, the gap increased marginally for moderate or severe food insecurity and remained about the same for severe food insecurity. ■

2.2 COST AND AFFORDABILITY OF A HEALTHY DIET

KEY MESSAGES

➔ The cost of a healthy diet rose globally by 4.3 percent in comparison to 2020, and by 6.7 percent compared to the pre-COVID-19-pandemic levels, in 2019. This increase is due to the overall rise in inflation in 2020 and 2021, driven in part by the persisting effects of the pandemic.

➔ Worldwide in 2021, the average cost of a healthy diet was 3.66 PPP dollars per person per day. The cost was higher in Latin America and the Caribbean (4.08 PPP dollars) compared to Asia (3.90 PPP dollars), Africa (3.57 PPP dollars), Northern America and Europe (3.22 PPP dollars), and Oceania (3.20 PPP dollars).

➔ In Africa, Asia, and Latin America and the Caribbean, the cost of a healthy diet increased by more than 5 percent from 2020 to 2021, negatively affecting all subregions except for Northern Africa, where the cost fell by 2.8 percent. In the same period, the cost of a healthy diet rose in Oceania (5.2 percent) and in Northern America and Europe (marginally, by 0.6 percent). The surge hit lower-middle-income countries more than high-income countries.

➔ More than 3.1 billion people in the world – or 42 percent – were unable to afford a healthy diet in 2021, representing an increase of 134 million people compared to 2019, before the pandemic. This reflects the increase in the cost of a healthy diet that, in many countries, occurred in combination with a decline in disposable income.

➔ While Asia had the largest number of people who were unable to afford a healthy diet (1.9 billion) in 2021, Africa reported the highest proportion of the population unable to afford it (78 percent) compared to Asia (44 percent), Latin America and the Caribbean (23 percent), Oceania (3 percent), and Northern America and Europe (1 percent).

➔ Southern Asia shows the highest number (1.4 billion) and proportion (72 percent) of the population unable to afford a healthy diet in Asia, with the prevalence almost twice the regional average. Eastern and Western Africa report the highest proportion (85 percent) in the Africa region, as well as the highest number (712 million), when considered together.

Healthy diets are essential for achieving food security goals and improving nutritional outcomes. A healthy diet is composed of a variety of nutritious and safe foods that provide dietary energy and nutrients in the amounts needed for a healthy and active life. A healthy diet is based on a wide range of unprocessed or minimally processed foods, balanced across food groups, while it restricts the consumption of highly processed foods and drink products; it includes wholegrains, legumes, nuts, an abundance and variety of fruits and vegetables, and can include moderate amounts of eggs, dairy, poultry and fish, and small amounts of red meat.[22, 23] Eating a healthy diet throughout the life cycle is critical for preventing all forms of malnutrition, including child stunting and wasting, micronutrient deficiencies and overweight or obesity. It also helps reduce the risk of non-communicable diseases (NCDs) such as cardiovascular diseases, diabetes and certain types of cancer.[24]

FAO, with support from the World Bank Data Group, systematically monitors the cost and affordability of a healthy diet (CoAHD) indicators and recently began to disseminate the updated series on the FAOSTAT database.[25] These indicators provide evidence regarding people's economic access to the lowest-cost healthy diet in a given country, using locally available foods to meet nutritional requirements. In this year's report, the CoAHD indicators are updated to 2021. Lack of updated income distribution at the country level and of detailed food prices and purchasing power parity (PPP) conversion factors makes it impossible to update these estimates for 2022. See **Annex 2, Section D** for details on the methodology and important updates.

This year, affordability indicators reflect not only price shocks but also income shocks induced by the pandemic, better capturing the global situation in 2020 and 2021. This was possible because income distributions – derived from the Poverty and Inequality Platform to estimate affordability – have now been updated to include the years 2020 and 2021 for all countries (see **Annex 2, Section D**).[i] Following the recent release of new PPPs for 2017, the World Bank adopted the latest conversion factors to present its monetary indicators in 2017 PPP terms, including income distributions.[26] Consequently, the indicators of affordability are expressed in 2017 PPP rather than 2011 PPP, as in previous years (see **Annex 2, Section D**).

The cost and affordability of a healthy diet in 2021

The revised analysis presented in this year's report – which accounts for updated income distributions in 2020 and 2021 – shows that almost 3.2 billion people worldwide could not afford a healthy diet in 2020, with a slight improvement in 2021 (a decrease of 52 million people). Food prices continued to climb throughout 2021, pushing up the average cost of a healthy diet globally. However, a rebound in economic growth in many countries, particularly in Asia, may have translated into larger fiscal space for stimulus packages, social transfers and improved labour markets.[27, 28] These efforts helped to counter the effects of high food inflation, thereby reducing the number of people unable to afford a healthy diet at the global level, largely driven by Asia.

Table 5 presents the CoAHD indicators at the global and regional levels, and by country income group, for 2019, 2020 and 2021. Estimated ranges of affordability indicators are presented in Table A3.2 for 2021, where lower and upper bounds reflect different assumptions about the share of income reserved for food. Country-level »

i In last year's report, affordability in 2020 was obtained by applying the cost of a healthy diet in 2020 to income distributions in 2019, hence accounting for price shocks induced by the pandemic, but not for income shocks.

TABLE 5 MORE THAN 3.1 BILLION PEOPLE COULD NOT AFFORD A HEALTHY DIET IN 2021, ALTHOUGH THERE WAS SOME IMPROVEMENT FROM 2020 TO 2021

	Cost of a healthy diet (PPP dollars per person per day)					Proportion of the population unable to afford a healthy diet (%)			Number of people unable to afford a healthy diet (millions)				
	2019	2020	2021	2019–2020 change (%)	2020–2021 change (%)	2019	2020	2021	2019	2020	2021	2019–2020 change (millions)	2020–2021 change (millions)
WORLD	**3.43**	**3.51**	**3.66**	**2.3**	**4.3**	**41.2**	**43.3**	**42.2**	**3 005.5**	**3 191.9**	**3 139.5**	**186.4**	**-52.4**
AFRICA	**3.31**	**3.38**	**3.57**	**2.2**	**5.6**	**77.4**	**77.9**	**77.5**	**989.4**	**1 020.7**	**1 040.5**	**31.3**	**19.8**
Northern Africa	3.60	3.57	3.47	-0.6	-2.8	54.7	54.0	51.7	131.3	131.9	128.5	0.6	-3.4
Sub-Saharan Africa	3.28	3.36	3.58	2.6	6.6	82.6	83.3	83.4	858.1	888.8	912.1	30.7	23.3
Eastern Africa	3.01	3.09	3.29	2.7	6.7	84.2	84.7	84.6	341.3	352.7	361.9	11.4	9.2
Middle Africa	3.30	3.37	3.55	2.2	5.3	82.1	82.2	81.9	145.7	150.5	154.5	4.8	4.0
Southern Africa	3.71	3.84	4.06	3.4	5.8	65.4	67.4	67.0	43.4	45.3	45.6	1.9	0.3
Western Africa	3.37	3.45	3.71	2.5	7.6	84.1	85.1	85.4	327.6	340.3	350.1	12.7	9.8
ASIA	**3.57**	**3.70**	**3.90**	**3.7**	**5.2**	**43.2**	**46.4**	**44.2**	**1 877.4**	**2 031.4**	**1 949.9**	**154.0**	**-81.5**
Central Asia	2.91	3.10	3.32	6.7	7.2	21.3	24.6	24.4	7.3	8.6	8.7	1.3	0.1
Eastern Asia	4.45	4.67	4.87	5.1	4.1	11.2	14.5	10.0	177.8	230.9	159.4	53.1	-71.5
South-eastern Asia	3.86	3.99	4.19	3.6	4.8	52.3	54.0	54.9	335.1	349.0	357.4	13.9	8.4
Southern Asia	3.66	3.82	4.08	4.2	6.9	70.2	73.8	72.2	1 340.6	1 425.9	1 408.5	85.3	-17.4
Western Asia	3.15	3.22	3.36	2.2	4.5	9.7	9.7	9.0	16.7	17.0	15.9	0.3	-1.1
LATIN AMERICA AND THE CARIBBEAN	**3.78**	**3.88**	**4.08**	**2.7**	**5.3**	**20.8**	**20.9**	**22.7**	**120.0**	**121.9**	**133.4**	**1.9**	**11.5**
Caribbean	4.06	4.20	4.41	3.3	5.0	51.6	55.2	57.0	13.7	14.8	15.4	1.1	0.6
Latin America	3.49	3.55	3.75	1.9	5.6	19.3	19.3	21.1	106.3	107.1	118.0	0.8	10.9
Central America	3.45	3.48	3.62	0.8	4.1	23.6	25.4	22.2	35.7	38.7	34.2	3.0	-4.5
South America	3.50	3.59	3.82	2.4	6.4	17.7	17.0	20.6	70.6	68.4	83.8	-2.2	15.4
OCEANIA	**2.96**	**3.04**	**3.20**	**2.8**	**5.2**	**2.6**	**2.7**	**2.9**	**0.7**	**0.7**	**0.8**	**0.0**	**0.1**
NORTHERN AMERICA AND EUROPE	**3.19**	**3.20**	**3.22**	**0.6**	**0.6**	**1.7**	**1.6**	**1.4**	**18.1**	**17.2**	**14.9**	**-0.9**	**-2.3**
COUNTRY INCOME GROUP													
Low-income countries	3.14	3.22	3.37	2.5	4.7	86.7	86.9	86.1	456.8	471.0	480.0	14.2	9.0
Lower-middle-income countries	3.55	3.65	3.88	2.9	6.2	68.3	71.0	70.2	2 180.7	2 296.8	2 299.6	116.1	2.8
Upper-middle-income countries	3.65	3.72	3.91	2.0	5.1	14.4	16.6	14.1	350.5	406.4	345.5	55.9	-60.9
High-income countries	3.29	3.36	3.43	2.1	2.1	1.5	1.5	1.3	17.4	17.6	14.3	0.2	-3.3

NOTES: The cost of a healthy diet is expressed in purchasing power parity (PPP) dollars per person per day. The share of people unable to afford a healthy diet is a weighted average (%) estimated using population data. The 2022 World Bank's income classification is used to identify country income groups. The calculation of the annual change (%) in the cost of a healthy diet is based on the cost rounded to three decimal places.
SOURCE: FAO. 2023. FAOSTAT: Cost and Affordability of a Healthy Diet (CoAHD). In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/CAHD

» estimates for the entire 2017–2021 series can be found in Table A3.1.

In 2021, the average cost of a healthy diet globally was 3.66 PPP dollars per person per day (Table 5). The cost was higher in Latin America and the Caribbean (4.08 PPP dollars) compared to Asia (3.90 PPP dollars), Africa (3.57 PPP dollars), Northern America and Europe (3.22 PPP dollars), and Oceania (3.20 PPP dollars).

The cost of a healthy diet has been on the rise since 2019. It increased globally by 6.7 percent between 2019 and 2021, with a notable single-year increase of 4.3 percent in 2021 (Table 5 and Figure 10A). The surge in the cost of a healthy diet reflects an overall rise in food inflation that hit every region following the outbreak of the pandemic. Soaring prices were mostly driven by lockdowns and by disruptions in the global supply chain and transportation systems, as well as labour shortages hitting especially the agriculture sector.[8]

The cost of a healthy diet increased by more than 5 percent between 2020 and 2021 in Africa, Asia, Latin America and the Caribbean, and Oceania, but only marginally in Northern America and Europe (0.6 percent). The increase in cost in Africa, Latin America and the Caribbean, and Oceania was nearly double that which occurred between 2019 and 2020, while the cost rose to a lesser extent in Asia and in Northern America and Europe (Table 5 and Figure 10A).

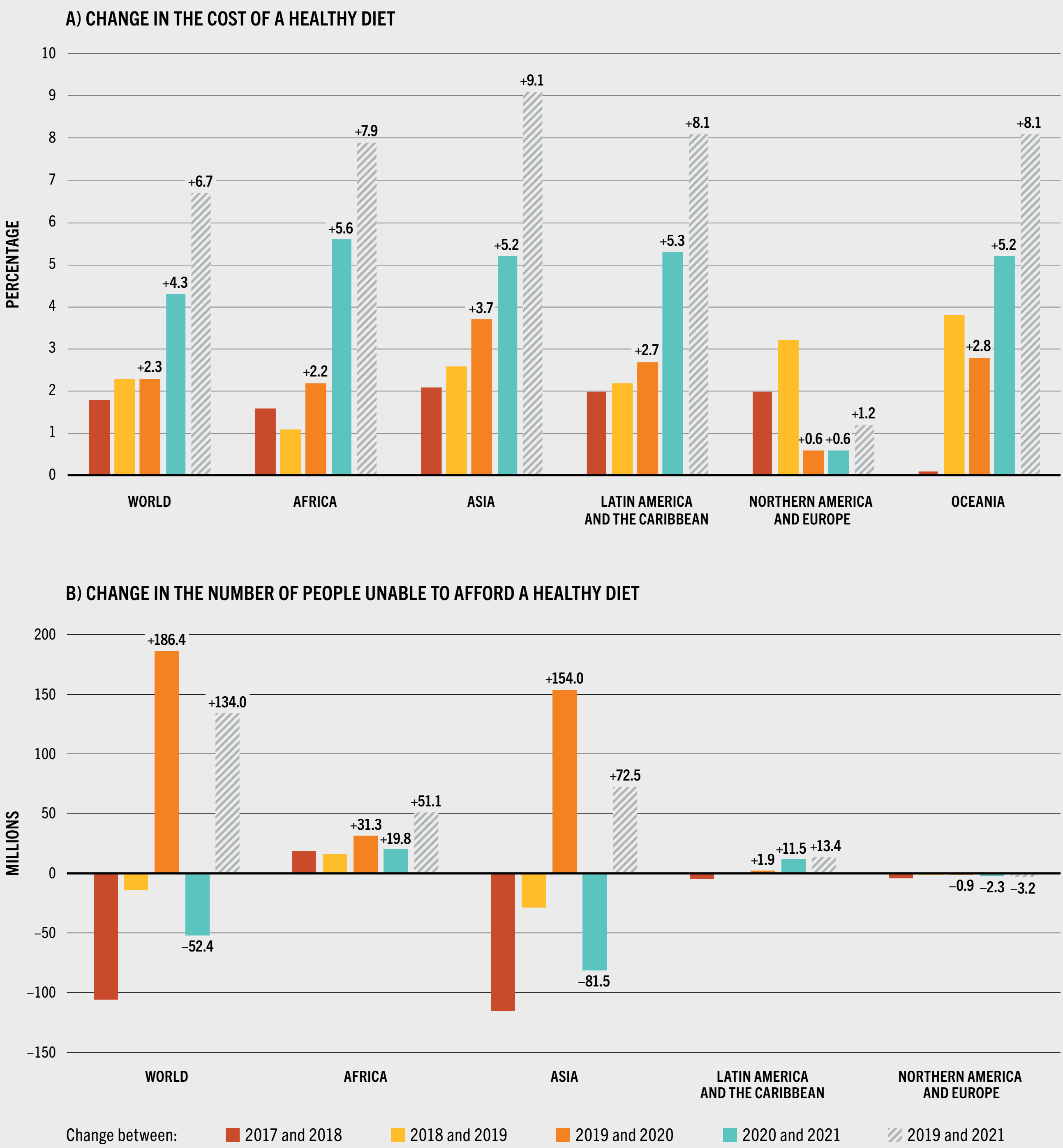
Between 2020 and 2021, soaring costs affected all subregions in Africa, Asia, and Latin America and the Caribbean, except for Northern Africa, where the cost declined by 2.8 percent. The cost of a healthy diet climbed by 7.6 percent in Western Africa, a threefold increase compared to the period between 2019 and 2020 (Table 5). Eastern Africa also experienced a 6.7 percent rise in the cost of a healthy diet, followed by Southern Africa (5.8 percent) and Middle Africa (5.3 percent). In Asia, the highest surge was seen in Central Asia and Southern Asia (7.2 percent and 6.9 percent, respectively). Eastern Asia reported the smallest increase in the cost between 2020 and 2021 (4.1 percent) and showed a slowdown in cost inflation compared to the previous period. In Latin America and the Caribbean, the cost increase ranged from 6.4 percent in South America to 4.1 percent in Central America.

The COVID-19 pandemic has exacerbated existing inequalities across all regions in the world. Low- and middle-income countries have faced greater challenges related to increases in food prices and food insecurity compared to high-income countries.[29] This is also reflected in the increased cost of a healthy diet from 2020 to 2021, which was much larger in LMICs (6.2 percent increase), UMICs (5.1 percent) and LICs (4.7 percent), compared to HICs (2.1 percent) (Table 5).

About 3.14 billion people in the world – or 42 percent – were unable to afford a healthy diet in 2021; this figure is down somewhat from 3.19 billion people – or 43 percent – in 2020 (Table 5 and Figure 10B). In many countries, the increase in the cost of a healthy diet occurred in combination with a decline in disposable income following the persisting effects of the pandemic. Lockdowns, economic downturns, and other pandemic-related disruptions in 2020 led to job losses and reduced incomes for many people, affecting low-income households the most as they spend a higher share of income on food.[30] The impact of escalating prices, coupled with a reduction in disposable income in many countries, resulted in an additional 186 million people unable to afford a healthy diet in 2020 compared to 2019.

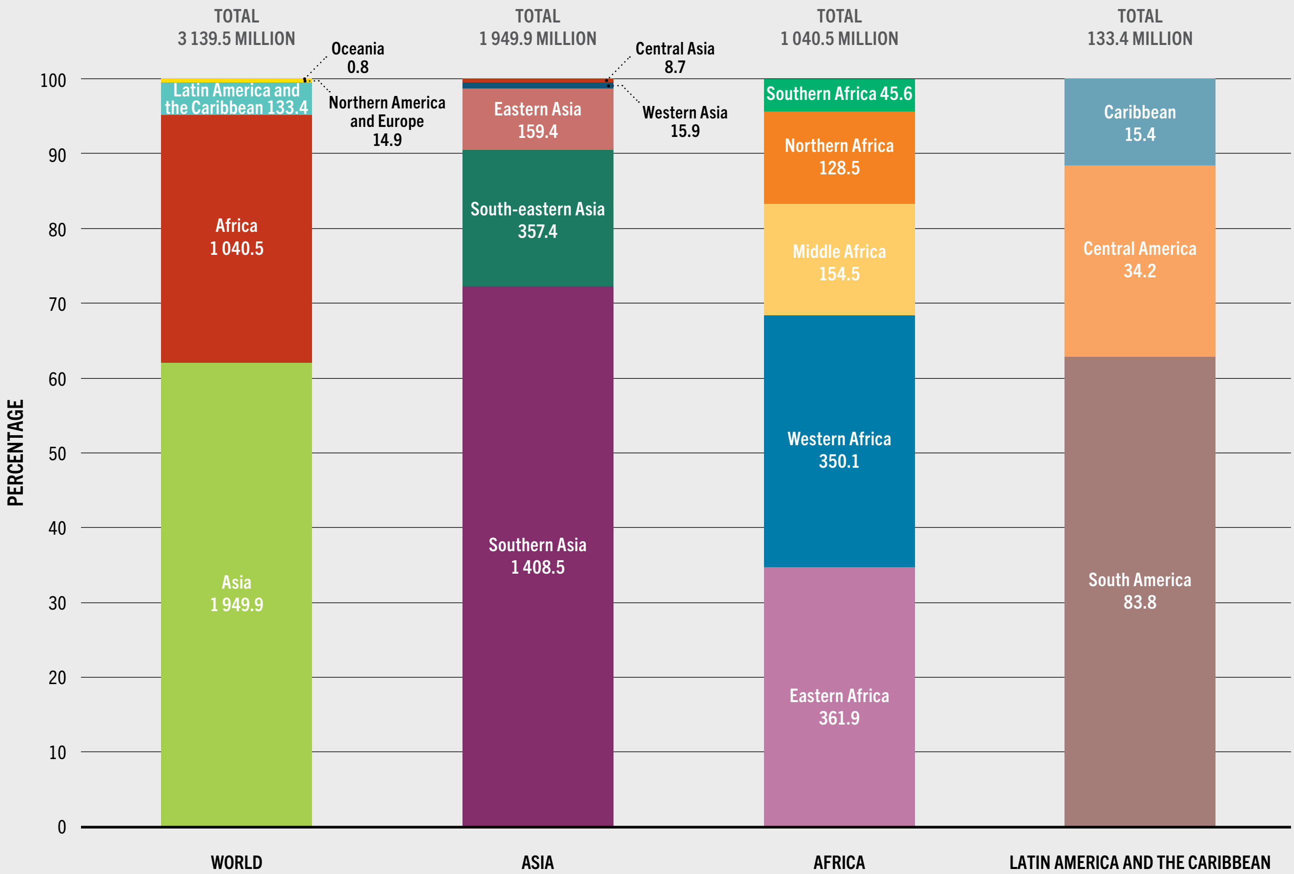
A slight turnaround occurred in 2021, when the number of people unable to afford a healthy diet declined by 52 million compared to 2020 (Table 5 and Figure 10B), but this is still 134 million more people compared to pre-pandemic levels in 2019. A rebound in global GDP growth to 6 percent in 2021, following the pandemic that plunged most countries into recession in 2020,[3] likely alleviated the burden of unaffordability, owing to several factors, including government stimulus programmes, social protection measures, and employment recovery, in some instances.[31] However, the unequal pattern of economic recovery across and within countries, coupled with increasing prices and inequalities, has made a healthy diet less affordable especially in some regions, placing an additional burden on the most vulnerable households. »

FIGURE 10 GLOBALLY IN 2021, THE COST OF A HEALTHY DIET INCREASED AND MORE PEOPLE WERE UNABLE TO AFFORD THE DIET COMPARED TO 2019 IN ALL REGIONS EXCEPT NORTHERN AMERICA AND EUROPE, DESPITE A SMALL DECLINE IN UNAFFORDABILITY FROM 2020 TO 2021



SOURCE: FAO. 2023. FAOSTAT: Cost and Affordability of a Healthy Diet (CoAHD). In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/CAHD

FIGURE 11 MOST OF THE PEOPLE UNABLE TO AFFORD A HEALTHY DIET IN 2021 LIVED IN SOUTHERN ASIA, AND IN EASTERN AND WESTERN AFRICA



SOURCE: FAO. 2023. FAOSTAT: Cost and Affordability of a Healthy Diet (CoAHD). In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/CAHD

» Compared to 2019, the number of people unable to afford a healthy diet was higher in 2021 in all regions except Northern America and Europe, where the number of people unable to afford the diet decreased by 2.3 million despite the price and income shocks induced by the pandemic (Figure 10B). In Asia, the number of people who could not afford a healthy diet increased by 154 million from 2019 to 2020, but then decreased by 81.5 million from 2020 to 2021 (Figure 10B). A notable improvement occurred from 2020 to 2021 in Eastern Asia, where a healthy diet was out of reach for fewer people (71.5 million fewer people could not afford it), and in Southern Asia (17.4 million fewer people), following sharp increases the previous year in the number of people unable to afford this diet. Eastern Asia is the only subregion in Asia reporting an overall improvement in 2021 compared to 2019, as the number of people unable to afford a healthy diet decreased by 18.4 million. In Africa, unaffordability continued to worsen: 51.1 million more people could not afford a healthy diet in 2021 compared to 2019, with the highest increase occurring from 2019 to 2020 (31 million). Sub-Saharan Africa reported the largest increase in the number of people unable to afford a healthy diet from 2019 to 2021 (54 million more people), while the situation improved in Northern Africa, where the diet was out of reach for almost 3 million fewer people (Table 5). Finally, in Latin America and the Caribbean, 13.4 million more people could not afford a healthy diet in 2021 compared to 2019, with the largest increase in South America (13.3 million people) due to a sharp jump from 2020 to 2021 (Table 5 and Figure 10B).

Of the people in the world who were unable to afford a healthy diet in 2021, 1.9 billion, or 62 percent, were found in Asia (Figure 11). In terms of proportion, however, Africa was the region with the highest proportion of the population that could not afford a healthy diet in 2021 (78 percent) compared to Asia (44 percent), Latin America and the Caribbean (23 percent), Oceania (3 percent), and Northern America and Europe (1 percent) (Table 5).

Almost 70 percent of the people in Africa who were unable to afford a healthy diet lived in Eastern and Western Africa. Considered together, the two subregions reported the highest number (712 million) and proportion (85 percent) of people who were unable to afford a healthy diet in Africa in 2021 (Table 5 and Figure 11). A high proportion was also found in Middle Africa (82 percent) in 2021, followed by Southern Africa (67 percent) and Northern Africa (52 percent), whose percentage was lower than the regional average (78 percent).

In Asia, Southern Asia showed the highest number (1.4 billion) and proportion (72 percent) of people unable to afford a healthy diet in 2021, far above the regional average of 44 percent. In South-eastern Asia, around 55 percent of people could not afford this diet, and the number has been increasing since 2019.

Finally, in Latin America and the Caribbean, 63 percent of the people unable to afford a healthy diet lived in South America, and only 12 percent lived in the Caribbean (Figure 11). The Caribbean was the subregion with the lowest absolute number of people (15 million) but the highest proportion of the population (57 percent) unable to afford a healthy diet – more than twice the regional average.

The indicators described in this section and in **Annex 2** and **Annex 3** provide a snapshot of the "average" cost and affordability situation at the global, regional and country levels. However, they do not fully capture the heterogeneous characteristics of a population that determine the ability to afford a healthy diet within a country or a region. Affordability is affected not only by the average cost of a healthy diet and people's incomes, but also by factors such as place of residence, proximity to food markets, or food production for own consumption. Due to data limitations, affordability estimates cannot control for these factors and may overestimate, in some instances, the cost of a healthy diet for specific population subgroups, and hence the number of people whose income falls below the cost threshold for a healthy diet. ■

2.3 THE STATE OF NUTRITION: PROGRESS TOWARDS GLOBAL NUTRITION TARGETS

KEY MESSAGES

➔ Worldwide in 2022 among children under five years of age, an estimated 148.1 million (22.3 percent) were stunted, 45 million (6.8 percent) were wasted and 37 million (5.6 percent) were overweight.

➔ Global stunting prevalence was 1.6 times higher and wasting prevalence 1.4 times higher in rural versus urban areas. The prevalence of overweight was only slightly higher in urban children (5.4 percent) compared to rural children (3.5 percent).

➔ There has been steady progress in reducing stunting since 2012, but the world is still not on track to achieve the 2030 target of 13.5 percent (50 percent reduction in the number of children with stunting from the baseline). In the ten years since 2012, the number of children with stunting declined by nearly 30 million.

➔ Reduction in wasting is making some progress but global prevalence is more than twice the 2030 target. Wasting among children was highest in low- and lower-middle-income countries (94 percent of the global burden).

➔ Globally, the majority of overweight children (77 percent) lived in lower-middle- and upper-middle-income countries in 2022. In terms of progress towards the 2030 target of less than 3 percent prevalence, no regions were on track and only Northern America and Europe made some progress towards the target.

➔ Globally, there has been no significant change in low birthweight over the last two decades – 16.6 percent in 2000 compared with 14.7 percent in 2020 – and no region is on track to attain the 2030 target of a 30 percent reduction since the 2012 baseline. Data gaps present a challenge to the global monitoring of low birthweight, as nearly one in three newborns in the world were not weighed at birth in 2020.

➔ Steady progress has been made on exclusive breastfeeding, with 47.7 percent of infants under six months of age exclusively breastfed worldwide in 2021, up from 37.0 percent in 2012. An estimated 75 percent of exclusively breastfed infants live in low- or lower-middle-income countries.

➔ Conflict, climate change and rising food prices, along with the persisting effects of the COVID-19 pandemic, all threaten progress towards achieving the 2030 global nutrition targets. Coordinated efforts are needed to eliminate malnutrition in all its forms.

The importance of nutrition and reporting on the Sustainable Development Goals

Nutrition is mentioned specifically in SDG 2 but it is central to the achievement of all 17 SDGs, specifically those related to health, education, gender equality and the climate.[32] This section presents an assessment of global and regional levels and trends for global nutrition targets. There are updates on five of the six nutrition targets initially endorsed by the World Health Assembly (WHA) in 2012 to be achieved by 2025, for which extended 2030 targets were subsequently proposed by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF). Four out of the six indicators were also selected to monitor progress towards SDG Target 2.2, namely stunting, wasting and overweight in children under five years of age, and anaemia in women aged 15 to 49 years. A seventh target to halt the rise in adult obesity was adopted by the WHA as part of the Global Action Plan for the Prevention and Control of NCDs in 2013. Only the indicators for stunting, wasting, overweight, exclusive breastfeeding and low birthweight will be presented in this edition of the report, as updated data were not available for anaemia in women aged 15 to 49 years and adult obesity.

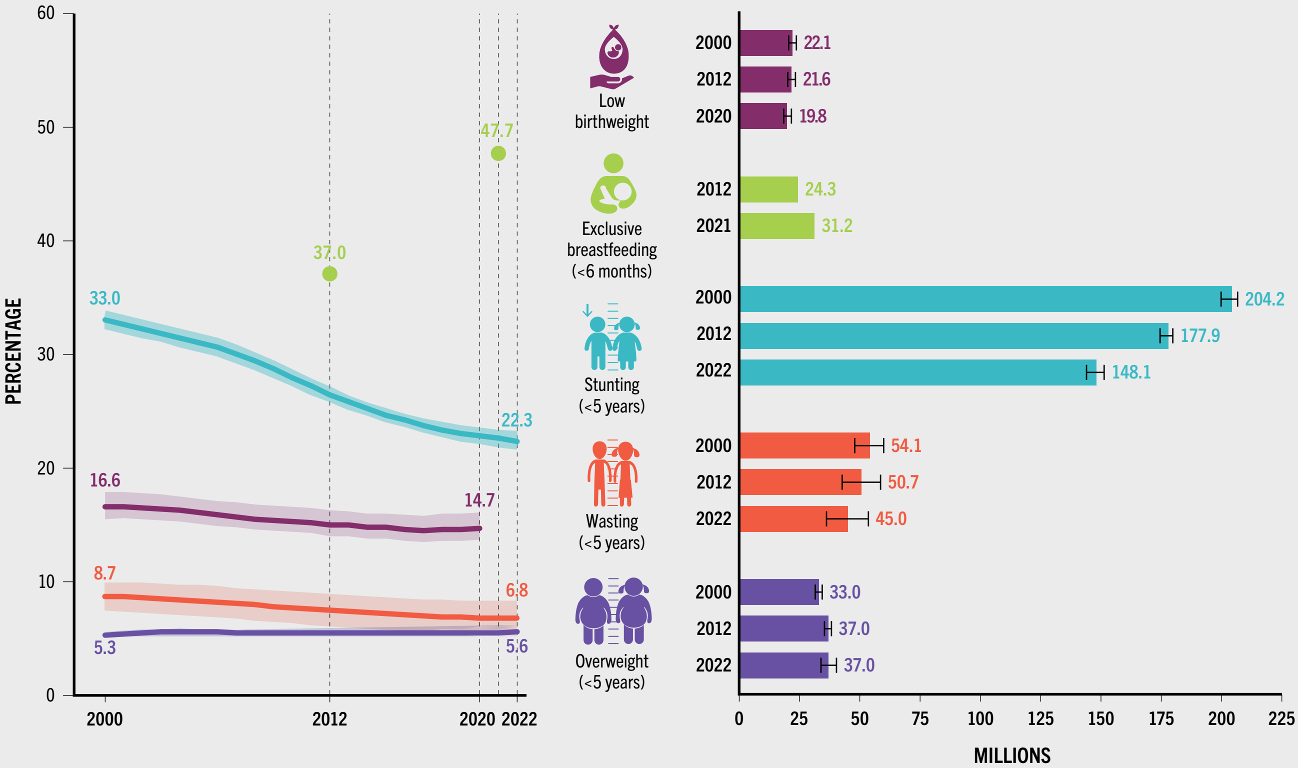
Global trends and burden of malnutrition

Conflict, climate change and the enduring secondary effects of the COVID-19 pandemic continue to affect malnutrition, birthweights and caring practices like exclusive breastfeeding. The 2022 edition of this report presented multiple pathways for the pandemic to impact child nutrition along with potential risks stemming from the war in Ukraine. Although the effects of the current crises on malnutrition are not yet fully reflected in the updates presented in this edition of the report, due either to data sparsity or to the long-term impact of some of the nutritional outcomes, negative impacts on various forms of malnutrition are expected at the global level. Any potential global consequences of the war in Ukraine on malnutrition are also yet to be measured comprehensively. The global trends in prevalence and absolute numbers for five nutrition indicators are summarized in Figure 12.

The latest estimate for **low birthweight** reveals that 14.7 percent of newborns (19.8 million) were born with low birthweight (less than 2 500 g) in 2020, a non-significant decline from 16.6 percent (22.1 million) in 2000. Infants born weighing less than 2 500 g are approximately 20 times more likely to die than those with adequate birthweight,[33] and those who survive face long-term development and health consequences, including a higher risk of stunting, a diminished intelligence quotient, and increased risk of obesity and diabetes as adults.[34]

Optimal breastfeeding practices, including **exclusive breastfeeding** for the first six months of life, are critical for child survival and the promotion of health and cognitive development.[35] Globally, the prevalence of exclusive breastfeeding among infants under six months of age rose from 37.0 percent (24.3 million) in 2012 to 47.7 percent (31.2 million) in 2021. Worldwide, over half of all

FIGURE 12 STUNTING IN CHILDREN UNDER FIVE YEARS OF AGE AND EXCLUSIVE BREASTFEEDING HAVE IMPROVED AND SOME PROGRESS HAS BEEN MADE ON WASTING, WHILE LOW BIRTHWEIGHT AND OVERWEIGHT IN CHILDREN UNDER FIVE YEARS OF AGE HAVE NOT CHANGED



NOTES: Wasting is an acute condition that can change frequently and rapidly over the course of a calendar year. The *UNICEF-WHO-World Bank: Joint child malnutrition estimates* do not currently adjust for seasonal variation that can affect wasting prevalence estimates. The global estimates of the number of children with wasting are based on national-level prevalence data which capture the cases of wasting at a given moment in time. As such, the reported estimates do not reflect the cumulative cases of wasting over the year.
SOURCES: Data for stunting, wasting and overweight are based on UNICEF, WHO & World Bank. 2023. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2023 edition)*. [Cited 24 April 2023]. https://data.unicef.org/resources/jme-report-2023, www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition; data for exclusive breastfeeding are based on UNICEF. 2022. Infant and young child feeding. In: *UNICEF*. [Cited 6 April 2023]. https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding; data for low birthweight are from UNICEF & WHO. 2023. *Low birthweight joint estimates 2023 edition*. [Cited 12 July 2023]. https://data.unicef.org/topic/nutrition/low-birthweight; www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-low-birthweight-estimates. The burden estimates by indicator are based on different denominators including children under five years of age for stunting, wasting and overweight, children under six months of age for exclusive breastfeeding and live births for low birthweight. Population data are based on United Nations Population Division. 2022. *World Population Prospects 2022*. [Cited 27 April 2023]. https://population.un.org/wpp

infants under six months of age do not receive the protective benefits of exclusive breastfeeding.

Stunting, the condition of being too short for one's age, is a marker for longer-term chronic malnutrition. It is caused by a combination of nutritional and other factors that simultaneously undermine the physical and cognitive development of children and increase their risk of dying from common infections. Stunting and other forms of undernutrition early in life may also predispose children to overweight and NCDs later in life.[36] Globally, the prevalence of stunting among children under five years of age has declined steadily, from an estimated 33.0 percent (204.2 million) in 2000 to 22.3 percent (148.1 million) in 2022.

Child **wasting** is a life-threatening condition caused by insufficient nutrient intake, poor nutrient absorption and/or frequent or prolonged illness. Affected children are dangerously thin, with weakened immunity and a higher risk of mortality.[37] The prevalence of wasting among children under five years of age declined non-significantly from 8.7 percent in 2000 to 6.8 percent in 2022. The estimated number of children with wasting declined from 54.1 million in 2000 to 45.0 million in 2022, but it is important to note that these are point estimates and not representative of the cumulative number of cases of wasting over the year. The global prevalence-based estimates of children under five years of age affected by wasting from the *UNICEF-WHO-World Bank: Joint child malnutrition estimates* should be considered underestimates of the annual burden. Wasting is an acute condition that can change rapidly and is affected by seasonal changes in many contexts.[38, 39] This makes reliable national trends over time challenging to estimate and interpret.

Children who are **overweight** or obese face both immediate and potentially long-term health impacts. Immediate impacts include respiratory difficulties, increased risk of fractures, hypertension, early markers of cardiovascular disease, insulin resistance and psychological effects.[40] Affected individuals also have a higher risk of NCDs later in life. Child overweight has been on the rise in many countries, hastened by increasingly inadequate levels of physical activity and increased access to highly processed foods, which tend to be high in energy, fats, free sugars and/or salt.[23] Globally, the prevalence of overweight among children under five years of age showed a non-significant increase from 5.3 percent (33.0 million) in 2000 to 5.6 percent (37.0 million) in 2022. The personal, community and societal costs of overweight and obesity are heavy and are increasing globally.[41]

Nutrition across country income groups

The global burden of malnutrition varies substantially across country income groups and over time. These analyses examine the distribution of the burden based on the latest classification of a country's income group.

The distributions of the global burden for five nutrition indicators by country income group are presented in Figure 13. For each indicator, the distributions in 2012 and in the year for which the most recent data are available are presented to show changes over time.

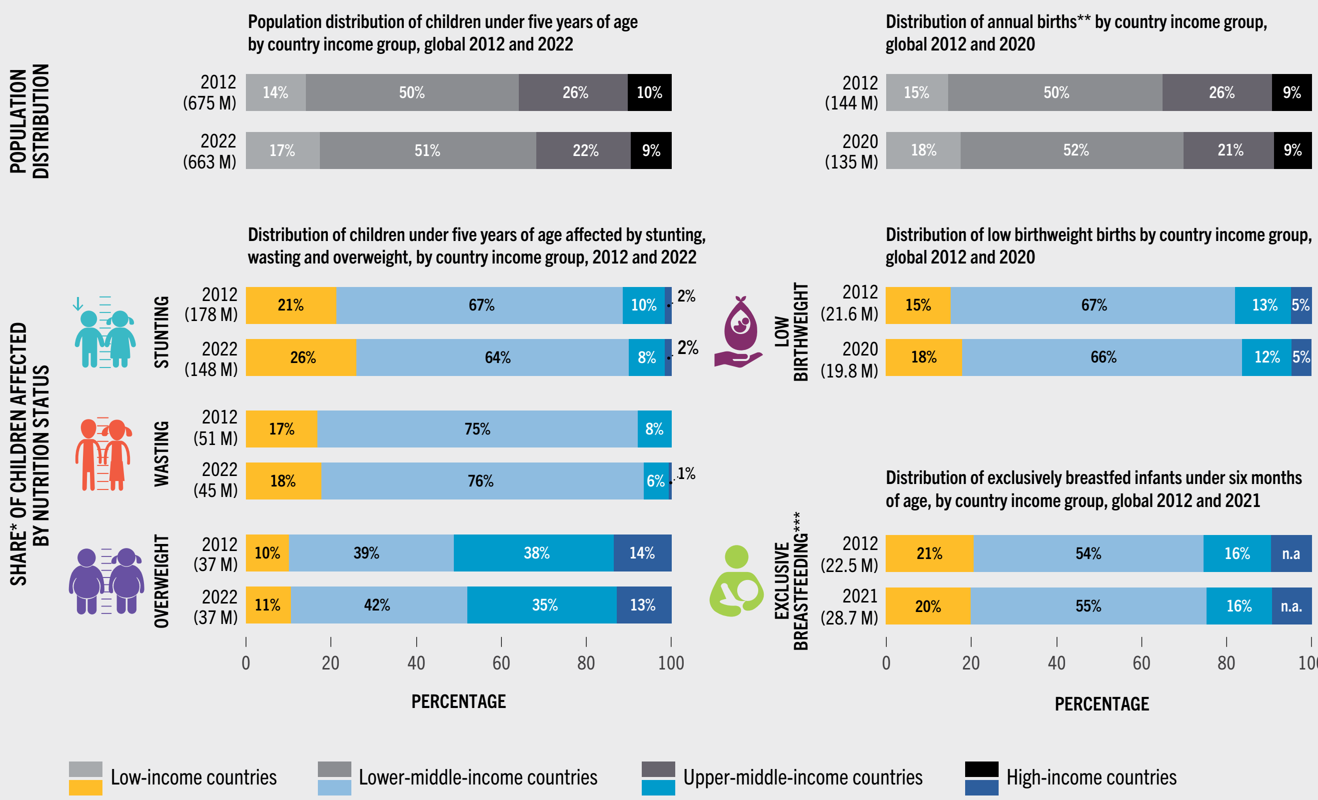
LICs and LMICs together carried the brunt of the low birthweight burden among newborns in both 2012 and 2020 – a total of 84 percent of the global burden of low birthweight in 2020 – while the two country income groups together represented only 70 percent of global annual births. Overall, the distribution of the burden across income groups remained similar between 2012 and 2020. The proportion of low birthweight in LICs increased from 15 percent to 18 percent, in parallel with the fastest global population growth.

Worldwide, the largest proportion of exclusively breastfed infants live in LICs or LMICs, and the combined estimate did not change from 2012 to 2021 (75 percent). The greatest proportion of exclusively breastfed children is found in LMICs (55 percent), while these countries represent only 52 percent of the overall target population. For HICs, there were insufficient data to examine the portion of exclusively breastfed infants; thus, the proportional contribution of HICs to the global total is presented as "estimates not available" in Figure 13.

The proportion of stunting in children under five years of age increased in LICs from 21 percent in 2012 to 26 percent in 2022, while the proportion of children under five years of age in these countries increased from 14 percent to 17 percent. For LICs and LMICs combined, the proportion of stunted children increased from 88 percent in 2012 to 90 percent in 2022, while these country income groups only represented 64 percent of all children under five years of age globally in 2012 and 68 percent in 2022.

As they do for low birthweight and stunting, LICs and LMICs also bear the greatest burden of wasting. These groups comprised a combined total of 92 percent in 2012 and 94 percent in 2022 of all wasted children under five years of age,

FIGURE 13 LOW- AND LOWER-MIDDLE-INCOME COUNTRIES BEAR THE GREATEST BURDEN OF STUNTING, WASTING AND LOW BIRTHWEIGHT, BUT ALSO HAVE THE LARGEST PROPORTION OF EXCLUSIVELY BREASTFED CHILDREN; MOST OVERWEIGHT CHILDREN LIVE IN LOWER-MIDDLE- OR UPPER-MIDDLE-INCOME COUNTRIES



NOTES: n.a. = estimates not available. * The percentages in the bar graphs refer to the proportion of the population/affected population in the four country income groups from the fiscal year 2023 World Bank income classification while the numbers in millions (depicted below each year) are aligned with global estimates. The distribution of affected population is relative to the total number affected across the four country income groups except for exclusive breastfeeding; this varies from the global totals (depicted below each year), which are aligned with global estimates used elsewhere in this report. The sums of the four country income groups are as follows: stunting 2012 = 177.4 million, 2022 = 147.7 million; wasting 2012 = 47.7 million, 2022 = 42.8 million; overweight 2012 = 36.9 million, 2022 = 36.8 million; low birthweight 2012 = 21.6 million, 2020 = 19.8 million. The percentages for distribution of children under five years of age (2022), wasting (2022), overweight (2012 and 2022) and low birthweight (2020) do not add up to 100 percent due to rounding. ** Due to space limitations, the population distribution for infants under six months of age in 2012 and 2021 is not shown, but the distributions are the same as for annual births in 2020 and only vary from 2012 births in high-income countries for which the proportion for infants under six months of age was 10 percent in 2012. *** Exclusive breastfeeding estimates are not available for high-income countries, so their contribution to the global total is presented as n.a. and the sums represent three country income groups.
SOURCES: Data for stunting, wasting and overweight are based on UNICEF, WHO & World Bank. 2023. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2023 edition).* [Cited 24 April 2023]. https://data.unicef.org/resources/jme-report-2023, www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition; data for exclusive breastfeeding are based on UNICEF. 2022. Infant and young child feeding. In: *UNICEF*. [Cited 6 April 2023]. https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding; data for low birthweight are from UNICEF & WHO. 2023. *Low birthweight joint estimates 2023 edition*. [Cited 12 July 2023]. https://data.unicef.org/topic/nutrition/low-birthweight; www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-low-birthweight-estimates. Population data are based on United Nations Population Division. 2022. *World Population Prospects 2022*. [Cited 27 April 2023]. https://population.un.org/wpp

despite representing only 68 percent of the global population under five years of age in 2022.

The proportion of overweight children in LICs and LMICs combined increased from 49 percent in 2012 to 53 percent in 2022. While these changes were marginal, they illustrate the rising threats of overweight and obesity among populations of lower country income groups. The distribution across country income groups of the burden of overweight among children under five years of age changed marginally between 2012 and 2022, with a small increase in the number of overweight children residing in LMICs and a small decline in numbers of overweight children in UMICs. The majority of overweight children (77 percent) live in LMICs and UMICs.

The analysis presented indicates that LICs and LMICs are home to the majority of infants who benefit from exclusive breastfeeding. It also highlights that LICs and LMICs combined carry the greatest burden for low birthweight, stunting, wasting and overweight.

Progress towards ending all forms of malnutrition by 2030

Global progress

Global progress towards the five nutrition 2030 targets for which indicators have been updated is summarized in Figure 14. The 2020 low birthweight prevalence of 14.7 percent has not declined quickly enough to be on track for the 2030 target of a 30 percent reduction from the 2012 baseline. The available low birthweight data suffer from data quality issues, especially among countries that are most likely to have high prevalence, and nearly one in three newborns in the world were not weighed at birth in 2020. Improvements in low birthweight data quality and representativeness are needed to assess the severity and magnitude of the problem more reliably.

The proportion of exclusively breastfed infants under six months of age increased from 37.0 percent in 2012 to 47.7 percent in 2021. Although this is close to the 50 percent target for 2025, the world is not on track to achieve the 2030 target of at least 70 percent. To achieve this target, sustained investment is needed in effective interventions that promote the adoption and continuation of exclusive breastfeeding (such as adequate paid maternity leave and workplace policies to ensure nearby access to quality childcare, breastfeeding breaks and dedicated nursing spaces), along with greater protection and support for breastfeeding in emergency contexts. Enactment and enforcement of the International Code of Marketing of Breastmilk Substitutes,[42] institutionalization of the Baby-friendly Hospital Initiative,[43] and scaling up of antenatal and postnatal breastfeeding counselling will also help countries to reach their individual targets.

Stunting in children under five years of age decreased from 26.3 percent in 2012 to 22.3 percent in 2022. To be on track for the target of a 13.5 percent stunting prevalence in 2030, however, the prevalence needed to reach 18.2 percent in 2022. Strong progress has been made, but larger investments in nutrition-appropriate policies and actions across multiple systems will be required to ensure greater strides are made in reducing stunting.

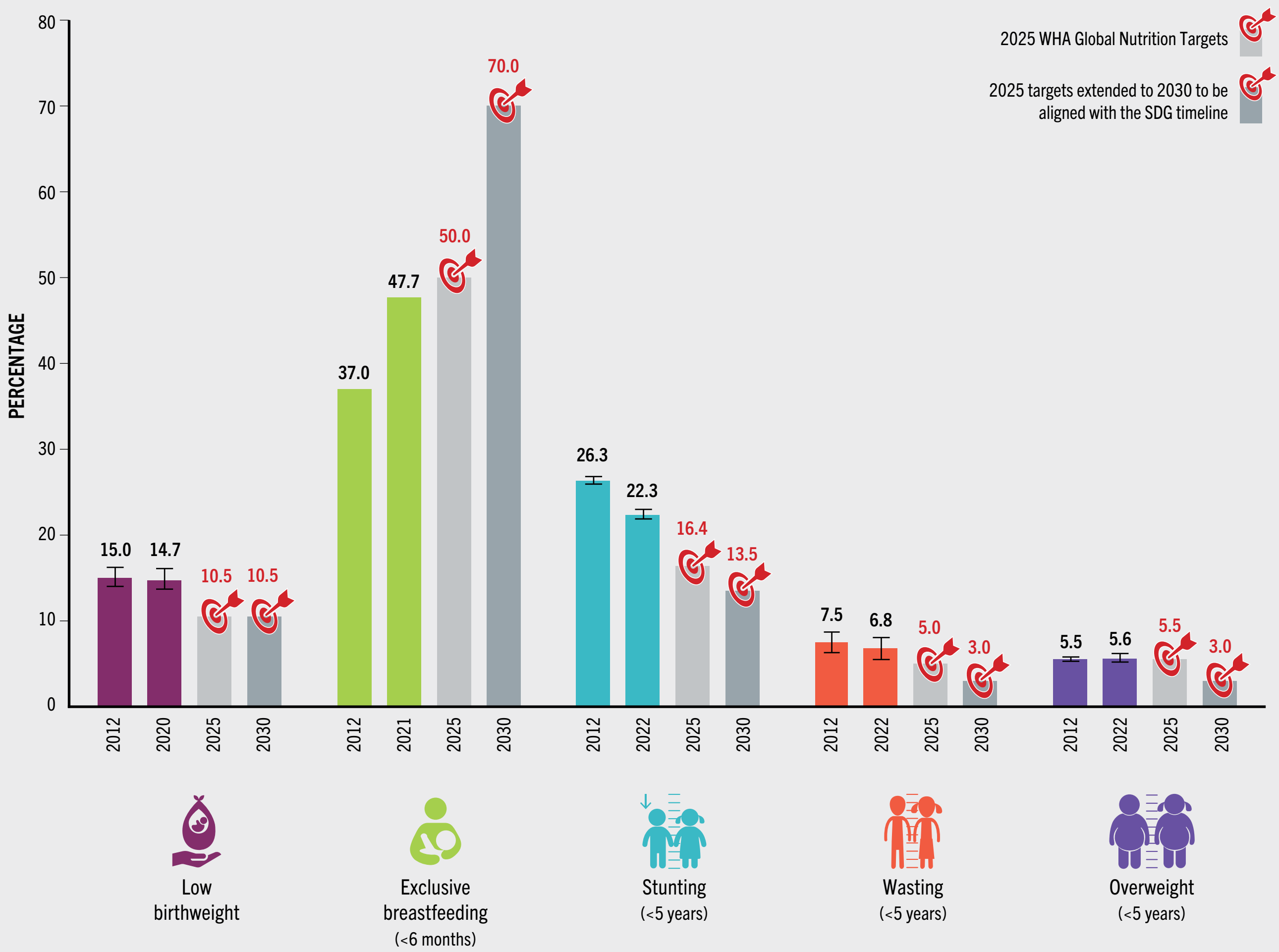
The global prevalence of wasting among children under five years of age did not change significantly from 2012 to 2022, declining from 7.5 percent to 6.8 percent. The 2022 estimate is more than double the 2030 target of less than 3 percent. These results signal that greater targeting of resources is needed towards those countries with the highest burden to increase their access to essential actions for the prevention of child wasting across multiple systems, including health, water and sanitation, education, and social policy. To ensure achievement of the global targets, scaling up of early detection, optimized treatments, and monitoring and delivery of effective services for reducing child wasting are needed, as per the Global Action Plan on Child Wasting.[44]

To achieve the 2030 target of 3 percent for child overweight, a shift is required in the direction of the global trend. The prevalence of overweight remained stagnant at 5.5 percent in 2012 and 5.6 percent in 2022. To address overweight and obesity in the youngest age groups, it is critical to invest in effective promotion and adoption of positive habits including healthy feeding patterns, avoiding easy access to foods high in sugars, salt and fats, as well as active play and other types of physical activity.[45]

Regional progress

This section presents an assessment of the progress towards the 2030 global nutrition targets at the regional and subregional levels. The regional and subregional analysis is based on the annual average rate of reduction[46] observed from trends between the baseline and the most recent year of the indicator, compared to the rate of reduction needed between 2012 and 2030 to reach the global targets. Progress is calculated as the progress achieved versus the change required to bring the indicators to the desired levels (Table 6). (The methodology is described in **Annex 2, Section F.**)

FIGURE 14 THE GLOBAL TRENDS IN STUNTING, WASTING, EXCLUSIVE BREASTFEEDING AND LOW BIRTHWEIGHT MUST BE ACCELERATED, WHILE FOR OVERWEIGHT IN CHILDREN THEY WILL HAVE TO BE REVERSED, TO ACHIEVE THE 2030 GLOBAL NUTRITION TARGETS



NOTE: WHA = World Health Assembly.
SOURCES: Data for stunting, wasting and overweight are based on UNICEF, WHO & World Bank. 2023. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2023 edition)*. [Cited 24 April 2023]. https://data.unicef.org/resources/jme-report-2023, www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition; data for exclusive breastfeeding are based on UNICEF. 2022. Infant and young child feeding. In: *UNICEF*. [Cited 6 April 2023]. https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding; data for low birthweight are from UNICEF & WHO. 2023. *Low birthweight joint estimates 2023 edition*. [Cited 12 July 2023]. https://data.unicef.org/topic/nutrition/low-birthweight; www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-low-birthweight-estimates. The targets are drawn from: UNICEF & WHO. 2017. *Methodology for monitoring progress towards the global nutrition targets for 2025 – technical report*. New York, USA and Geneva, Switzerland. https://data.unicef.org/resources/methodology-for-monitoring-progress-towards-the-global-nutrition-targets-for-2025; and UNICEF & WHO. 2019. *The extension of the 2025 Maternal, Infant and Young Child nutrition targets to 2030*. New York, USA and Geneva, Switzerland. https://data.unicef.org/resources/who-unicef-discussion-paper-nutrition-targets

For low birthweight, no region is on track to reach the 2030 targets and global progress is off track (no progress or worsening). Only Africa made modest progress (off track – some progress) and the remaining regions have made no progress (off track – no progress or worsening) towards the 30 percent reduction in prevalence of low birthweight. Despite Africa being one of the two regions with the highest prevalence of low birthweight, it is the region where some progress is being achieved in three out of five subregions.

At the global level, there has been some progress (off track – some progress) towards reaching the 2030 target for exclusive breastfeeding. At the regional level, Africa, Asia, and Latin America and the Caribbean have all achieved some progress (off track – some progress). »

TABLE 6 ALL REGIONS MADE SOME PROGRESS TOWARDS THE STUNTING, WASTING AND EXCLUSIVE BREASTFEEDING 2030 TARGETS EXCEPT OCEANIA EXCLUDING AUSTRALIA AND NEW ZEALAND

	Child stunting (%)			Child overweight (%)			Child wasting (%)		Low birthweight (%)			Exclusive breastfeeding (%)		
	2012	2022	2030	2012	2022	2030	2022	2030	2012	2020	2030	2012	2021	2030
WORLD	**26.3**	**22.3**		**5.5**	**5.6**		**6.8**		**15.0**	**14.7**		**37.0**	**47.7**	
AFRICA	**34.4**	**30.0**		**5.0**	**4.9**		**5.8**		**14.5**	**13.9**		**35.4**	**44.3**	
Northern Africa	23.5	21.7		11.8	12.3		6.3		14.0	14.1		40.8	n.a.	
Sub-Saharan Africa	36.2	31.3		3.8	3.7		5.7		14.5	13.9		34.4	45.1	
Eastern Africa	38.6	30.6		3.9	3.6		5.0		14.7	14.0		48.6	59.1	
Middle Africa	37.9	37.4		4.5	4.6		5.6		12.8	12.2		28.4	44.4	
Southern Africa	23.4	22.8		12.3	11.4		3.5		16.4	16.4		n.a.	32.8	
Western Africa	34.5	30.0		2.3	2.4		6.7		14.9	14.3		22.1	35.1	
ASIA	**28.2**	**22.3**		**4.8**	**5.1**		**9.3**		**17.2**	**17.2**		**39.0**	**51.5**	
Central Asia and Southern Asia	39.3	29.4		2.9	2.9		13.7		25.4	23.5		46.5	59.4	
Central Asia	14.7	7.7		8.2	5.0		2.1		6.3	6.0		29.2	44.9	
Southern Asia	40.3	30.5		2.7	2.8		14.3		26.1	24.4		47.2	60.2	
Eastern Asia and South-eastern Asia	16.0	13.9		6.5	8.0		4.2		8.1	8.7		30.3	41.5	
Eastern Asia	7.7	4.9		6.6	8.3		1.5		5.5	5.5		28.4	35.3	
South-eastern Asia	30.4	26.4		6.4	7.4		7.8		12.8	12.5		33.4	48.3	
Western Asia	19.1	14.0		9.1	7.2		3.5		12.2	12.2		31.9	31.7	
Western Asia and Northern Africa	*21.2*	*17.9*		*10.4*	*9.8*		*4.9*		*13.1*	*13.1*		*37.2*	*n.a.*	
LATIN AMERICA AND THE CARIBBEAN	**12.7**	**11.5**		**7.4**	**8.6**		**1.4**		**9.5**	**9.6**		**34.3**	**42.6**	
Caribbean	13.0	11.3		6.5	6.6		2.9		11.4	11.7		29.4	31.4	
Central America	18.2	16.9		6.6	6.7		1.0		10.9	10.9		21.7	37.7	
South America	10.1	9.0		7.9	9.7		1.4		8.6	8.8		42.2	46.8	
OCEANIA EXCLUDING AUSTRALIA AND NEW ZEALAND	**40.9**	**44.0**		**9.3**	**13.9**		**8.3**		**17.4**	**17.9**		**56.6**	**59.5**	
Australia and New Zealand	3.4	3.4		12.4	19.3		n.a.		6.4	6.4		n.a.	n.a.	
NORTHERN AMERICA AND EUROPE*	**4.2**	**3.8**		**9.0**	**7.6**		**n.a.**		**7.4**	**7.4**		**n.a.**	**n.a.**	
Northern America	2.6	3.6		8.6	8.2		0.2		8.0	8.1		25.5	25.8	
Europe	5.1	4.0		9.2	7.3		n.a.		7.1	7.0		n.a.	n.a.	

Legend for stunting, wasting and overweight
On track
Off track – some progress
Off track – no progress
Off track – worsening
Assessment not possible

Legend for low birthweight and exclusive breastfeeding
On track
Off track – some progress
Off track – no progress or worsening
Assessment not possible

NOTES: Details on the methodology to assess progress can be found in **Annex 2**, **Section F**; n.a. is where population coverage is under 50 percent.
* The combined regions of Northern America and Europe had a lower bound confidence interval of 3.1 percent for stunting in 2022 and were projected to have a lower bound confidence interval below 3 percent by 2030; they were therefore categorized as "on track".
SOURCES: Data for stunting, wasting and overweight are based on UNICEF, WHO & World Bank. 2023. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2023 edition).* [Cited 24 April 2023]. https://data.unicef.org/resources/jme-report-2023, www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition; data for exclusive breastfeeding are based on UNICEF. 2022. Infant and young child feeding. In: *UNICEF.* [Cited 6 April 2023]. https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding; data for low birthweight are from UNICEF & WHO. 2023. *Low birthweight joint estimates 2023 edition*. [Cited 12 July 2023]. https://data.unicef.org/topic/nutrition/low-birthweight; www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-low-birthweight-estimates. The targets are drawn from: UNICEF & WHO. 2017. *Methodology for monitoring progress towards the global nutrition targets for 2025 – technical report*. New York, USA and Geneva, Switzerland. https://data.unicef.org/resources/methodology-for-monitoring-progress-towards-the-global-nutrition-targets-for-2025; and UNICEF & WHO. 2019. *The extension of the 2025 Maternal, Infant and Young Child nutrition targets to 2030*. New York, USA and Geneva, Switzerland. https://data.unicef.org/resources/who-unicef-discussion-paper-nutrition-targets

» Considerable improvements have been made in Eastern Africa and Southern Asia with exclusive breastfeeding, both of which are on track to reach their targets. Subregions that are not progressing (off track – no progress or worsening) include the Caribbean, Oceania excluding Australia and New Zealand, Northern America and Western Asia. The subregions with inadequate data (assessment not possible) include Australia and New Zealand, Europe, Northern Africa and Southern Africa.

Global estimates show some progress (off track – some progress) towards reaching the stunting reduction target. Northern America and Europe are on track. All other regions except Oceania excluding Australia and New Zealand achieved some progress (off track – some progress) on stunting reduction. The subregions considered on track for stunting include Australia and New Zealand, Central Asia, Eastern Asia, Europe and Northern America. The remaining subregions are making some progress on stunting with the exception of Middle Africa and Southern Africa.

For wasting at the global level, some progress (off track – some progress) has been achieved, with Latin America and the Caribbean on track to reach the 2030 target. Among the subregions, those on track are the Caribbean, Central America, Central Asia, Eastern Asia, Northern America and South America. Africa and Asia have made some progress (off track – some progress) to address this dangerous condition in regions with the highest prevalence.

There has been no progress in reducing overweight in children to meet the 2030 target at the global level (off track – no progress). The prevalence of overweight is worsening in Asia, Australia and New Zealand, Latin America and the Caribbean, and Oceania excluding Australia and New Zealand. The situation is comparatively better in Africa; the region is still off track (no progress), but with a non-significant reduction in overweight in children under five years of age.

Great achievements have been made in promoting exclusive breastfeeding and reducing stunting, but the results vary across regions. Malnutrition in all its forms is found across all regions and could be underestimated due to various factors, as mentioned at the beginning of this section. Achieving the 2030 global nutrition targets requires stronger and more concerted efforts to prevent global setbacks. The global trends in stunting, wasting, exclusive breastfeeding and low birthweight must be accelerated, while for overweight in children they will have to be reversed, to achieve the 2030 global nutrition targets.

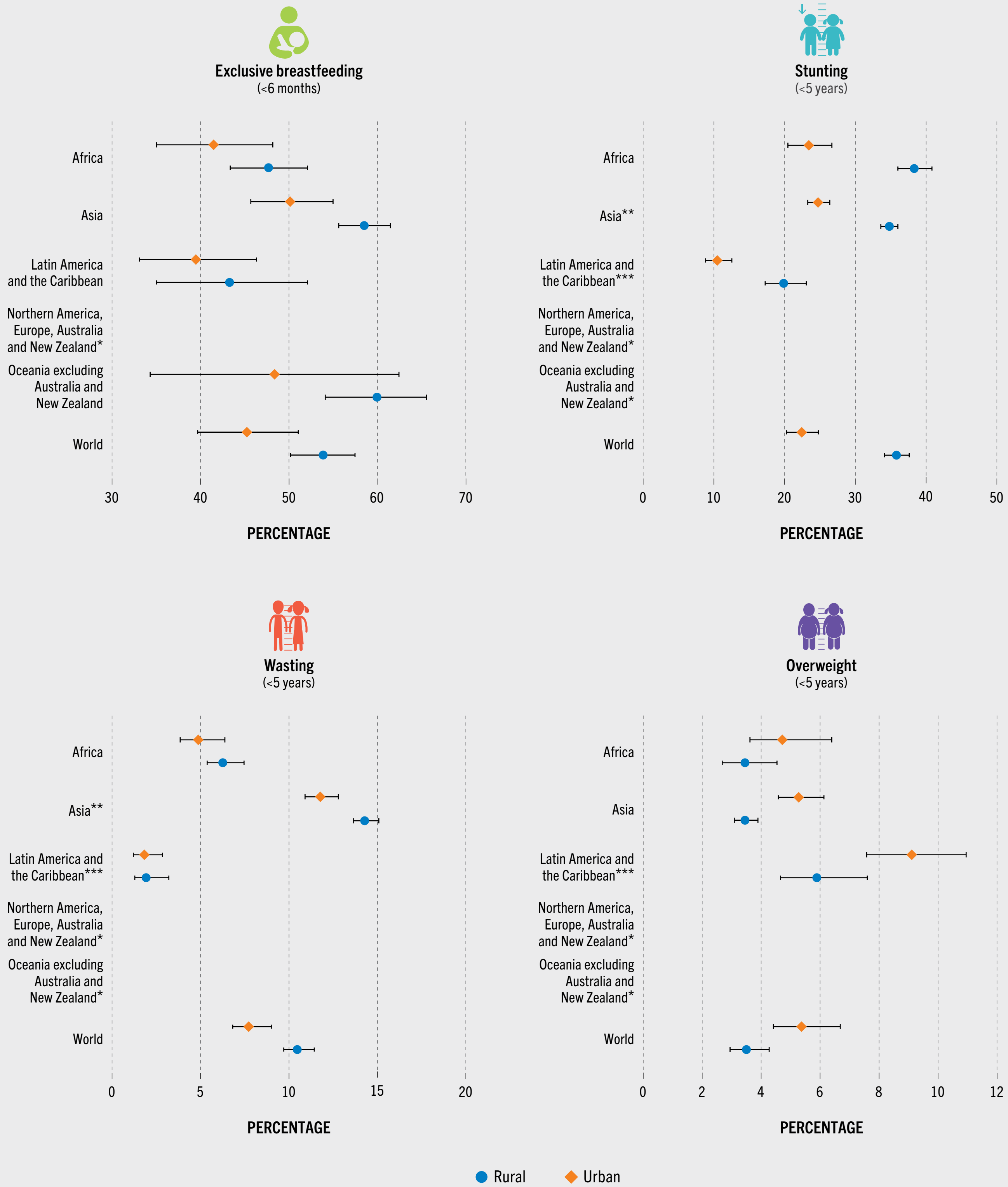
Urban–rural differences in nutrition indicators

In the past, urban children held a distinct advantage of being better nourished than rural children.[47] The higher incomes and improved food access and availability associated with urban residence allowed children to obtain more regular and diverse diets as well as access to health services, potable water and sanitation. But with continued urbanization and the rapid rise in urban poor, there is now a larger population dependent on the most easily available and inexpensive foods which are often not nutritious or hygienic, increasing the risk of malnutrition.

Rural populations often depend on agriculture for their livelihoods. At the same time, the poorest populations are typically found in agricultural regions across and within countries. Hence, when other labour opportunities arise, people often move away from poorly compensated agricultural work, which reinforces the paradox that in agricultural regions, the population and notably its children are more likely to be malnourished.[48] In fact, it has been demonstrated that proximity to agricultural food production does not translate into healthier diets for children. The 2022 report on child food poverty found a higher prevalence of severe food poverty (consuming foods from only two food groups or less per day) among children living in rural areas.[49]

Urban–rural differences in stunting and wasting arise in part from disparities in access to health care, water, sanitation and a hygienic environment.[50] Implementation of key public health interventions across the continuum of care helps to improve the health and nutritional status of children and mothers, through provision of care at first-line health facilities. Improved »

FIGURE 15 THE PREVALENCE OF STUNTING AND WASTING WAS HIGHER IN RURAL COMPARED TO URBAN AREAS, WHILE OVERWEIGHT WAS MORE COMMONLY FOUND IN URBAN AREAS



NOTES: The regional estimates for urban and rural areas presented are based on a population-weighted analysis of a subset of countries with disaggregated data available on place of residence using the latest available data from national surveys between 2015 and 2021 for exclusive breastfeeding and between 2016 and 2022 for stunting, wasting and overweight. * Regions with less than 50 percent population coverage are not considered representative and results are supressed. ** In the urban estimates for Asia, stunting and wasting are based on 49 percent population coverage. *** Latin America and the Caribbean excluding Brazil.

SOURCES: Data for stunting, wasting and overweight are based on UNICEF, WHO & World Bank. 2023. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2023 edition)*. [Cited 24 April 2023]. https://data.unicef.org/resources/jme-report-2023, www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition; data for exclusive breastfeeding are based on UNICEF. 2022. Infant and young child feeding. In: *UNICEF*. [Cited 6 April 2023]. https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding. Population data are based on United Nations Population Division. 2022. *World Population Prospects 2022*. [Cited 27 April 2023]. https://population.un.org/wpp. Rural/urban data are from United Nations Population Division. 2018. *World Urbanization Prospects 2018*. [Cited 27 April 2023]. https://population.un.org/wup

» sanitation and hygiene practices can make significant differences in halting the cycle of infectious disease and undernutrition.

Since 2000, as urban populations have undergone the nutrition transition, nutrition-related NCDs – including obesity, diabetes and hypertension – have caused a larger proportion of death and disability compared to undernutrition.[51] Worldwide, rural populations are now undergoing the same transition, and in some areas are beginning to show higher prevalence of overweight and obesity compared to urban areas.[52] The unfinished agendas to reduce stunting, wasting and micronutrient deficiency, along with rising overweight and obesity, represent the current challenge to address multiple forms of malnutrition. Malnutrition in all its forms is related to poor diets, the rise of low-cost nutrient-poor foods and the increasing availability of highly processed foods in rural areas.[53, 54]

Figure 15 presents the prevalence of four nutrition indicators in rural and urban areas.

The definitions of rural and urban residence used in the analysis are based on national definitions recorded in national master sample frames employed to generate survey samples.[j] The criteria are commonly based on population size, range of economic activities undertaken, whether the area has been assigned an administrative function, or a combination of these characteristics. For more information on rural–urban classification, see Box 3 in **Chapter 3**.

The prevalence of exclusive breastfeeding is significantly higher in rural Asia (58.6 percent) than in urban Asia (50.2 percent). No significant differences were found in exclusive breastfeeding by area of residence in Africa, Latin America and the Caribbean, and Oceania excluding Australia and New Zealand. Globally, exclusive breastfeeding is higher in rural areas (53.9 percent) than in urban areas (45.3 percent) with the differences bordering on statistical significance but clearly indicating public health significance for the millions of children who benefit from exclusive breastfeeding.

j Therefore, the rural–urban classifications are not entirely comparable across countries, as are the DEGURBA classifications used in Section 2.1 and the URCA classification used in **Chapter 3** (see Box 3).

For stunting, there are major rural–urban differences globally and in three of the five regions. In Africa, Asia, and Latin America and the Caribbean, the prevalence of stunting in rural areas is 9 to 15 percentage points higher than in urban areas. Globally, the prevalence of stunting is higher in rural areas (35.8 percent) than in urban areas (22.4 percent).

Wasting presented a similar distribution, with the global prevalence significantly higher in rural areas (10.5 percent) than in urban areas (7.7 percent). In Asia, there is a significant difference in wasting between rural (14.3 percent) and urban (11.8 percent) areas. No rural–urban differences were found in Africa or Latin America and the Caribbean.

For child overweight, there are small but significant differences by rural–urban residence that serve as an important alert. In Asia and globally, overweight prevalence was nearly two percentage points higher in urban areas (5.3 percent in Asia and 5.4 percent globally) than in rural areas (3.5 percent in both). The highest reported regional prevalence in 2022 was among children residing in urban areas of Latin America and the Caribbean (9.1 percent). Current results were not available in the most urbanized subregions, namely Australia and New Zealand, Europe and Northern America.

The results from these analyses help to identify vulnerable population groups, contributing to evidence to inform decision-making and effective action through the appropriate targeting and design of policies and programmes. Sound nutrition is fundamental to the achievement of the Sustainable Development Goals and must be central in government policy and supported by key stakeholders, including civil society and the private sector. ■

PALESTINE
A man tends to the vegetable garden on the rooftop of his home – increasing access to food by improving household-level production.
©FAO/Marco Longari

CHAPTER 3
URBANIZATION IS TRANSFORMING AGRIFOOD SYSTEMS AND AFFECTING ACCESS TO AFFORDABLE HEALTHY DIETS ACROSS THE RURAL–URBAN CONTINUUM

KEY MESSAGES

➔ Growing urbanization is a megatrend that, combined with changes in incomes, employment and lifestyles, is driving changes throughout agrifood systems across the rural–urban continuum, from food production, food processing, food distribution and procurement, to consumer behaviour.

➔ These changes represent both challenges and opportunities to ensure everyone has access to affordable healthy diets. Challenges include the increasing availability of cheap, energy-dense and highly processed foods and the exclusion of small farmers from formalizing value chains. But there are also opportunities for increased employment along the food value chains and improvements in the variety of nutritious foods.

➔ The centrality of large cities to the transformation of agrifood systems is challenged by the fact that, due to urbanization, nowadays one-fourth of the global population live in peri-urban areas of intermediate and small cities and towns, which can serve as important nodes in strengthening rural–urban linkages and the functioning of value chains.

➔ Moreover, with the convergence of high food purchases in both peri-urban and rural areas, where almost half of the global population live, markets in these areas are a significant driver of agrifood systems transformation.

➔ Urbanization is often associated with a diversification of diets, including increased consumption of dairy, fish, meat, vegetables, fruits and legumes – foods that can contribute to a healthy diet.

➔ But there are challenges: i) the availability of vegetables and fruits, in particular, is insufficient to meet the daily requirements of a healthy diet in almost every region of the world; and ii) urbanization contributes to the spread of convenience, pre-prepared and fast foods, often energy dense and high in fats, sugars and/or salt, which are increasingly abundant and also cheaper.

➔ The increased demand for high-value crops, such as fruits and vegetables and processed products, including in rural areas, has led to significant growth in longer, more formal and complex food value chains, providing greater income opportunities for off-farm employment, especially for women and youth.

➔ Supply-side factors, including globalized technology in food production, transportation and marketing, coupled with an increase in demand for readily available foods, have contributed to a substantial expansion of supermarkets, hypermarkets, food deliveries and other convenience retailers. However, these are also associated with increased supply and spread of energy-dense and highly processed foods.

➔ As urban areas and rural areas become more interlinked, rural producers often have better access to agricultural inputs and services, allowing for improved productivity, which typically increases income levels. However, there are also risks that small-scale producers in peri-urban areas may lose their lands to urban expansion.

➔ Overall, access to affordable healthy diets and food security are better in cities than in rural areas, although this generalization is complicated by the socioeconomic disparities in diet affordability and food security that exist within urban areas and across the rural–urban continuum.

Urbanization, combined with other contextual factors such as rising incomes, employment and changing lifestyles, is driving changes throughout agrifood systems across the rural–urban continuum, including food production, food processing, food distribution and procurement, and consumer behaviour. These changes may also lead to disparities across this continuum, with both positive and negative effects on the availability and affordability of healthy diets, and in turn, on food security and nutrition outcomes.

This chapter first examines the drivers, patterns and dynamics of urbanization, through a rural–urban continuum lens. It then presents a conceptual framework to understand the pathways through which urbanization is affecting agrifood systems across the rural–urban continuum. Last, the chapter summarizes the challenges and opportunities that urbanization and the associated agrifood systems changes can pose for access to affordable healthy diets. ■

3.1 DRIVERS, PATTERNS AND DYNAMICS OF URBANIZATION

Drivers of urbanization

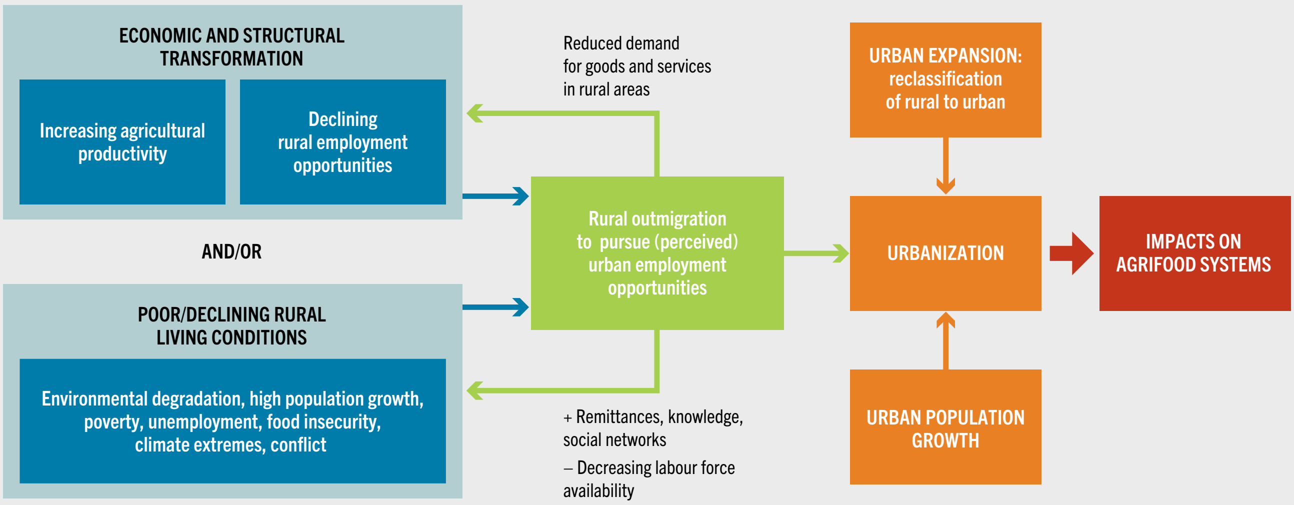
Urbanization is the result of urban population growth, urban expansion (i.e. reclassification of rural areas to peri-urban or urban) and migration from rural to urban areas, as conceptualized in Figure 16. This process is fast-changing, context specific and driven by intertwined factors, including diverse economic developments (e.g. increasing agricultural productivity), policy choices, availability of natural resources, and external stressors such as conflict, climate extremes or environmental degradation.

Many parts of the world have rapidly urbanized since the Second World War, with the urban share of the world's population rising from 30 percent in 1950 to 57 percent in 2021. It is projected to reach 68 percent by 2050.[1] In most regions, this has been largely driven by structural transformation, which entails an economic transformation from mainly agriculture to a more diversified national economy, in the process attracting rural people to urban areas.[2]

The structural transformation of economies is characterized by improvements in productivity, especially of labour, and changes in the relative importance of sectors through the reallocation of production factors such as labour and capital.[3] This entails four interrelated processes: i) a declining share of agriculture in gross domestic product (GDP) and employment, and a gradual shift of jobs from the primary agriculture sector to secondary and tertiary sector jobs, typically located in urban areas; ii) rural-to-urban migration; iii) the rise of a modern industrial and service economy; and iv) a demographic transition from high to low rates of births and deaths.[2, 4, 5, 6]

As the relationship between agriculture and the rest of the economy changes, rural transformation occurs. The latter refers to the process of inclusive and sustainable improvements in rural livelihoods following rising productivity of (smallholder) agriculture, increasing marketable surpluses, rising off-farm employment opportunities in rural areas, better access to services and infrastructure also in rural areas, and the capacity to influence policy, embedded in national processes of economic growth and structural transformation.[7] This process involves a strengthening of rural–urban linkages, which connect agriculture and other activities in the rural economy to the manufacturing and service sectors as they expand into urban centres.[3] Growth in non-farm sectors and shifts in the labour force out of farming are then expected to

FIGURE 16 DRIVERS OF URBANIZATION



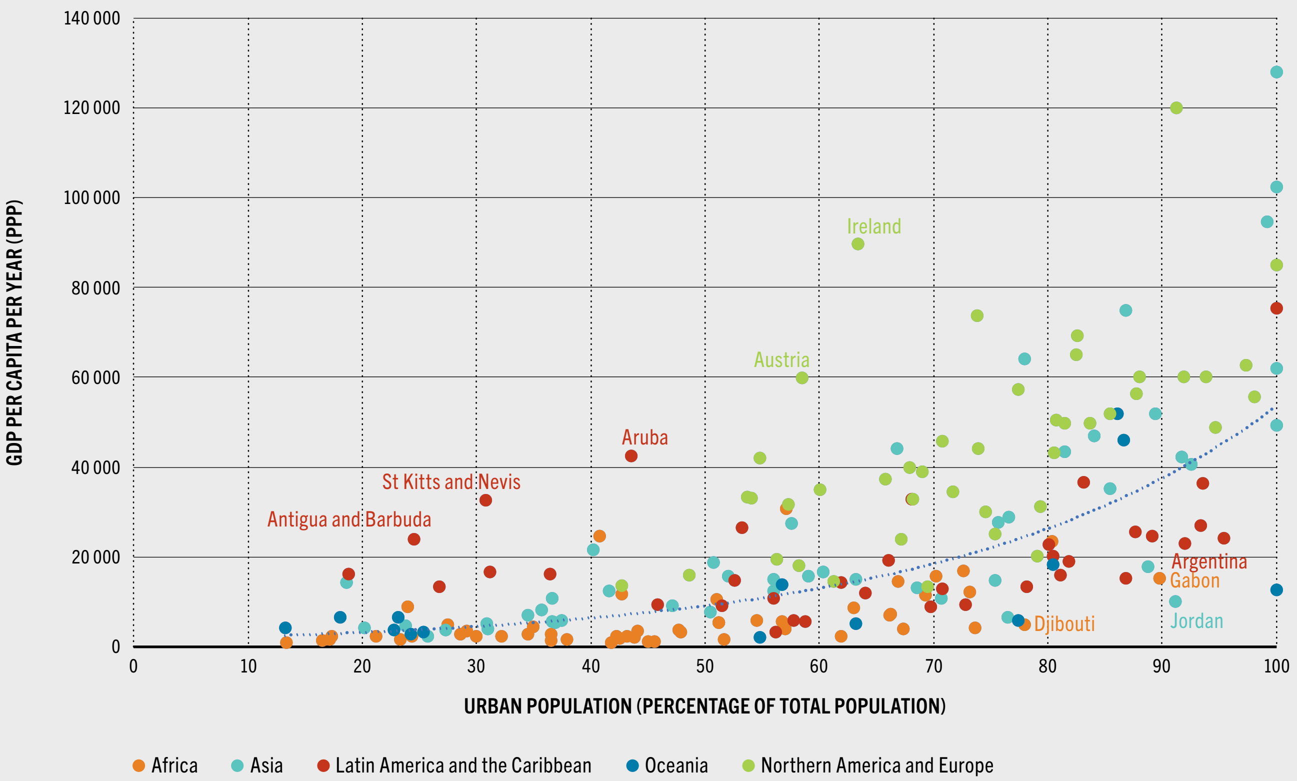
SOURCE: de Bruin, S. & Holleman, C. (forthcoming). *Urbanization is transforming agrifood systems across the rural–urban continuum creating challenges and opportunities to access affordable healthy diets*. Background paper for *The State of Food Security and Nutrition in the World 2023*. FAO Agricultural Development Economics Technical Study. Rome, FAO.

gradually contribute to land consolidation and rising farm sizes. Improvements in agricultural productivity are a necessary condition for such a process to result in reductions in rural poverty and overall improvements in living standards.

However, the theory that urbanization goes hand in hand with economic growth and structural transformation does not hold for all countries and regions. Although countries with a high share of urban population are often more prosperous than countries with a large rural population, this is not true in all cases.[8] Figure 17 shows that although a trend can be seen between GDP per capita at purchasing power parity (PPP) and level of urbanization (measured by the share of the urban population), there is no one-to-one association. For example, in 2019, 91 percent of Jordan's population was urban, but this country's GDP per capita was relatively low at almost 10 000 PPP dollars per year. Likewise, in Gabon, 90 percent of the population was living in cities in 2019, but the country's GDP per capita was around 15 000 PPP dollars per year. Small island countries and territories (Antigua and Barbuda, Saint Kitts and Nevis, and Aruba), as well as small landlocked countries, have lower levels of urbanization than expected considering their relatively high GDP per capita.

Urbanization without structural transformation and economic growth occurred in some of the poorest countries in the late twentieth century.[9] As in the cases above, the increase in share of population in cities does not necessarily indicate high economic growth. Rather urbanization is associated with other "atypical" developments. First, overall population growth leads to growth in both urban and rural areas. Without increases in agricultural productivity, rural population growth results in land subdivision, unviable farming plots and a lack of livelihood opportunities in rural areas. Rural inhabitants then migrate to cities where opportunities may be limited (because of the lack of economic growth), resulting in increases in urban poverty. Second, urban population growth stretches the capacity of urban infrastructure and social and other services to the limit. This is particularly the case for rapidly growing urban areas, where investments have not kept pace with urban expansion.

FIGURE 17 GROSS DOMESTIC PRODUCT PER CAPITA AND LEVEL OF URBANIZATION



NOTES: GDP = gross domestic product; PPP = purchasing power parity. Each dot represents a country/territory.
SOURCE: World Bank. 2023. DataBank. In: *World Bank.* [Cited 23 May 2023]. https://databank.worldbank.org

Urbanization without economic growth can be linked to poor rural living conditions – including poverty, lack of employment or underemployment, lack of infrastructure, lack of access to services and food insecurity – and/or environmental degradation.[10, 11, 12] Southern Asia and sub-Saharan Africa are two regions where structural transformation is lagging behind, as a result of the low productivity of subsistence agriculture and, above all, the rapid rates of population growth and urbanization.[3] In sub-Saharan Africa, there is less poverty reduction alongside urbanization than is historically observed in other regions.[13] Through the late 1990s, sub-Saharan Africa had the highest rate of urbanization in the world; however, this took place in the midst of lagging performances in agriculture and the broader economy.[k] In the late 1990s, per capita income growth in this subregion began to increase significantly, outpacing many countries around the world; still however, aspects of the economic transformation show significant divergences from urbanization driven by structural transformation elsewhere.[15] For example, rural populations continue to grow as most African countries are urbanizing and farm labour is not necessarily moving to

k In sub-Saharan Africa, the urban population share rose by a factor of 3.2, from 11 percent in 1950 to 36 percent in 2010. In comparison, Asia's urban population share during this period increased only 2.5 times (from 18 percent to 44 percent), and Latin America's 1.9 times (from 41 percent to 79 percent).[14]

off-farm sectors of the economy.[15] Moreover, urban-based households, many of whom are medium-scale investor farmers, control a sizeable share of national agricultural land and continue to invest there.

Another factor that may contribute to urbanization is climate change and environmental degradation, which can affect rural-to-urban migration movements.[16, 17] Generally, in low-income rural regions, the lower the per capita income, the larger the share of the labour force employed in agriculture, forestry and fisheries.[18] This means that more people in these regions depend on natural resources for their livelihoods, and are therefore more vulnerable to climate change and environmental degradation.[19] If the agriculture, forestry, fisheries and land-use sectors are weakened from the effects of climate change and biodiversity loss, these populations may be compelled to migrate to urban areas in search of work.[20] With the growing magnitude of climate change impacts, future rural-to-urban migration may be increasingly affected.

However, migration may be neither possible nor desirable for all affected populations. Some of the poorest and most vulnerable groups (including women, children and the elderly) can become trapped in rural areas, their mobility constrained by insufficient resources or social norms. Evidence also indicates that others may choose to remain in high-risk areas due to a strong attachment to their ancestral land and livelihoods.[21] While migration to cities presents risks and opportunities, those who remain in rural areas, whether willingly or unwillingly, are disproportionately vulnerable to climate change impacts, which will have adverse implications for their future livelihoods and food security.

Where there are recurrent climate shocks, patterns of movement can become cyclical, pre-emptive and permanent because of perceived future risk. For example, evidence from Bangladesh suggests that around 22 percent of rural households affected by tidal-surge floods, and 16 percent of those affected by riverbank erosion, have migrated to urban areas.[22] Evidence from sub-Saharan Africa shows that, between 1960 and 2000, nearly 50 percent of net migration[l] (estimated at 5 million people) was due to changes in temperature and rainfall, which affected agricultural production and brought about a reduction in farm incomes and rural wages, thus spurring rural-to-urban movements.[23]

Sending one or more family members into cities to work in sectors other than agriculture, especially for poor rural households, is often important in order to reduce the risks of hunger and extreme poverty, and to cope with possible adverse shocks the household might face. For example, evidence from the Sidama District in southern Ethiopia shows that households whose members were anxious about a decrease in quality and quantity of food were more likely to decide that an adult should migrate in search of employment to support better lives for themselves and the family.[24] Additional evidence from the same country confirmed these results: for households without a migrant member, the inability to feed the family compared to neighbouring households with migrant members increased by four times the propensity to send out a migrant for work.[25]

There is also an increasing occurrence of forced displacement from rural areas to urban areas, often as a result of disasters and/or conflict. Displaced populations are increasingly concentrating in cities, with 61 percent of the 26 million refugees,[26] and two out of three internally displaced persons, residing in urban areas in 2019.[27]

Patterns and dynamics of urbanization

With urban expansion and improving road and communication infrastructure across ever larger parts of rural areas, the distinction between rural and urban areas is increasingly blurred. A large share of the new urban dwellers are expected to live in peri-urban areas, as well as in small cities and interconnected towns. Increasingly, rural and urban areas are less separate spaces in their own right, but rather two ends of a spectrum, connected via numerous linkages across a rural–urban continuum (Box 2), which are important for agrifood systems. »

l The difference between immigration to and emigration from the area during the year.

BOX 2 UNTANGLING THE RURAL–URBAN CONTINUUM

Global populations are regularly categorized as living either in urban centres *or* in rural areas. This distinction is often attributed to data limitations but also to the practicality of the categorization, for example in national ministries which are usually divided by rural and urban mandates.[28, 29] This approach also tends to focus on the rural–urban divide, with the conclusion that rural areas typically lag behind their urban counterparts.[30, 31] However, this divide is challenged both in science and in policy, due to the increasing interconnectedness between various types of population agglomerations.

There is no commonly agreed upon definition of the term "urban" across countries, and thus comparability of "urban areas" across countries and regions is not always straightforward.[32] This limitation carries over directly to globally reported urban population statistics by the United Nations Department of Economic and Social Affairs, which classifies areas as urban according to the criteria used by each country or territory.[33] Criteria may be based on political/administrative aspects, structural and/or functional characteristics related to population density and size or the functions that cities have for their inhabitants.[34]

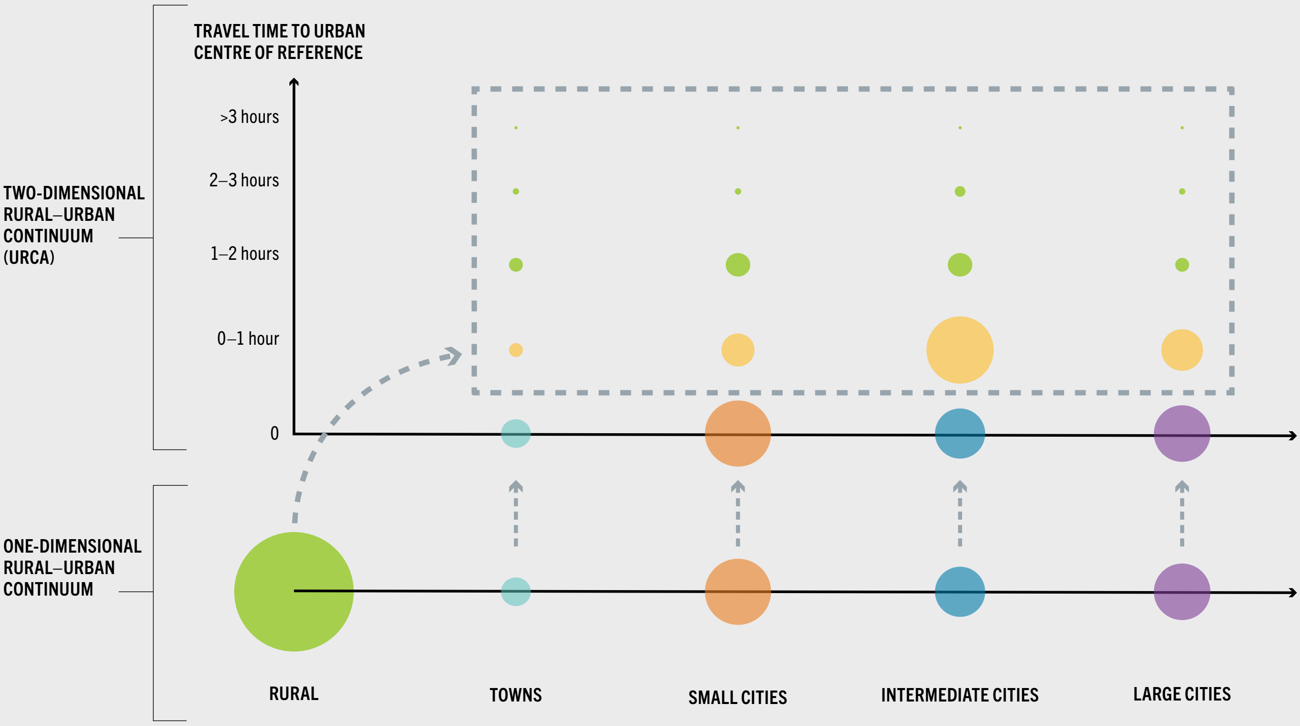
Recently, important advances were made in developing a methodology for delineating urban and rural areas for international and regional statistical comparisons.[35] The UN Statistical Commission endorsed the Degree of Urbanization (DEGURBA) in March 2020 – a methodology developed by a consortium of the European Union and international agencies (Organization for Economic Co-operation and Development [OECD], World Bank, FAO, United Nations Human Settlements Programme [UN-Habitat] and International Labour Organization [ILO]). This methodology classifies the entire territory of a country across a rural–urban continuum,[36] by degree of urbanization. The classification system consists of three classes – cities, towns and semi-dense areas, and rural areas – and seven subclasses for the rural and semi-dense areas, based on population size and density, using the same thresholds across the globe, and thus ensuring global comparability.[37] The outcome is an open-access geospatial dataset. This official classification system is used for the first time in **Chapter 2**, to look at differences in SDG Indicator 2.1.2 (prevalence of moderate or severe food insecurity in the population based on the Food Insecurity Experience Scale [FIES]) among rural, peri-urban and urban populations around the world.

To explore how urbanization shapes agrifood systems, a more granular lens of the rural–urban continuum is useful. For this reason another publically available global geospatial dataset – Urban Rural Catchment Areas (URCA) – is used for the country case study analysis in **Chapter 4**. This newly available global geospatial dataset provides a global mapping of the rural–urban continuum,[28, 38] based on the Global Human Settlement Layer.[39] Like the DEGURBA classification, it places urban centres on a gradient based on population size and density, whereby city size is a proxy for the breadth of services and opportunities provided by an urban centre. But it also adds a second dimension: rural locations are assigned a gradient of their own, using the shortest travel time to urban centres of various sizes as a proxy for the cost of accessing goods, services and employment opportunities (Figure A). Thus, the URCA dataset disaggregates rural areas into multiple categories; distinguishing, for example, between locations that are less than 1 hour from an urban centre (in yellow) and those that are farther away.

The URCA methodology for defining urban–rural catchment areas provides a spatial and functional representation of the connection between rural areas and urban centres, giving new insights into the degree of connectivity between rural and urban areas and the diversity of patterns in rural–urban linkages around the world. Spatial representation refers to the geographical and locational distribution of the population (i.e. what area it occurs in and how spread out it is). Functional representation entails how these areas relate to each other in terms of activities and purpose (i.e. access of rural locations to urban services and opportunities, captured by the size of the closest urban centre and the associated travel time from the rural location). This categorization, when combined with household survey data, allows for a more detailed analysis regarding consumption and production across the rural–urban continuum (see **Chapter 4**).

BOX 2 (Continued)

FIGURE A RURAL–URBAN CONTINUUM BASED ON THE URBAN RURAL CATCHMENT AREAS (URCA) DATASET



NOTES: The figure is a stylized representation of the URCA-defined rural–urban continuum which has a two-dimensional gradient and the more common one-dimensional conceptualization of a rural–urban continuum. The size of the bubble roughly expresses population sizes based on the URCA dataset of global population distribution across the rural–urban continuum in 2015 (see Figure 19B). See **Annex 4** for full definition and description.
SOURCE: Adapted from FAO. 2021. Global Urban Rural Catchment Areas (URCA) Grid – 2021. In: *FAO*. [Cited 12 June 2023]. https://data.apps.fao.org/?share=g-3c88219e20d55c7ce70c8b3b0459001a

» Figure 18 conceptualizes two divergent patterns of urbanization and their major impacts (see Box 3 for definitions of city sizes), which ultimately determine the availability and affordability of healthy diets.[3] The degree of connectivity between rural and urban areas shapes agrifood systems, and thus the availability of affordable healthy diets, and the livelihoods of urban and rural primary producers, processors and traders.[3]

Rural agricultural livelihoods often depend on their connection to peri-urban and urban food spaces, while cities depend on surrounding peri-urban and rural areas for food and ecosystem services. For example, in many parts of Africa, agriculture often flourishes in close proximity to urban centres through more intensive production of high-value crops such as fruits and vegetables, which are highly perishable. In this case, farmers can take advantage of this proximity to markets for both inputs and post-harvest products and services.[3, 40]

Whether urban growth takes place in large or intermediate and small cities or towns will affect rural populations' access to services, markets and

BOX 3 DEFINITIONS OF URBAN, PERI-URBAN AND RURAL AREAS IN URBAN–RURAL CATCHMENT AREAS (URCAs)

The definition of city size and type differs widely among countries. Numerous designations are given indicating size and function, such as primary, secondary or tertiary cities, indicating the role of a city within a national context.

There is also no standard definition of peri-urban, and the term is applied to a diverse mix of informal and formal settlements around urban areas.[41, 42] In general, however, peri-urban refers to the geographical edge of a city – the "urban fringe" outside the formal city limits. It is often described as the landscape interface or transition zone between urban and rural areas.

For the purposes of the discussion and analysis in **Chapters 3**, **4** and **5** of this report, the terminology utilizes URCA definitions to define urban, peri-urban and rural areas.

Based on combined URCA urban area subcategories, urban areas are defined according to the following population sizes:

- Large cities: >1 million people.
- Intermediate cities: 0.25–1 million people.
- Small cities: 50–250 thousand people.
- Towns: 20–50 thousand people.

Furthermore, based on URCA subcategories, peri-urban and rural areas are defined as follows:

- Peri-urban areas consist of three URCA subcategories: <1 hour to a large city; <1 hour to an intermediate city; <1 hour to a small city.
- Rural areas also consist of three URCA subcategories: <1 hour to a town; 1–2 hours to a city or town; >2 hours to a city or town.

See **Annex 4** for further details on the URCA methodology.

inputs (Figure 18). This is because intermediate and small cities, also referred to as "secondary cities",[m] play a pivotal role in providing input and output market opportunities for rural populations not residing close to the large cities. Infrastructure and facilities in intermediate and small cities are important for connecting different urban centres with each other and with rural areas, thereby facilitating access to more dispersed patterns of pre-harvest and post-harvest facilities such as collection hubs, (cold) storage facilities, and distribution and processing centres.[45, 46]

Several studies find that the growth of intermediate and small cities may matter even more than the growth of large cities in reducing poverty nationally.[47, 48, 49] Population growth in large cities seems to have little effect on poverty reduction, and even increases poverty in some cases, while decreasing levels of urban food security.[50] For these reasons, several local, national and international policies have explicitly promoted the growth of such intermediate and small cities.[51]

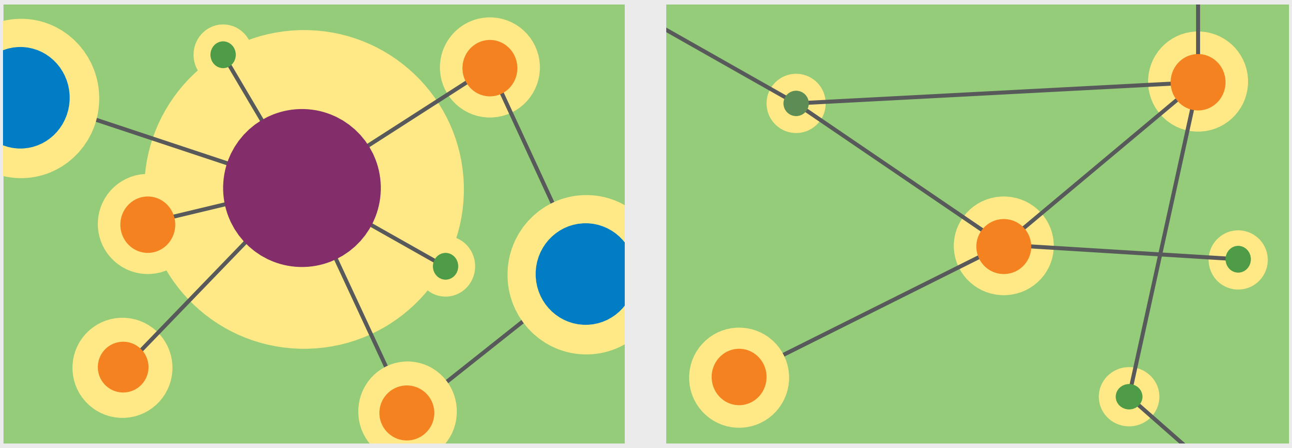
As rural and urban areas represent two ends of a spectrum, a rural–urban continuum framework is therefore critical to understand the links between urbanization and agrifood systems changes and how these changes are affecting the availability and affordability of healthy diets, and in turn, food security and nutrition. With this in mind, the global Urban Rural Catchment Areas (URCA) dataset suggests that the breadth of services and opportunities available, as well as their accessibility to rural locations, are often a function of the size of nearby urban centres and the associated travel time from rural locations (see Box 2 and **Annex 4** for a full description of the data and the definition of URCA categories).

m Secondary cities are geographically defined urban jurisdictions or centres performing vital governance, logistical and production functions at a subnational or submetropolitan regional level within a system of cities in a country. Secondary cities range in size from 100 000 to 1 000 000 people or more in some of the more populated countries, and they are centres of subnational government, logistics, employment and services.[43, 44]

FIGURE 18 PATTERNS OF URBANIZATION

A) DENSE METROPOLIZATION AROUND LARGE AND INTERMEDIATE CITIES

B) DISPERSED SMALL CITY AND TOWN URBANIZATION



A)
- Centralized markets and demand
- More centralized economic growth
- Higher levels of economic inequality
- Increased risk of slums and urban poverty

B)
- Decentralized markets and demand
- Scattered centres of economic growth
- More dispersed non-farm employment
- More inclusive growth

Large city · Intermediate city · Small city · Town · Sphere of influence · Connectivity

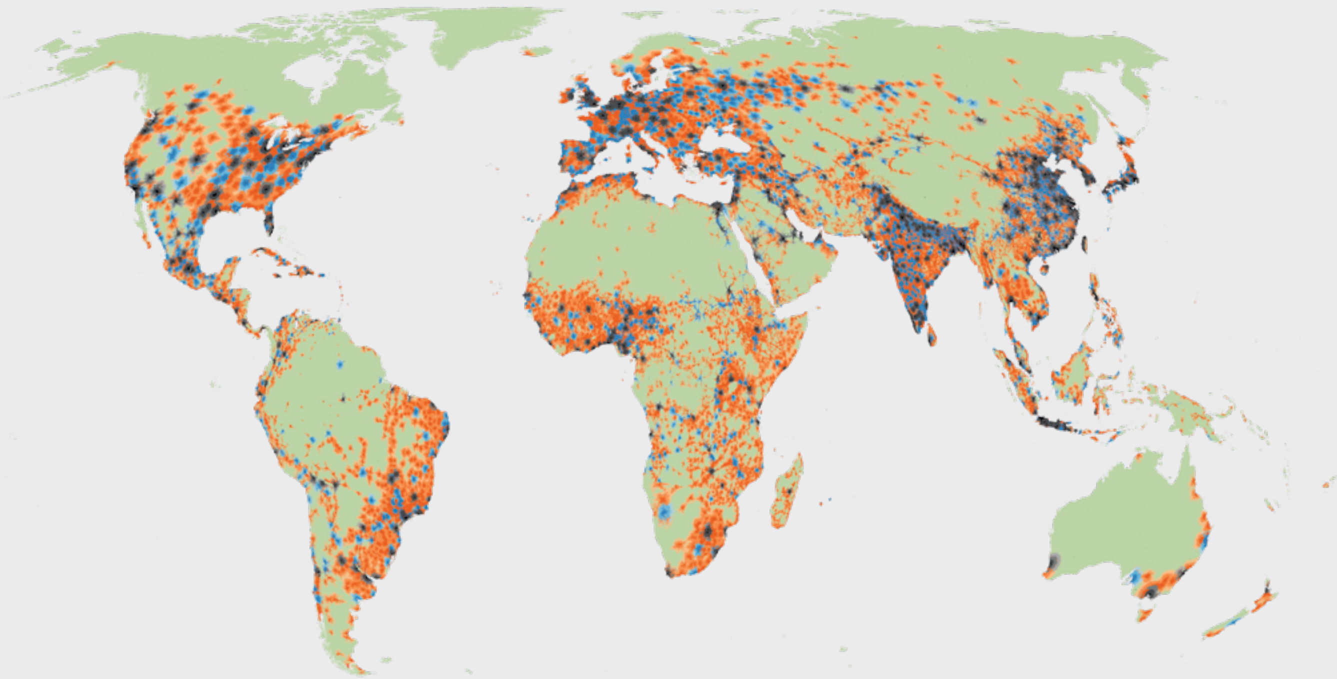
SOURCE: Adapted from de Bruin, S., Dengerink, J. & van Vliet, J. 2021. Urbanisation as driver of food system transformation and opportunities for rural livelihoods. *Food Security*, 13: 781–798. https://doi.org/10.1007/s12571-021-01182-8

Figure 19A shows a global mapping of the URCA categories around the world and Figure 19B shows the global population distribution of URCA categories by country income group and regional group. The URCA mapping reveals disparities in access to services, with around 3.4 billion people living in peri-urban and rural locations (Figure 19) (see Box 3 for specific URCAs). Around one-fourth of the global population live in peri-urban areas (less than 1 hour to an urban centre) of intermediate and small cities and towns, which challenges the centrality of large cities to development, as well as to the transformation of agrifood systems (Figure 19B). Intermediate and small cities appear to provide catchment areas for proportionately more people gravitating around them compared to larger cities, emphasizing their importance (as conceptualized in Figure 18). Similarly, in low-income countries, 64 percent of the population live either in small cities and towns or within their catchment areas (i.e. locations that gravitate around a specific urban centre in terms of access to markets, services and employment opportunities). All told, almost half of the global population (47 percent) live in peri-urban areas (less than 1 hour to large, intermediate and small cities or towns)[n] and rural areas (1 to 2 hours or more to an urban centre). Given the increasing connectivity of peri-urban and rural areas and the convergence »

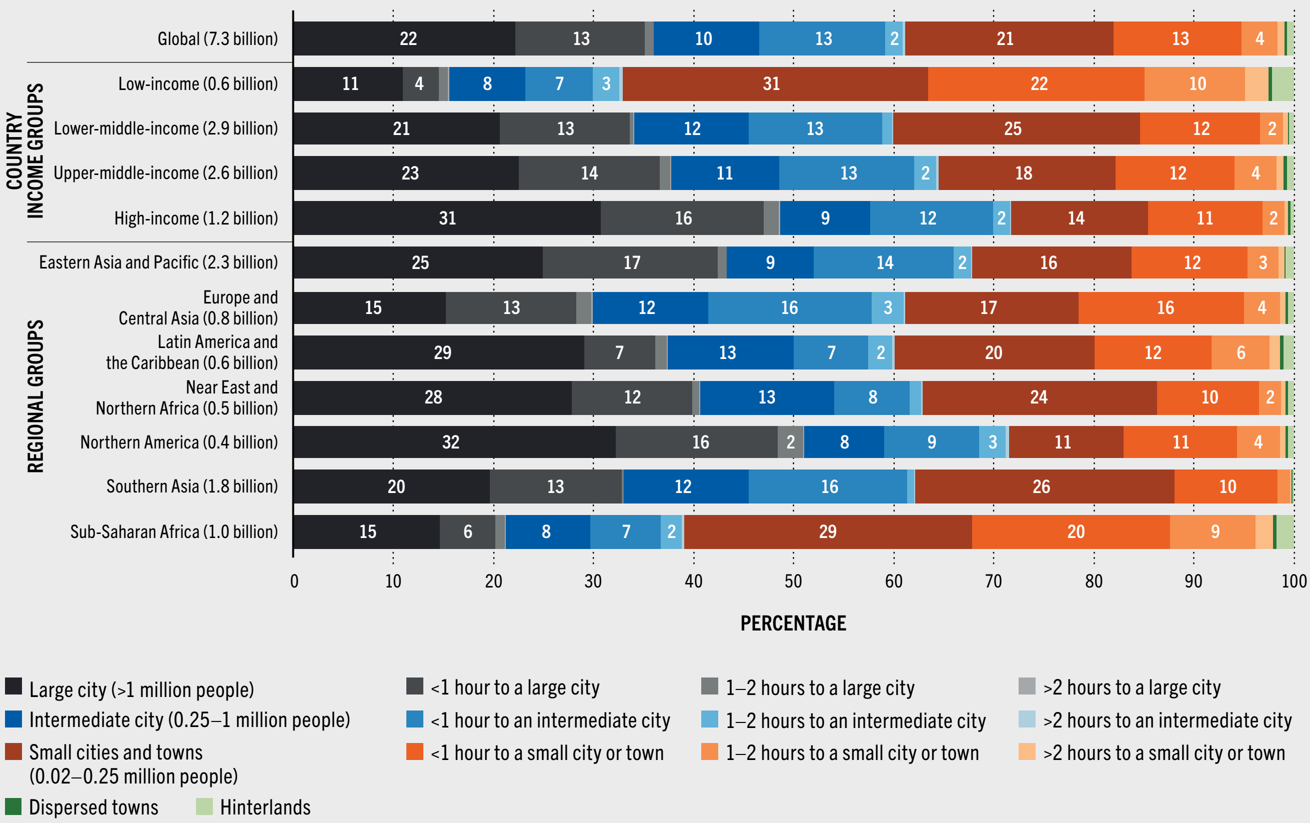
n Note for the purposes of the selected country analyses in **Chapter 4**, small cities and towns are split into two separate categories and peri-urban areas are defined as less than 1 hour travel to a city of any size (i.e. towns are excluded). This facilitates representation of the analysis of the selected countries in Africa studied in **Chapter 4**.

FIGURE 19 GLOBAL MAPPING AND DISTRIBUTION OF POPULATION BY RURAL–URBAN CONTINUUM (URCA) IN 2015

A) GLOBAL MAP OF RURAL–URBAN CONTINUUM (URCA) IN 2015



B) GLOBAL POPULATION DISTRIBUTION ACROSS THE RURAL–URBAN CONTINUUM (URCA) IN 2015, BY COUNTRY INCOME GROUP AND REGIONAL GROUP



SOURCE: Adapted from Cattaneo, A., Nelson, A. & McMenomy, T. 2021. Global mapping of urban–rural catchment areas reveals unequal access to services. *PNAS (Proceedings of the National Academy of Sciences of the United States of America)*, 118(2): e2011990118. https://doi.org/10.1073/pnas.2011990118

» of high food purchases in both (see **Section 3.2**), it is clear that peri-urban and rural markets are significant drivers of agrifood systems transformation. ■

3.2 URBANIZATION AFFECTS AGRIFOOD SYSTEMS, CREATING CHALLENGES AND OPPORTUNITIES TO ENSURE ACCESS TO AFFORDABLE HEALTHY DIETS

Urbanization contributes to the transformation of agrifood systems by reshaping spatial patterns of food demand and affecting consumer preferences, changing how, where and what food is produced, supplied and consumed. These changes are affecting agrifood systems in ways that are creating both challenges and opportunities to ensure everyone has access to affordable healthy diets.

With urbanization and rising incomes, households often eat greater and more diverse quantities of food, including dairy, fish, meat, legumes, fresh fruits and vegetables, as well as more processed foods.[52, 53, 54, 55] This, together with population growth, implies substantial increases in the production and supply of some types of foods (i.e. meat, dairy, fresh fruits and vegetables, wheat and wheat products, as well as highly processed foods) to satisfy increased demand. This, in turn, as urban populations grow, translates into vast increases in the total amount of food that agrifood systems have to produce, process and distribute over time. There may also be slower growth or even declines in demand for other food products sold such as traditional grains, maize, roots and tubers.

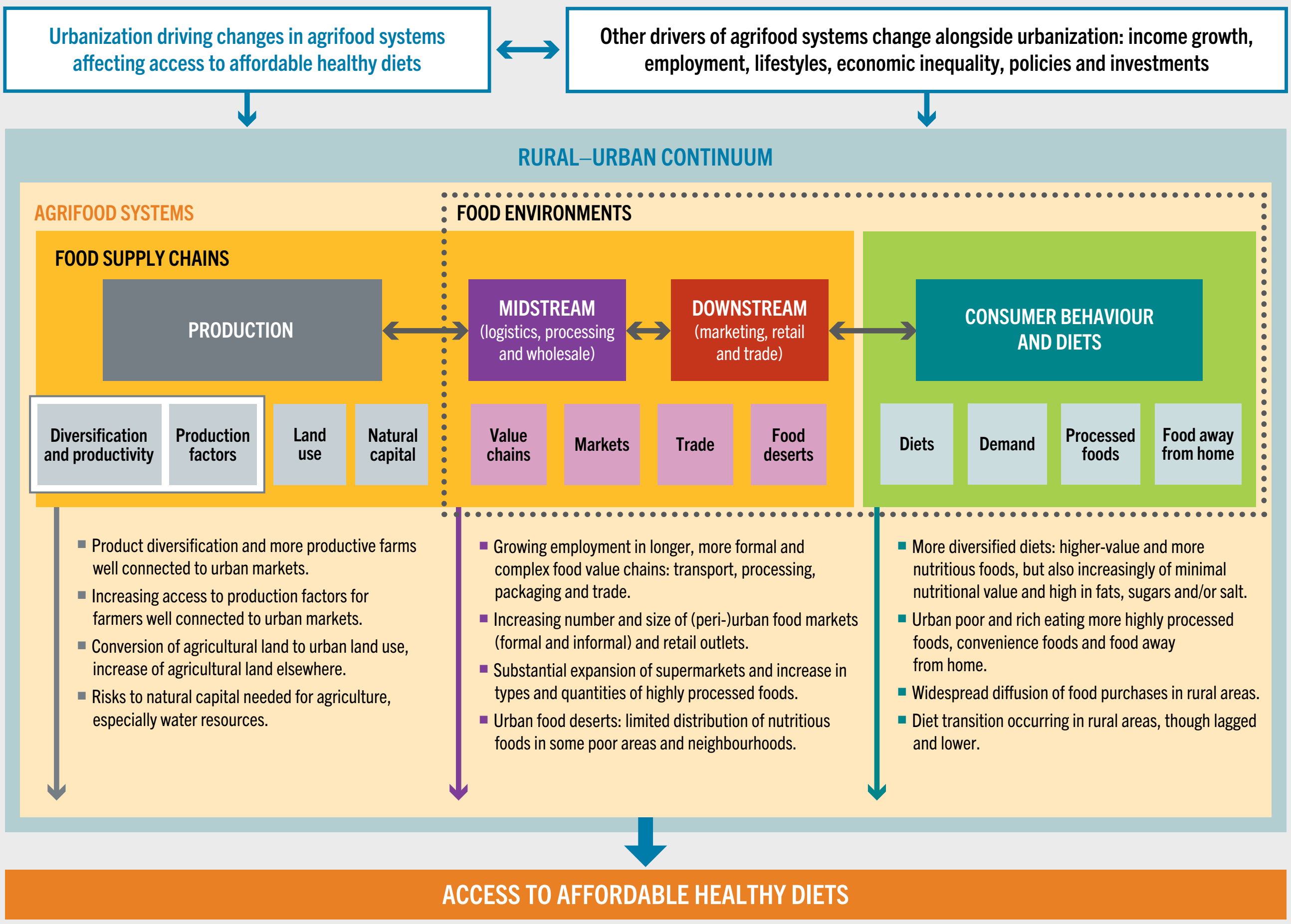
Adjustments in the quantity and quality of food demand and supply bring about changes in markets and retail trade; midstream food supply chains (changes in post-harvest systems for logistics, processing, wholesale and distribution); rural input markets; agricultural technology; and the size distribution of farms.[14, 56] Thus, agrifood systems are transformed, from traditional and mostly rural systems based on local market linkages and farming employment, to systems with greater connectivity between rural areas, and between rural, peri-urban and urban areas. This entails more complex rural–urban market linkages across a spatial and functional rural–urban continuum, and more diverse employment opportunities along the food value chain, including processing, marketing and trade. It also entails more dependence on income and food pricing (affordability) for dietary choices, as there is a greater dependence on purchased foods.

Of specific concern against this backdrop are the changes in the supply and demand of nutritious foods that constitute a healthy diet; their cost relative to foods of high energy density and minimal nutritional value, which are often high in fats, sugars and/or salt; and their cost relative to people's income (i.e. their affordability).

Figure 20 presents a conceptual framework for understanding the different pathways through which urbanization is driving changes in agrifood systems across the rural–urban continuum, and is, in turn, affecting access to affordable healthy diets. The orange text throughout this section refers to specific elements in Figure 20 for emphasis and to ease cross-referencing with the figure. The framework was developed based on a systematic review and meta-analysis of evidence from scientific studies[o] and informed by new analysis presented in **Chapter 4** on changes in food demand and supply across the rural–urban continuum. Figure 20 recognizes that urbanization is not an agrifood systems driver in isolation but that it changes agrifood systems in interaction with other drivers including income growth, employment, lifestyles, economic inequality, policies and investments.

o The design of this review is based on the design as suggested in the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines, but is adapted making use of FAO's Data Lab, which automatizes searches of scientific articles and identifies the most relevant ones through an artificial intelligence method that learns from users' selections and extends the assessment to other articles. A description of the tool and approach is available in **Annex 4.**

FIGURE 20 THE PATHWAYS THROUGH WHICH URBANIZATION AFFECTS AGRIFOOD SYSTEMS AND ACCESS TO AFFORDABLE HEALTHY DIETS



SOURCE: de Bruin, S. & Holleman, C. (forthcoming). *Urbanization is transforming agrifood systems across the rural–urban continuum creating challenges and opportunities to access affordable healthy diets.* Background paper for *The State of Food Security and Nutrition in the World 2023*. FAO Agricultural Development Economics Technical Study. Rome, FAO.

This conceptual framework stipulates that in addition to rural areas, food can also be produced in urban and peri-urban areas. In many countries, the components of agrifood systems are more interconnected. There are also both short and long food supply chains, and there can be a dislocation of midstream processing away from urban areas as part of very long supply chains. For these reasons, the conceptual framework does not visualize the rural–urban continuum alongside the agrifood systems continuum; it is a broader continuum in which agrifood systems can be placed.

Figure 20 depicts the ways in which urbanization is affecting three major components of agrifood systems: i) consumer behaviour and diets; ii) midstream (e.g. logistics, processing and wholesale) and downstream (e.g. markets, retail and trade) food supply chains; and iii) food production. The figure presents these three components in the standard order for conceptualizing agrifood systems and food supply chains. However, the following sections start at the other end with consumer behaviour and diets, as this is one of the most important pathways through which urbanization is driving changes in agrifood systems. Changes across agrifood systems also impact food environments which here refer to physical, economic, sociocultural and policy conditions that shape access, affordability, safety and food preferences.[57, 58, 59, 60]

Moreover, as illustrated in Figure 20 and expanded on below, food environments reflect a complex interplay among supply-side drivers including food pricing, product placement and promotion, and demand-side drivers including consumer preferences and purchasing power. Together this complex interplay of supply and demand considerations is key to understand how urbanization is driving changes in agrifood systems across the rural–urban continuum, affecting access to affordable healthy diets.

Consumer behaviour and diets

One of the most important pathways through which urbanization is driving changes in agrifood systems is through a shift in consumer behaviour and diets (Figure 20). Higher average incomes, combined with changing lifestyles and employment, are driving a dietary transition. While this is occurring in countries and regions at different speeds and with variations, it is happening around the world. This transition is characterized by changes in the types and quantities of food consumed, with diets shifting beyond traditional grains into dairy, fish, meat, vegetables and fruits, but also into consumption of more processed foods[p] and convenience foods or food away from home. These changing preferences are reinforced by the greater diversity of both food products and places to buy food in urban food environments, ranging from supermarkets to informal markets, food street vendors and restaurants.[61] The increased availability of these options often results in increased food consumption and dietary diversity. Dietary preferences are also shaped by marketing and other supply factors, with a reinforcing compounding effect on the food produced, supplied and consumed.

However, urbanization has also contributed to the spread and consumption of processed and highly processed foods, which are increasingly cheap, readily available and marketed, with private sector small and medium enterprises (SMEs) and larger companies often setting the nutrition landscape. Cost comparisons of individual food items and/or food groups from existing studies indicate that the cost of nutritious foods – such as fruits, vegetables and animal source foods – is typically higher than the cost of energy-dense foods high in fats, sugars and/or salt, and of staple foods, oils and sugars.[62, 63, 64, 65] The relative prices of nutritious foods and foods of high energy density and minimal nutritional value have also been shown to differ systematically across income levels and regions.[62, 66, 67]

With urbanization, purchases from supermarkets, fastfood takeaway outlets, home deliveries and e-suppliers and other convenience retailers are increasing.[68, 69, 70] In Latin America and the Caribbean, for example, there has been a profound shift in the last 20 years towards foods of high energy density and minimal nutritional value, including sugar-sweetened beverages. While this phenomenon occurs predominately in urban and peri-urban areas, it is spreading to rural areas and Indigenous Peoples' lands. There has also been a shift towards increased consumption of food away from home and snacking, which corresponds to high levels of overweight and obesity among all ages, along with high burdens of stunting in some countries.[69] Such challenges are not unique to the Latin America and the Caribbean region, and many settings now face multiple, simultaneous burdens of different forms of malnutrition.[71, 72]

Another reason for the spread of processed foods is convenience. Urbanization is associated with changes in the lifestyles and employment

p Food processing can facilitate the promotion of high-quality diets, as it can make food more available as well as safer. However, highly processed foods can contain very high densities of salt, free sugars and saturated or trans fats, and these products, when consumed in high amounts, can undermine diet quality. Free sugars are all sugars added to foods or drinks by the manufacturer, cook or consumer, as well as sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates. For further information, see **Annex 5, Section C** ("Explanatory note on processed foods and food processing classification systems").

profiles of both women and men, as well as increasing commuting times, resulting in greater demand for convenience, pre-prepared and fast foods. Women, who often bear responsibility for food preparation, are increasingly working outside the home, and thus may have less time to shop, process and prepare food. At the same time, men are increasingly working far from home in other cities. These trends are driving the purchase of pre-prepared or ready-to-eat cereals such as rice and wheat,[73, 74] along with more processed foods and food away from home prepared by restaurants, canteens, retailers, etc.[18] The food processing sector and fastfood segment have grown quickly as a result. For example, eating patterns of Tanzanian migrants change when they move from rural to urban areas, away from traditional staple foods such as cassava and maize, and towards convenience, ready-to-eat or pre-prepared foods such as rice, bread and food away from home.[75] Increasingly, this trend is also occurring in rural areas as a time-saving measure for off-farm labourers and women working outside the home, facilitated by increased rural incomes, increased supply of these foods from urban and other rural areas, and reduced transportation costs because of better roads.

The diet transition is also occurring in rural areas, though lagged and to a lesser extent compared to urban and peri-urban areas. New studies in the last two years,[52, 53, 76] including the new analysis presented in **Chapter 4**, underscore the extent of the diet transition across the rural–urban continuum and the absence of stark differences between urban and rural areas within countries analysed.

There is also a diffusion of food purchases in rural areas, more so than is commonly understood. The diet in these areas has shifted from mainly home-produced foods to increasingly market-purchased products. The rural poor are heavily engaged in purchasing food from markets and are, in general, net food buyers. In Eastern and Southern Africa, research shows rural households buy 44 percent (in value terms) of the food they consume.[77] A study of Bangladesh, Indonesia, Nepal and Viet Nam shows rural households buy an even higher proportion of their food – 73 percent (in value terms).[78] Moreover, new research presented in **Chapter 4** also shows that food purchases form the majority (average 56 percent) of the foods consumed (in value terms) by rural households in 11 countries in sub-Saharan Africa. This is true even for those households living 1 to 2 hours from a small city or town (average 56 percent), and those living more than 2 hours from a city or town (average 52 percent).

Studies show that while consumption of processed foods (of all types) is higher in urban areas, in terms of the proportion of expenditure on food, rural consumption of processed foods is not much lower.[54, 79] In Eastern and Southern Africa, for example, 29 percent of total food outlays are spent on such food, and of these 17 percent are spent on purchased milled grains classified as minimally processed items, 48 percent on non-grain minimally processed foods and 35 percent on highly processed foods.[77, 80] Recent evidence from three African countries shows that the shares of processed foods of all types are surprisingly high among the poor and even the ultra-poor, in both rural and urban areas.[52, 53, 54] However, there are different patterns of consumption of various types of processed foods across the rural–urban continuum, with highly processed food and food away from home shares showing a strong correlation with total food-budget shares and urban areas in the 11 sub-Saharan Africa countries analysed (see **Chapter 4**).[54, 79]

Midstream and downstream food supply chains

Another pathway through which urbanization is affecting agrifood systems is changes in midstream and downstream food supply chains (Figure 20). These changes are often the result of increased investments in infrastructure such as roads, warehouses and cold storage facilities. The midstream consists of the post-farm gate activities related to the logistics, processing and wholesale of food. This includes cleaning, sorting, packaging, transportation, storage and wholesaling of agricultural and food products. Downstream food supply chains involve those segments more directly related to consumer purchases, that is retail markets and sales, and trade.

Food supply chains

Urbanization can contribute to longer, more formal and more complex food supply chains, following rising consumer demand and increased regulation of agrifood systems.[81, 82] As cities grow and diets of urban dwellers change, urban populations increasingly must look beyond local production for their food supply. Only around 30 percent of urban residents worldwide are estimated to fulfil their demand for specific crops locally (approximately 100 km radius).[83, 84] The majority of urban food demand, about 80 percent, is supplied regionally (within a 500 km radius).[85]

Although some of the foods consumed in urban areas must travel far to reach their destination, most are produced within national borders and traded domestically (for example, this share is 90–95 percent in Asia).[80] Exceptions are the entire Near East and North Africa region, some countries in sub-Saharan Africa, as well as the Small Island Developing States. According to the latest World Trade Organization report, there are 32 net food-importing developing countries.[86] For these countries, food imports can be substantial. For example, according to the OECD–FAO Agricultural Outlook, roughly 70 percent of all food commodities consumed in the Near East and North Africa are imported.[87] For most other countries, imports are a low share of food supply, and mainly consist of a few products, such that domestic supply chains really drive food supply.[55] This is consistent across regions and most food groups (except oils and fats), and is particularly the case for fruits, vegetables and animal source foods, which are important food groups for healthy diets.

Domestic food supply chains are usually long and criss-cross a country from supply zones to cities and rural areas.[88] Short rural local supply chains, or traditional food supply chains based around subsistence agriculture, only account for approximately 10 percent of the food economy in Africa and Southern Asia, and 5 percent in South-eastern Asia and Latin America.[76, 88, 89] On the other hand, long supply chains connecting rural producers to urban consumers through a web of labour-intensive agrifood SMEs are more prevalent, accounting for approximately 70 percent of the food economy in Africa and Southern Asia, and 50 percent in South-eastern Asia and Latin America.[88, 89] Modern food supply chains based around supermarkets and large processors tend to be long as well, stretching from rural areas to urban areas, but they also include international elements. Such long supply chains account for approximately 20 percent of agrifood systems in Africa and Southern Asia, and 45 percent in South-eastern Asia and Latin America.

Midstream food supply chains

Midstream food supply chains have become major supply chain growth engines as a result of the overall rise in urban food demand and more specifically the higher demand for high-value and processed products.[90] These supply chains have grown quickly over several decades and now constitute a significant share of the total value added and costs in food value chains. In low- and lower-middle-income countries, midstream food supply chains form 30 to 40 percent of the value added in food value chains.[80] Additionally, due to the embeddedness in local economies, the midstream segments can provide locally adapted services and market linkages to farmers contributing to enhancing food supply and rural economies.[91]

The past several decades have witnessed a rapid proliferation of SMEs, which now play an important role in the transformation of agrifood value chains in Africa, Asia and Latin America.[91, 92] The spread of SMEs is most rapid during the transitional stage of this transformation, when agrifood value chains develop and grow longer as urbanization progresses, but remains fragmented (see Table 7 for more detail on the transformation of agrifood value chains). The absence of appropriate policies has been a factor hindering the proliferation of "formal" SMEs, particularly in the processing sector.[91]

In sub-Saharan Africa, SMEs operating in the midstream food value chains procure 95 percent of the total supply for small farms and have become the largest investors in agricultural produce markets in the region.[93] The productivity of this midstream is, therefore, as important as farm yields for food security in poor countries. The post-farm gate segments of the supply chain – the midstream (processing

TABLE 7 THE THREE STAGES OF TRANSFORMATION OF AGRIFOOD VALUE CHAINS

	Traditional agrifood value chains	Transitional agrifood value chains	Modern agrifood value chains
Main enterprise type in:			
Retail	Home enterprise	Small and medium enterprises (SMEs), wet markets	Supermarkets
Food service	None (home cooking)	Street vendors, independent restaurants	Fastfood chains, supermarkets and hypermarkets, independent restaurants
Processing	None (home processing)	SMEs such as small mills	Large processors and food manufacturers
Wholesale	Brokers based in rural villages	Wholesalers based in urban markets	Off-market distribution companies
Logistics	Own logistics by brokers	SMEs in third-party logistics (3PL)	Large 3PL companies and freight forwarders
Supply chain length	Short, local	Long, rural–urban	Long, rural–urban, international
Exchange arrangements	No contracts, no standards	No contracts, public standards, some vertical integration	Emerging contracts, private standards, vertical integration
Technology	Labour intensive	Labour intensive	Capital intensive
Foreign direct investment	None	Emerging	Significant

SOURCE: Adapted from Barrett, C.B., Reardon, T., Swinnen, J. & Zilberman, D. 2022. Agri-food Value Chain Revolutions in Low- and Middle-Income Countries. *Journal of Economic Literature*, 60 (4): 1316–1377. https://doi.org/10.1257/jel.20201539

and wholesale/transport) and downstream (retail and food stalls) segments – together comprise 40 to 70 percent of food costs for urban Africans.[94] Rural areas nearer to cities tend to experience a more rapid transformation of food value chains, including the development of the midstream.[80] However, in some low-income and urbanizing countries, the midstream segments of agrifood systems are still at an early stage of transformation. For example, in many countries in sub-Saharan Africa, most cities still have only a narrow range of packaged and processed foods, with the greatest diversity of products available in the capital or large cities.[95, 96, 97]

Importantly, **growing midstream and downstream activities provide important off-farm employment opportunities**, which can provide steady and liveable incomes, increasing the affordability of healthy diets. For example, in sub-Saharan Africa, employment in off-farm agrifood systems is currently growing more rapidly than employment in farming itself[45] – a clear manifestation of agrifood systems transformation. Employment in off-farm activities, most often in SMEs, includes post-farm gate jobs in food processing, wholesale, logistics, retail, and food service, as well as non-agrifood systems jobs. Studies show that SME employment in agrifood systems in processing, wholesale, transport and retail can be especially important to the employment of women and youth.[36, 98] While estimates of the number of employed people in food supply chains are scarce, a number of studies have estimated employment in agrifood systems as a whole for specific regions and subpopulations. For example, one study estimates that in Africa, Asia and Latin America, youth employment rates in agrifood systems are 61 percent, 39 percent and 48 percent, respectively.[99] Another study in Western Africa estimates that agrifood systems account for 66 percent of total employment and that processing

BOX 4 FOOD DESERTS AND SWAMPS

Urbanization and changing agrifood systems have given rise to two new types of food environments: food deserts and food swamps. Food deserts are geographic areas where residents' access to diverse, fresh or nutritious foods is limited or even non-existent, due to the absence or low density of "food entry points" within a practical travelling distance. Food swamps are areas where there is an overabundance of foods of high energy density and minimal nutritional value. They offer few options for affordable, nutritious foods.

Although both concepts have been criticized for their narrow and inappropriate meaning in certain contexts,[110] urbanization can affect the accessibility of both healthy and unhealthy diets, especially in expanding informal neighbourhoods. While a new and growing phenomenon in urban slums of low- and middle-income countries, this problem was already well established in poorer neighbourhoods in high-income countries.

For example, the rapid growth of Windhoek, the capital of Namibia, has gone hand in hand with the rapid growth of informal peri-urban and urban settlements. These settlements can be defined as food deserts due to the lack of nutritious foods for most inhabitants.[111] In the Mexican city of Mazatlán, in contrast, low- and middle-income neighbourhoods, with a very high density of very small, informal businesses selling energy-dense snacks, quick meals and sugary drinks, can be considered food swamps.[112] In Rio de Janeiro, Brazil, a study found that food deserts and swamps were simultaneously more prevalent in the lowest-income neighbourhoods, which had high levels of deprivation and segregation.[113]

and food vending/services are disproportionately female, with women comprising over 80 percent of workers in those sectors.[45] In the fisheries and aquaculture sector, women represent 50 percent of those employed in the entire aquatic value chain (including pre- and post-harvest).[100]

Furthermore, several studies highlight that especially in low- and middle-income countries, where agrifood systems employ the largest number of workers, agrifood systems transformation offers the promise of new jobs both downstream and midstream, particularly for large, young populations.[101, 102, 103] A new study estimates that total employment in agrifood systems was 1.23 billion people worldwide in 2019.[104, 105] Total agrifood systems employment in Africa is estimated at 62 percent, compared with 40 percent in Asia and 23 percent in the Americas. While the study does not disaggregate employment by the different components of agrifood systems, it does separate out employment related to food supply trade and transportation. Of the 1.23 billion people employed in agrifood systems, 375 million are in jobs related to food supply, trade and transportation. The inclusion of trade and transportation jobs has the biggest impact in Africa, where the share of non-agricultural jobs in agrifood systems is between 5 percent and 14 percent. Across all other regions, the share ranges from 8 percent in Europe to 14 percent in Africa.[104, 105]

Changing urban food markets: the rise of supermarkets and highly processed foods

Urbanization results in an **increase in the number and size of urban food markets**. Both formal and informal food market outlets have been expanding with city growth, owing to the demand and purchasing power of urban residents as well as to public and private investments in these markets. A study in Eastern and Southern Africa estimates the growth of urban markets in the two regions at between 600 percent and 800 percent over the last four decades.[90] A study of South-eastern Asia places growth at roughly 1 000 percent in the same period.[106] Urbanization and changing agrifood systems have also given rise to both food deserts and swamps, which are characterized by markets that provide poor access to or limited availability of diverse and nutritious foods (Box 4). »

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A woman harvesting potato leaves.
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» The formal food sector is characterized by more formalized supermarkets and chains; they are regulated and taxed by governments at various scales, and – unlike informal markets – are able to afford financial and technical services. In contrast, the informal food sector can be broadly defined as all food-related economic activities that take place in independent, small and/or unregistered enterprises. Mostly, there is limited coverage by formal authorities for monetary, regulatory and institutional arrangements such as taxation.

Supply-side factors, coupled with an increase in demand for readily available foods, have contributed to a substantial expansion of supermarkets and hypermarkets.[107, 108, 109] These supply factors include policy liberalization and privatization in the 1980s and 1990s leading to competitive domestic investments, public infrastructure investments that reduced transaction costs for supply chain development (e.g. procurement systems), and globalized distribution of modern technology related to food production, transportation and marketing, mass media, and the flow of capital and services. Supermarkets have been able to attain economies of scale in procurement, and economies of scale and scope in marketing, which has allowed them to increase over time their share of retail compared to small shops and wet markets (marketplaces selling fresh foods such as meat, fish, produce and other consumption-oriented perishable goods in a non-supermarket setting), especially in Asia and Latin America.[108, 109]

Increasingly, supermarkets and hypermarkets represent the major force contributing to the diet transition in any country or region. Their establishment has been facilitated by the increase in large urban food markets, which both bring together potential consumers and attract foreign investments.[114] These markets are often part of multinational chains or, in countries such as South Africa and China, domestic chains that function like global chains.

The relationship between urbanization and the growth of supermarkets differs widely by region and city size. In Latin America and the Caribbean, urbanization occurred in the 1980s, before the rise of supermarkets, and the process was actually more profoundly linked to privatization and liberalization of agrifood systems.[69] In Asia on the other hand, supermarket development was closely correlated with urbanization. Ultimately, the shift towards more supermarkets has been driven by a range of factors including rising incomes, changing lifestyles, marketing and increasing awareness of food safety and quality.[115, 116, 117]

While supermarkets can be linked to increased access to nutritious foods,[118] and modern food technology has provided benefits in terms of reducing waste, enhancing sanitation and reducing adverse effects of seasonality,[109] they have also been associated with increased supply of energy-dense and highly processed foods.[81, 119, 120, 121, 122, 123] The substantial expansion in the types, varieties and quantities of highly processed foods sold worldwide can be associated with the expansion of supermarkets and hypermarkets, the industrialization of agrifood systems, technological change, and globalization including market growth and the political activities of transnational food corporations. While there are wide variations between regions and countries, sales of highly processed foods are highest in Oceania and the Pacific, Northern America, Europe and Latin America, but are also growing rapidly in Asia, the Near East and Africa.[119]

Despite the greater penetration of formal markets such as supermarkets and hypermarkets, open and wet markets, as well as informal kiosks and street vendors, are still important for local urban food cultures in many countries around the world, particularly in Asia and Africa.[117] Here, the low average annual income per person is seen as an important limitation for supermarkets to expand.[124]

Poor urban dwellers especially buy most of their food at informal markets or street shops. For example, supermarkets account for only 3 percent and 0.4 percent of all food expenditure of slum dwellers in Nairobi and Kampala, respectively.[125] In Zambia, the share of supermarkets is lower in small cities than in larger cities.[126] Despite a greater penetration of formal markets, informal food retailers – such as street and market traders and small-scale shops – remain abundant across the African

TABLE 8 THE AVAILABILITY OF FOOD GROUPS TO MEET A HEALTHY DIET BASKET, BY REGION (PER CAPITA PER DAY), 2020

	Africa	Asia	Latin America and the Caribbean	Northern America	Europe	World
	(%)					
Staple foods	188	108	68	44	73	111
Animal source foods (except oils)	–33	40	143	331	258	71
Pulses, nuts and seeds	–38	–37	–42	–43	–67	–41
Vegetables	–55	25	–63	–20	–27	–4
Fruits	–40	–31	–2	–13	–24	–29
Fats and oils	–21	–3	67	100	82	12

NOTES: Yellow highlights emphasize where amounts of food available are insufficient to meet a Healthy Diet Basket (HDB). Food availability is based on FAO Food Balance Sheets data and healthy diet requirements by food group are those of the HDB used in the cost and affordability of a healthy diet in **Chapter 2**.
SOURCE: Dolislager, M.J., Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum for selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

continent as well as in many Asian countries.[117] In Latin America and the Caribbean, street markets and wholesale markets are also still relevant, especially for fresh foods.[127, 128, 129] In places where supermarkets are expanding, this process affects prices, quality and safety standards, often restricting access to sales channels for small producers.[130, 131]

Food production

Urbanization, in particular, by increasing the connectivity of rural and urban areas, also affects agrifood systems through changes in agricultural production (Figure 20). As consumer behaviour and diets change, this influences agricultural production and diversification, with shifts in intensity and type of production factors (i.e. labour, land and other natural resources). Furthermore, as already highlighted, this has a reinforcing compounding effect – as food supply changes in turn influence consumer behaviour and choices, which further affect food production.

Food production, production factors and agricultural services

Urbanization is often associated with a diversification of diets, including dairy, fish, meat, vegetables, fruits and legumes – foods that help constitute a healthy diet, as already highlighted above. However, the availability of vegetables and fruits, in particular,[q] is insufficient to meet the daily dietary requirements in almost every region of the world (Table 8). Particularly concerning is the insufficient availability of all food groups apart from staple foods in Africa. There are, however, notable differences across countries and within regions. For example, the supply of vegetables is more than adequate in Asia.[55]

Urbanization affects agricultural production in different ways across the rural–urban continuum. In rural and peri-urban regions that are well connected to expanding urban markets or storage and processing facilities, small- and large-scale farmers are increasingly commercial and relatively well served by agribusinesses providing inputs and farm output marketing services.[133] Farmers located close to urban markets often receive higher returns on their agricultural products and benefit most from growing markets for diversified high-value products.[134, 135]

As urban areas become better connected to rural areas, rural producers may also have better access to agricultural inputs and services, allowing for improved productivity that typically increases income levels,[136]

q This finding is aligned with an analysis in the 2020 edition of this report,[62] which showed that the availability of fruits and vegetables for human consumption was below 400 g per capita per day, which is the recommended amount in FAO and World Health Organization guiding principles of a healthy diet.[132] Further research is needed to determine the reasons behind these results.

which is key to increase access to nutritious foods. For instance, in Meru, United Republic of Tanzania, urbanization has stimulated the demand for milk, providing a reliable source of income for smallholders in a region facing a scarcity of (fertile) land.[137] Improved access to inputs and the support of stable institutions were important conditions that facilitated this intensification, resulting in higher incomes.

The effects of urbanization can spread to agricultural zones quite far from towns and cities, depending on the connectivity between rural and urban areas, which is shaped by the proximity to cities and by existing transport routes.[138] This can be seen in the rural regions around Delhi, India. Vegetables and dairy products are becoming increasingly important components of consumption not only in high-income urban households, but also in low- and middle-income urban households. As a result of these changes in urban consumption, the rural areas around Delhi, which used to be cultivated with cereals, are now increasingly being diversified to vegetable production and livestock keeping, and productivity is rising.[139] The far-reaching influence of urbanization is also seen in fisheries, where it has impacted fishers' ability to meet the rising cost of living in fishing communities.[140]

At the same time, millions of smallholders in less accessible or detached hinterlands remain cut off from the opportunities that growing urban food markets can bring.[141] In more isolated rural areas, agricultural growth is limited due to low productivity and high transportation costs.[138] Farmers with limited access to urban markets have few opportunities to profit from urban development. For example, in sub-Saharan Africa, the adoption of high-input technology and crop productivity is found to be negatively correlated with travel time to urban centres.[142]

Another important direct impact of urban expansion is **land-use change**. In some countries, farmers receive high compensation for selling their land,[143] whereas in others, dispossession of agricultural land is not compensated, resulting in a loss of livelihoods and issues around land rights. As farms in peri-urban areas make voluntary or involuntary room for urban expansion and associated infrastructure, they often move farther away from cities and convert more remote natural areas (mostly forests and scrublands) into new farmland, negatively affecting habitat quality and biodiversity, and causing environmental degradation and deforestation.[144, 145, 146, 147] In some cases, farmers are driven to use less productive lands in more remote villages, or are restricted to unauthorized public spaces.[148, 149] What is more, converted lands are less fertile than arable lands around cities, leading to a loss in agricultural productivity that is higher than the absolute loss of land.[150] Meeting food production and demand for an urbanizing population when land availability and quality are reduced requires agricultural intensification; this implies intensive use of energy, land and water, which if not managed to mitigate against climate change, can lead to an increase in greenhouse gas emissions.[151, 152, 153, 154]

With urbanization continuing, the resultant loss of cropland is expected to be 3 percent in the whole of Asia and Africa by 2030. The production loss, however, is 6 and 9 percent (respectively), because (as stated above) agricultural land around cities is often more fertile – an important reason why cities historically developed where they did. Additionally, farmers close to cities are often more productive due to higher input use and knowledge levels.[150] Therefore, the productivity loss is higher than the absolute loss of land. In most countries, production is relocated, although this is not possible everywhere – in Egypt, for instance, the amount of arable and fertile land is limited.[155]

Urbanization can also affect farm size in various ways. Impacts depend on land tenure security, non-farm opportunities, and the magnitude and impact of land purchases by urban buyers.[133, 138] In low-income countries, farm sizes have decreased from an average of 2.1 hectares in 1960 to 1.3 hectares in 2010, due to rural population growth (and subsequent outmigration as part of urbanization).[156] In general, farm sizes decrease until off-farm opportunities, often in cities, expand sufficiently to absorb new workers. Asia has now passed this turning point so its average farm sizes can rise, while in Africa average farm sizes are expected to continue to fall in many countries[138] – although in some areas they are rising. In sub-Saharan Africa, the growing acquisition of farmland by urban buyers has increased average farm sizes compared to other African countries.[15]

How urbanization affects access to affordable healthy diets, food security and nutrition

Urbanization can have both positive and negative impacts on access to affordable healthy diets and on food security and nutrition across the rural–urban continuum. Linkages between urbanization and access to affordable healthy diets are not unequivocal: observations depend highly on local or national context-specific dynamics, including investments in agrifood systems as well as in rural and urban infrastructure, training and education, and economic policies. There are however some important overarching challenges and opportunities concerning urbanization across the rural–urban continuum. Figure 21 summarizes the most important of these, drawing from the previous sections on how urbanization is affecting agrifood systems, as well as further empirical evidence and studies. Although the challenges outnumber the opportunities, this is not per se the case for the magnitude of the impacts on access to affordable healthy diets.

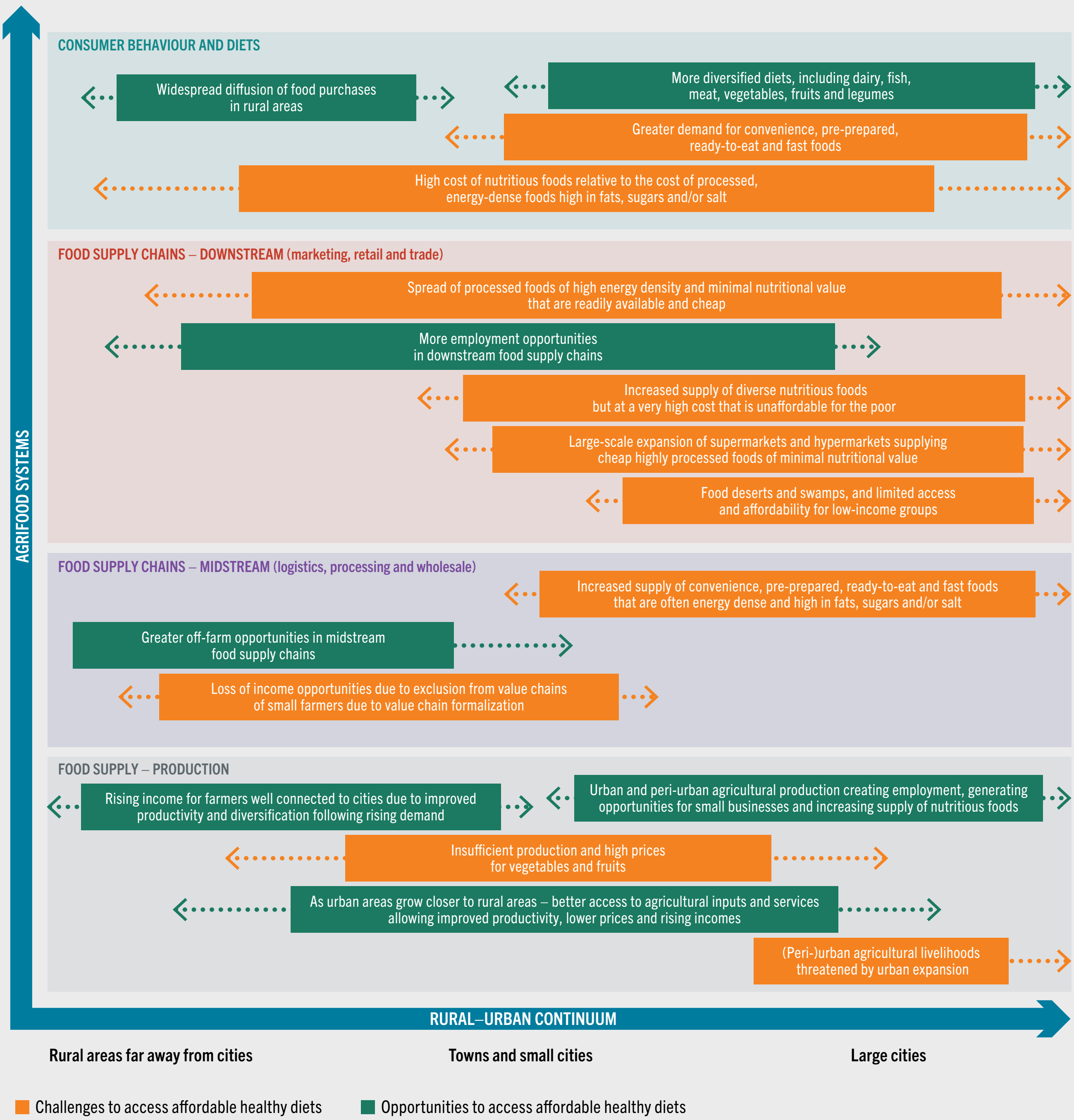
In recent years, many studies have focused on urbanization and agrifood systems transformation; nevertheless there is limited common understanding of how the nexus of these two processes affects both access to affordable healthy diets and food security and nutrition, and even fewer studies have applied a rural–urban continuum lens. Data to support such a disaggregated rural–urban continuum analysis are extremely limited; the analysis requires household survey data with geospatial locational data, and for most countries in the world such data are not readily available. **Chapter 4** explores this question through a new analysis on variations in food demand, economic access to healthy diets, and food security and nutrition across the rural–urban continuum, using selected country case studies as far as data availability allowed.

What we do know is that empirical evidence reveals socioeconomic disparities in access to affordable healthy diets throughout the rural–urban continuum as a result of a number of structural challenges.[62, 157] These include economic challenges related to the high cost of nutritious foods (Figure 21), which varies within countries and can be even higher in poor neighbourhoods. For urban populations living in poverty, the most easily available and affordable diets tend to be unhealthy.[158] Access to nutritious foods is often limited, as these types of foods are more expensive, or in some cases unavailable, in more urbanized areas. Poorer households are inclined to prioritize meeting dietary energy requirements over nutritional quality, spending their resources on more affordable foods, which tend to be of high energy density and minimal nutritional value.[158, 159] Other structural barriers are found in agrifood supply systems and markets, impeding physical access to healthy diets (resulting in food deserts and swamps in urban areas, for example).

For other income groups of urban dwellers, an important challenge to access to affordable healthy diets is that urban centres have more supermarkets and especially fastfood chains, including multinational outlets, offering a ready and abundant supply of highly processed foods, as well as energy-dense snacks, sweets, and sugar-sweetened beverages (Figure 21). These developments have negatively affected obesity levels and health conditions of urban dwellers.[160, 161] It is important to note that while supermarkets have an advantage in selling highly processed foods because of economies of scale, a growing number of small shops are also selling these products.[54, 69] The rapidly increasing share of highly processed foods of high energy density and minimal nutritional value, especially in urban consumption patterns, is linked to the rise in obesity and non-communicable diseases.[54] In many countries, obesity levels have risen alongside urbanization. New evidence for Africa suggests that consumption of highly processed foods and high-calorie snacks and beverages is spreading across the full spectrum of the rural–urban continuum, even among the rural poor – a trend of great concern (see **Section 4.1**).

Recent empirical studies show that the risk of food insecurity can even be higher in urban areas than in rural areas, due to the intra-urban inequalities present in many rapidly urbanized »

FIGURE 21 CHALLENGES AND OPPORTUNITIES IN ACCESSING AFFORDABLE HEALTHY DIETS ACROSS THE RURAL–URBAN CONTINUUM



SOURCE: de Bruin, S. & Holleman, C. (forthcoming). *Urbanization is transforming agrifood systems across the rural–urban continuum creating challenges and opportunities to access affordable healthy diets*. Background paper for *The State of Food Security and Nutrition in the World 2023*. FAO Agricultural Development Economics Technical Study. Rome, FAO.

» countries.[162] Indeed, new analysis from country cases studies in sub-Saharan Africa (see **Section 4.2**) shows that the prevalence of moderate or severe food insecurity based on the Food Insecurity Experience Scale in urban and peri-urban areas is similar to (e.g. Côte d'Ivoire, Senegal) or sometimes even higher than (e.g. Niger, Nigeria) that in rural areas. Access to food – nutritious foods in particular – across the rural–urban continuum is complex, with multiple determinants. It cannot be assumed that this access is always better for populations in urban areas. In fact, several studies show that the so-called "urban advantage" does not benefit the poorest, who – on the contrary – face disproportionate barriers to accessing and consuming a healthy diet and have an increased risk of food insecurity and malnutrition.[157]

Furthermore, when migration decisions reflect the push factors in rural areas (e.g. conflict or lack of access to land) rather than the pull of better opportunities in urban areas, food security and nutrition outcomes can be compromised (Figure 21).[10] Challenges around accessing food and the risk of food insecurity among rural–urban migrants are intensified during crises.[163, 164, 165] Rural–urban migrants who often inhabit informal settlements lack social protection coverage and their neighbourhoods often fall outside the remit of urban planning. The COVID-19 pandemic is an example of a situation in which low-income and informal rural–urban migrants experienced food insecurity in cities.

Food insecurity in urban areas is strongly driven by income limitations; low-income households need to allocate a high proportion of their total expenditure to food and are extremely vulnerable to external shocks including unemployment, health problems and food price inflation.[157] Food insecurity can be further compounded by poor health, as low-income urban households tend to have poor sanitation and a low standard of other essential housing infrastructure and goods.[166, 167, 168] Urban poverty poses diverse challenges that prevent access to healthy diets (e.g. unplanned built environments), and challenging social network structures often prevent low-income households from finding strategies to cope with food insecurity. Social protection and food assistance programmes designed to facilitate food access – such as monetary or in-kind transfer schemes, community kitchens and food banks – are often insufficient by themselves to fully resolve food insecurity problems, because they do not address barriers such as lack of cooking facilities or food storage, and competing health or housing expenses.

On the other hand, in rural areas, urbanization can provide opportunities for on- and off-farm employment (Figure 21), thus increasing purchasing power and options to access healthy diets. Especially in rural communities where agriculture completely dominates the economy, the growth of small cities and towns can play an important role in providing access to inputs, markets and non-farm activities, thus reducing poverty and improving food security.[169] However, there are also risks of losing or decreasing opportunities to sustain livelihoods due to formalization processes. For example, fees for stalls in formal markets are often relatively expensive, which decreases the accessibility of these markets for many small-scale farmers and traders. Nearly all smallholder farmers, most traders in food markets and many micro- and small-scale food processors and food retailers are not part of the formal food economy in sub-Saharan Africa,[170] and improvements in formal markets will not benefit these actors. Thus there is a risk that smallholders, small-scale food processors and food retailers be excluded from formalizing value chains. Understanding how to best sustain informal value chains is critical; however, this knowledge is often lacking.[171]

The rural-to-urban outmigration of young people, often men, also poses both challenges and opportunities in terms of improving access to affordable healthy diets (Figure 21). In some contexts, rural outmigration can result in substantial remittances that increase the accessibility of healthy diets and improve food security in rural areas.[172, 173] Households that receive remittances can be better off in terms of total income, assets, calorie supply and micronutrient supply.[174] Rural-to-urban migration can also contribute to resilience in the communities of origin and further the transfer of knowledge and other resources besides financial remittances.[175] However, there are instances where remittances are too low (or even absent) to replace the lost workers with hired labour.[176] In such cases, the lost labour and associated reduction in income or agricultural produce can result in decreased access to healthy diets, or in longer working hours for the left-behind women in subsistence farming to maintain household food security.

In terms of malnutrition, studies generally show that rural populations face a higher burden of child undernutrition than urban populations,[177, 178] not only but especially in sub-Saharan Africa, a subregion where many households still live in remote rural areas. Studies suggests there are no fundamental differences in the characteristics that determine child nutrition outcomes in urban and rural areas. Instead, differences are explained by the better urban environment, greater choices and increased opportunities related to socioeconomic characteristics, from maternal and spousal education, wealth, and employment, to social and family networks, as well as access to health care and other services.

Urbanization typically entails improved access to non-food markets and services that are important for nutrition, including schools, health clinics and non-farm labour markets that improve income stability.[177, 178, 179] Furthermore, proximity to towns can also weaken the relationship between agricultural shocks and child nutrition.[180, 181] More recently, studies find that "market access" can be an important determinant of dietary diversity and hence child nutrition outcomes.[182, 183, 184] There is relatively little research, however, on the degree to which rural populations have access to urban markets and services and the associated differences in nutrition seen across rural and urban populations, or across gradients of rural remoteness.[185] One such study, which examined the linkages between child nutrition and urbanization and proximity to large urban centres in sub-Saharan Africa,[185] found that rural populations are characterized by worse nutrition outcomes than urban populations, but it also produced the somewhat unexpected result that the nutrition outcomes of more remote rural populations are not substantially worse than those of less remote rural populations. This finding is also aligned with new analysis (presented in **Section 4.2**) of child stunting and wasting, which looks at rural catchment areas of varying travel times to the nearest town or city in three sub-Saharan African countries. Furthermore, and broadly in keeping with previous analyses of rural–urban inequality in nutrition, it appears that the majority of this nutritional disadvantage is explained by differences in wealth, education, health and non-road infrastructure services across rural and urban areas.[185]

In conclusion, access to affordable healthy diets is generally better and food security and nutrition levels are higher in cities than in rural areas because of the better availability of food, higher average purchasing power in urban areas, and better access to health care, education and other services that are essential for health and nutrition. However, this does not always hold true given the transformations underway in agrifood systems, the stark inequalities that exist within urban populations, and the increasingly spatial and functional connectivity between cities, towns and rural catchment areas.[185, 186] New evidence from 11 countries in sub-Saharan Africa presented in **Section 4.2** suggests that the "urban advantage" in accessing affordable healthy diets, food security and nutrition may not be as great as expected. Thus, it will be increasingly important to analyse these across the rural–urban continuum, and to understand the patterns of urbanization and connectivity across the rural–urban continuum in order to identify the challenges and opportunities for ensuring access to affordable healthy diets, to improve food security and nutrition for all. ■

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A man transports sacks of cabbages to market by bicycle.
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CHAPTER 4
THE INTERPLAY OF FOOD SUPPLY AND DEMAND AND THE COST AND AFFORDABILITY OF HEALTHY DIETS ACROSS THE RURAL–URBAN CONTINUUM

As highlighted in **Chapter 3,** a thorough understanding of how urbanization is driving changes in agrifood systems that affect the availability and affordability of healthy diets is only possible through a rural–urban continuum lens. As seen in **Chapter 3** and illustrated in Figure 20, food environments reflect a complex interplay among supply-side drivers including food pricing, product placement and promotion, and demand-side drivers including consumer preferences and purchasing power.

Together this complex interplay of supply and demand in agrifood systems is key to understanding how urbanization is affecting access to affordable healthy diets across the rural–urban continuum. A more nuanced georeferenced mapping of the spatial and functional connectivity across the rural–urban continuum, using the newly available FAO Urban Rural Catchment Areas (URCA) global dataset (see **Chapter 3** and Box 2), thus becomes a key tool to arrive at such a thorough understanding.

This chapter contributes new evidence on how urbanization is changing food supply and demand across the rural–urban continuum, drawing from analysis utilizing the URCA data combined with georeferenced household survey data (**Section 4.1**). This is followed by additional analysis for selected countries that explores differences in the cost and affordability of a healthy diet (CoAHD), food insecurity, and different forms of malnutrition across the URCA-defined rural–urban continuum (**Section 4.2**). ■

4.1 UNDERSTANDING FOOD SUPPLY AND DEMAND ACROSS THE RURAL–URBAN CONTINUUM

KEY MESSAGES

➔ New evidence for 11 Western, Eastern and Southern African countries shows that while high shares of food purchases among households living in urban centres are expected (78–97 percent), shares are surprisingly high across the rural–urban continuum. This is the case even for rural households living 1 to 2 hours (56 percent) and more than 2 hours (52 percent) from an urban centre.

➔ Own production is not the main source of food in rural areas in the 11 African countries. In fact, the average share of own production represents only 37 percent and 33 percent of total household food consumption in high- and low-food-budget countries respectively, dispelling the notion that rural populations in Africa rely primarily on subsistence farming.

➔ Given that rural households in the 11 African countries do not produce the majority of the food value they consume, the affordability of healthy diets is equally critical across the rural–urban continuum.

➔ While the diffusion of processed foods, including highly processed foods, is already advanced in Asia and Latin America, it is spreading quickly in Africa as well. In the 11 countries in Africa, rural households are consuming processed foods, including highly processed foods, across the rural–urban continuum, even in remote rural areas.

➔ Highly processed foods are a small proportion of total purchases and their consumption is higher in urban areas; however, results show the penetration of highly processed foods in rural areas, even those living 1 to 2 hours or more from a city or town.

➔ Moving across the continuum from urban to rural areas in these countries, there is an increasing household food consumption value share of staple foods and pulses, seeds and nuts, and a decreasing value share of animal source foods and food away from home. In contrast, shares of vegetables, fruits, and fats and oils are uniform across the rural–urban continuum.

➔ While animal source food consumption value shares are strongly driven by income across the rural–urban continuum, in contrast, shares of fruits and vegetables are driven more by access and availability.

As highlighted in **Chapter 3**, urbanization, combined with rising incomes, increases in the opportunity cost of time related to work, lifestyle changes and demographic shifts, is changing food demand. These factors together with many supply-side considerations, including food pricing, marketing and promotion, among others, in turn are changing agrifood systems, so there is a reinforcing compounding effect on the food produced, supplied and consumed.

Most notably, rapid urbanization is leading to rising and changing food demand, and shifts in patterns of food supply[1, 2] – especially in sub-Saharan Africa and Southern Asia, the two regions exhibiting the highest urbanization rates. Projections of overall food expenditure estimate an approximate 2.5-fold increase in sub-Saharan Africa and a 1.7-fold increase in Southern Asia by 2050.[1, 3, 4]

An understanding of the changes occurring in food supply and demand based on empirical evidence is crucial for policymakers. This knowledge is needed to design appropriate food, agricultural and nutrition policies, as well as related sector policies such as health, city and regional planning, and education. Only through all of these policies can agrifood systems be leveraged to deliver healthy diets that are affordable to everyone across the rural–urban continuum.

While there is a substantial amount of literature that discusses the effect of urbanization on food demand,[5] sound empirical evidence that looks at the full spectrum of the rural–urban continuum is still scarce and limited. To date, the majority of existing research is based on the descriptive comparison of food demand between rural and urban areas. While this research is important, this simple comparison does not reflect the reality of changing settlement patterns and demographic shifts within a rural–urban continuum.

New research suggests that the differences between urban and rural food demand may not be as acute as previously thought (see **Chapter 3**). However, this research does not provide an understanding of the magnitude of the differences in food demand across the full spectrum of the rural–urban continuum, nor an understanding of the location-related factors (i.e. where households live in relation to various points across the rural–urban continuum), and other household (e.g. socioeconomic) or food environment factors that may be driving these differences.

To help bridge this gap, this section presents an analysis of food demand, defined as household food consumption (at market value) across the rural–urban continuum in selected countries, applying the newly available geospatial URCA dataset. The URCA classification provides a more granular lens to explore the interplay of food supply and demand across the rural–urban continuum than the Degree of Urbanization (DEGURBA) classification used in **Chapter 2**, which is an official methodology for delineating urban and rural areas for international and regional statistical comparisons.

TABLE 9 URBAN–RURAL CATCHMENT AREAS (URCAs) USED IN CHAPTER 4

Ten URCAs applied in the analyses of Chapter 4	Further aggregation into three categories
Large city (>1 million people)	Urban
Intermediate city (0.25–1 million people)	
Small city (50–250 thousand people)	
Town (20–50 thousand people)	
<1 hour to a large city	Peri-urban
<1 hour to an intermediate city	
<1 hour to a small city	
<1 hour to a town	Rural
1–2 hours to a city or town	
>2 hours to a city or town	

SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

The URCA methodology defines urban centres across a rural–urban gradient based on population size and density, whereby the city size is a proxy for the breadth of services and opportunities provided by an urban centre. Uniquely, the URCA dataset also classifies rural locations using the shortest travel time to an urban centre, as a proxy for the cost of accessing goods, services and employment opportunities (see **Chapter 3** and Box 2). There are 30 urban–rural catchment areas (URCAs) categories in total; however, for the purpose of the analysis in this chapter, these are further aggregated into ten categories (Table 9). To facilitate the presentation and discussion of the more complex data, some of the analysis is further aggregated into three categories for urban, peri-urban and rural areas (see Table 9).

The URCA global geospatial dataset is mapped against latitudinal and longitudinal data of households from the most recent World Bank Living Standards Measurement Study (LSMS), making it possible to work with different categories of catchment areas across the rural–urban continuum – as defined in Box 3 in **Chapter 3.**

The availability of georeferenced household survey data was a major limiting factor for selection of countries for this food demand analysis, as there are currently only a handful of LSMS datasets that have latitude and longitude information which is publicly available.[r] All of these datasets are for Africa; hence the analysis in this section is limited to country case studies in that region. However, as an analysis of food demand across the URCA-defined rural–urban continuum, it is the first of its kind and provides insights on the importance of using a rural–urban continuum lens when analysing other regions. Given that Africa has the highest share of the total population unable to afford a healthy diet (77.5 percent in 2021) (see **Chapter 2**) and is lagging behind in food security and nutrition, focusing on countries of this continent is with merit in itself, especially as it has one of the highest rates of urbanization in the world. The analysis presented below also serves to highlight the need for further analysis covering other regions, which will depend on an increased availability of georeferenced survey data.

To evaluate household food consumption behaviour, georeferenced data from nationally representative LSMS surveys covering the period 2018/19 are used for Benin, Burkina Faso, Côte d'Ivoire, Ethiopia, Guinea-Bissau, Mali, the Niger,

r Most LSMS surveys collect latitude and longitude information for each household. However, almost all countries do not make these data publicly available for reasons of privacy.

TABLE 10 FOOD BUDGETS, INCOME LEVELS AND HOUSEHOLD FOOD CONSUMPTION SHARES FOR HIGH- AND LOW-FOOD-BUDGET COUNTRIES ANALYSED

	Food budget	Income	Food consumption shares
	Total household food consumption	Total household expenditure	Household food consumption as a percentage of total household expenditure
	(PPP dollars per capita per day)		(%)
High-food-budget countries	**2.34**	**4.04**	**58**
Senegal	2.57	6.10	42
Ethiopia	2.44	3.85	63
Côte d'Ivoire	2.29	5.04	45
Mali	2.29	4.54	50
Nigeria	2.26	3.81	59
Low-food-budget countries	**1.62**	**3.29**	**49**
Guinea-Bissau	2.06	4.38	47
Benin	2.00	4.41	45
Togo	1.69	4.12	41
Burkina Faso	1.57	3.70	42
Malawi	1.52	2.39	64
Niger	1.46	2.78	52

NOTES: All surveys are 2018/19, except Malawi (2019/20). PPP = purchasing power parity.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

Nigeria, Senegal and Togo, and 2019/20 for Malawi.[s] The LSMS surveys capture household food consumption using a seven-day recall. For the food demand analysis, reported foods are aggregated into categories based on food source, food processing level and food group. Food sources are defined using four categories, the first three of which are assumed for at-home consumption, specifically food from own production, food purchased, and food received as a gift or as in-kind payment for labour. The value of food consumption from own food production and food received as a gift or in-kind is valued at the market price that households would have had to pay if they had purchased the same quantity from the market.[27] The fourth category comprises all foods consumed away from home (e.g. from street vendors and in restaurants).

The classification of food items by level of food processing was adapted from the NOVA food classification system,[6, 7] focusing only on those foods classified as low processed ("processed" in the NOVA classification) and highly processed. See **Annex 5** for a full description of the datasets and definitions applied, including descriptions of food groups and details about food processing.

In the food demand analysis that follows, the 11 countries were classified into two groups according to their food budget, that is the market value of the average total household food consumption per capita per day: high-food-budget countries (average 2.3 PPP dollars per capita per day) and low-food-budget countries (average 1.6 PPP dollars per capita per day) (Table 10). Countries were first ranked based on average food budget and then split into high- and low-food-budget countries. Countries were split into the two groups with no reference to

s These are the only countries that have publicly available LSMS survey data identifying households by latitude and longitude and an exhaustive food consumption module, elements which are necessary to carry out the demand analysis by URCA. Other spatial identifiers were explored, but they proved to be inaccurate in identifying households by URCA, so these were not applied. The fact that 9 out of the 11 countries are located in Western Africa prevented a more balanced subregional approach.

a benchmark, but they depict a cross-section of African countries from the perspective of different levels of development in terms of average total household food consumption, which also roughly correlates with average total household expenditure, a proxy for household income (Table 10). They fell roughly into above and below 2 PPP dollars per capita per day food budget.[t, u]

Moreover, there is an assumption that the differences in food budgets will lead to different patterns of consumption. This is based on a well-established economic law, referred to as Bennett's law,[v, 8] which stipulates that diets become more diversified with higher levels of food consumption, income and employment. Thus, the differences in food consumption point to larger food budgets providing "room" for additions beyond staple foods with increasing expenditure on non-staple products (as Bennett's law predicts) as well as on industrially (rather than home) processed food products that reduce the opportunity cost of time for women and men engaged in employment (see **Chapter 3**). Usually higher food budgets are correlated with both of these consumption changes, and the two sets of countries allow this correlation to be tested. This is of particular relevance when seeking to understand how urbanization is driving changes in agrifood systems and how this is likely to affect food demand and access to healthy diets, as we shall see next.

The two country food-budget groups add a further dimension to the analysis that relates to an ongoing debate about what happens in countries of high and low per capita food consumption: Are the latter just traditional, or are they also changing? One expects to find more diversified diets and processed foods in urban areas, as well as in places where there are higher levels of food consumption per capita, but, as we shall see below, looking at food demand across the rural–urban continuum and comparing high- and low-food-budget countries, this may not be the case as a rule. If the patterns of food demand are the same – between either urban, peri-urban and rural areas or low- and high-food-budget countries – this in itself is an important finding. Indeed, the insights and messages are stronger if one sees they are happening both across the rural–urban continuum and in high- and low-food-budget contexts.

For the 11 African countries analysed, Figure 22 shows the country population distribution across ten categories (i.e. URCAs) of the rural–urban continuum (see Table 9 for specific category grouping). While there are country exceptions in each group, in general, high-food-budget countries tend to have a larger share of the population living in large and intermediate cities and their surrounding peri-urban areas (41.5 percent) compared to low-food-budget countries (34.2 percent).

Furthermore, high-food-budget countries are in most cases characterized by dense metropolitan urbanization patterns, while low-food-budget countries tend to have more dispersed urbanization patterns around small cities and towns. Figure 23 provides a mapping that represents two contrasting patterns of urbanization: dense metropolitan (e.g. Nigeria) and small city and town dispersed (e.g. Burkina Faso). The maps provide a useful visual for "unpacking" the ten URCA categories (see **Annex 6** for maps of other countries analysed).

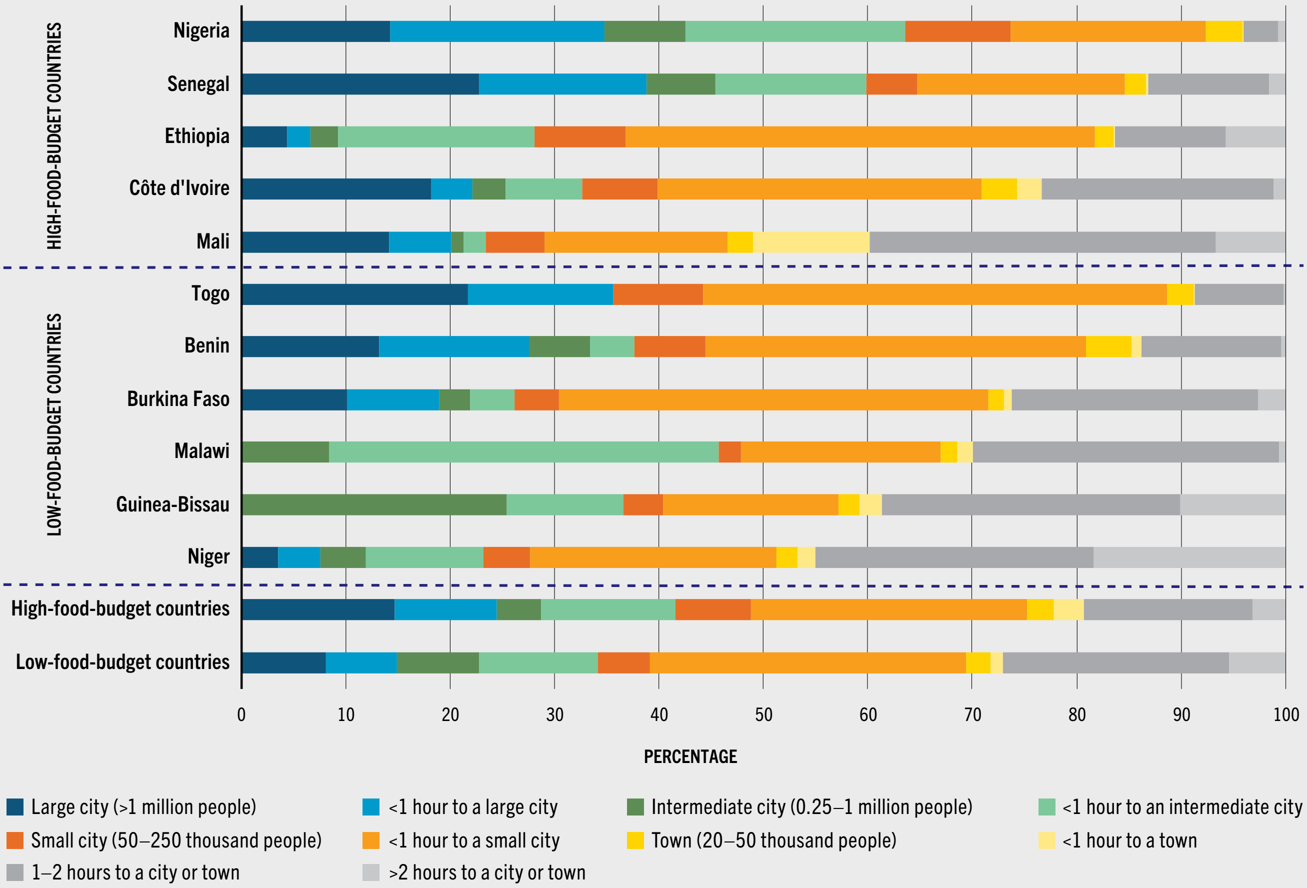
As highlighted in **Chapter 3**, the spatial patterns and degree of connectivity of rural–urban linkages determine the impacts of urbanization on agrifood systems. The analysis presented below attempts to find empirical evidence of a "location effect"; that is to say, to test if

t Ranking and classifying countries by income is not as relevant for a food demand analysis, because some countries have high incomes linked to the non-farm sector, and these incomes are spent on non-food items. It is also not useful to rank and classify countries by the share of food in total expenditure, for a similar reason: higher income usually leads to lower food share (Engel's law), but the food share can vary for non-income reasons, and thus it does not matter.

u The country "split" occurs at a food budget of roughly USD 2 per capita per day. Coincidentally, it may be noticed that this split point is not far from the new World Bank extreme poverty line of USD 2.15 per capita per day; however, the two are in no way related, as poverty lines are income based. The list of countries analysed for this report is based only on LSMS availability, and represents neither a random sample nor the totality of countries in Africa.

v In agricultural economics and development economics, Bennett's law is well established, based on the observation that as incomes rise, people eat relatively fewer staples and relatively more non-staples including some nutrient-dense foods (e.g. meats, fruits and vegetables).[8] Bennett's law is related to Engel's law, which considers the relationship between rising household incomes and total food spending. Engel's law, also well established, is related to the observation that as family income increases, the percentage spent on food decreases; that spent on clothing, rent, heat and light remains the same; while that spent on education, health and recreation increases.

FIGURE 22 DISTRIBUTION OF POPULATION ACROSS TEN URCA CATEGORIES OF THE RURAL–URBAN CONTINUUM, FOR SELECTED COUNTRIES, 2020



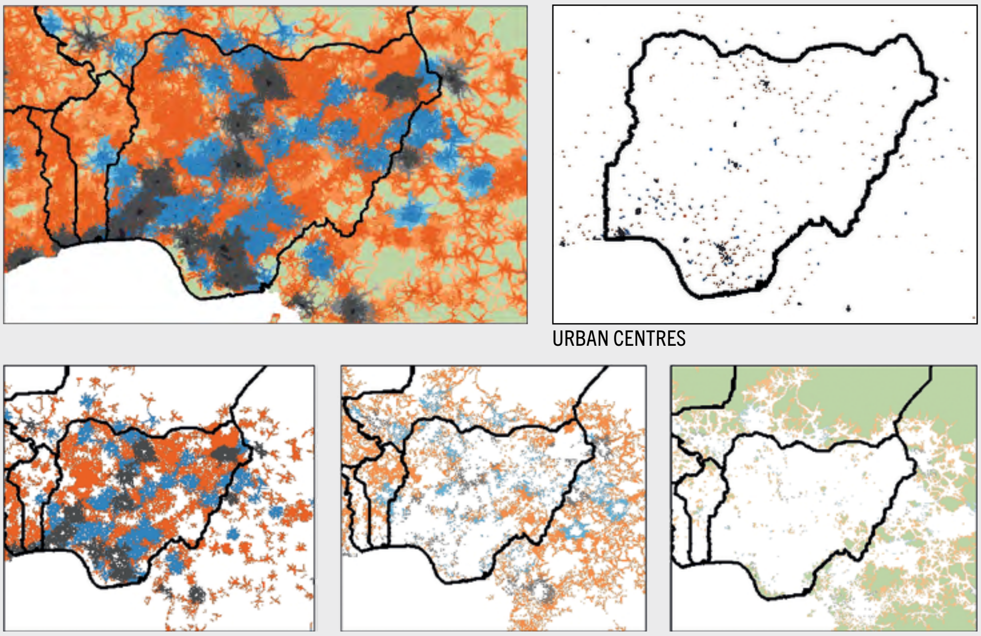
NOTES: Countries are listed based on the ranking of the percentage of their rural population within each food-budget group. See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: FAO estimates based on 2020 GHS-POP dataset and FAO URCA dataset.

the different URCAs across the rural–urban continuum are contributing determinants of food demand. An important limitation of this analysis, however, is that it does not completely isolate the location effect from other drivers such as food environment considerations including, *inter alia*, the role of industry product placement and promotion.

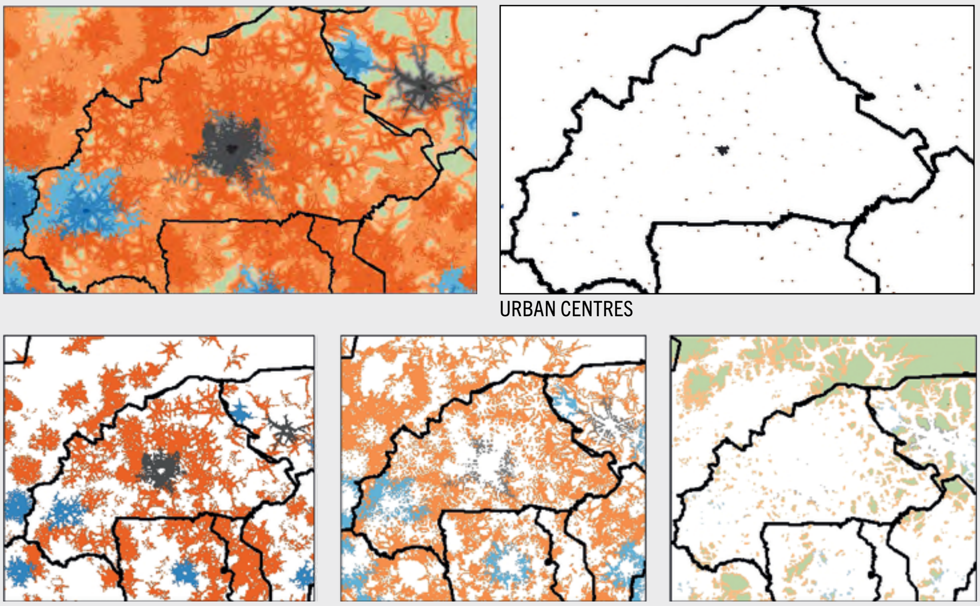
In the sections that follow, we explore three different aspects of food consumption, examining patterns and their drivers across the rural–urban continuum for high- and low-food-budget countries. First, food consumption patterns are analysed in terms of how households acquire food, meaning whether the food they consume is purchased, own-produced, acquired as gifts or in-kind barter, or purchased as prepared meals eaten away from home. The extent of consumption of purchased foods sheds light on the importance and reach of food supply chains, moving out from urban areas across the continuum to more remote rural areas. The conventional view is that households living in or just outside urban areas purchase most of their food, whereas households in rural areas largely produce their own food. »

FIGURE 23 TWO CONTRASTING PATTERNS OF URBANIZATION: DENSE METROPOLITAN URBANIZATION (NIGERIA) AND SMALL CITY AND TOWN DISPERSED URBANIZATION (BURKINA FASO)

A) DENSE METROPOLITAN URBANIZATION PATTERN – EXAMPLE NIGERIA



B) SMALL CITY AND TOWN DISPERSED URBANIZATION PATTERN – EXAMPLE BURKINA FASO



- Large city (>1 million people)
- Intermediate city (0.25–1 million people)
- Small cities and towns (0.02–0.25 million people)
- Dispersed towns
- Hinterlands
- <1 hour to a large city
- <1 hour to an intermediate city
- <1 hour to a small city or town
- 1–2 hours to a large city
- 1–2 hours to an intermediate city
- 1–2 hours to a small city or town
- >2 hours to a large city
- >2 hours to an intermediate city
- >2 hours to a small city or town

SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

» Especially in the context of sub-Saharan Africa, there is a persistent view that households living in rural areas are subsistent farmers who produce their own food, with the exception of the landless poor who are reliant on farm labour and who purchase or barter to meet some of their food consumption needs.

Second, food consumption patterns are analysed in terms of the share of total household food consumption that is low processed and highly processed. This analysis can shed some light on the magnitude and reach of the midstream food value chains and the associated employment that this sector generates (see **Chapter 3**) related to both low processed and highly processed foods.[w] In addition, low processed foods can provide many advantages to households through enhanced shelf-life, food safety, convenience, and in some cases nutritional enhancement (e.g. fortification). On the other hand, many highly processed foods are energy dense and high in fats, sugars and/or salt, and research suggests that they may contribute to overweight and obesity as well as some non-communicable diseases (NCDs) (see **Chapter 3**). As already highlighted, it is expected that the consumption of both low processed and highly processed foods is higher with higher levels of food consumption and especially where income and employment are higher.

Third, household food consumption patterns are analysed examining the market value of the foods consumed by food group, which provides insights into the spread of the consumption of diverse diets among households across the rural–urban continuum. Urbanization is generally associated with a change in consumption behaviour, with urban households usually eating a more diversified diet including more expensive foods such as animal source foods and fruits (see **Chapter 3**). However, some studies suggest that it is higher income, rather than urbanization per se, that is causing these diet shifts.

w Note a comprehensive overview of processed foods is not provided, as NOVA Group 1 (unprocessed and minimally processed) is not analysed.

Food purchases are a major contributor to household food consumption across the rural–urban continuum, even among the rural poor

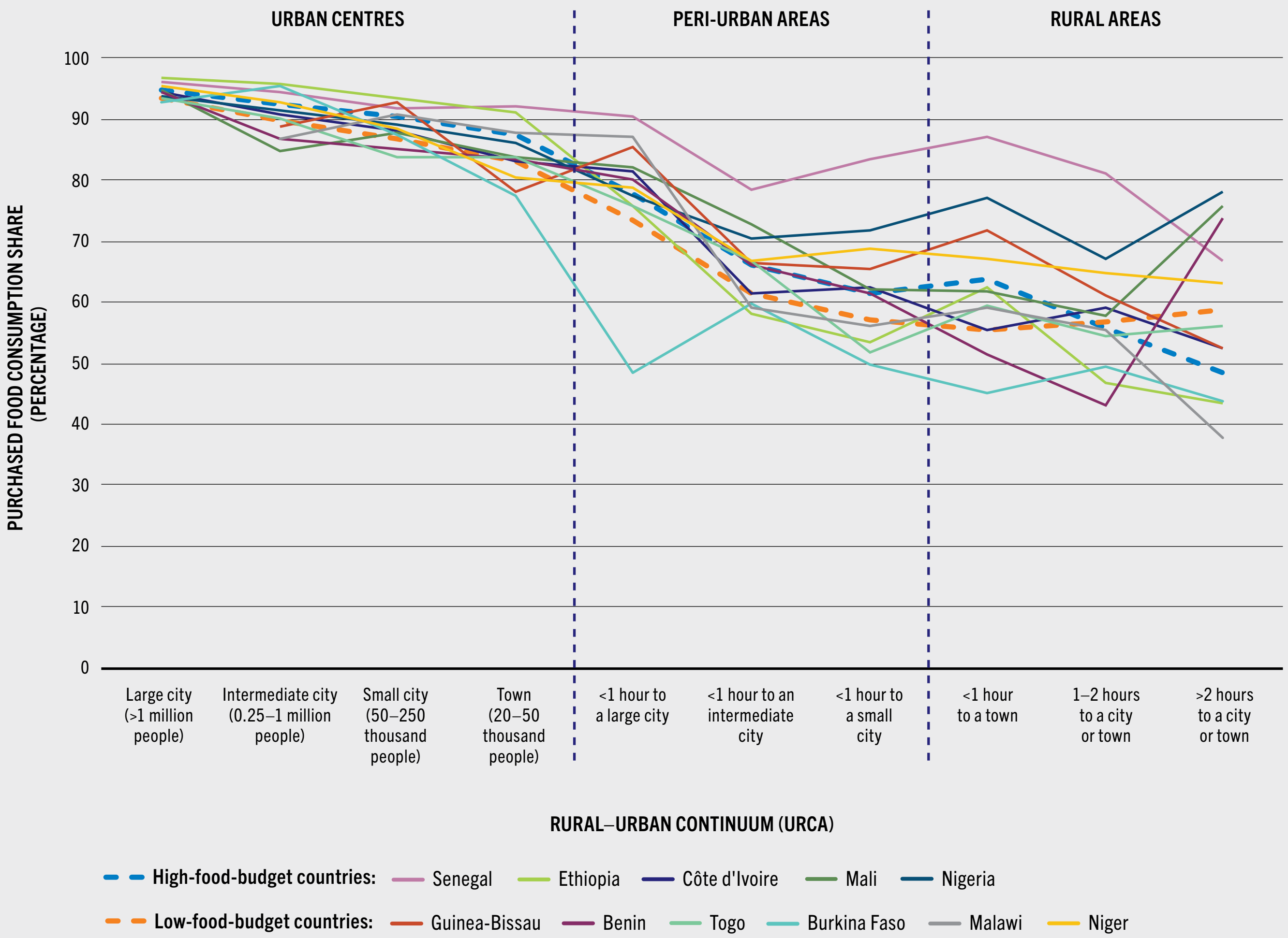
Across the 11 high- and low-food-budget African countries, food purchases form the majority of total household food consumption in value terms, including food for home consumption and food consumed away from home (Figure 24). While high shares of food purchases relative to total food consumption among households living in urban areas are to be expected (78–97 percent), shares are surprisingly high across the rural–urban continuum, even for rural households living 1 to 2 hours from a small city or town (56 percent on average) and for those living more than 2 hours from any urban centre (52 percent on average). The finding that in most of the countries analysed the "majority" of household food consumption in rural households is coming from purchases (56 percent on average in the 11 countries analysed) is a major deviation from the traditional image of rural subsistence households (Box 5).

Indeed, the diffusion of high levels of food purchases across the rural–urban continuum (Figure 24) confirms that food markets and supply chains are important to rural areas in both high- and low-food-budget countries. Furthermore, the average food purchase share for populations living in rural areas is only slightly lower in high-food-budget countries (52 percent) than in low-food-budget countries (57 percent), indicating a convergence across different patterns of urbanization and income levels.

As expected, food purchase shares decline moving from urban to rural areas across the continuum. The decline is slightly steeper for low-food-budget countries moving from urban to peri-urban areas (32 percent decline, versus 27 percent in high-food-budget countries), whereas moving from peri-urban to rural areas the drop is significantly higher in high-food-budget countries (18 percent on average) than in low-food-budget countries (6 percent).

While this pattern over the rural–urban continuum applies on average, there are variations between countries depending on the density of

FIGURE 24 WHILE HIGH FOOD PURCHASES AMONG HOUSEHOLDS LIVING IN URBAN AREAS ARE EXPECTED, THEY ARE SURPRISINGLY HIGH ACROSS THE RURAL–URBAN CONTINUUM, EVEN FOR RURAL HOUSEHOLDS



NOTES: The figure shows household food purchases as a percentage share of total household food consumption (at market value) across the rural–urban continuum (URCA) by country and high- and low-food-budget country group. Although URCA is a categorical variable, it is conceptualized as a spatial continuum, thus the use of a line graph, which also facilitates the presentation of the results. All surveys are 2018/19, except Malawi (2019/20). See **Annex 5** for the full definition of variables. See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa*. Background paper for T*he State of Food Security and Nutrition in the World 2023*. FAO Agricultural Development Economics Technical Study. Rome, FAO.

urbanization patterns. For example, there is a notable increase in purchases in areas less than 1 hour from a town in Ethiopia, Guinea-Bissau, Nigeria and Togo (Figure 24).

Another striking finding is that for four countries, there is an uptick in food purchases in the most remote rural areas (more than 2 hours travel to a city of any size): Mali and Nigeria (high-food-budget countries), and Benin and

Togo (low-food-budget countries). The uptick in purchases in these areas can be explained in several ways. First, farmers in remote areas tend to be poorer, meaning households often need purchases to "smooth consumption" or compensate for poor harvests. Second, in furthest outlying rural areas (more than 2 hours travel to a city or town), local non-farm employment is scarce, as are services, and therefore households focus more on migration to bring in money, which can be used to buy food. This pattern is more marked in poorer countries, reflected in the larger uptick in Benin and Mali, the two low-food-budget countries.

The traditional view of a rural–urban divide formed a few decades ago, when most rural areas in Africa were much poorer and less connected to urban areas. However, more recently, the urbanization occurring in many African countries is dispersed, with growing networks of interconnected small cities and towns and increased connectivity with rural areas. This translates directly to expansive growth in off-farm employment opportunities, interconnected food markets and food supply chains; lifestyles thus change, which in turn affects how households acquire food and what foods they eat (see **Chapter 3**).

Looking to other regions, studies show there is substantial evidence of high levels of food purchases in rural areas, for example in Asia, including studies from Bangladesh, Indonesia, Nepal and Viet Nam.[9, 10] These studies find similar patterns of food purchases in rural areas, but the convergence between urban and rural food purchase patterns is more advanced than in Africa.

When household income levels are considered, the notion that rural households in sub-Saharan Africa rely primarily on subsistence farming for food still does not hold. The findings show that food purchases represent 50 percent or more of total household food consumption (including own production valued at market prices) across all income groups in rural areas of most of the countries, which is by no means low. The main exception is Ethiopia, which drags down the average share of food purchases for high-food-budget countries (Figure 24). Ethiopia is an outlier case among the high-food-budget countries, as its pattern of urbanization "straddles" the divide between "dense metropolitan" and "small city and town dispersed" (see Figure A6.1 in **Annex 6**), with poorer outlier rural areas not well connected due to very poor or limited road infrastructure.[11]

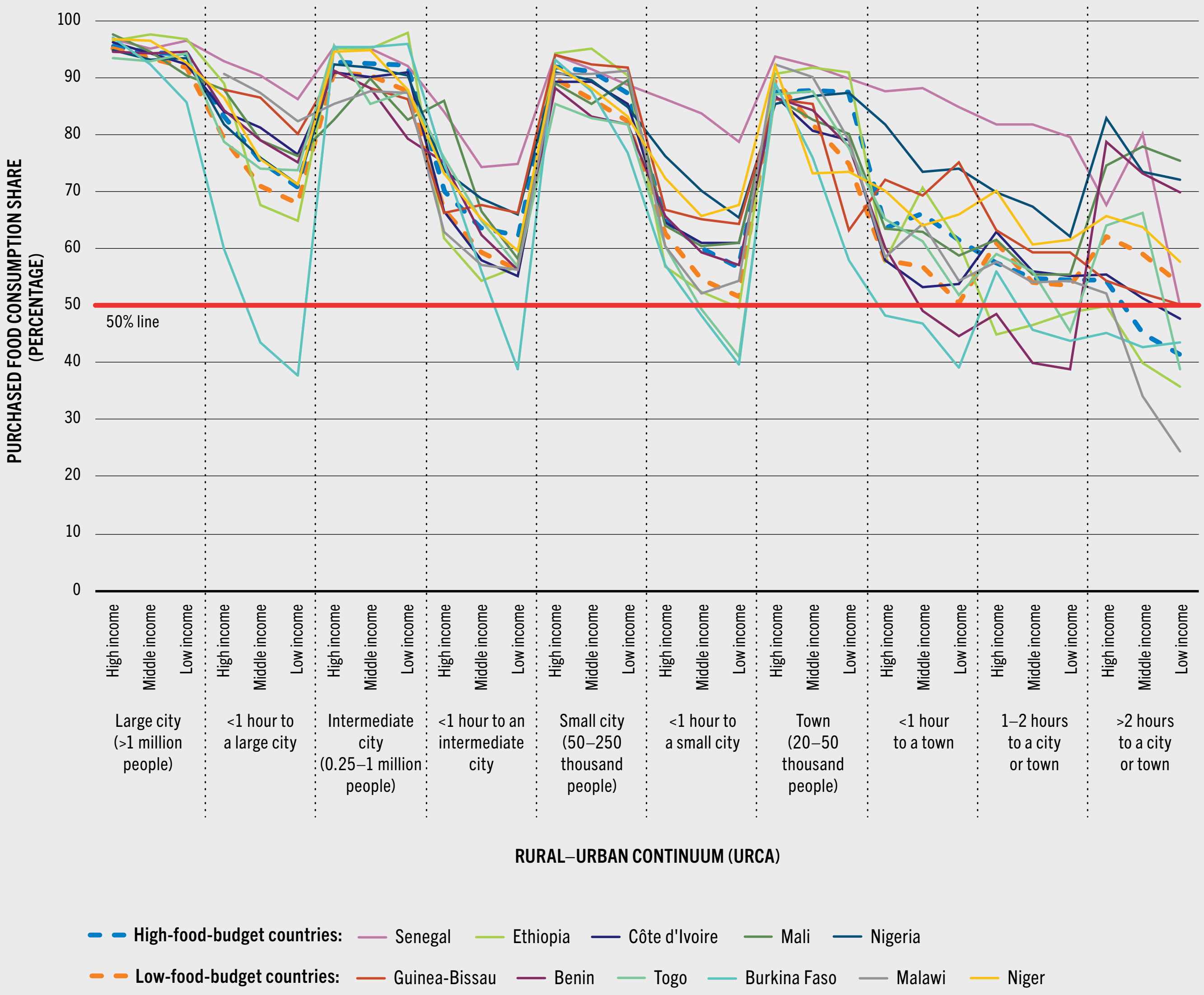
Food purchase shares of low- and middle-income households are lower overall than the shares of high-income households across the rural–urban continuum (Figure 25). The differences are small in urban areas, but become much bigger in peri-urban areas less than 1 hour from either a large city or an intermediate city. This suggests that while these households still rely on food purchases, own food production is also important (Box 5). The pattern holds for both high- and low-food-budget countries, although food purchase shares are slightly lower for the latter.

In urban and rural areas, the dispersion of food purchase shares across household income groups is smaller than in peri-urban areas, indicating that household income is less of a factor driving food purchase shares for urban and rural households. The only exception is poor households in more remote rural areas (more than 2 hours travel to a city or town), whose food purchase shares are 31 percent and 15 percent less than high-income households in the same areas of high- and low-food-budget countries, respectively.

The descriptive analysis presented up until this point is backed up by an econometric analysis that looks into the determinants of food purchase shares for the high- and low-food-budget countries. Determinants include location across the rural–urban continuum, household income, non-farm employment, food prices,[x] age, education, marital status and gender of the head of the household, household size, and size of cultivated land, ownership of assets and animal stocks. Table A7.1 in **Annex 7** presents the full econometric results. Here we highlight some of the key findings from this analysis. »

x While the focus is on non-price determinants, price variables are added as control variables to show the location effect across the rural–urban continuum. As expected, the marginal effect of own prices is statistically significant.

FIGURE 25 THERE IS A MARKED DROP IN PURCHASED FOOD CONSUMPTION SHARES FOR LOW- AND MIDDLE-INCOME HOUSEHOLDS LIVING IN PERI-URBAN AREAS, WITH LEVELS SIMILAR TO RURAL HOUSEHOLDS IN BOTH HIGH- AND LOW-FOOD-BUDGET COUNTRIES



NOTES: The figure shows household food purchases as a percentage share of total household food consumption (at market value) across the rural–urban continuum (URCA) by household income group, country, and high- and low-food-budget country group. Income levels are calculated using terciles of total household expenditure per adult equivalent as proxy. Although URCA is a categorical variable, it is conceptualized as a spatial continuum, thus the use of a line graph, which also facilitates the presentation of the results. All surveys are 2018/19, except Malawi (2019/20). See **Annex 5** for the full definition of variables. See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa*. Background paper for *The State of Food Security and Nutrition in the World 2023*. FAO Agricultural Development Economics Technical Study. Rome, FAO.

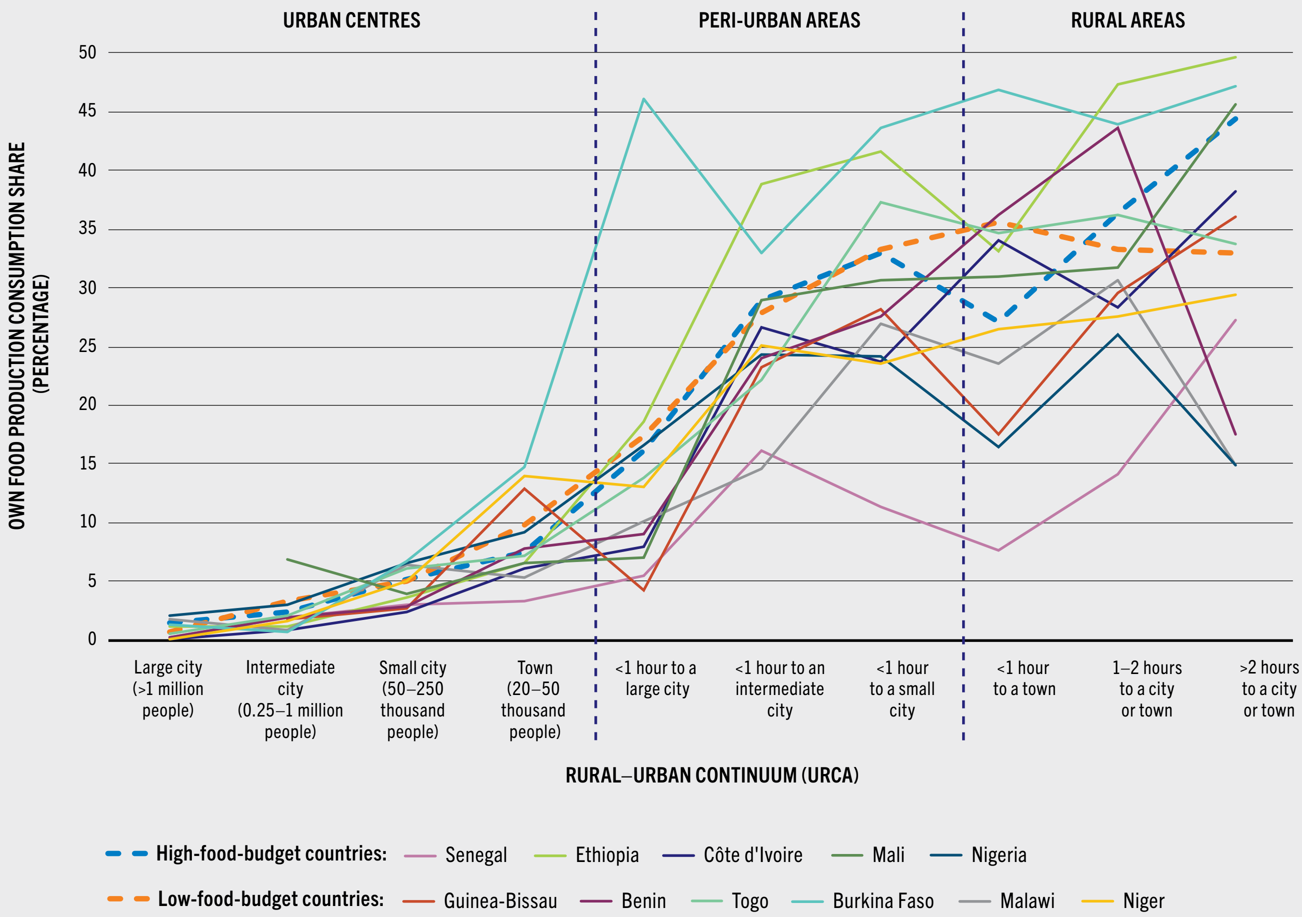
BOX 5 THE MYTH OF RURAL SUBSISTENCE FARMING IN AFRICA

Especially in the context of sub-Saharan Africa, there is a persistent view that households living in rural areas are subsistence farmers who produce their own food, yet the analysis in this report indicates that this does not hold true. Using market prices, the value of food consumption from own production is estimated here, that is the value that households would pay if they acquired the same quantity of that food from the market. Findings show that, moving from urban to rural areas across the continuum, food consumption shares of own production grow, with a sharp increase starting in areas less than 1 hour from a large city (Figure A1).

And yet, own production never becomes the main source for food – not even in rural areas. In rural areas, the average share of own production represents only 37 percent and 33 percent of total consumption in high- and low-food-budget countries, respectively. The shares range from 8 percent to 50 percent in high-food-budget countries, and from 18 percent to 47 percent in low-food-budget countries (Figure A1).

FIGURE A ALL HOUSEHOLDS ACROSS THE RURAL–URBAN CONTINUUM HAVE FOOD CONSUMPTION SHARES FROM OWN FOOD PRODUCTION THAT ARE LESS THAN 50 PERCENT

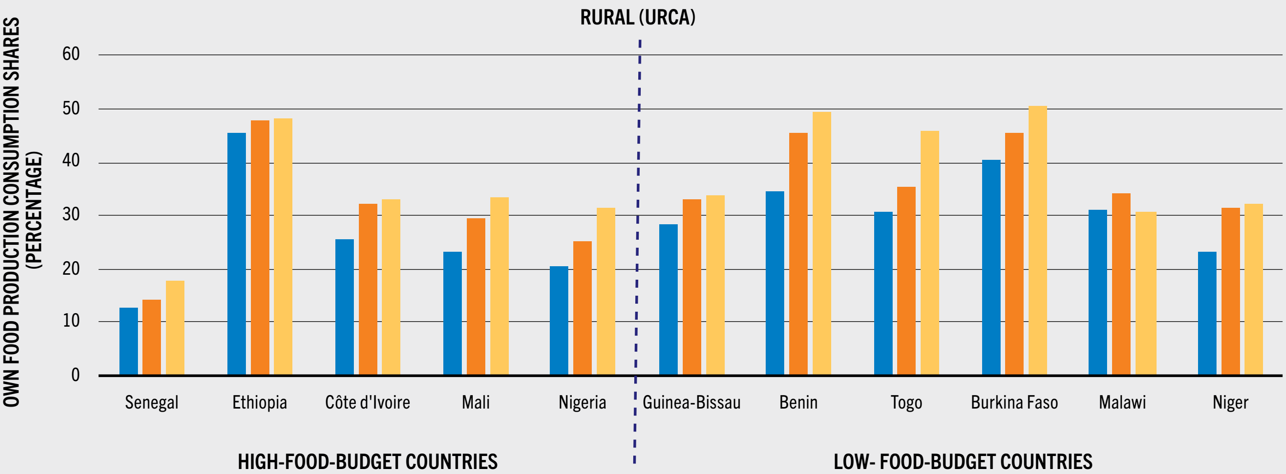
A1) MARKET VALUE DERIVED HOUSEHOLD FOOD CONSUMPTION SHARES FROM OWN FOOD PRODUCTION – ACROSS THE RURAL–URBAN CONTINUUM IN SELECTED COUNTRIES IN AFRICA

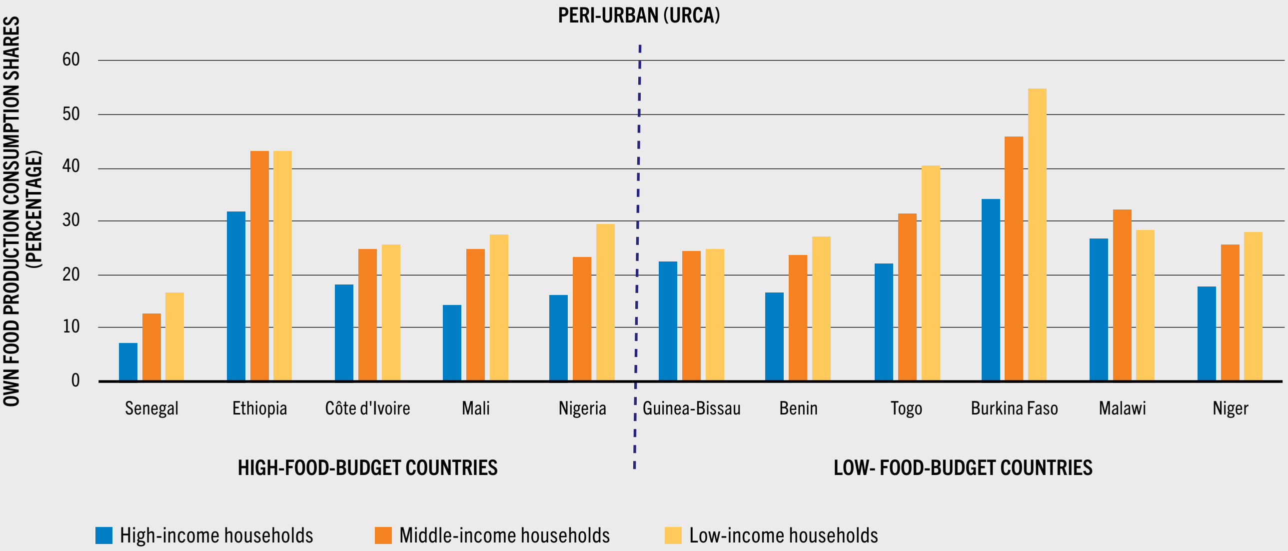


BOX 5 (Continued)

These surprising findings hold true even among poor rural households (Figure A2), who obtain on average 40 percent and 36 percent of food consumption from own production in high- and low-food-budget countries, respectively. Furthermore, these shares of own production are not much higher than the shares found for peri-urban households (i.e. an average of 34 percent in both high- and low-food-budget countries). Given that rural households do not produce the majority of the food value they consume, their capacity to afford a healthy diet is a key factor to consider regarding their consumption of nutritious foods.

A2) MARKET VALUE DERIVED HOUSEHOLD FOOD CONSUMPTION SHARES FROM OWN FOOD PRODUCTION – FOR HOUSEHOLDS LIVING OUTSIDE URBAN AREAS, BY HOUSEHOLD INCOME LEVEL IN SELECTED COUNTRIES IN AFRICA





NOTES: The figures show household consumption from own production as a percentage share of total household food consumption (at market value) across the rural–urban continuum (URCA) (Figure A1) and by rural and peri-urban area and household income group (Figure A2). Although URCA is a categorical variable, it is conceptualized as a spatial continuum, thus the use of a line graph in Figure A1, which also facilitates the presentation of the results. All surveys are for 2018/19, except Malawi (2019/20). See **Annex 5** for the full definition of variables. See Table 10 for the definition and list of high- and low-food-budget countries.

SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa*. Background paper for *The State of Food Security and Nutrition in the World 2023*. FAO Agricultural Development Economics Technical Study. Rome, FAO.

» For both country food-budget groups, there is statistical confidence about the location effect across the rural–urban continuum; that is, the farther from a large city, the lower the share of purchases in total household food consumption. As observed in the descriptive analysis, this pattern is fairly smooth and continuous.

Holding all other factors constant, the effect of income on the food purchase share is positive in both sets of countries (excluding Ethiopia, which shows a negative effect), with a somewhat higher effect in low-food-budget countries – according to the supplementary econometric analysis. This can be interpreted as meaning that households "start purchasing" at lower income levels in high-food-budget countries; that is, the transition of diets in the form of purchasing has spread more into lower-income households in that group of countries. This coincides with the findings of other studies.[12]

In both country food-budget groups, furthermore, more non-farm employment (and hence non-farm income) leads to a higher food purchase share. This was found reliably in all country cases and when controlling for gender (except Guinea-Bissau). Male rural non-farm employment shows a somewhat stronger effect in low-food-budget countries (for the reason noted above). The effect is present but less supported for female employment in both high- and low-food-budget countries.

Another important result is that education of the head of the household, particularly secondary schooling, even when controlling for income, is correlated with a higher household food purchase share. The result is particularly strong in high-food-budget countries. This may reflect a variety of factors such as greater opportunity cost of time (for home production) in the types of jobs held by the more educated. In addition, when accounting for gender, there is a positive effect for female-headed households in high-food-budget countries, excluding Malawi. This could again be linked to opportunity cost of time for women in these households to do both their own farming and home processing of food, versus buying food to free up time for home chores and management.

Furthermore, results show that the larger the household size the lower the household food purchases, in both high- and low-food-budget countries. This is presumably because having their own labour allows households to substitute purchased food with their own production, for example in processing and farming. This is reinforced with the expected negative effect on food purchases of ownership of farmland and animal stocks.

There is a diffusion of processed foods and food away from home across the rural–urban continuum, but it is higher in urban areas

In all regions, there has been diffusion of purchased processed foods, as well as food away from home (e.g. prepared food from vendors or in restaurants), in urban and rural areas. Over centuries, small- and large-scale processing of staple foods (e.g. polished rice, wheat and maize flour, edible oils) have introduced essential time- and energy-saving innovations, presenting opportunities for nutritional enhancement such as food fortification. Food processing has continued to grow, expanding to prepared foods, both at small scale (often unpackaged and unbranded) and at very large scale (packaged and branded). While the diffusion of processed foods, including highly processed foods, is already advanced in Asia[9] and Latin America,[13] it is spreading quickly in Africa as well.[14]

Increasing numbers of women are working outside the home in both urban and rural areas, while men and women are increasingly commuting to work in urban areas and going to off-farm jobs in rural areas. These factors may prompt a rise in purchases of prepared food from food service enterprises, due to reduced time availability for home processing (e.g. hand-pounding grains) and food preparation. The dynamics of supply and demand for processed foods, however, are complex. There has been a surge on the supply side, with small and medium enterprises and large private companies alike making massive aggregate investments in all types of processed foods (from minimally to highly processed) in response to demand.[14] At the same time, aggressive marketing and relatively low pricing – and even interference in policies to curb consumption of highly processed foods and sugar-sweetened beverages – are driving up consumption.

There is a critical role for minimally and low processed foods as part of a healthy diet; in addition, they are a major and growing source of employment across the rural–urban continuum (see **Chapter 3**). On the other hand, there is growing evidence of the role of highly processed foods in the development of overweight, obesity and related NCDs (see **Chapter 3**). Many countries now seek to curb consumption through targeted interventions (e.g. bans in schools) and population-based policies (e.g. taxation and front-of-pack labelling) (see **Chapter 5**). Recent studies in Africa show that the expansion of food supply chains in the processing sector (processing, wholesale, transport and retail) provides a major source of employment across the rural–urban continuum, especially for women and youth.[12] Latest estimates indicate that 20 percent of rural employment and 25 percent of urban employment are in agrifood systems jobs such as wholesale and processing.[12] Unfortunately, few of these studies provide sufficient disaggregation of product portfolios to assess the balance of potential benefits and harms to healthy diet goals.

Examining the household consumption of both low processed and highly processed foods and food away from home provides insights into food demand across the rural–urban continuum. The demand for processed foods of all types in Africa is expected to continue to rise over the next decades with urbanization, the continued rise in rural non-farm employment and the concomitant effects on cost savings of food preparation and thus demand for convenience foods. Increased commuting to work is also raising the opportunity cost of time for both men and women, with meals and snacks purchased at roadside stalls, restaurants and market kiosks. Evidence shows that this process has already been seen in other developing regions.[15, 16]

In the analysis that follows, all food items were classified by level of food processing based on the four main groups in the NOVA food classification system. Unprocessed and minimally processed foods (group 1) were then excluded from the analyses in this section. Groups 2 and 3 were combined as one group, referred to as "low processed", and group 4 was maintained as highly processed. See **Annex 5** for an explanation and full description and sources of the processing categories applied. In addition to these two categories, food away from home was made a separate, single category, because there is insufficient information to identify the extent of processing for all items involved and it is therefore not possible to accurately categorize such food.

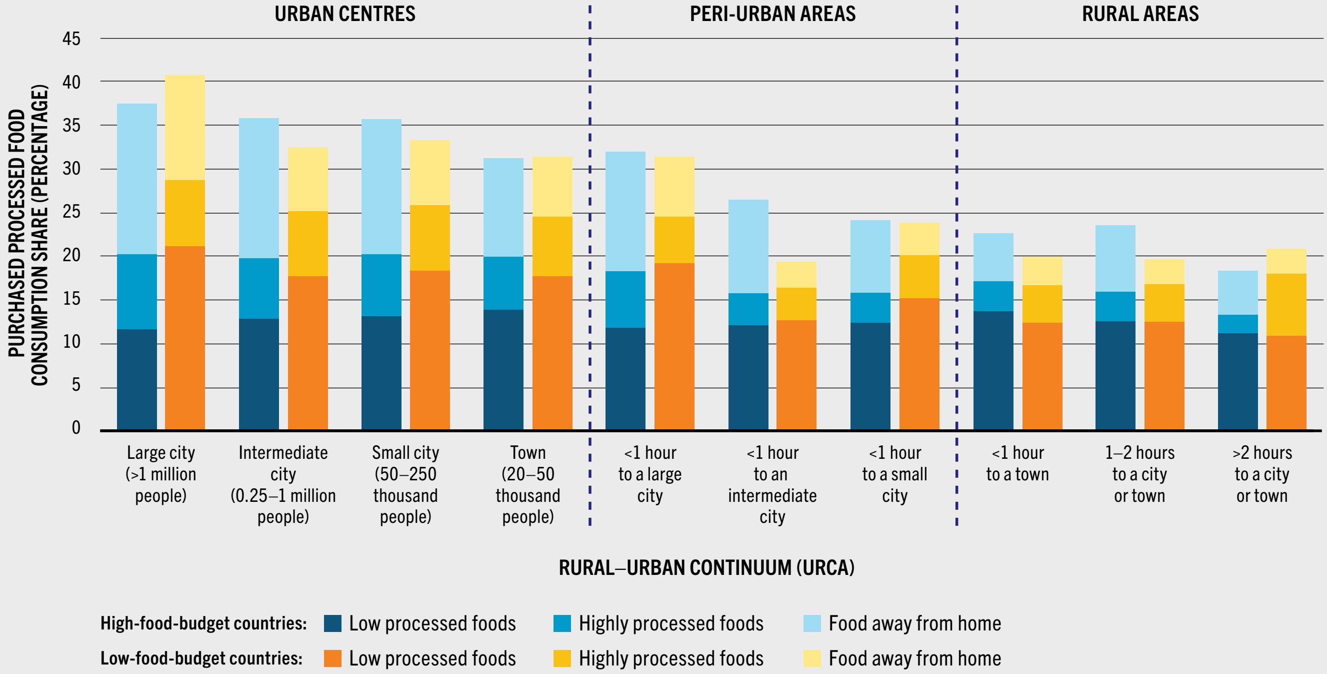
The diffusion of processed foods across the continuum is similar and quite extensive for both high- and low-food-budget countries (Figure 26A). The exception to this is in areas less than 1 hour from intermediate cities of low-food-budget countries, where the share is much lower if compared to the same catchment areas of high-food-budget countries. On average, the share of total processed foods and food away from home is 29 percent in high-food-budget countries, and 25 percent in low-food-budget countries. Even households living in rural areas 1 to 2 hours or more from a city or town are consuming processed foods and food away from home.

While the consumption of processed foods and food away from home is higher in cities and towns, in terms of consumed value shares, it only declines gradually moving into peri-urban areas; however, there is a more abrupt drop in peri-urban areas of intermediate cities in low-food-budget countries (Figure 26A). Evidence of a smooth and gradual diminishing share along the continuum dispels the notion of a sharp rural–urban divide in the consumption of processed foods.

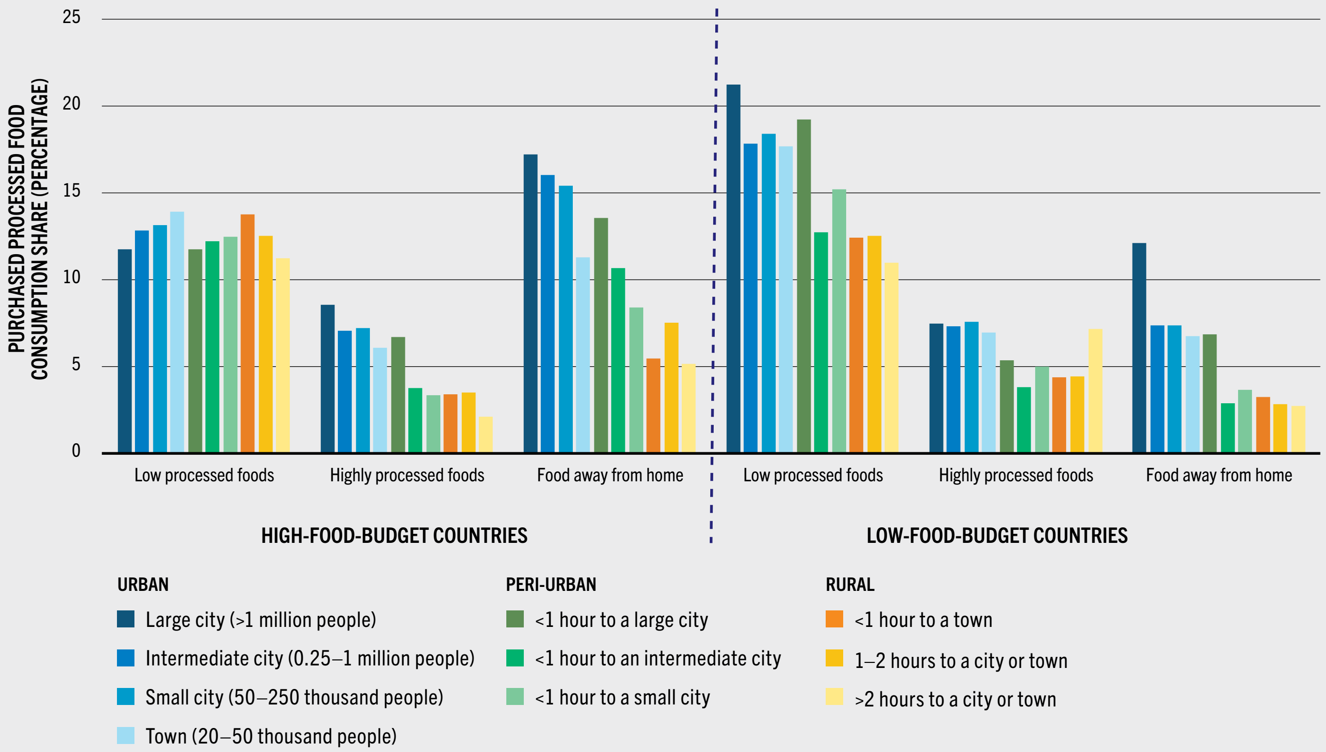
Looking at low processed and highly processed foods separately, we find that in both sets of countries, highly processed foods account for a small proportion of total consumption (Figure 26B). However, the shares are slightly higher in peri-urban areas of small cities and towns and rural areas of low-food-budget countries compared to the same areas in high-food-budget countries. The shares of highly processed foods are also found to be greater in urban areas than in rural areas, in both sets of countries. The results highlight the penetration of highly processed foods into rural areas, even those living 1 to 2 hours or more from a city or town. »

FIGURE 26 IN THE 11 COUNTRIES IN AFRICA, RURAL HOUSEHOLDS ARE CONSUMING PROCESSED FOODS, INCLUDING HIGHLY PROCESSED FOODS, EVEN THOSE LIVING 1 TO 2 HOURS OR MORE FROM A CITY OR TOWN

A) AVERAGE CONSUMPTION SHARES OF PROCESSED FOODS AND FOOD AWAY FROM HOME ACROSS THE RURAL–URBAN CONTINUUM FOR SELECTED HIGH- AND LOW-FOOD-BUDGET COUNTRIES IN AFRICA

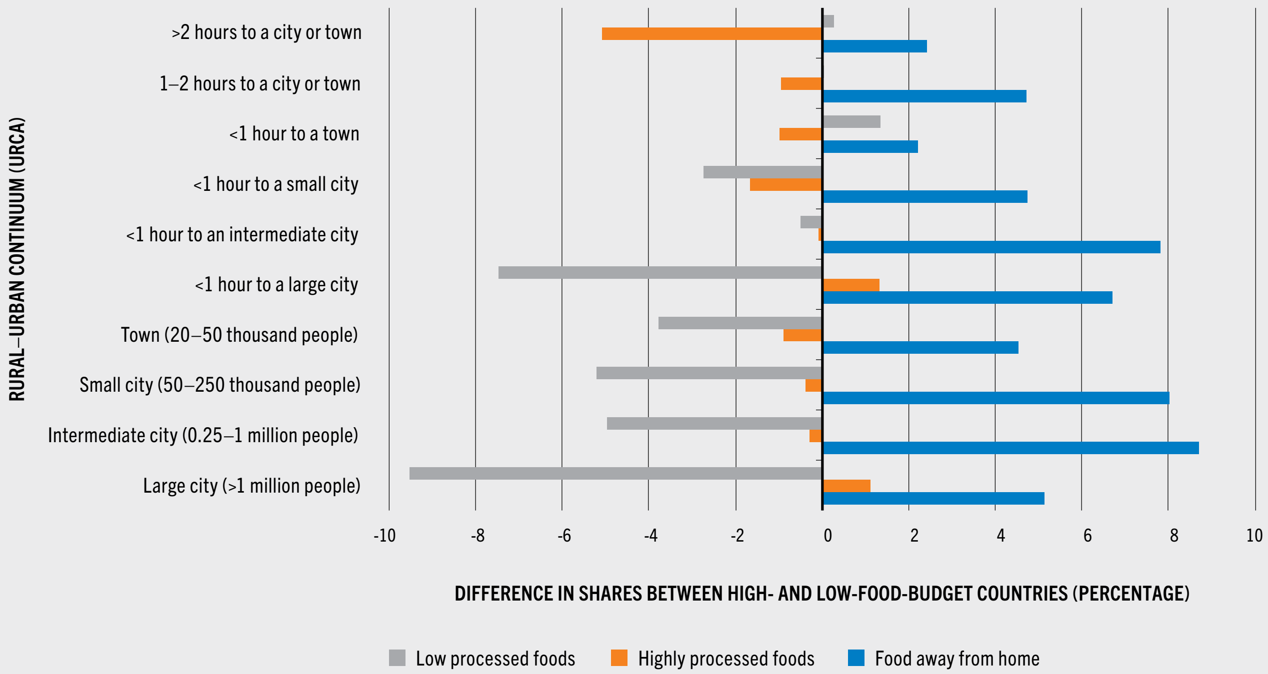


B) COMPOSITION OF AVERAGE CONSUMPTION SHARES OF PROCESSED FOODS ACROSS THE RURAL–URBAN CONTINUUM FOR SELECTED HIGH- AND LOW-FOOD-BUDGET COUNTRIES IN AFRICA



NOTES: The figures show household food consumption of processed foods (low and highly processed foods) and food away from home as a percentage share of total household food consumption (at market value) across the rural–urban continuum (URCA). All surveys are for 2018/19, except Malawi (2019/20). The classification of food items by level of food processing was adapted from the NOVA food classification system. See **Annex 5** for the full definition of variables. See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

FIGURE 27 IN THE 11 COUNTRIES IN AFRICA, LOW PROCESSED AND HIGHLY PROCESSED FOOD CONSUMPTION SHARES ARE HIGHER ACROSS THE RURAL–URBAN CONTINUUM IN LOW-FOOD-BUDGET COUNTRIES, WHILE SHARES OF FOOD AWAY FROM HOME ARE HIGHER IN HIGH-FOOD-BUDGET COUNTRIES



NOTES: The figure shows the difference in household food consumption percentage shares (at market value) of low processed foods, highly processed foods and food away from home, comparing high-food-budget countries with low-food-budget countries across the rural–urban continuum (URCA). The classification of food items by level of food processing was adapted from the NOVA food classification system. All surveys are for 2018/19, except Malawi (2019/20). See **Annex 5** for the full definition of variables. See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

» Highly processed foods are primarily packaged with extended shelf-life,[17] which may enhance their spread to more remote rural areas given their storability.

In both sets of countries, the consumption value shares of low processed foods are higher compared to highly processed foods, but in urban and peri-urban areas of low-food-budget countries the difference is much greater. This is not unlike the pattern seen in other countries with initial higher penetration of low processed rather than highly processed foods.[14]

However, there is a marked difference in the food consumption shares (at market value) of both low processed and highly processed foods and food away from home between high- and low-food-budget countries. To more clearly see these differences, Figure 27 shows the difference between the food value shares of the two categories of processed foods and food away from home comparing high- and low-food-budget countries.

In low-food-budget countries, low processed food consumption in urban and peri-urban areas is higher than in high-food-budget countries. Not as high – but still higher in low-food-budget countries – is the share of highly processed foods in all areas, except large cities and their surroundings. This is surprising because, as highlighted earlier, it is expected that highly processed foods would be greater in high-food-budget countries. On the other hand, food away from home is higher as a share of total household food consumption in high-food-budget countries (Figure 27). This could suggest that there is more off-farm employment in rural areas of high-food-budget countries. This makes sense as food away from home is correlated with working outside the home and commuting within cities or from rural to urban areas or other rural areas (see **Chapter 3**). Such employment patterns emerge with development and urbanization, both correlated with high-food-budget countries.

As was done for food purchases, an econometric analysis was undertaken to look into the determinants (i.e. location effect of each URCA, household income, non-farm employment, etc.) of the share of purchases of highly processed foods as a value share of total household food consumption. Table A7.2 in **Annex 7** presents the statistically significant results, of which the key points are highlighted below.

Holding other factors constant, the effects of location across the rural–urban continuum corroborate the descriptive findings: the farther from a large city, the smaller the share of highly processed foods in total household food consumption for high-food-budget countries, except for more remote areas in low-food-budget countries. The finding on the location effect is similar to that observed for the United Republic of Tanzania (not included in this analysis), according to a study using detailed household budget survey data with urban, peri-urban and rural gradations.[17] It is also similar to findings for rural and urban areas in Bangladesh, Indonesia, Nepal and Viet Nam.[9]

The pure effect of income is associated with a higher share of highly processed foods in both country food-budget groups, but with a greater impact in low-food-budget countries (Table A7.2 in **Annex 7**). This corroborates findings from other recent studies in Africa, for example in Uganda and the United Republic of Tanzania.[17] In both high- and low-food-budget countries, more non-farm employment leads to a higher share of highly processed foods in total household food consumption. This finding is particularly true for male non-farm employment, as the effect is found to be statistically significant in 8 out of the 11 countries analysed. The effect for female non-farm employment is similar to that for male non-farm employment in high-food-budget countries, but is not statistically significant in low-food-budget countries.

All other things equal, the primary schooling of the household head is significantly correlated with a greater consumption value share of highly processed foods in only three countries, while the household head being female is correlated with a greater share in most high-food-budget countries, except for a dampening effect in Ethiopia (Table A7.2 in **Annex 7**). In the former, this is supported by other studies showing that women substitute processed foods for meal preparation to free up time for other household chores, as well as off-farm work.[14] But in poorer countries, it could be that women managing the household alone have less time (and therefore less access) to buy these foods. However, these results require further exploration. Finally, larger households have a lower share of highly processed food purchases in some of the high-food-budget countries, whereas the effect is mixed in low-food-budget countries (Table A7.2 in **Annex 7**). The higher the dependency ratio[y] in both country food-budget groups, the higher the share of highly processed foods purchased.

Household food consumption by various food groups varies over the rural–urban continuum, driven by patterns of urbanization, income and non-farm employment

Urbanization is implicitly associated with shifts in household food consumption, in which urban households purchase a more varied diet, one that is less dominated by staple foods and comprises a larger variety of foods from other food groups, including more expensive foods such as meat and dairy (see **Chapter 3**). However, some studies suggest that it is higher income in urban areas, rather than urbanization per se, that is causing these shifts.[18] This section provides further analysis of these issues.

y Dependency ratio takes into account the consumption needs of young and elderly people, and the productivity of middle-aged people.

All food items are categorized into eight food groups: i) staple foods including cereals, roots, tubers, plantains and their products; ii) pulses, seeds, nuts and their products; iii) animal source foods including milk, eggs, meat, fish, shellfish, insects/grubs and all their products; iv) vegetables and their products; v) fruits and their products; vi) fats and oils; vii) sweets, condiments and beverages; and viii) meals eaten outside the home (food away from home). See Table A5.6 in **Annex 5** for definitions of food group aggregates. Given the number of food groups to be analysed, the ten URCA categories are further aggregated into three categories – urban, peri-urban and rural – to facilitate the presentation of some figures (see Table 9).

Looking at household food composition in terms of the value shares of food consumption by food group, a diet transition is clearly occurring across the rural–urban continuum (Table 11). This involves a diversification of diets at the household level, including the consumption of more expensive food items, like animal source foods and fruits. This suggests the transition is also occurring in rural areas, though lagged and to a lesser extent than in urban and peri-urban areas.

Interestingly, in this small group of countries in Africa, there are no major differences between high- and low-food-budget countries. This might suggest a convergence in the diet transition occurring across the set of countries. The finding that consumption value shares of non-staple foods are similar in the two food-budget groups is somewhat paradoxical. This could be because in both sets of countries, low-cost non-staple foods – such as vegetables or pulses – are accessible and also desired by households. Another study in Senegal[19] found that household expenditure shares were similar in urban and rural areas, but the absolute levels of expenditure were lower in rural areas and among the poor. This may be similar to saying that low-cost pulses figure largely in the diets of the poor. The findings do not negate Bennett's law,[z] but make its slope more gradual.

z In agricultural economics and development economics, Bennett's law observes that as incomes rise, people eat relatively fewer calorie-dense starchy staple foods and relatively more nutrient-dense meats, oils, sweeteners, fruits and vegetables.[8]

Staple foods as a share of household food consumption in value terms are on average 30 percent (high-food-budget countries) and 28 percent (low-food-budget countries) in urban areas (Figure 28). Note that this share is just slightly above the share of 25 percent in Asian cities.[9]

Consumption value shares of staple foods, including market-valued own-produced staple foods, are similar in peri-urban and rural areas, but roughly 12 percentage points higher than in urban areas. The average share of staple foods in total houseold food consumption is similar in high- and low-food-budget countries: 41 percent and 40 percent (respectively) in peri-urban areas, and 42 percent and 43 percent (respectively) in rural areas.

As expected, following Bennett's law, as household income rises the share of staple foods in total household food consumption falls (Figure 28). This holds true across the rural–urban continuum, whether looking at urban, peri-urban or rural aggregate categories (as shown in Figure 28) or at more disaggregated URCA categories (not shown).

Overall, the value shares of staple foods comprise a minority of total household food consumption, not only in urban areas but across the rural–urban continuum. It is striking that the diversification of household food consumption, which is the inverse of dependence on staple foods, is similar in urban areas of both country food-budget groups. Furthermore, the ratio of the shares of staple foods in rural areas to urban areas is nearly the same in high- and low-food-budget countries (1.4 and 1.5, respectively), suggesting an intercountry convergence.

The smaller staple food shares in urban areas are generally offset by larger shares of animal source foods and food away from home (Figure 29A). This is expected, as urbanization is generally associated with urban households procuring more varied foods, including more expensive foods such as meat, but also eating outside the home more often. With this analysis, however, as previously mentioned, it is not possible to assess the types of foods consumed away from home, whether they contribute to diversity, and their level of processing.

TABLE 11 IN THE 11 COUNTRIES IN AFRICA, A DIET TRANSITION AT THE HOUSEHOLD LEVEL IS OCCURRING ACROSS THE RURAL–URBAN CONTINUUM AND IN HIGH- AND LOW-FOOD-BUDGET COUNTRIES – EVEN IN RURAL AREAS, THOUGH LAGGED AND TO A LESSER EXTENT THAN IN URBAN AND PERI-URBAN AREAS

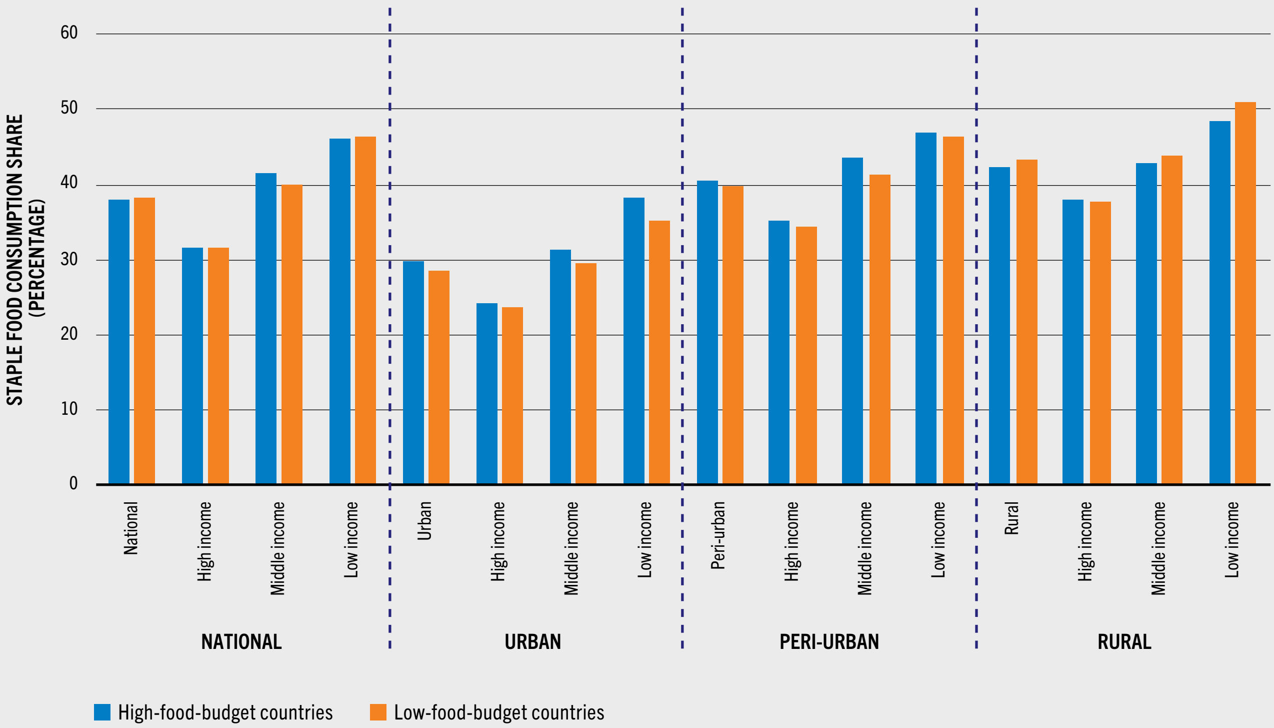
		Large city (>1 million people)	Intermediate city (0.25 –1 million people)	Small city (50–250 thousand people)	Town (20– 50 thousand people)	<1 hour to a large city	<1 hour to an intermediate city	<1 hour to a small city	<1 hour to a town	1–2 hours to a city or town	>2 hours to a city or town
		(%)									
High-food-budget countries	Staple foods	26	32	31	34	34	41	44	45	41	47
	Pulses, seeds and nuts	5	6	6	7	7	8	8	6	8	10
	Animal source foods	22	17	17	17	18	13	12	16	14	10
	Vegetables	12	12	12	11	11	11	10	9	11	10
	Fruits	3	2	3	3	3	2	2	1	2	1
	Fats and oils	5	6	6	7	6	6	6	5	5	5
	Sweets, condiments and beverages	9	8	9	10	7	8	9	12	11	12
	Food away from home	17	16	15	11	14	11	8	5	8	5
Low-food-budget countries	Staple foods	25	31	30	34	33	43	40	44	43	44
	Pulses, seeds and nuts	3	4	4	5	6	8	8	8	8	6
	Animal source foods	25	23	22	20	19	15	16	15	15	14
	Vegetables	14	14	14	13	14	14	13	11	13	12
	Fruits	4	3	4	3	4	2	3	3	3	2
	Fats and oils	5	5	5	5	5	4	5	4	4	5
	Sweets, condiments and beverages	13	12	13	13	12	11	12	11	12	15
	Food away from home	12	7	7	7	7	3	4	3	3	3

NOTES: The table shows household food consumption by food group as a percentage share of total household food consumption (at market value) across the rural–urban continuum (URCA) for high- and low-food-budget countries. All surveys are for 2018/19, except Malawi (2019/20). See **Annex 5** for the full definition of variables. See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

In urban areas, on average across the countries analysed, animal source food consumption value shares (which include milk, eggs, meat, fish, shellfish and insects) are 40 percent higher than in peri-urban areas and 44 percent higher than in rural areas. Looking at low-food-budget countries, the share in urban areas is 1.5 times higher than in peri-urban areas and 1.6 times higher than in rural areas. For high-food-budget countries, the differences are smaller: urban shares are 1.4 times higher than peri-urban and rural (not shown here, see Figure A7.1A in **Annex 7**). There is also a notable decrease in value shares of pulses, seeds and nuts in urban areas compared to peri-urban areas and rural areas (40 percent and 47 percent lower than in peri-urban and rural areas, respectively) (Figure 29A). This finding is typical, as these items are cheaper sources of nutrient-rich foods, but

Animal source foods and food away from home increasingly substitute staple foods, moving from rural to urban areas across the continuum

FIGURE 28 IN THE 11 COUNTRIES IN AFRICA, THE SHARE OF STAPLE FOODS REPRESENTS A MINORITY OF TOTAL HOUSEHOLD FOOD CONSUMPTION IN VALUE TERMS, AND RISES AS INCOME FALLS ACROSS THE RURAL–URBAN CONTINUUM IN BOTH HIGH- AND LOW-FOOD-BUDGET COUNTRIES



NOTES: The figure shows household staple food consumption as a percentage share of total household food consumption (at market value) by national, urban, peri-urban and rural area (URCA), and by income tercile (low-income, middle-income and high-income households) within each category. All surveys are for 2018/19, except Malawi (2019/20). See **Annex 5** for the definition of urban, peri-urban and rural. See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

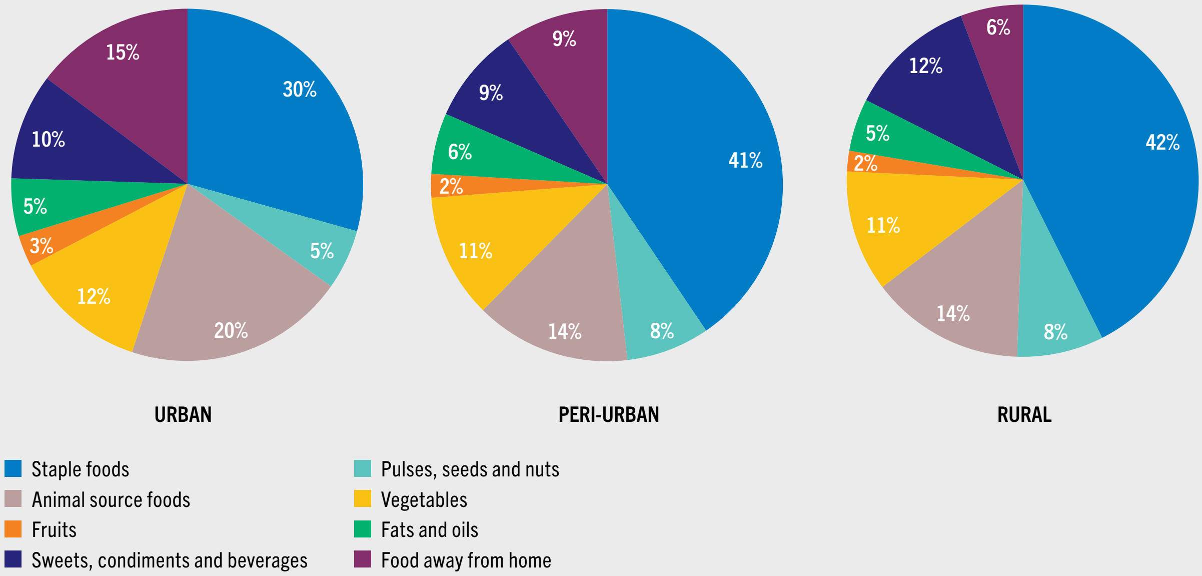
tend to be supplanted by animal source foods (if only by milk in partially vegetarian countries such as India) as people's incomes increase.

Across all countries, shares of food away from home are higher in urban areas, and decline steeply moving to peri-urban and rural areas (Figure 29). On average, shares are 1.6 times higher in urban areas than in peri-urban areas, and 2.6 times higher than in rural areas. This pattern is stronger in low-food-budget countries, with urban shares 2.4 times higher than in peri-urban areas, and 3.2 times higher than in rural areas (see Figure A7.1B in **Annex 7**).

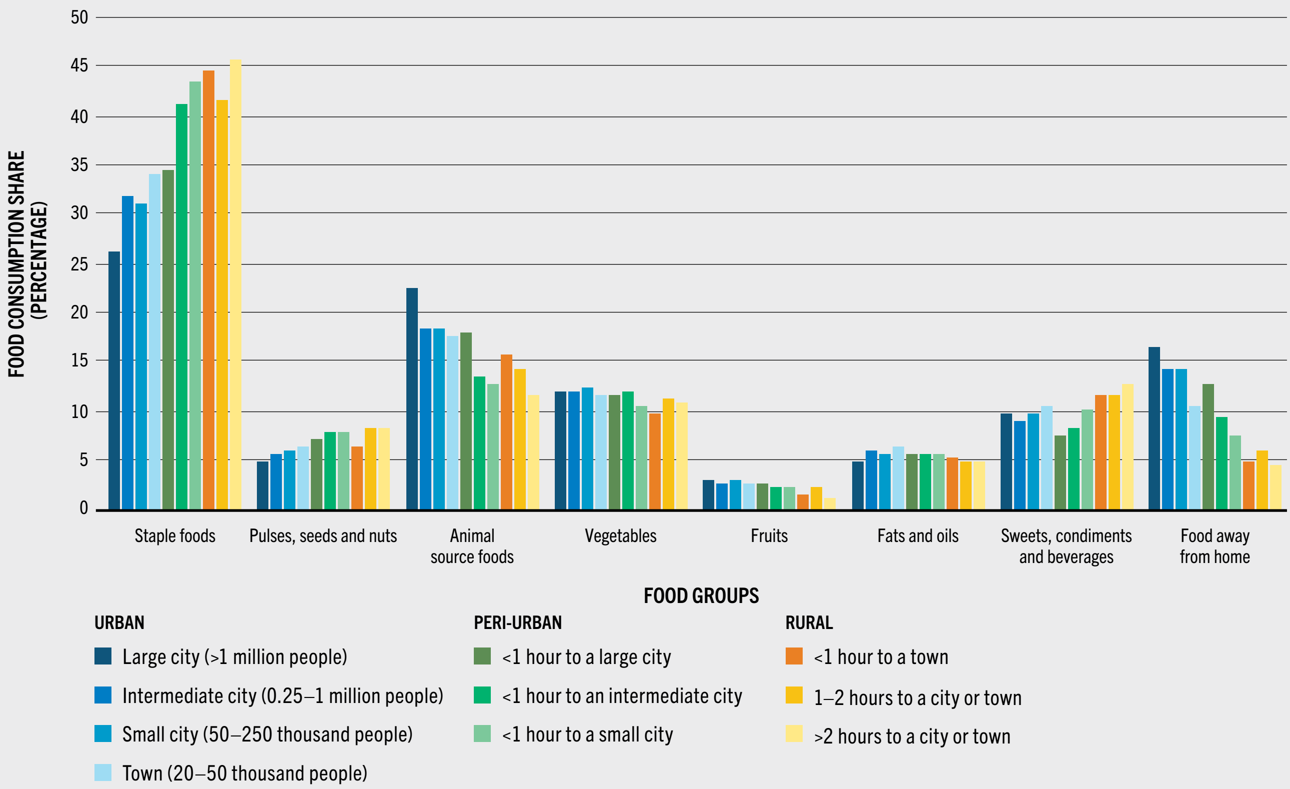
A more disaggregated look at the consumption value shares by food group shows that on average across all countries, there is no abrupt rural–urban divide across the continuum (Figure 29B). Again, this is a surprise, as it is generally assumed there is a marked difference between urban and rural areas. Moving across the continuum from urban to rural areas (Figure 29B), there is an increasing share of staple foods and pulses, seeds and nuts, and a decreasing share of animal source foods and food away from home. In contrast, shares for vegetables, fruits, and fats and oils are fairly uniform across the rural–urban continuum. Although there are some variations, »

FIGURE 29 IN THE 11 COUNTRIES IN AFRICA, ANIMAL SOURCE FOODS AND FOOD AWAY FROM HOME SUBSTITUTE STAPLE FOODS, MOVING FROM RURAL TO URBAN AREAS

A) AVERAGE SHARES OF HOUSEHOLD FOOD CONSUMPTION VALUES BY FOOD GROUP AND URBAN, PERI-URBAN AND RURAL AREAS (URCA)



B) AVERAGE SHARES OF HOUSEHOLD FOOD CONSUMPTION BY FOOD GROUP ACROSS THE RURAL–URBAN CONTINUUM (URCA)



NOTES: The figures show household food consumption by food group as a percentage share of total household food consumption (at market value), by urban, peri-urban and rural area (URCA) (Figure A), and by rural–urban continuum (URCA) (Figure B). All surveys are 2018/19, except Malawi (2019/20). See **Annex 5** for the definition of urban, peri-urban and rural. See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

» sweets, condiments and beverages also are uniform (see Table 11 for disaggregated values by high- and low-food-budget countries).

An econometric analysis of the determinants of consumption of the different food groups provides further insights. For example, the determinants of consumption of animal source foods and food away from home corroborate the descriptive trends. Increases in the share of consumption of animal source foods in household food consumption are mainly driven by statistically significant increases in income (see Table A7.3 in **Annex 7**).

For the shares of food away from home, the effect of income is mixed across high- and low-food-budget countries, but it shows an average higher consumption share as income increases when all countries are pulled together (Table A7.4 in **Annex 7**). However, in both country food-budget groups, more male non-farm employment leads to a higher share of food away from home and the effect is higher in high-food-budget countries than in low-food-budget countries. This may reflect employment that is more spatially dispersed, with longer commutes, and thus a greater need for food away from home. It may also be the case that in some high-food-budget countries, restaurants and vendors (i.e. food services) that prepare meals (for food away from home) are more plentiful.

The location effect across the rural–urban continuum is present and statistically significant in low-food-budget countries. In this case, the consumption value share of food away from home is much greater in large cities than in towns, but decreases incrementally in peri-urban areas the larger the size of the closest city, and decreases moving from towns to rural areas, with the largest decrease occurring in areas 1 to 2 hours from any urban centre. The location effect is statistically significant for fewer URCA categories in high-food-budget countries. It shows a greater consumption of food away from home in large and intermediate cities compared to towns, and a decrease in rural areas, with the largest drop occurring in areas more than 2 hours from any urban centre. These results corroborate the descriptive findings: the larger the urban city, the higher the share of food away from home in total consumption; the greater the distance from a large city, the smaller the share (Table A7.4 in **Annex 7**). The consumption of food away from home is often linked to commuting for work; therefore these patterns reflect how much farther workers have to commute from home in cities compared to rural areas.

For household consumption, shares of animal source foods are driven by income, while shares of fruits and vegetables are determined by access and availability.

In contrast to animal source foods and food away from home, the analysis of the determinants of the share of vegetables in total household food consumption suggests that this consumption is driven more by access and availability than by income. The effect of income on vegetable consumption is mixed, but overall negative and statistically significant, indicating a reduction in vegetable consumption shares as income increases (Table A7.5 in **Annex 7**).

On the other hand, considering all countries together, there are statistically significant location effects on the share of vegetables in total household food consumption across the rural–urban continuum – after controlling for income. Large, intermediate and small cities and areas less than 1 hour from large and intermediate cities have higher shares of vegetable consumption than do towns (Table A7.5 in **Annex 7**). For low-food-budget countries, there is also a notable decrease in the share of vegetable consumption in rural areas. These findings may reflect the presence of major horticultural commercial zones near cities, or in well-watered areas near highways and rivers, in both low- and high-food-budget countries.

In both high- and low-food-budget countries, the effect of non-farm employment is mostly non-significant (Table A7.5 in **Annex 7**). However, if the household is headed by a woman, there is a positive effect on the share of vegetable consumption in both country food-budget groups. Since the effect of income is taken into consideration at the same time, this can be interpreted as an indication that female diet choices for households make a difference, as women, for example, choose food with greater nutrient and vitamin content. ■

4.2 COST AND AFFORDABILITY OF A HEALTHY DIET, AND FOOD SECURITY AND NUTRITION ACROSS THE RURAL–URBAN CONTINUUM

KEY MESSAGES

➔ In the 11 African countries analysed, the cost of a healthy diet in urban areas is much higher (on average 1.2 times higher) than in peri-urban areas, and it then decreases the smaller the city size and moving closer to rural areas. This trend is less pronounced in high-food-budget countries, which show similar costs across all urban areas.

➔ The higher cost of animal source foods, compared to the other food groups, drives up the cost of a healthy diet across the rural–urban continuum, especially in urban areas and remote rural areas.

➔ The lower cost of a healthy diet in peri-urban areas of the 11 countries analysed compared to urban areas does not translate into more affordable healthy diets, as income levels are a considerable factor. The percentage of the population unable to afford a healthy diet in peri-urban areas is higher than in urban areas and similar to rural areas.

➔ In the 11 countries in Africa, the cost of a healthy diet exceeds average food expenditure for low- and middle-income households in both high- and low-food-budget countries. Low-income households living in peri-urban and rural areas are especially disadvantaged, as they would need to more than double what they currently spend on food to secure a healthy diet.

➔ In many of these African countries studied, the prevalence of moderate or severe food insecurity in urban and peri-urban areas is similar to that in rural areas, and in some cases, slightly higher, indicating that food insecurity is not exclusively a rural problem in most of the countries analysed.

➔ In the three countries analysed in Africa, the prevalence of child stunting generally increases as cities become smaller and as one moves away from urban centres. Child wasting and overweight are lower and exhibit less evident trends across the rural–urban continuum.

Based on the latest estimates (**Chapter 2**), we are not on track to end all forms of malnutrition by 2030. For instance, still 148.1 million children under five years of age were stunted in 2022, while 45 million were wasted and 37 million were overweight. According to the Global Burden of Disease Study, in 2019 dietary risk was the second largest Level 2 risk factor[aa] for attributable deaths among females and the third among males.[20]

All forms of malnutrition have multiple causes, but healthy diets can help reduce the risk of malnutrition in all its forms, including micronutrient deficiency, stunting, wasting, overweight and obesity, as well as diet-related NCDs.[21] The determinants of consumption of healthy diets are similarly highly complex and include behavioural and cultural factors, food placement and promotion within the food environment. It is clear, however, that to ensure access to healthy diets, nutritious foods must be both available and affordable. Availability refers to the existence of food coming from either own production or the market, while affordability refers to people's financial capacity to acquire sufficient food, which in turn depends on household income and food prices. Low incomes constrain how much food households can economically access, but relative prices and systematic food price dispersion[ab] will greatly influence the types of foods selected and, as a result, may influence diet-related nutrition outcomes.[22]

aa The Global Burden of Disease Study[20] estimates the prevalence of exposure and attributable deaths for, among others, 23 age groups; males, females, and both sexes combined; and 204 countries and territories. The study uses a risk factor hierarchy of 87 risks or clusters of risks. Level 1 risk factors are behavioural, environmental and occupational, and metabolic; Level 2 comprises 20 risk factors or clusters of risks; Level 3 comprises 52 risk factors or clusters of risks; and Level 4 comprises 69 specific risk factors.

ab Food price dispersion emerges when the same kind of foods are sold at different prices by stores in the same market.

It is worth recalling that the affordability indicator is a measure of economic access. It measures not the number of people not eating a healthy diet, but rather the number who do not have enough resources to acquire a healthy diet. As such, the contribution of social protection programmes such as school feeding programmes are not taken into consideration. On the other hand, social programmes such as cash-based transfers, whether in-kind or monetary, or food donation programmes, are considered part of the household income.

The 2020 edition of this report showed the existence of within-country variations in the cost and affordability of a healthy diet, but it did not cover variations across the rural–urban continuum. Studies suggest that urbanization may directly exert upward pressure on food prices in poor countries.[18] This is because most households now depend on food supplied by markets rather than their own production. This is particularly true in urban areas where – as shown in Figure 24 in **Section 4.1** – food purchases constitute more than 78 percent of household consumption in the 11 sub-Saharan African countries analysed. However, it also holds true in peri-urban and rural areas, where households of almost all countries analysed acquire more than 50 percent of the food consumed in markets. Such high shares increase the risk of food hoarding when prices are expected to rise, which itself can contribute to higher prices.

This section presents a new descriptive analysis of indicators of healthy diet access, food security and nutrition for selected countries. The analysis relies on the geospatial URCA dataset (see Box 2 and Box 3 in **Chapter 3**, and **Annex 4**, **Section A**); while there is no comparable global dataset to support the analysis, there are microlevel national survey data that, once merged with the URCA dataset, could provide insights on differences across the rural–urban continuum. The analysis focuses on the 11 sub-Saharan countries covered in **Section 4.1**, using the same household survey data (see Table A5.1 in **Annex 5**), and still grouping them into high-food-budget countries (2.3 PPP dollars per capita per day) and low-food-budget countries (1.6 PPP dollars per capita per day) (see Table 10 for the list of countries by category).

Similar to **Section 4.1**, patterns, differences and similarities are also analysed across ten URCA categories of the rural–urban continuum, as well as a further aggregation into urban, peri-urban and rural categories (see Table 9 and **Annex 5**, **Section B** for further details).

Cost and affordability of a healthy diet across the rural–urban continuum

The calculation of subnational cost and affordability of a healthy diet follows the same methodology as the global monitoring CoAHD indicators presented in **Chapter 2**. However, national estimates derived from the aggregation of subnational indicators are not comparable with global CoAHD indicators due to differences in data sources. For further information and the full description of the data sources and methodology, see **Annex 8**.

Cost of a healthy diet

Across the 11 African countries analysed, the cost of a healthy diet in urban centres is much higher (on average 1.2 times higher) than in peri-urban areas and it then decreases the smaller the city size and moving closer to rural areas. The higher cost of a healthy diet in urban centres in almost all countries analysed may be associated with the widespread diffusion of supermarkets in cities. While diffusion of supermarkets may increase access to a more diverse diet (see **Chapter 3**), it may also push the cost of a healthy diet up, making it less affordable for poorer households in urban centres.

However, there are exceptions to this cost pattern. For example, in Guinea-Bissau, the cost in peri-urban areas is slightly higher than in urban areas. This is likely attributed to the unique geographic concentration of cities in the south around the port of Bissau and to poor infrastructure, particularly in ferry and road transport systems linking urban and peri-urban areas that are 1 hour away or less (Figure A6.1D in **Annex 6**).[23] In Ethiopia and Togo, the other exceptions, the cost is higher in rural areas than in peri-urban areas; this is directly related to the dispersed urbanization pattern in these countries (see Figure A6.1C in **Annex 6**), with poor rural areas inadequately connected to urban areas due to poor and limited road infrastructure.[24]

Generally, in these three exceptional cases, poor transport infrastructure is a major factor hampering availability of nutritious foods (often highly perishable) and pushing up their cost in rural areas.

Average values across countries also hide differences between high- and low-food-budget countries as shown in Figure 30A. The cost of a healthy diet in high-food-budget countries is 23 percent – 22 percent and 28 percent higher than in low-food-budget countries, comparing urban, peri-urban and rural areas. The higher cost in high-food-budget countries is mainly due to the higher cost of vegetables and animal source foods (29 percent and 32 percent higher than in low-food-budget countries, respectively). For both country food-budget groups, the largest decrease in the cost occurs moving from urban to peri-urban areas, while in rural areas the cost is similar to (in high-food-budget countries) or only slightly lower than (in low-food-budget countries) that in peri-urban areas.

A more disaggregated view of the rural–urban continuum (i.e. considering the ten URCA categories) reveals a much closer convergence in the cost of a healthy diet in high-food-budget countries, particularly in urban areas (Figure 30B). On the other hand, the range in the cost is wider for low-food-budget countries. The greater convergence in the cost of a healthy diet in high-food-budget countries points to their better connectivity in food supply chains across the rural–urban continuum compared to low-food-budget countries.

Looking at the cost pattern across the rural–urban continuum for individual countries also provides further insights (Table A9.2 in **Annex 9**). For example, in Benin and Togo, households living in urban centres face a cost, respectively, 1.4 and 1.7 times higher than households living in peri-urban areas – and most of the population of these countries is concentrated in peri-urban areas of small cities. This suggests that a more dispersed urbanization pattern, likely involving decentralized markets served by local producers, may significantly drive the cost of healthy diets down.

Finally, and differently from that seen for low-food-budget countries, the cost of a healthy diet basket is particularly high in very remote rural areas, more than 2 hours from any urban centre in high-food-budget countries (Table A9.2 in **Annex 9**). Among the high-food budget countries, the cost difference between these remote areas and rural areas 1 to 2 hours from any urban centre is particularly high in Nigeria. This may be a reflection of the different urbanization patterns in those countries, which have undergone a metropolitan expansion process with most of the population living in large and/or intermediate cities and in peri-urban areas 1 hour away or less. In this situation, a more abrupt separation from more remote rural areas can be expected, with disruption in the food supply chain and higher prices.

The cost structure by food group of a healthy diet does not present any striking differences across URCAs, with each of the six food groups contributing to the total cost of a healthy diet in about the same percentage, independently of the catchment area for both high- and low-food-budget countries (Figure A9.1 in **Annex 9**). The largest cost contribution by food group to a healthy diet comes from animal source foods (31–41 percent), followed by vegetables (17–22 percent), staple foods (16–21 percent), fruits (10–18 percent), fats and oils (6–8 percent), and pulses, seeds and nuts (6–8 percent).

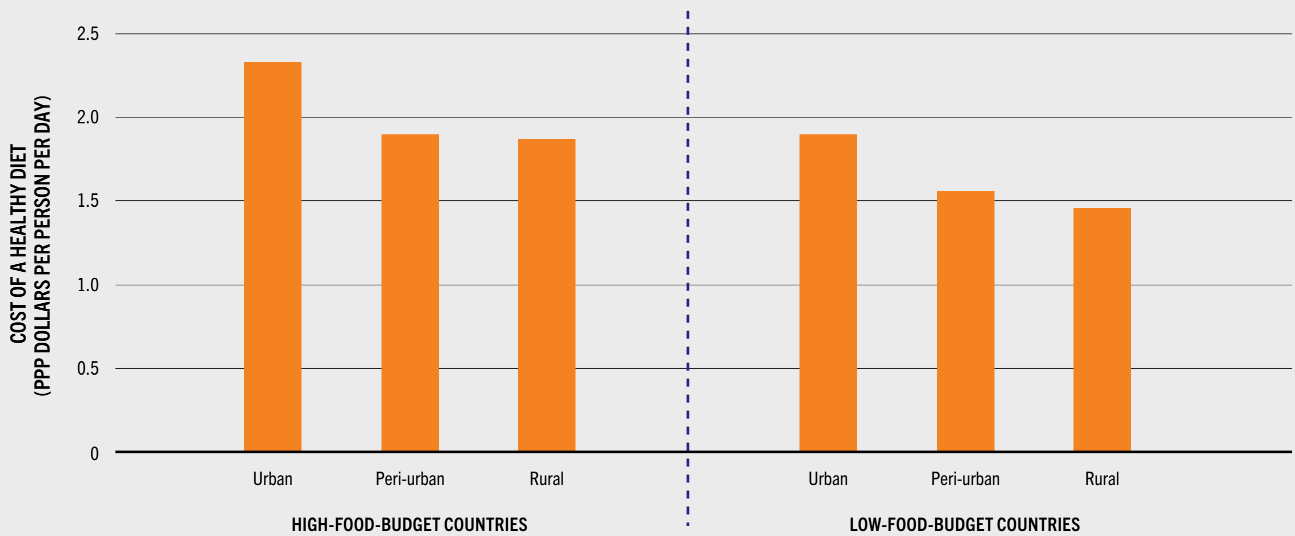
However, it is worth noting the higher cost share of animal source foods in all urban centres and peri-urban areas of high-food-budget countries, compared to low-food-budget countries (between 2 and 6 percentage points difference) (Figure A9.1 in **Annex 9**). The largest cost difference is found in towns, where households in high-food-budget countries spend USD 0.29 more per person per day on animal source foods than do households in low-food-budget countries (Figure 31).

The other trend to highlight is the higher cost contribution of animal source foods compared to all other food groups, even vegetables and fruits combined, in almost all URCAs in both country food-budget groups. The main outliers are large cities of low-food-budget countries, due to the higher share of fruits in the cost of a healthy diet (Figure A9.1 in **Annex 9**).

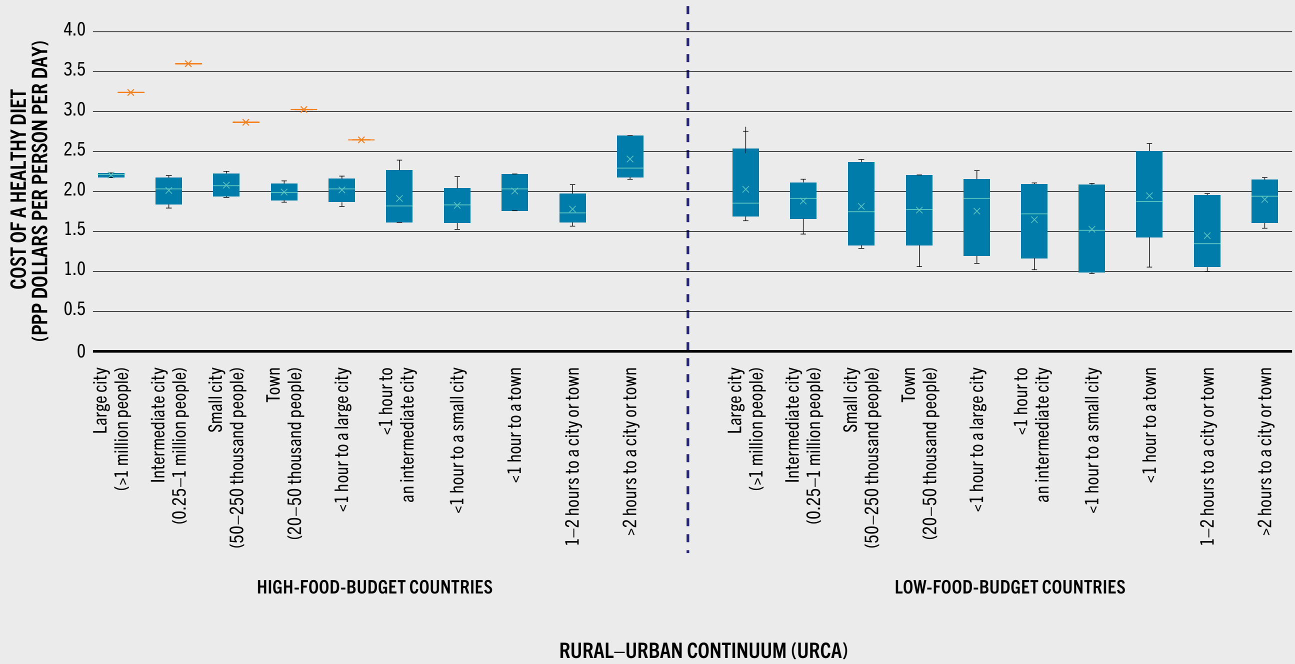
Finally, the cost contribution of animal source foods in the total cost of a healthy diet (both as »

FIGURE 30 IN THE 11 COUNTRIES IN AFRICA, THE COST OF A HEALTHY DIET IN URBAN AREAS IS MUCH HIGHER THAN IN PERI-URBAN AREAS, AND IT DECREASES THE SMALLER THE CITY SIZE AND MOVING CLOSER TO RURAL AREAS; THIS TREND IS LESS PRONOUNCED IN HIGH-FOOD-BUDGET COUNTRIES, WHICH SHOW SIMILAR COSTS ACROSS ALL URBAN AREAS

A) COST OF A HEALTHY DIET IN URBAN, PERI-URBAN AND RURAL AREAS (URCA)



B) COST OF A HEALTHY DIET ACROSS THE RURAL–URBAN CONTINUUM (URCA)



NOTES: Figure A shows the cost of a healthy diet in urban, peri-urban and rural areas (URCA). In Figure B, each bar visualizes the median, 25th and 75th percentile range, and whiskers of 1.5 times that range of the cost of a healthy diet for the 11 countries analysed across the rural–urban continuum (URCA) by high- and low-food-budget countries, in PPP dollars per person per day (PPP = purchasing power parity). Crosses in the high-food-budget figure are cost of heathy diet in urban centres in Ethiopia, classified as outlier compared to the values of other countries in the same URCAs. All surveys are for 2018/19, except Malawi (2019/20). See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Holleman, C. & Latino, L. (forthcoming). *Variations in the subnational cost and affordability of a heathy diet – Evidence from sub-Saharan Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023*. FAO Agricultural Development Economics Working Paper. Rome, FAO.

» share and in terms of money value) is also high in more remote areas (more than 2 hours travel to a city or town) in both high- and low-food-budget countries. On the other hand, it is lower in peri-urban areas of intermediate and small cities, as well as in areas 1 to 2 hours from a city of any size (Figure 31 and Figure A9.1 in **Annex 9**).

The lower cost of animal source foods in peri-urban areas, coupled with the high cost of fruits and vegetables in large cities, particularly in low-food-budget countries, explains the decrease in the overall cost of a healthy diet basket from urban to rural areas across the continuum (Figure 31). The lower cost of fruits, vegetables and animal source foods in the outskirts of cities is clearly a consequence of the proximity to the production site of these perishable products. In fact, the increasing demand for animal source foods from better-off urban dwellers is attracting more medium- and large-scale livestock operators to urban and peri-urban areas (such operators had moved farther away when urbanization first began to intensify).[25] Furthermore, the wider cost difference for animal source foods across the rural–urban continuum of low-food-budget countries is likely due to the higher constraints in the cold supply chain.

Cost of a healthy diet compared to actual household food expenditure

The food demand analysis in **Section 4.1** shows the patterns of food consumption across the rural–urban continuum, including the market value of the foods consumed by food group. From this analysis, however, it is not possible to determine whether the consumed diet provides the quantity of calories and nutrients, and the diverse intake of foods from different food groups that would constitute a healthy diet. This would require a different set of data and information, which is not available. On the other hand, it is possible to compare the cost of a healthy diet to what households are actually spending on food (including market value of own food production), in order to determine whether they would have to spend more or less of the income they have available to secure a healthy diet. This is a useful comparison, especially as estimates can be disaggregated by URCA category and household income level.

On average at the national level, the cost of a healthy diet is lower than the amount households spend on food in the high-food-budget countries analysed (see Table A9.1 in **Annex 9**). For high-food-budget countries, the cost of a healthy diet is 86 percent of average food consumption, varying from 74 percent to 97 percent among the countries in this group. For low-food-budget countries, there is more variability. In two countries (Burkina Faso and the Niger), the cost of a healthy diet is almost 40 percent greater than average food consumption. However, in the others, the cost of a healthy diet is lower than the actual amount spent on food.

The national averages, however, obscure the fact that for low- and middle-income households in both country food-budget groups, the cost of a healthy diet actually exceeds average expenditure on food (Figure 32A). For low-income households, the cost of a healthy diet basket is about twice the amount that households spend on food: specifically, 2.3 times higher in low-food-budget countries and 2 times higher in high-food-budget countries. Middle-income households would also need to increase current spending to have access to a healthy diet (i.e. by 34 percent in low-food-budget countries and 17 percent in high-food-budget countries).

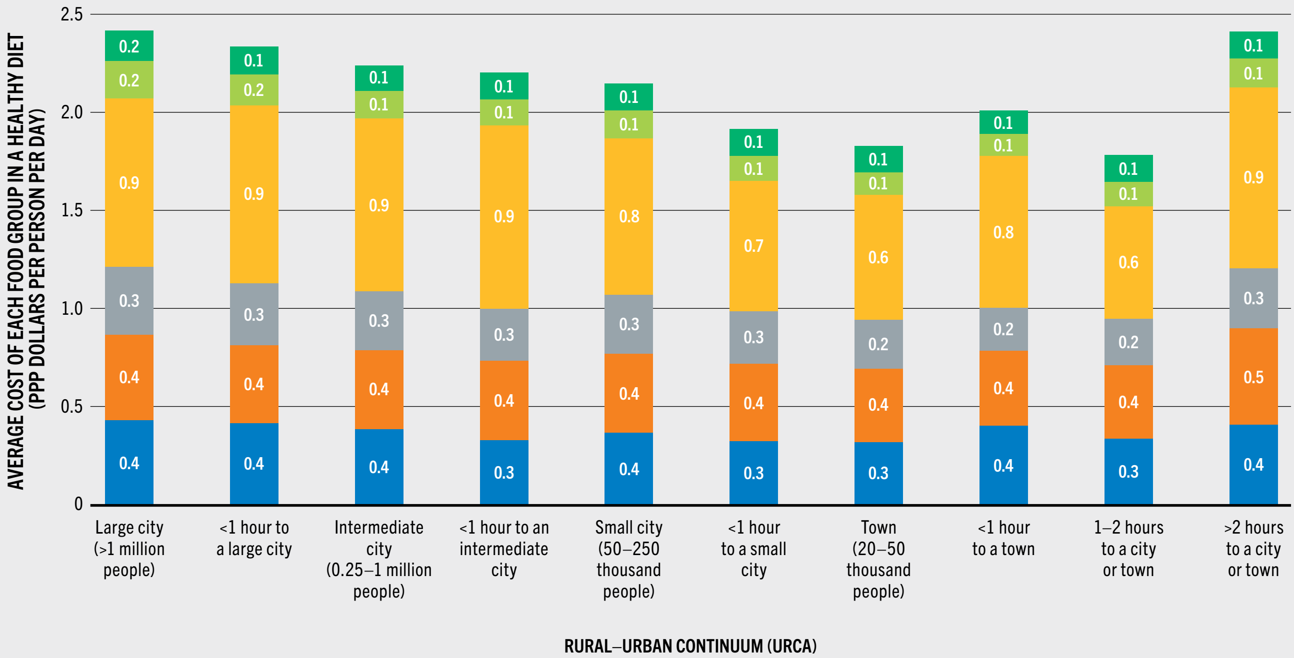
This problem is seen for all low- and middle-income households in both high- and low-food-budget countries across the rural–urban continuum, although it becomes particularly acute moving from urban to peri-urban areas (Figure 32B). Low-income households living in peri-urban and rural areas are especially disadvantaged, as they would need to more than double what they currently spend on food to secure a healthy diet.

Affordability of a healthy diet across the rural–urban continuum

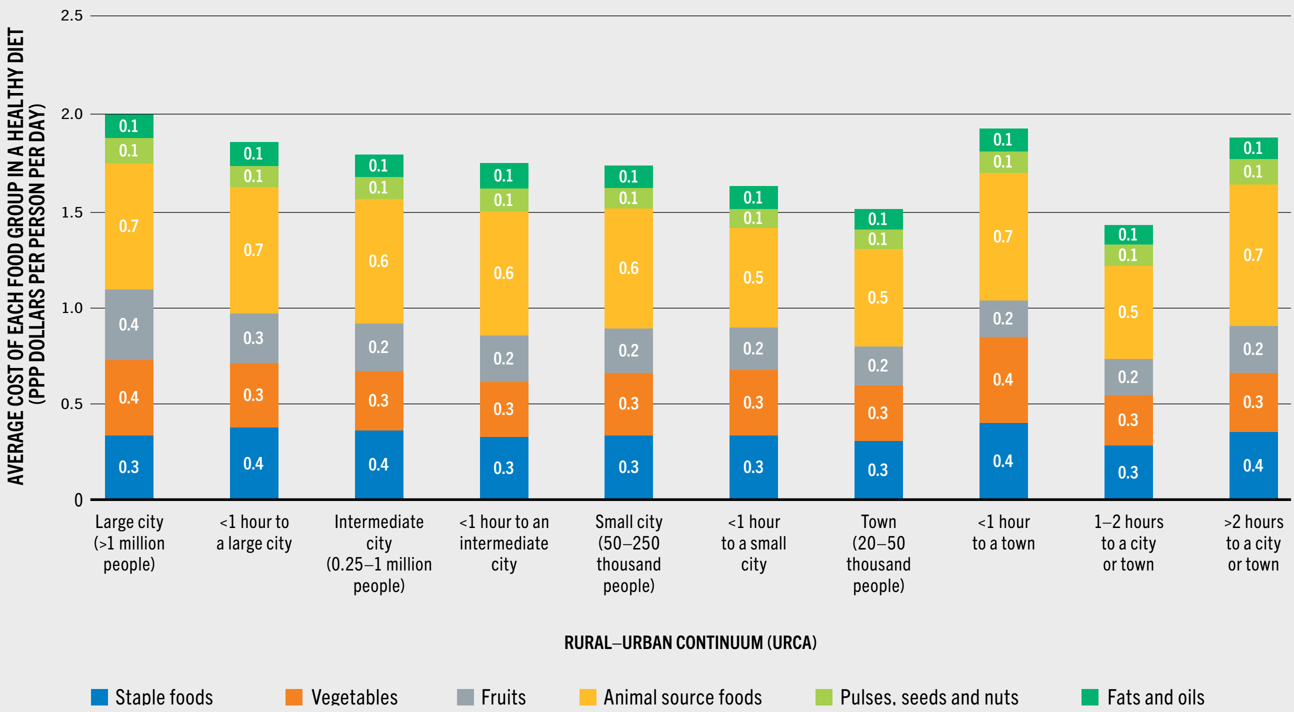
Affordability, or the cost of a healthy diet relative to income that households can credibly reserve for food, reflects the ability to access a healthy diet. Tracing this affordability across each URCA in the 11 countries analysed shows how economic access to a healthy diet follows different paths in countries with different levels of development and urbanization. Importantly, high costs do not necessarily translate into greater unaffordability, and vice »

FIGURE 31 IN THE 11 COUNTRIES IN AFRICA, THE HIGHER COST OF ANIMAL SOURCE FOODS DRIVES THE HIGH COST OF A HEALTHY DIET ACROSS THE RURAL–URBAN CONTINUUM, ESPECIALLY IN URBAN AND REMOTE RURAL AREAS

A) AVERAGE COST OF EACH FOOD GROUP IN A HEALTHY DIET ACROSS THE RURAL–URBAN CONTINUUM IN HIGH-FOOD-BUDGET COUNTRIES



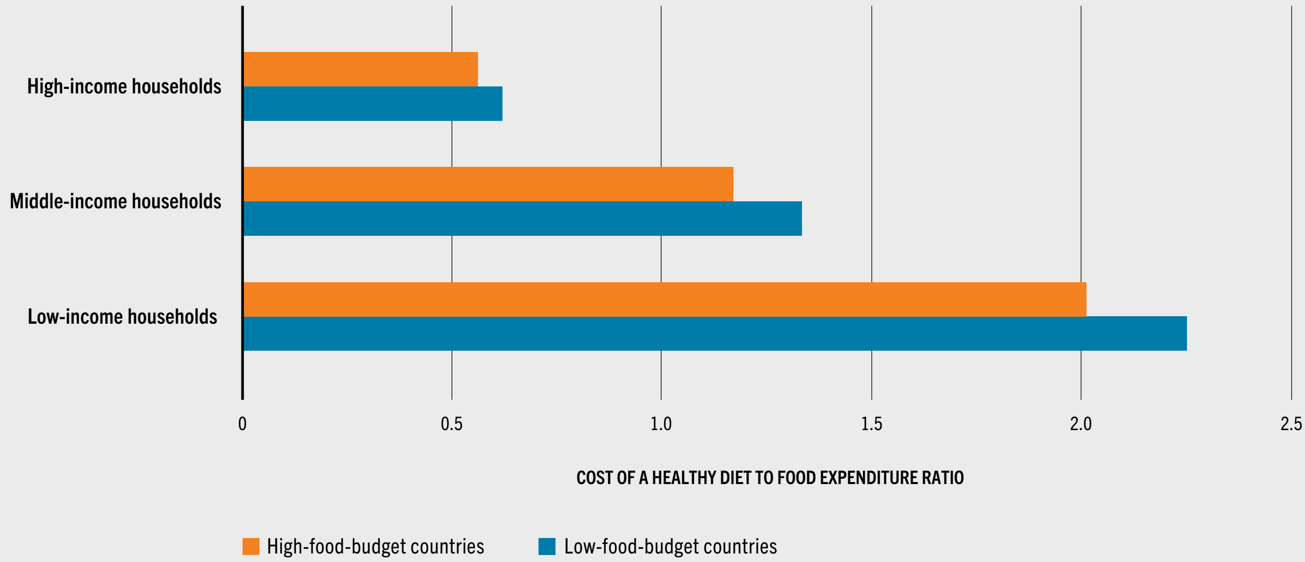
B) AVERAGE COST OF EACH FOOD GROUP IN A HEALTHY DIET ACROSS THE RURAL–URBAN CONTINUUM IN LOW-FOOD-BUDGET COUNTRIES



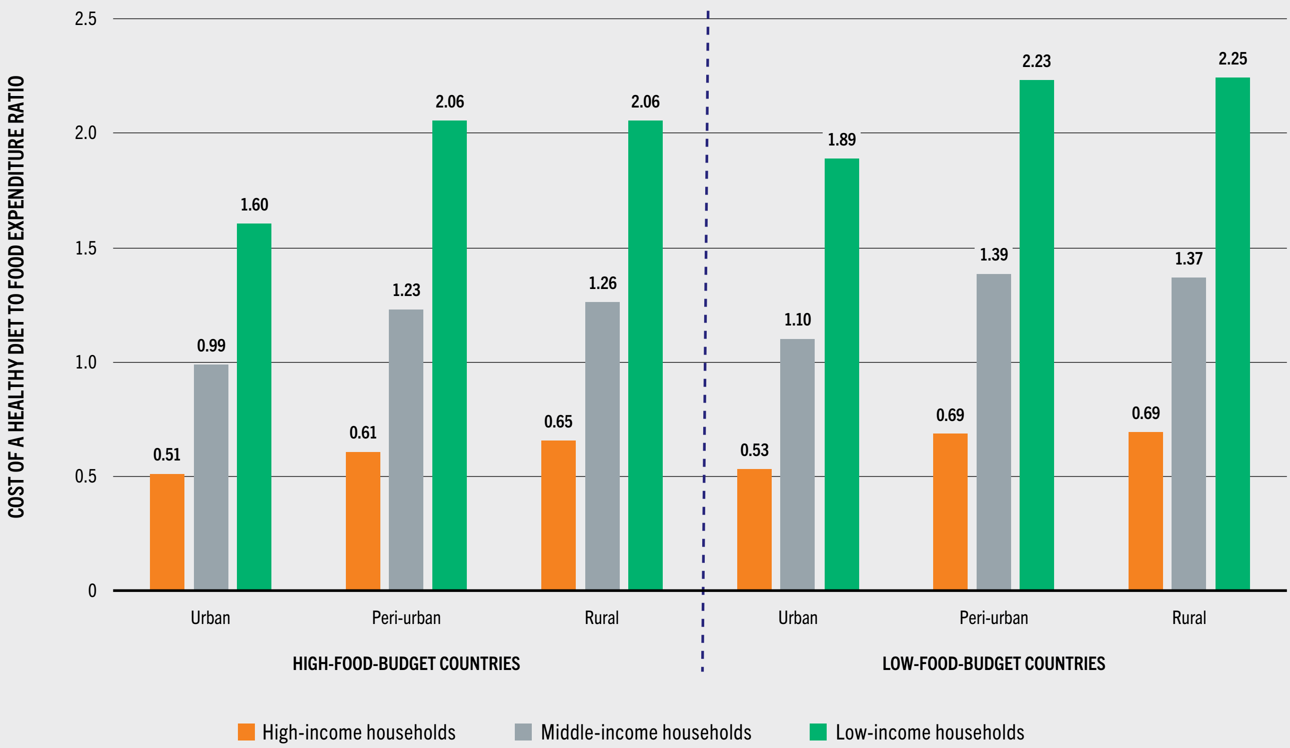
NOTES: The figures show the average cost of each food group in a healthy diet across the rural–urban continuum (URCA), for high-food-budget (Figure A) and low-food-budget (Figure B) countries. The cost of a healthy diet is expressed in PPP dollars per person per day (PPP = purchasing power parity). All surveys are for 2018/19, except Malawi (2019/20). See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Holleman, C. & Latino, L. (forthcoming). *Variations in the subnational cost and affordability of a heathy diet – Evidence from sub-Saharan Africa*. Background paper for *The State of Food Security and Nutrition in the World 2023*. FAO Agricultural Development Economics Working Paper. Rome, FAO.

FIGURE 32 THE COST OF A HEALTHY DIET EXCEEDS AVERAGE FOOD CONSUMPTION FOR LOW- AND MIDDLE-INCOME HOUSEHOLDS IN BOTH HIGH- AND LOW-FOOD-BUDGET COUNTRIES IN THE 11 COUNTRIES ANALYSED IN AFRICA

A) RATIO OF THE COST OF A HEALTHY DIET AND AVERAGE FOOD CONSUMPTION BY HOUSEHOLD INCOME LEVEL IN HIGH- AND LOW-FOOD-BUDGET COUNTRIES

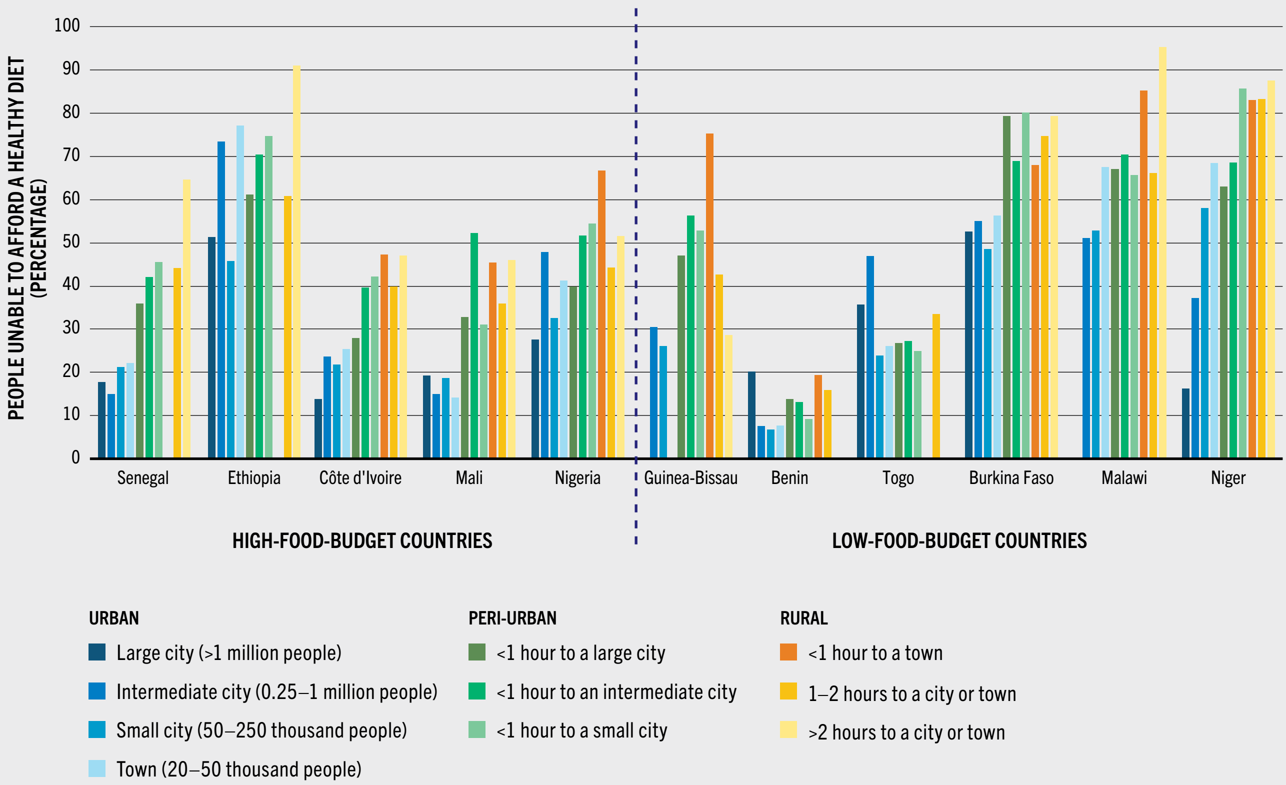


B) RATIO OF THE COST OF A HEALTHY DIET AND AVERAGE FOOD CONSUMPTION BY HOUSEHOLD INCOME LEVEL AND BY URBAN, PERI-URBAN AND RURAL AREA (URCA) IN HIGH- AND LOW-FOOD-BUDGET COUNTRIES



NOTES: In the figures, total household consumption (at market value) serves as a proxy for household income, and terciles are calculated to classify low-, middle- and high-income households. A ratio greater than 1 shows how many times a healthy diet is more expensive than average household food consumption. All surveys are for 2018/19, except Malawi (2019/20). See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Holleman, C. & Latino, L. (forthcoming). *Variations in the subnational cost and affordability of a heathy diet – Evidence from sub-Saharan Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Working Paper. Rome, FAO.

FIGURE 33 IN THE 11 COUNTRIES IN AFRICA, THE PERCENTAGE OF THE POPULATION UNABLE TO AFFORD A HEALTHY DIET IN PERI-URBAN AREAS IS HIGHER THAN IN URBAN CENTRES AND SIMILAR TO RURAL AREAS



NOTES: All surveys are for 2018/19, except Malawi (2019/20). See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Holleman, C. & Latino, L. (forthcoming). *Variations in the subnational cost and affordability of a heathy diet – Evidence from sub-Saharan Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Working Paper. Rome, FAO.

» versa, as this depends on the level of income relative to the cost.

Indeed, this is a key finding from the analysis. Although the cost of a healthy diet in peri-urban areas is lower than in urban areas (Figure 30A), this does not translate into a more affordable healthy diet in the former (Figure 33). On average, the percentage of the population unable to afford a healthy diet in peri-urban areas is 1.5 times higher than in urban centres and similar to rural areas.

In the Niger, a low-food-budget country with the highest percentage of population living in areas more than 1 hour from any urban centre among the 11 countries analysed, the percentage of population unable to afford a healthy diet grows as cities get smaller and as one moves into rural areas. In this case, there is an increase of 52 percentage points between large cities and towns (Figure 33 and Table A9.3 in **Annex 9**). Surprisingly, Burkina Faso and Guinea-Bissau, both low-food-budget countries, follow a pattern similar to that of high-food-budget countries, with affordability levels within each country remaining more or less constant across urban centres.

In low-food-budget countries (except Benin and Togo), moving away from urban centres introduces a structural change, with the percentage of population unable to access a healthy diet increasing significantly. In high-food-budget countries (except Ethiopia), this jump occurs one step farther along the continuum, crossing peri-urban areas of large and intermediate cities. Finally, in high-food-budget countries, the percentage of the population unable to afford a healthy diet increases across peri-urban areas as the size of the closest urban centre decreases (Figure 33).

Food insecurity across the rural–urban continuum

The comparison of food insecurity among rural, peri-urban and urban populations at the global and regional levels based on the Degree of Urbanization (DEGURBA) classification,[ac] presented in **Chapter 2**, indicates that food insecurity is lower in urban areas at the global level. At the regional level, Africa and Latin America and the Caribbean follow this pattern, but not Asia nor Northern America and Europe, revealing context-specific differences that defy generalization. An analysis of patterns of the prevalence of moderate or severe food insecurity based on the Food Insecurity Experience Scale (FIES), using household survey data for 9 of the 11 countries studied up until now, grouped by food budget (see Table 10) and according to the URCA-defined rural–urban continuum (see Table 9), sheds light on some context-specific differences and has the potential to complement the analysis in **Chapter 2**.

In many of the analysed countries, the prevalence of moderate or severe food insecurity in urban and peri-urban areas is similar to that in rural areas (e.g. Côte d'Ivoire, Senegal) or sometimes even slightly higher (e.g. Niger, Nigeria) (Figure 34). This suggests that food insecurity is not exclusively a rural problem in most of the countries analysed.

The FIES analysis shows a different pattern across the rural–urban continuum in high- and low-food-budget countries. In general, low-food-budget countries show larger differences and varying patterns in food insecurity (Figure 34A). In Malawi, moderate or severe food insecurity is much lower in urban areas and increases significantly moving to peri-urban and rural areas, with extremely high levels of severe food insecurity in both areas. Moderate or severe food insecurity in urban and peri-urban areas is about the same in Benin, but in Burkina Faso it is higher in urban areas than in peri-urban areas. Only in Guinea-Bissau and Togo is there a gradual increase moving from urban to rural areas.

In contrast, in high-food-budget countries, the prevalence of moderate or severe food insecurity is about the same across the rural–urban continuum (Figure 34A). In the case of Nigeria, there is some indication that moderate or severe food insecurity may be highest in peri-urban areas and lowest in rural areas (Figure 34A).

Further disaggregation reveals some additional differences. However, the sample sizes in each category are small and the margins of error are very large, so the observed patterns must be interpreted with caution (see the full set of results in Table A10.1 and Table A10.2 in **Annex 10**). For example, in Nigeria, a high-food-budget country, the prevalence of food insecurity is positively associated with city size: the bigger the city, the higher the prevalence of food insecurity (Figure 34B). Moreover, levels of severe food insecurity in large and intermediate cities (15 percent and 14 percent, respectively) are even higher than in more remote areas (10 percent in areas more than 2 hours travel to any urban centre). This is likely related to the presence of slums outside the larger cities. A similar pattern is also observed in Burkina Faso, a low-food-budget country with a more dispersed urbanization pattern.

In the Niger, the pattern is reversed: the prevalence of moderate or severe food »

ac The DEGURBA classification was developed by EUROSTAT, ILO, FAO, OECD, UN-Habitat and the World Bank and was approved at the 51st session of the UN Statistical Commission in March 2020.[26] This differs from the Urban Rural Catchment Areas (URCA) criteria used for the analysis of subsets of countries in this section (see Box 3).

FIGURE 34 IN MANY OF THE NINE COUNTRIES ANALYSED IN AFRICA, THE PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN URBAN AND PERI-URBAN AREAS IS SIMILAR TO THAT IN RURAL AREAS, AND IN SOME CASES, SLIGHTLY HIGHER, INDICATING THAT FOOD INSECURITY IS NOT EXCLUSIVELY A RURAL PROBLEM IN MOST OF THE COUNTRIES ANALYSED

NOTES: All surveys are for 2018/19, except Malawi (2019/20). See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Authors' (FAO) own elaboration.

» insecurity increases as the size of the city decreases (Figure 34B) – similar to the pattern found for the percentage of the population unable to afford a healthy diet basket in those countries – but then begins to fall moving into peri-urban areas, with the exception of a sharp uptick in areas less than 1 hour from a town. Malawi, on the other hand, presents evidence of a structural change: a sudden worsening of food insecurity, most notably severe food insecurity, for households living in areas less than 1 hour travel to an intermediate city, with high levels of food insecurity moving to remote rural areas more than 2 hours travel to any city or town (Figure 34B).

Another analysis of food insecurity based on FIES from 21 rural development projects worldwide, looking at the ten URCA categories of the rural–urban continuum, is presented in Box 6. While this analysis is not nationally representative, it provides some perspective beyond the nine African countries analysed above, even if at project level.

In summary, the results of the analysis of nationally representative FIES datasets from the nine African countries, as well as of the FIES data collected in the context of these rural development projects, tend to indicate that food insecurity is not exclusively a rural problem in many places. While it is not possible to draw general conclusions given the limited number of countries in this chapter's FIES analysis (all from one region), the results – including those from the 21 rural development projects – signal that further research is needed to guide more targeted policies and investments across the rural–urban continuum.

Nutritional status across the rural–urban continuum

The prevalence of malnutrition across the ten URCA categories was also estimated only for 3 of the 11 countries of the sections above (i.e. Benin, Nigeria and Senegal),[ad] due to data limitations. The analysis is based on 2018 data from demographic and health surveys (Table A5.1). See Table A10.3 in **Annex 10** for the full table of results.

In the three countries, generally the prevalence of stunting in children under five years of age gradually increases as cities become smaller and as one moves away from urban centres. The biggest increase in Nigeria occurs moving to areas less than 1 hour travel to a small city, while in Benin it is seen moving into more remote rural areas (i.e. more than 2 hours travel to an urban centre). The prevalence of stunting is notably lower in Senegal, and while there is a general pattern of increases, with some variations as one moves away from urban areas, the increases are smaller with some variations (e.g. there is a notable decrease in areas less than 1 hour travel to large and intermediate cities, as well as to a town).

Furthermore, as already emerged in the analysis of the cost and affordability of a healthy diet across URCAs, the data suggest that the size of the closest urban centre plays a role in the prevalence of stunting in peri-urban areas, with the prevalence being higher in areas closest to small cities and towns in Benin and Nigeria. This result is aligned with other studies that find high levels of food insecurity and malnutrition in the sprawling poverty-stricken areas surrounding many cities in Africa. Food access is limited, and many of these peri-urban slums are food deserts, where residents' access to diverse, fresh or nutritious foods is limited or even non-existent due to the absence or low density of food entry points (see Box 4 in **Chapter 3**) and inadequate access to services, including health and education. »

ad The choice of the three countries was data driven in Benin and Nigeria, as they are the only countries among the 11 for which georeferenced data on malnutrition for 2018/19 exist.

BOX 6 FOOD SECURITY ACROSS THE RURAL–URBAN CONTINUUM: EVIDENCE FROM 21 RURAL DEVELOPMENT PROJECTS WORLDWIDE

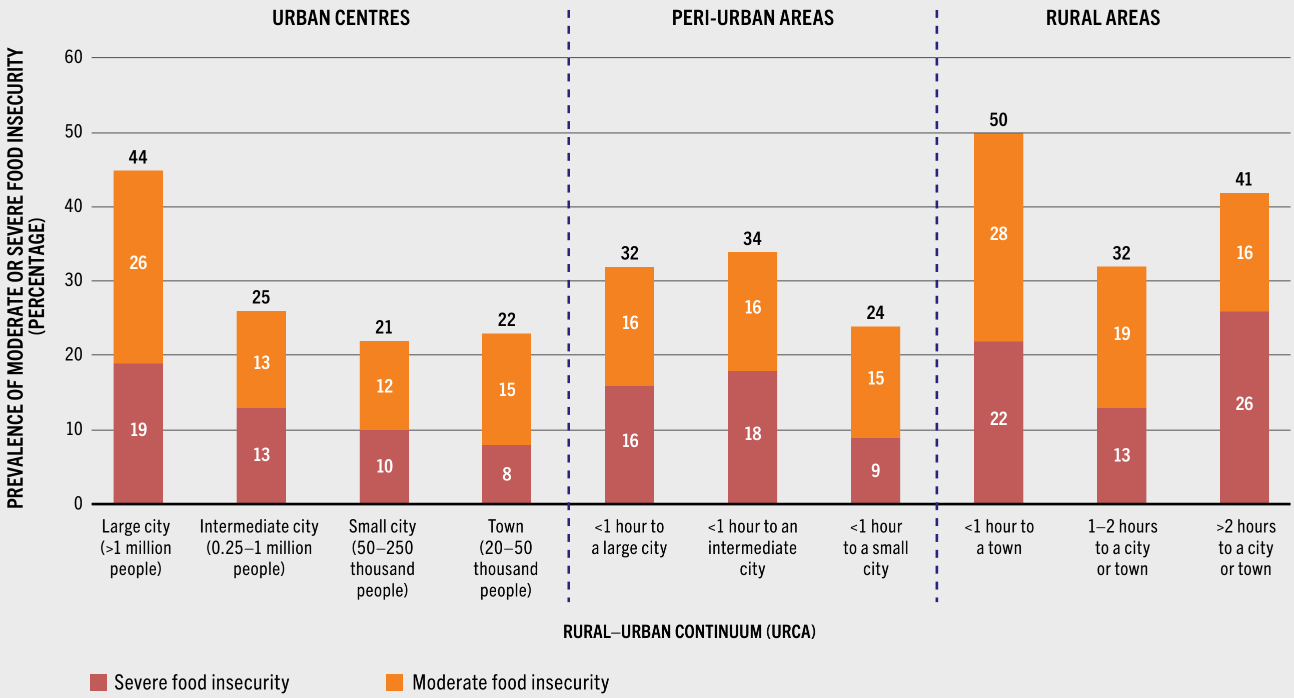
Between 2019 and 2021, household-level data with GPS coordinates were collected from 21 rural development projects supported by IFAD and implemented in most regions of the world. This includes five countries in Asia and the Pacific; six in Eastern and Southern Africa; four in Latin America and the Caribbean; four in Near East, Northern Africa, Europe and Central Asia; and three in Western and Central Africa (see **Annex 5, Section D** for the full list of countries and projects). These datasets contain information from more than 41 000 households and are representative of small-scale producers who are engaged in projects financed by international financial organizations. The data were merged with the Urban Rural Catchment Areas (URCA) dataset (using GPS coordinates), and households were thereby classified across the ten URCA categories of the rural–urban continuum.

Figure A shows the prevalence of moderate or severe food insecurity across the rural–urban continuum using the pooled sample of the 21 rural development projects. It is important to clarify that for some URCA categories, the sample size is too small to draw any statistically significant inference, thus the results are presented and interpreted in terms of a description of food insecurity across the rural–urban continuum.

Results show that the prevalence of food insecurity varies across the rural–urban continuum. There is a higher prevalence of moderate or severe food insecurity in areas close to towns (less than 1 hour travel) compared to areas more than 1 hour from a city or town. In addition, there is a much higher prevalence of moderate or severe food insecurity in larger cities compared to smaller cities or towns, and it is even higher than those living 1 to 2 hours or more than 2 hours from a city or town. This bears some similarity to findings shown in Figure 34B. On the other hand, severe food insecurity is highest in rural areas that are less than 1 hour to a town and more than 2 hours to a city or town. However, of surprise is that severe food insecurity is also very high in large cities, as well as high in peri-urban areas of large and intermediate cities. This analysis adds information on food insecurity patterns that could be more specifically addressed and targeted, but which are generally not visible when looking at only the three urban, peri-urban and rural categories.

In summary, the prevalence of moderate or severe food insecurity among a selected number of small-scale producers in urban and peri-urban areas is high – in some cases as high or even higher than in rural areas. This is similar to the findings for many of the nine African countries analysed (Figure 34).

FIGURE A PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY AMONG HOUSEHOLDS OF 21 RURAL DEVELOPMENT PROJECTS ACROSS THE RURAL–URBAN CONTINUUM (URCA)



NOTES: The figure shows the prevalence of moderate or severe food insecurity based on the Food Insecurity Experience Scale (FIES) across the rural–urban continuum for 21 rural development projects implemented in countries from all regions of the world. See **Annex 5**, **Section D** for the list of countries and projects, data sources and methodology.
SOURCE: Authors' (IFAD) own elaboration.

FIGURE 35 THE PREVALENCE OF CHILD STUNTING GENERALLY INCREASES AS CITIES BECOME SMALLER AND MOVING AWAY FROM URBAN CENTRES; CHILD WASTING AND OVERWEIGHT ARE LOWER AND EXHIBIT LESS EVIDENT TRENDS ACROSS THE RURAL–URBAN CONTINUUM

NOTES: Figures show the prevalence of malnutrition in children under five years of age in three Western African countries, by URCA category (2018). Gaps in URCA indicate missing data.
SOURCE: Authors' (UNICEF) own elaboration.

» The prevalence of wasting in children under five years of age is lower than that of stunting in all three countries and exhibits less evident trends across the rural–urban continuum (Figure 35B). Nevertheless, there are hints of increased wasting in some peri-urban and rural areas in Nigeria and Senegal. Similarly, the prevalence of overweight in children is low in all countries and does not present a clear trend across the rural–urban continuum (Figure 35C). However, it is worth noting there is a suggestion towards lower overweight in peri-urban areas and higher overweight in some rural areas compared to urban areas. ■

NETHERLANDS (KINGDOM OF THE)
Hanging tomatoes ripening on their stalks in an industrial greenhouse.
©Shutterstock/ Sergey Bezverkhy

CHAPTER 5
POLICIES AND SOLUTIONS TO LEVERAGE AGRIFOOD SYSTEMS TRANSFORMATION FOR HEALTHY DIETS ACROSS THE RURAL–URBAN CONTINUUM

KEY MESSAGES

➔ Actions, policies, new technologies, and consequently needed investments to overcome the challenges and seize the opportunities that urbanization creates require a clear understanding of the interaction between agrifood systems and the rural–urban continuum.

➔ The policy approach needs to leverage the progressive connectivity between urban, peri-urban and rural areas through investments in infrastructure, public goods and enhanced capacities, in order to increase access to affordable healthy diets and achieve food security and nutrition for everyone across the continuum.

➔ In the face of a gradual convergence in dietary patterns across the rural–urban continuum, including the consumption of highly processed foods, policies and legislation are needed to promote healthy food environments, both formal and informal, and to empower consumers to make nutritious food choices.

➔ In intermediate and small cities and towns and their peri-urban and rural surroundings, the midstream activities of agrifood systems (i.e. logistics, processing and wholesale) can play an essential role in economic development, reducing the cost of nutritious foods and improving income opportunities. This is particularly the case for new investments that enable small and medium enterprises to expand.

➔ The rural–urban continuum lens is critical to determine what and where support is most needed to address the insufficient worldwide availability of and access to nutritious foods, particularly fruits and vegetables. Improved access to production inputs and irrigation infrastructure are needed across the whole rural–urban continuum, but support should target especially smallholder farmers in rural areas and urban and peri-urban agriculture (UPA) elsewhere.

➔ Public investment in research and development needs to be increased to develop technologies and innovations to create healthier food environments and increase the availability and affordability of nutritious foods. Technology can be particularly important to boost the capacity of UPA to supply nutritious foods in cities and towns.

➔ To strengthen rural–urban continuum connectivity and linkages, agrifood systems governance mechanisms and institutions need to cross sectoral and administrative boundaries. Subnational and local governments must play a key role in designing and implementing policies beyond their administrative authority, engaging with agrifood systems stakeholders at all levels.

➔ Evidence from multilevel and multisector governance mechanisms implementing school feeding, UPA and/or public procurement suggests these are potential entry points for making healthy diets available and accessible.

Patterns of urbanization, as well as the size and clustering of urban agglomerations and the surrounding rural areas, are transforming agrifood systems with implications for access to affordable healthy diets, as well as food security and nutrition (**Chapter 3**). The increased links across the rural–urban continuum, coupled with closer interactions between the components of agrifood systems, create a number of opportunities and challenges for the availability and affordability of healthy diets. This chapter argues that such interactions also create a number of policy and programme entry points to support agrifood systems transformation towards affordable healthy diets. However, a change of direction in policy is needed which considers both agrifood systems and spatial dynamics, and their interactions and interconnectedness. A systems approach is therefore better suited for effective solutions.[1]

Such an approach should also consider the increasing convergence in food demand and supply patterns across the rural–urban continuum (**Chapter 4**). The growing importance of food purchases, and of processed foods in dietary patterns, opens up the opportunity for leveraging midstream and downstream agrifood systems activities which link primary production to the final consumer. At the same time, the strong growth of small and intermediate cities and towns (SICTs), which, as shown in Figure 19B of **Chapter 3**, comprise almost one-third of the global population, needs to be considered in policy and planning. Scholars have called them the "hidden" and the "missing" middle, respectively.[ae] Therefore, policies, investments and legislation supporting the "hidden/missing middle" can leverage the increased interconnectedness driven by urbanization to facilitate the creation of scale economies for smallholder farmers and agrifood small and medium enterprises (SMEs), increase off-farm employment opportunities and rural household incomes, and reduce the cost of healthy diets.

The interaction between agrifood systems and the rural–urban continuum introduces the notion of a "territory" as a unit of analysis and policymaking for agrifood systems transformation towards improving food security and nutrition.[4] A territory in this context includes one or more urban areas which are connected to each other and to the rural hinterland through a dense set of agrifood systems links. Those links can be leveraged to promote a place-based agrifood systems transformation for improved access to affordable healthy diets across the rural–urban continuum leading to win–win situations.[af] For instance, increased off-farm income opportunities in peri-urban and rural areas in midstream and downstream activities could increase economic access to healthy diets, while improved efficiency in the connectivity between producers in rural areas, midstream activities in peri-urban and urban areas, and consumers could reduce the cost of nutritious foods.[ag]

The policy approach should take into consideration the development and adoption of technologies and innovations as essential elements for transforming agrifood systems inclusively and sustainably towards improved access to affordable healthy diets.[7,8] Reinforcing the science–policy interface is fundamental to leverage transformative opportunities,[8] and can be an essential complement for many policies, investments and legislations oriented to shift dietary preferences towards healthy diets, improve the efficiency of midstream activities and increase the supply of nutritious foods. Given the multiple entry points created by urbanization, however, there will be no "one-size-fits-all" technological or innovative solutions to address all the challenges and take advantage of the opportunities for current agrifood systems.

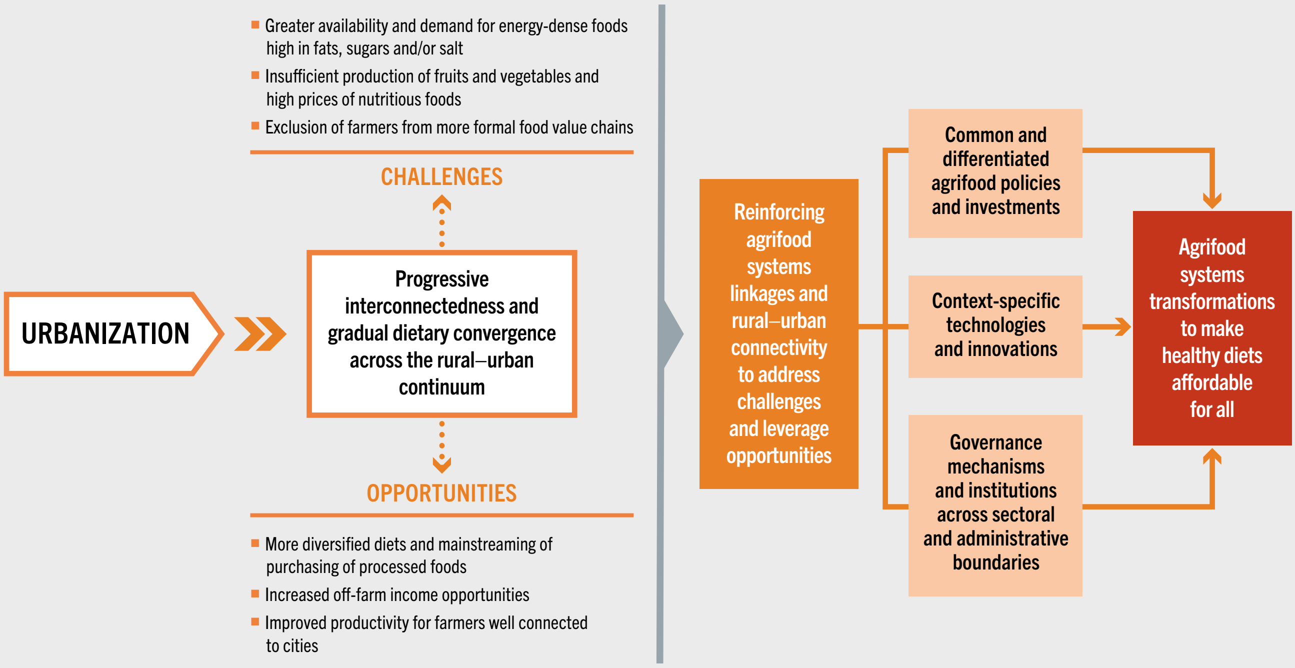
Finally, a policy approach which considers the territory is inherently intersectoral and involves different agrifood systems stakeholders: public, private and civil society. The success of this territory-oriented policy approach rests therefore on the coordination of several actors and stakeholders. Strong institutions and governance mechanisms are required to coherently implement policies, investments and legislation on one side, and leverage technology and innovation on the other, but they have to be

ae The "hidden middle" is attributed to Reardon (2015)[2] and refers to the agrifood component between primary producers and final consumers. It includes the "midstream" and "downstream" segments as defined in **Chapter 3** of this report. The "missing middle" is attributed to Christiaensen and Todo (2014)[3] and refers to small- and medium-sized cities. In both cases, the terms have been used to indicate that policies often miss the particularities and dynamism of the two "middles".

af This approach is also called "agroterritorial development" and is analysed in detail in the 2017 edition of *The State of Food and Agriculture in the World*.[5]

ag As indicated in the 2020 edition of this report,[6] inadequate food logistics and poor public infrastructure, especially for perishable foods, are key drivers of the cost of nutritious foods.

FIGURE 36 REINFORCING AGRIFOOD SYSTEMS LINKAGES AND RURAL–URBAN CONNECTIVITY TO MAKE HEALTHY DIETS AFFORDABLE ACROSS THE RURAL–URBAN CONTINUUM



SOURCE: Authors' (FAO) own elaboration.

oriented to enhance agrifood systems linkages through the growing rural–urban connectivity. In particular, subnational governments and local governance mechanisms are key factors for improving linkages across the rural–urban continuum.[9] Figure 36 provides a visual summary of this approach to address the challenges and leverage the opportunities that urbanization creates in agrifood systems for ensuring access to affordable healthy diets across the rural–urban continuum.

This chapter first analyses different policy alternatives available among the components of agrifood systems, through a rural–urban continuum lens, to address the challenges and leverage the opportunities for access to affordable healthy diets identified in the previous chapters. As such, this chapter focuses on policies to promote healthy food environments; policies and investments to leverage the economic potential of the midstream of agrifood systems in SICTs, which can lead to reduced cost and improved affordability of healthy diets; and food production policies to increase the supply of nutritious foods. It then identifies technological and innovative solutions across the different agrifood systems components that show potential to support agrifood systems transformation towards affordable healthy diets, noting those that can particularly work. Finally, the chapter examines governance mechanisms deemed most appropriate to manage the proposed policy approach across administrative and sectoral boundaries, and highlights the role of subnational governments and local administrations in designing and implementing such mechanisms. ■

5.1 POLICIES AND INVESTMENTS FOR HEALTHY DIETS ACROSS THE RURAL–URBAN CONTINUUM

Food environments and consumer behaviour policies

Households obtain foods through various sources, for example through own production, purchases or gifts. As has been noted previously, the majority of households across the rural–urban continuum acquire foods through purchases. In addition, processed foods are an important part of households' food consumption, not only in big cities but also in small towns and rural areas.

Certain aspects of retail food environments[ah] are becoming more similar across the rural–urban continuum, for example, the presence of food outlets and their role in making highly processed foods more available. However, there are also differences in the level of formality of food outlets (e.g. supermarkets or smaller food shops). Large and formal outlets are more common in urban settings and their surroundings, and less so in rural areas far from cities where informal vendors or "traditional" outlets (i.e. open-air or wet markets) are more prevalent.[11, 12] Yet these informal vendors still play an important role in retail food environments even in large or intermediate cities, particularly in low-income neighbourhoods and slums.[13] Influencing food environments through supportive nutrition policies is an important entry point to facilitate better access to safe, affordable and nutritious foods and reduce consumption of highly processed foods of high energy density and minimal nutritional value. For this, an understanding of the specificities of retail food environments across the rural–urban continuum will be key to identify common policies for the entire continuum but also differentiated policy entry points for key "nodes" across the continuum (e.g. food environments in small cities or towns versus food environments in large cities).

Regulation of food and beverage marketing can be important in a variety of settings across the continuum.[ai] Advertising of highly processed foods in rural settings is common and, depending on the country, sometimes even more widely used than in urban areas.[11] Examples of local initiatives to create healthier retail food environments include restricting advertising of energy-dense foods high in fats, sugars and/or salt in the vicinity of schools[15] in Mandurah (Australia), and on public transport in London.[16, 17]

Taxation of energy-dense foods and beverages high in fats, sugars and/or salt has been implemented in 85 (for sugar-sweetened beverages) and 29 (for foods high in fats, sugars and/or salt) countries[18] and has shown clear evidence of providing disincentives for buying these foods,[19] contributing to shifting the demand towards more nutritious foods.[14] A recent systematic review in six countries (Australia, Canada, Mexico, South Africa, United Kingdom of Great Britain and Northern Ireland, and United States of America) found not only evidence of the impacts of such taxation on reducing the sales of energy-dense foods, but also that the health-related benefits largely exceed the possible health costs of not intervening.[20] Taxation can also encourage product reformulation to reduce the content of the target component (e.g. sugars, salt, unhealthy fats), thus improving its nutrient profile.

Nutrition labelling, by providing information on the nutrition properties and the quality of foods to aid purchase and consumption decisions, has the potential to help rebalance a food retail environment currently skewed towards foods that undermine healthy diets.[21] Marketing influences children's food preferences, purchase requests and dietary intakes. Governments have a legal obligation to protect child rights, including those that are threatened by harmful marketing.[22]

ah Also called "built" food environments, they include informal and formal markets where available food is chosen and purchased.[10]

ai For more details regarding how these policies contribute to healthy diets, please refer to the 2022 edition of this report.[14]

Supporting healthier food outlets will be key for enabling access to healthy diets, as this has shown positive impacts on dietary quality.[23] While small neighbourhood food shops are important for the food security of households, particularly for low- to middle-income ones, consumers are disproportionately exposed to energy-dense highly processed foods in these shops.[10] This could be particularly important in rural areas, where food is increasingly purchased in these kinds of food outlets.[11, 12] Policy incentives are necessary to encourage shops to stock and sell greater amounts of fresh and minimally processed foods, for instance, by improving their cold storage facilities.[24] The availability of healthier food outlets in particular areas across the rural–urban continuum can be improved through land-use planning and zoning regulations; tax credits or exemptions; or licensing agreements.[14] Although land-use planning tools are generally underutilized to support healthy diets, a combination of financial and zoning incentives has been used at the city level to increase the availability of healthy and affordable food options in shops in under-served areas.[25] Measures in place to restrict outlets that predominantly sell energy-dense foods high in fats, sugars and/or salt include, for example, local authority zoning measures that limit the establishment of hot food takeaways or fastfood restaurants in or around schools[26, 27, 28, 29] or in particular neighbourhoods.[30]

In rural areas, where food sources include purchased food and own production, some policies could have positive effects not only in shifting dietary patterns but also on the availability and accessibility of healthy diets. **Nutrition education**, while more common in urban settings, has proven vital to encourage more diverse and healthier dietary patterns at the household level. Several studies have found that in rural settings, nutrition education at home or in schools could increase dietary diversity in food consumption and, at the same time, incentivize diversification of food production, possibly improving the availability of nutritious foods at the community level.[31, 32]

Considering that income is a main determinant of the affordability of healthy diets, **cash transfers** are also important for poor households across the rural–urban continuum. In rural areas, these can contribute to improve dietary patterns and promote diversification of food production through the alleviation of liquidity constraints.[33, 34] In addition, cash transfer programmes associated with nutrition education offer greater chances to improve child nutrition and health.[35]

Turning to urban and peri-urban settings, street food and food away from home businesses[aj] play a particularly important role in both employment provision and food security for the most vulnerable populations. Street foods are especially convenient for low-income workers and households who may not have the resources, facilities and/or time to prepare dishes at home.[1] In some contexts, informal street vendors can also be a key source of both nutritious foods and livelihood; for example, in a peri-urban area of Dar es Salaam where 70 percent of vegetables were sold by informal vendors, often most of these vendors were women (i.e. for 95 percent of green leafy vegetables).[36] However, street food does not always contribute to healthy diets among poor urban and peri-urban food consumers.[37] A critical aspect is to ensure the **safety and nutritional quality of street foods**, considering both the high degree of informality of the street food sector and the fact that street foods are consumed by an estimated 2.5 billion people worldwide every day.[38] Informal street vendors play a major role in providing food to the most vulnerable populations in low-income countries (LICs) of Africa and Asia, particularly in urban settings.[1] There are multiple infrastructure and regulatory gaps along the street food supply chain and many street vendors have temporary structures with no running water or cold storage and sanitation facilities. Important food safety actions include ensuring a supply of water of acceptable quality for food preparation, clean places for preparation and consumption of food, sanitary facilities for workers in food outlets, training for street vendors and consumer education.[38] Interventions at national and local government levels are also required to ensure nutritional quality for street foods in each local situation (see Box 7).

aj All food and beverage outlets where food and drink can be purchased and consumed outside the home, either on or off the premises. See the **Annex 11** for a full definition of food away from home.

BOX 7 INITIATIVES FOR MORE NUTRITIOUS FOOD AWAY FROM HOME IN SOUTH-EASTERN ASIA

Ready-to-eat foods sold in restaurants, small-scale eateries or online, and also sold by food hawkers and street vendors, make up an important part of the diets of many urban populations in South-eastern Asia. Many people consume food away from home at least once a day, and sometimes for all three daily meals.[41, 42] Food away from home is also of cultural and economic importance in the region, with many people relying on the informal food sector for their livelihood.

Singapore has implemented a comprehensive, multistakeholder approach, led by the Health Promotion Board, to improve the supply of healthier options in the food away from home sector, while also increasing demand for these options among consumers.

To improve the availability and accessibility of nutritious foods, the government provides research-based support to industry to produce healthier base ingredients such as wholegrain noodles with a high fibre content. The Healthier Dining Programme[43] – building on the earlier Healthier Hawker Programme and the creation of hawker centres in the early 1970s to improve the safety of street foods[44] – supports food outlets to incorporate healthy options through reformulation grants.[33] These grants can, for example, help in covering the cost of buying healthier ingredients, paying for healthy cooking classes or funding research and development. Separate grants are available for promotion of healthier food and drink options.[45]

To help increase demand, awareness-raising campaigns have used simple messages to highlight healthy options. Food items endorsed by the Healthier Dining Programme are clearly labelled with "Healthier Choice" meal identifiers on menus/ menu boards, counter tops, shelves and packaging. In addition, the Eat, Drink, Shop Healthy Challenge campaign[46] promotes healthier options and offers rewards for selection of healthier choices through a smartphone app.

These elements are supported by a whole-of-government approach, including a commitment to use healthier ingredients in all catering services in government institutes including schools. This pledge was important for encouraging investment in product innovation and reformulation.

Finally, it is important to consider that gender plays an important role in accessing affordable healthy diets and, in turn, food security and nutrition. **Improving women's status and gender equality** positively influence the nutritional status of women and their families. Therefore, eliminating structural gender inequalities and unleashing women's potential can play a fundamental role in improving access to affordable healthy diets. For instance, evidence demonstrates that most transport systems are biased towards the travel needs of men.[39] In Blantyre, Malawi, reduced transport options to peri-urban and rural informal markets, which are often more affordable than urban markets for poor people, have reduced access to affordable sources of food for female-headed households.[40] This points to the need for multifaceted and targeted territorial planning to address gender-related challenges to access affordable healthy diets. Efficient transport systems can reduce the time between home and work, as can strategically locating city food outlets that supply nutritious, diverse food on the routes that women take in their daily lives.[39]

Midstream food supply chain policies: strengthening the role of the "hidden/ missing middle" in making healthy diets affordable for all

As countries grow and transform, urban populations also grow but follow differential clustering patterns in different countries or contexts (**Chapter 3**). Structural transformation is accompanied by a rapid increase in large cities in some countries, while in others by the growth of SICTs reducing the space between large cities and the rural hinterland.[47, 48] Differential patterns of population agglomerations have been found to be associated with different rates of economic growth and poverty reduction,[3, 49] and have implications for agrifood systems and healthy diets and nutrition.

Food production, especially that of perishables (such as fruits and vegetables, which are important elements of healthy diets), tends to be located in the proximity of urban markets to minimize transactions and transport costs.[50] However, as agrifood systems are transformed by urbanization, it is not physical distance but travel time that matters. Thus, food production located in areas far from urban centres but with better access to natural resources (e.g. high-quality soil, water) can be better suited for supplying these centres, provided the cost of transport is low and midstream activities such as processing, logistics and transport are available and efficient.

The key role of small and intermediate cities and towns in agrifood systems transformation

Chapter 3 indicated that one-fourth of the global population live in peri-urban areas of small and intermediate cities and towns. For poor populations seeking to increase their physical, economic and social mobility, SICTs serve as a "first step" towards migration to bigger cities (or abroad) but also as an end destination for permanent migration.[3] Proximity of SICTs to rural areas allows agricultural and rural households to increase and diversify their incomes through daily commuting to nearby towns, seasonal or permanent migration, and remittances.

In general, the clustering of populations in only a few localities (i.e. urban concentration in metropolises) is associated with higher overall economic growth as a result of economies of scale and agglomeration when driven by structural transformation (**Chapter 3**). Nevertheless, low skill employment opportunities in non-farm economic activities generated in SICTs may be more readily accessible to the poor, who tend to be unskilled and semi-skilled.[38, 39] Properly targeted public policies and investments in SICTs could attract private investments including in agrifood activities, thus creating employment, increasing demand for food from local agriculture, and enabling poor people in those locations to escape poverty and increase their access to healthy diets (Box 8). Investing in SICTs is likely to have a more significant impact on healthy diets both for their populations and for the populations of their catchment areas compared to the benefits that trickle down from growth in large cities.[ak]

However, in most cases, especially in lower-middle-income countries (LMICs), SICTs are constrained from delivering on their potential for catalysing inclusive agrifood systems transformation and improving access to affordable healthy diets. Urban expansion is unplanned and unregulated, while local governance is characterized by weak capacity to plan and execute programmes and insufficient resources (from national transfers or local revenue raising) to finance them. This translates into lack of basic infrastructures and services (road networks, ports, housing, access to markets, health, education and social protection), which in turn limits private investment in growth sectors and the potential for employment and income generation.[54] For instance, absence of transport infrastructure connecting rural areas to nearby towns and intermediate cities has been shown to negatively affect agricultural productivity and nutrition.[55, 56]

Addressing some of the challenges faced by SICTs can allow agrifood systems to be the driver of inclusive rural development through the creation of on- and off-farm employment for rural households, as well as of increases in food production and productivity due to increased food demand, scale economies and expanded market outlets. This also creates opportunities for SMEs, which have an essential role to play in this development, as discussed below.

Supporting midstream small and medium enterprises to increase availability and affordability of nutritious foods

Small and medium enterprises (SMEs), especially in LMICs, play a key role in ensuring connectivity between primary producers and final consumers. From a spatial point of view, SMEs connect the rural hinterland to expanding urban and peri-urban agglomerations of all sizes. They include a constellation of midstream activities involving rural and urban traders

ak This is particularly important considering the analysis presented in **Chapter 2**, which shows that the prevalence of moderate or severe food insecurity tends to be higher in peri-urban and rural areas around the world. Please refer also to **Chapter 3**, in which the importance of SICTs for poverty reduction is analysed.

BOX 8 THE ROLE OF URBAN PROXIMITY IN AGRICULTURAL INTENSIFICATION: CASE STUDIES IN ETHIOPIA AND INDIA

Evidence largely shows that agriculture practised in proximity to urban centres is more productive due to better input prices received, access to input markets and increased adoption of modern agricultural inputs. However, less is known about how patterns of urbanization and the size of urban centres affect agricultural production.

A study in Ethiopia shows that the proximity to cities of different sizes has differentiated implications for farmers' agricultural intensification decisions: rural farmers living near a large city such as Addis Ababa use more modern inputs and achieve higher yields than farmers near small and intermediate cities and towns (SICTs). However, in the absence of SICTs, farmers excluded from the central market in a large city would most likely remain subsistence oriented. But when the population is partially distributed in SICTs, farmers who were initially located too far from a large city to produce for its market can meet urban demand for food from SICTs.[51]

A study focused on the large Indian city of Bangalore and its surroundings provides evidence that may confirm the essential role of SICTs in increasing the use of modern agricultural inputs in rural areas, by offering improved linkages with markets. In some cases, farmers located farther from Bangalore show a higher use of modern inputs due to the influence of the town of Doddaballapura.[52] In addition, evidence of the potential of SICTs for improving rural livelihoods through non-agricultural jobs emerges in a later study in Ethiopia, which shows that the expansion of SICTs has a positive short-term effect on household welfare, driven by increased participation in the non-agriculture sector.[53]

Policy can strengthen intensification and increased productivity in farming close to SICTs, by improving connectivity between farms and input and output markets, thus reducing the cost of access to both domestic and international markets and fostering farmers' access to and use of modern inputs.

and retailers, truckers, third-party logistics firms, storage service providers, processors and distribution networks.

For SMEs located in SICTs, many are taking advantage of, *inter alia*, the closeness to production areas. However, this is not always the case: the location of SMEs depends on a number of other factors including regular supply of agricultural products, perishability of raw materials, bulkiness and value of agricultural commodities *vis-à-vis* processed products, the state of infrastructure and transport networks, electrification, and access to water.[57, 58, 59]

Midstream SMEs can be fundamental for rural investment, off-farm employment, modernization of the agrifood sector, upgrading utilities such as water and energy, and linking small farms to expanding urban food markets.[60] As such, they can support livelihoods for agricultural households and communities and for nearby populations.[61] Strengthening their efficiency and expansion can also contribute to gains in the production and productivity of nutritious foods, and a possible parallel reduction in the cost of food for consumers. For example, in Kenya more than 95 percent of the fresh fruits and vegetables consumed are grown domestically, mainly by smallholders, and are supplied mainly by SMEs through informal supply chains.[62]

The presence of processed foods in household diets across the whole rural–urban continuum constitutes a driving force for expansion of the services provided by SMEs in processing and distribution, as these enterprises are involved in a wide range of processed foods (Box 9).[63] By transforming perishable raw materials into palatable products with a long shelf-life, SMEs contribute to broadening options for consumers, helping offset seasonality and reducing food loss. Increased demand for agricultural inputs, and downstream processing and related services and logistics, constitute additional drivers for expansion.

BOX 9 SUPPORTING INCLUSIVE FOOD VALUE CHAINS IN AFRICA

Investing in agrifood processing creates opportunities for developing local entrepreneurship and generating employment and value addition in rural and peri-urban areas of Africa.[65] While most processed agrifood products have traditionally been imported from outside Africa, local sourcing of these products is on the rise, including from cottage industries. This increase is largely in response to the growing peri-urban and rural market demand for processed foods.[66, 67] If investments in domestic agrifood processing are not made in African countries, there will be a continued dependence on imports for these products.

Capitalizing on this potential requires channelling of substantial resources towards local agrifood processing in addition to lowering of barriers faced by local processors to entry in new and distant (including export) markets. This requires, *inter alia*, supportive financial and market linkage services to connect small-scale producers in rural areas with traders and aggregators in peri-urban and urban areas. However, there could be other approaches. Future research could focus on how a variety of measures – such as international transfers as well as trade and fiscal measures in high-income countries – might also help address the challenges to financing agrifood processing that African and other low- and middle-income countries face.[14]

There are already examples of investments in agrifood processing in peri-urban areas of Africa. For instance, in Ghana, the Rural Enterprises Programme works to improve the livelihood of rural small and medium enterprises by increasing profitability and generating growth and employment opportunities. The project has established sustainable district-level delivery systems for business development services in peri-urban centres; offered capacity building and training related to manufacturing processing equipment and testing prototypes; and facilitated linkages with participating financial institutions including rural and peri-urban banks. Total income, durable assets, and business income were, respectively, 50 percent, 55 percent and 25 percent higher for beneficiary households *vis-à-vis* non-beneficiary ones,[68] and household dietary diversity increased by 10 percent. Furthermore, women were more likely to manage self-employment activities jointly with men and have higher decision-making power related to access to credit.

In the United Republic of Tanzania, the Marketing Infrastructure, Value Addition and Rural Finance Support Programme was created to, *inter alia*, provide support to small-scale producers to overcome the main barriers encountered along the agrifood value chain. Such barriers include limited access to credit and inputs, absence of functioning post-harvest storage facilities, difficult access to markets, and the dearth of skills to use available technology. The project rehabilitated rural roads, strengthened agrifood processing and agricultural market information systems, supported production and decision-making capacity of producers and traders regarding purchase and sale of inputs and outputs, and increased the capacity of rural and peri-urban financial institutions, for example by linking them to the formal banking sector. This resulted in significant increases in agricultural income, livestock assets and productive assets for beneficiary households representing 16 percent, 11 percent and 7 percent, respectively.[69] Crop yields and crop revenues increased by 29 percent and 18 percent, respectively; household dietary diversity was also found to have increased by 4 percent. Moreover, women were more likely to hold decision-making power regarding crop revenues jointly with men, and were also more likely to be members of influential groups in their communities.

Small and medium enterprises can contribute to nutrition improvements in rural areas by enhancing smallholders' access to markets and inputs. In addition, they can stimulate upgrading at the farm level by providing inputs and finance[64] and offering differentiated pricing based on quality. For these reasons, SMEs have great potential to contribute to rural poverty reduction and access to healthy diets, by expanding employment opportunities in the SMEs themselves, boosting farming incomes and increasing the supply of nutritious foods.

However, a number of challenges prevent SMEs from fulfilling their potential and taking advantage of growth opportunities.

These challenges are often neglected in research and national policy formulation aiming at agrifood systems transformation, inclusive rural development or urban planning.[70, 71, 72] In LMICs, SMEs are often scattered, numerous, and small to very small in size; they are predominantly informal, and family owned. They face high transaction costs due to their size but also weak infrastructure, while their growth is limited by insufficient access to finance, lack of support for accessing improved technologies, and lack of policy initiatives targeting their growth. Because many of them depend on local sourcing rather than on a diversified base of commodity supplies, they face covariate risks with local farming. The existence of multiple constraints limits their potential to accumulate assets and expand operations, including as sources of employment and income diversification and as contributors to healthy diets.[60] There is also public underinvestment in specific value chains that would contribute towards increased availability of nutritious foods: namely, a disproportionate amount of public investment is directed towards staple crop productivity.[14]

Furthermore, SMEs located in SICTs are at a competitive disadvantage *vis-à-vis* larger firms. Scattered evidence shows that economies of scale and scope feature more prominently when intermediaries serve an urban population concentrated in large cities, rather than one that is spread across many mid-sized cities, although more systematic research is needed on this aspect.[70] Women are also heavily engaged in SMEs, both as workers and as entrepreneurs; however, they systematically face constraints to scaling up their business due to financial, mobility and empowerment gaps.[73] In addition, many SMEs involved in midstream activities are informal, which may exclude them from public services and policies that are mostly oriented to formal agribusinesses.[74]

It is also important to note that unleashing the potential of SMEs does not come without trade-offs between growth and employment and healthy diet outcomes. Increasing the productivity and reducing the cost of unhealthy processed foods (e.g. sugary drinks, bleached flour, refined starches, oils and sugars) lowers the price of those foods, thereby creating a cost advantage *vis-à-vis* minimally processed or unprocessed items such as fruits and vegetables.[6, 75]

The growing middle class food markets in LICs can be leveraged to increase supplies of processed nutritious foods.[76, 77] In this context, there are opportunities to invest in processing SMEs, through the identification of specific value chains and products that can both be nutritious and provide value-added livelihood opportunities for value chain participants. Examples of this are moringa (moringa powder) and a range of non-timber forest products.[78]

Policies and investments to leverage the potential of the "hidden/missing middle" to provide affordable healthy diets for all

Policies to enable the potential of SICTs for growth, poverty reduction and improved access to affordable healthy diets should facilitate the flow of people, products and resources between such cities and their rural catchment areas, but also expand the reach of local agriculture to more distant markets. These improvements in connectivity are also critical for SMEs. Better linkages between producers, agro-industrial processors,[al] agricultural and non-agricultural services, and other downstream segments of the agrifood value chain could provide more opportunities for SME development and, from a spatial perspective, could turn SICTs into crucial "food exchange" nodes.[am, 5]

Building **rural infrastructure**, including quality rural and feeder roads to connect remote farms and enterprises to main road networks, is essential for unlocking the productive potential of SICTs and their catchment areas.[55, 56] There is ample evidence that rural roads lead to other

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al Within the manufacturing sector, agro-industry develops, transforms and distributes inputs to and outputs from agriculture, fisheries and forestry. It includes agroprocessing, a subset of manufacturing that processes raw materials and intermediate products derived from agriculture, including food, beverages, tobacco products, textiles and clothing, wood products and furniture, paper products and rubber products.

am As stated by Sonnino (2016, p. 190),"by highlighting the centrality of the relationships between urban and rural areas and actors as targeted intervention areas, the analysis raises the need for a tighter scholarly and policy focus on 'connectivities' – i.e. the role of food exchange nodes and of governance coordination in the design and implementation of more effective food security strategies."[79]

BOX 10 STRENGTHENING CAPACITIES OF SMALL AND MEDIUM ENTERPRISES TO OFFER SAFE AND NUTRITIOUS FOODS

Small and medium enterprises (SMEs) can play an important role in improving the availability of and access to healthy diets. However, they often face managerial and technical capacity gaps. These shortcomings are compounded by the lack of systematic support to value chains for producing nutritious foods, especially those in which the myriad of SMEs are involved.

To strengthen their role in the supply of safe and nutritious foods, SMEs' capacities need to be improved across a range of skills such as business management, financial planning, marketing, technical aspects of sustainable agriculture, food quality and safety, processing, and nutrition. Ensuring food safety is one of the biggest challenges, as SMEs often operate in inadequate structures and/or unhealthy surroundings with no access to basic utilities, using rudimentary or obsolete technologies, and with limited application of updated productive, manufacturing and hygiene practices.[85, 86] Filling these gaps will not only facilitate access to more lucrative markets, it will also add value to public support programmes that invest in technologies suited to SMEs (e.g. low-cost cold storage or solar dryers, affordable packaging solutions, and labour-, water- and energy-saving processing technologies). For example, the demand for aquatic foods has led to the development of innovative practices to turn processed by-products (about 50 percent of processed fish with the greatest concentration of nutrients) and other underutilized aquatic foods such as seaweed into processed foods to include in local school feeding programmes.[87, 88]

Capacity development for SMEs needs to be integrated into broader programmes to strengthen value chains of nutritious foods, in order to overcome the rising production costs associated with unreliable access to raw materials within fragmented value chains and upgrade the inadequate storage, power and transport infrastructures.

investments that can improve nutrition, such as schools and health services,[80] and have positive impacts on rural dietary diversity, productivity, incomes and food security outcomes.[81] There is also evidence that as infrastructure and services develop, midstream activities (especially agrifood processing) tend to get relocated in SICTs.[82]

Public investments (in addition to roads) to support linkages between (mainly small) farms and SMEs could include **warehousing, cold storage, dependable electrification, access to digital tools** and **water supply**. Providing this infrastructure, which forms the basis for a diversified service industry, is a critical step towards more efficient functioning of SMEs (Box 10). Such investments build resilience and contribute to smoothing income shocks from seasonality, market volatility and weather variability.[83] In order to attract private sector investment, these public investments need to be more targeted and part of more comprehensive national strategies for infrastructure development. For example, building "last-mile" infrastructure and logistics that enable delivery from a distribution centre or facility to the end user, opens up possibilities for producers to reach bigger markets and, in the process, creates conditions that foster agribusiness development.[5, 84]

Investment for improving access to markets is also important for hinterland communities that are far away from SICTs catchment areas, as is the case of some Indigenous Peoples. They often face great difficulty accessing markets, and thereby have to rely on traders and aggregators, which may leave them prey to rent extraction. Existing evidence indicates that improving market access of Indigenous producers in remote areas could lead to significant improvements in economic and livelihood outcomes. In Brazil, for example, a cooperative effort to improve market access among Indigenous Peoples' communities so they could purchase larger boats, thereby allowing small-scale fishers to deliver fish directly to markets, contributed to a 27 percent increase in income,[89] mainly as a result of fishers receiving higher prices for their fish. In the Philippines, a project aimed at improving the livelihoods of poor households in Indigenous Peoples' communities by developing market access infrastructures and community watersheds, and providing financial capital and capacity-building training, improved small-scale producers' market participation by 13 percentage points. As a result, total income was 32 percent higher in treatment households than in control households, and income sources became more diversified by 6 percent.[90]

Investments targeting the midstream may also address multiple constraints elsewhere in the agrifood value chain leading to win–win situations of greater economic development and increased production of nutritious foods. Combinations of investments in wholesale markets and feeder roads in China have had important effects on farming in the market catchment areas of SICTs by reducing transaction costs for farmers to reach local markets. This has increased adoption of vegetable farming and intensified production.[91] In Bangladesh, the government has made extensive investments in fish wholesale markets in rural areas to serve as nodes for the formation of wholesale and logistics SME clusters across fish-farming areas, which has encouraged and facilitated commercialization, intensification, and species diversification in fish farming.[92] In general, investments in connectivity between locations and components of agrifood systems in SICTs have spurred substantial development of and investments by SMEs and the creation of spontaneous clusters of wholesale and logistics SMEs. Such clusters, in turn, induce farmers to increase their crop variety and to use more inputs.[91,93] In India, the confluence of factors such as increased demand from urban areas and improved roads and transport linkages from rural areas to SICTs, boosted the expansion of cold storage facilities for potato farmers in places like Agra and Bihar. The result was reduced seasonality of potato supply, a diminished role for traditional rural brokers and shorter supply chains between farmers and consumers.[70]

Moreover, recent studies have shown that investments in public goods such as roads or storage facilities can reduce trading costs, thus encouraging farmers to produce highly profitable foods such as fruits, instead of low-profitability staple foods for self-consumption.[94, 95] Lower trading costs could provide the right incentives for smallholder farmers to shift their production to more nutritious foods which, considering their availability gap, could be key for making healthy diets more available and affordable for all. This is aligned with one of the main insights of the 2022 edition of this report, which indicated that repurposing and stepping up food and agriculture policy support towards general services support (which includes investments in roads and other public goods) could play a key role in the affordability of healthy diets.

Territorial food markets, including wholesale markets, constitute a key linkage between producers, intermediaries, retailers and consumers in Latin America and the Caribbean,[96] South-eastern Asia, and Africa, and are often the most important marketing place for fruits and vegetables.[97] Investing in improved and gender-sensitive[an] wholesale market infrastructure (e.g. in territorial food markets) could improve supply of fresh products and facilitate compliance with food safety and quality standards by smallholder producers (see Box 11),[97] incentivize producers to supply higher-quality foods that could bring them better returns, and increase the quantity and variety of food supply through vertical and horizontal scaling.[13]

The increased reliance on, and demand for, processed foods presented in **Chapter 3** and **Chapter 4** present both a challenge and an opportunity regarding healthy diets. Although food processing is often associated with highly processed foods high in fats, sugars and/or salt, it can also be used to improve food nutritional quality and reduce the cost of a healthy diet. For instance, improving the nutritional quality of processed foods and beverages through **reformulation** is essential across the rural–urban continuum:[99] it can enhance diet quality, increasing nutrient content and reducing the intake of saturated and trans-fatty acids, sugars

an Women account for only 35 percent of wholesale workers worldwide but, on the other hand, represent 53 percent of all retail workers in agrifood systems.[98]

BOX 11 TERRITORIAL FOOD MARKETS, FOOD SAFETY AND HEALTHY DIETS

Territorial* food markets are key retail outlets not only for fruits and vegetables, but also for animal source and staple foods, among others. From small villages to large metropolitan cities, they are an important food supply source of many products, and are also part of the social fabric of communities. These markets are a primary source of affordable, nutritious and fresh foods for many low- and middle-income groups, and an important source of livelihood for millions of urban, peri-urban and rural inhabitants worldwide.[106]

Territorial food markets are also critical sales outlets for local producers. In Africa's food sector, for example, 80 percent of domestic food supplies are purchased in markets comprising primarily small and medium enterprises, while only 20 percent remain within farm households (for own consumption).[107] Furthermore, these food markets are also crucial for providing employment opportunities to women, who make up a significant share of retailers. For example, in markets mapped in Malawi, Paraguay and the United Republic of Tanzania, women retailers represent a clear majority, between 57 and 81 percent.[108]

However, if not well managed, territorial food markets may represent a global public health risk, as shown by the major outbreaks of zoonotic foodborne diseases periodically occurring on every continent.[109] The causes of such outbreaks are manifold, including human–animal interactions, poor infrastructure and deficient post-harvest handling practices leading to food contamination by viruses, bacteria, parasites, prions and chemicals (including toxins, pesticides, industrial chemicals, metals and persistent organic pollutants).[110]

Ensuring that nutritious foods are available, affordable, safe and desirable in territorial food markets can positively influence people's dietary preferences and choices, and thus help to improve their nutritional status and health. To this end, appropriate regulation and investment in rehabilitation and renovation of territorial markets play an important role in promoting food safety and quality, improving health, enhancing food security, and strengthening the economy. These food markets are also ideal settings for engaging stakeholders (e.g. vendors and local authorities) and the public to inform consumers about outbreaks and promote general health (including information on nutrition).[38] The latter is key to nudging consumers to purchase foods with higher nutritional quality (e.g. fruits, vegetables, legumes, nuts and fish).[111]

NOTES: * Territorial markets refer to markets that are directly linked to local, national and/or regional agrifood systems, and which are mostly organized horizontally among the various stakeholders. They have multiple functions (economic, social, cultural, etc.) in their respective territory beyond food supply, and are the most remunerative for smallholder farmers.[112]

and/or salt in purchased foods.[ao] In many high-income countries (HICs), and increasingly in LMICs, a significant proportion of sodium in the diet comes from processed foods such as bread, cereal and grains, processed meats, and dairy products. Introducing maximum limits for sodium in such processed foods can promote reformulation and improve the nutritional quality of food available.[101] To date, 65 countries have implemented policies to reformulate manufactured food to contain less sodium and almost half of the world's population are covered by mandatory trans-fatty acid limits.[101, 102, 103] While reformulation of processed foods can lead to products with a healthier profile, it does not eliminate the concern for high consumption levels of highly processed foods. For example, often free sugars are replaced by non-nutritive (or artificial) sweeteners, which alone does not improve diet quality. Instead, free sugars should be replaced with sources of naturally occurring sweetness, such as fruits, as well as minimally processed unsweetened foods and beverages.[104] Similarly, **fortification** is the practice of deliberately increasing the content of one or more micronutrients (i.e. vitamins and minerals) in a food or condiment to improve the nutritional quality of the food supply and provide a public

ao For instance, in the Kingdom of the Netherlands, a reduction in the intake of trans-fatty acids was observed after the implementation of a voluntary reformulation agreement. However, no effects were observed in saturated fat intakes.[100]

health benefit with minimal risk to health. Food vehicles for fortification range from basic commodities such as various types of flour, sugar and salt which can be ingredients of processed foods, to processed foods that are fortified at the point of manufacture or use.[105]

Food production policies

As has been indicated in **Chapter 3**, the availability of fruits and vegetables per capita per day is insufficient to meet the requirements of a healthy diet in most parts of the world. This makes it essential to boost the production of nutritious foods and, in general terms, support the diversification of food production, which has shown to have positive effects on food supply and food security.[113] In addition, changing food expenditure patterns across the rural–urban continuum, as highlighted in **Chapter 4**, could send important signals for redesigning food production policies.[ap]

Access to inputs such as seeds is key for supporting production of fruits and vegetables,[115] and this is true across the rural–urban continuum. Supporting smallholder farmers in diversifying their production will have positive effects not only on the overall supply of nutritious foods, but also on the accessibility of healthy diets in rural areas. For example, different kinds of **input subsidies** (direct distribution of inputs, vouchers or targeted preferential prices) have been shown to have positive impacts in improving access to diverse and more nutritious foods at the household level.[116] In Ethiopia, a study found that rural vegetable producers earned more income and were more food secure than non-vegetable producers.[118] **Agricultural extension** is also important in rural areas, and can have positive effects on dietary diversity and quality at household levels.[81] However, currently extension programmes are often oriented towards staple crops rather than nutritious foods such as fruits and vegetables. Changing the focus of these programmes could be essential for increasing the availability of these foods.[115]

As mentioned in the previous section, investing in infrastructure is key for enhancing agrifood systems linkages across the rural–urban continuum. From a productive perspective, investing in **irrigation** is important for boosting fruit and vegetable production, to the point that in India, producers that have access to irrigation infrastructure show better dietary diversity outcomes.[119] In cases in which the conditions and capabilities for producing diverse nutritious foods have yet to be developed, **biofortification** has shown to be a valid alternative method to improve the nutrient intake and dietary quality of rural populations.[aq] The adoption of biofortified crops by smallholder farmers can improve the supply of essential micronutrients not only via own consumption, but also through commercialization in local markets and inclusion in social protection programmes including in-kind food transfers and school meal programmes (the latter in all kinds of settings across the rural–urban continuum).[120]

It is important to highlight that many studies in rural settings have found that **women's empowerment** is one of the most important pathways through which food production policies can have positive effects on access to nutritious foods and, in turn, on food security and nutrition outcomes, particularly in rural areas. Several studies have found positive associations between women's empowerment and household dietary diversity,[117, 121] making the closure of the gender gap in rural areas a key consideration for any food production policy oriented towards improving access to affordable healthy diets.

On the other hand, in cities and their surroundings, **urban and peri-urban agriculture (UPA)** has the potential to increase the availability of fruits and vegetables for urban dwellers.[122] In fact, it has been found that households involved in urban agriculture improve their dietary diversity through own

ap For instance, a study found changing expenditure patterns in Zambia from maize towards other cereals such as wheat, as well as to vegetables and animal source foods, between 1996 and 2015, driven by income growth and urbanization. However, Zambian agricultural policy is still focused mostly on maize, undermining the possibilities for production diversification.[114]

aq Please see **Section 5.2**.

production, and in turn reduce their food expenditure.[123, 124, 125] However, this evidence is limited compared to that for rural areas, as there is a gap in the analysis of direct policy instruments oriented towards food production in urban areas.[ar] Still, it has been observed that the inclusion of urban agriculture objectives in city planning and regulations, often in HICs, can create adequate conditions for the development of urban agriculture.[as, 126]

The development of UPA is closely linked to the adoption of productive technologies and innovations, which can lead to increased yields and reduced environmental impacts. Considering the scarcity in urban areas of natural resources such as land and water needed for the production of nutritious foods, technology could play an essential role in making urban agriculture a sustainable alternative for food supply.[126] The next section provides a detailed analysis of these technological innovations, as well as other agrifood systems innovations that could boost the effects that the different kinds of policies analysed here could have in making healthy diets affordable across the rural–urban continuum. ■

5.2 TECHNOLOGY AND INNOVATION: A KEY ENABLER FOR AGRIFOOD SYSTEMS TRANSFORMATION UNDER URBANIZATION

In an urbanizing world, the strategic deployment of technology and innovation can be a critical catalyst of agrifood systems transformation.[127] This section discusses the potential of technology and innovation to contribute to increasing efficiency, inclusiveness, resilience and sustainability of agrifood systems under urbanization, which are key for making healthy diets available and affordable for all and, in turn, achieving food security and nutrition.

Countries have varied needs and capacities with respect to technologies and innovations, and there are important differences within countries and between segments of agrifood systems. Urbanization offers additional opportunities for agrifood systems to rapidly evolve and innovate across the rural–urban continuum (see Figure 21 in **Chapter 3**). Of course, no single "silver bullet" technology or innovation will meet all needs in all contexts across the rural–urban continuum. Furthermore, innovations cannot be considered in isolation: potential trade-offs and co-benefits must be considered, both among the innovations themselves and in relation to other agrifood systems interventions. For example, automation can lead to unemployment, especially for manual labourers/low-skilled workers, when it is incentivized through government subsidies in areas where labour is abundant. However, it also has the potential to stimulate employment in logistics and processing due to increased production as well as generate new jobs that demand high levels of cognitive ability (this entails building the knowledge and skills of agricultural workers to facilitate the transition).[128] Therefore, the development and use of technologies and innovations should be guided by the assessment of their socioeconomic, environmental and ethical impacts.

A plethora of technologies and innovations is available (though not necessarily accessible to all countries and social groups) spanning entire agrifood systems. Whether these technologies and innovations are inclusive for all depends not only on their adoption and impact, but also on how research and development (R&D) is shaped. Between 1981 and 2016, there was a doubling of global public investment in agricultural R&D, and larger middle-income countries (MICs), in particular Brazil, China and India, significantly increased their investment in agricultural R&D.[129] However, smaller LMICs continue to have insufficient investment compared to other components of general services support such as

ar Some cases show direct support of city governments to urban agricultural producers, but no assessment of their impact has been found.[126]

as See **Section 5.3** for more details.

infrastructure investments.[at, 14] The long time lag between investments and their impact on the ground, as well as the "invisible" nature of research and innovation compared to tangible investments in physical infrastructure, are contributing factors for this neglect.

Public spending on agricultural R&D is still lower than private spending. From 1990 to 2014, private spending on agricultural R&D worldwide more than tripled (with companies based in HICs accounting for 88 percent of global private agricultural R&D spending), but was still focused on a relatively small number of commodities.[131] Venture capitalist investments in the agrifood technology sector reached USD 29.6 billion in 2022, though this represented a 44 percent decline from 2021.[132] However, the increasingly important role of the private sector in R&D poses challenges. The concentration of some key agrifood markets in the hands of a few multinational corporations and the increased vertical integration could lead to an R&D agenda that favours certain financial interests over sustainability considerations, and promotes the adoption of high-tech and high-cost technological and innovative solutions above others.[133, 134] Indeed, looking at research and innovation trends, it appears that in highly concentrated markets, the focus of innovation is primarily on "defensive" R&D, aimed at safeguarding existing products or technologies rather than promoting novel ideas.[135] Nevertheless, innovative business approaches used in the private sector could still be beneficial for agrifood systems: for instance, the idea of the "circular economy"[au] is promoting the development of innovative approaches to reduce food loss and waste at different stages of the food supply chain, including at the domestic level.[134]

An exhaustive and complete listing of technologies and innovations (including those in the ever-expanding pipeline) is beyond the scope of this section. Illustrative examples are provided to showcase diverse options that could be bundled together in contextually appropriate packages, and considered as integral elements of a portfolio of policies, investments and legislation for transforming agrifood systems to make healthy diets affordable for all.[137] In particular, there are a multitude of rapidly advancing digital innovations that cross-cut all segments of agrifood systems, opening up the possibility of transforming these systems in unprecedented ways across the rural–urban continuum, including offering LMICs opportunities to leapfrog existing technologies that are less efficient. It is estimated that by 2050 each farm alone could produce around 4.1 million data points daily (compared with 190 000 data points produced per farm per day in 2014).[138] Extrapolating across various aspects of agrifood systems, such data can improve the use of public funds by identifying the most effective and efficient policy options as well as reducing transaction costs along the policy cycle (from implementation to monitoring and compliance to evaluation). For instance, the use of geospatial data could provide evidence for policymaking using a rural–urban continuum lens,[139] and it could be particularly important for improving common and differentiated policy entry points.

However, innovations in digital technologies risk increasing the digital divide across socioeconomic groups (e.g. income, gender and age), geographies (e.g. rural and urban populations) and geopolitical groups, in addition to raising concerns around control of information and power, democracy and human rights. Some of the factors to address include the high cost of some digital technologies, absence of digital infrastructure, lack of digital skills and literacy, and sociocultural barriers linked to gender as well as issues of information asymmetry, data ownership and management, privacy, and cybersecurity. Worldwide, 2.7 billion people do not have access to the internet, and fixed or mobile broadband services are too expensive for the average consumer in most low-income countries.[140] Moreover, in LMICs, women are 16 percent less likely to utilize mobile internet compared to men, while adults residing in rural areas are 33 percent less likely to use mobile internet than their urban counterparts.[141]

at For instance, an analysis of food and agriculture public expenditure in 13 African countries (Benin, Burkina Faso, Burundi, Ethiopia, Ghana, Kenya, Malawi, Mali, Mozambique, Rwanda, Senegal, Uganda and United Republic of Tanzania) found that none of these reached the African Union target of spending an equivalent of 1 percent of their agricultural GDP on R&D.[130]

au A circular economy aims to maintain the value of products, materials and resources for as long as possible by returning them into the product cycle at the end of their use, while minimizing the generation of waste.[136]

Food environments and consumer behaviour-oriented technology and innovation

In urbanizing contexts, where consumers are increasingly exposed to highly processed foods, increasing the demand for nutritious foods is particularly important. The application of **behavioural science** is an essential innovation that enables governments, scientists and the public to work together to develop evidence-based approaches to increase access to affordable healthy diets, as well as empower consumers to choose healthy diets. When employed as an iterative, innovation process, behavioural science can help identify barriers to consuming a healthy diet as well as help design, test and scale solutions to overcome them. Considering that food outlets are a major source of foods all across the rural–urban continuum, nudges[av] at the point of purchase can be used to interrupt automated behavioural responses and redirect them towards healthier food choices.

Nudging interventions in school cafeterias or local grocery shops have produced positive results in steering individual dietary choices towards more nutritious foods in high-income countries,[143, 144] and they would not be too costly for lower-income countries to emulate as a useful adjunct to important regulatory and economic policy tools. For example, a trial involving ten primary schools in Australia aimed to encourage the selection of healthier foods and beverages from the online school menu. By introducing multiple nudges including placement (listing healthy items first), prompts and appealing descriptions of target foods, the intervention was able to significantly lower the energy, saturated fat and sodium content of children's school lunches compared to a non-intervention control.[145]

Food labelling can contribute to a healthy food environment by providing information to the consumer about the content of foods, drawing consumer attention to the benefits and risks of particular nutrients or ingredients of public health concern, and motivating manufacturers to produce foods which have healthier nutrition profiles.[146] **Nutrient profiling** is a method that assesses the nutritional quality of processed foods and beverages. It is also a tool to guide policy interventions such as **front-of-package (FOP) or menu labelling** and restrictions on marketing to children to help inform and empower consumers to shift demand towards healthy diets. For example, the OBAASIMA project in Ghana has used a FOP seal and social marketing campaign to encourage local SMEs to produce nutritious products. The project has shown promising preliminary results in increasing consumer awareness and SME capacity and is expanding to more cities.[54] Regional nutrient profiles have also been developed as a resource for national or local policymakers.[147, 148, 149, 150, 151]

Promoting – while preserving – traditional foods originating from Indigenous Peoples' agrifood systems through **labelling and certification** (including territorial labels, geographic indications and participatory guarantee schemes) can create niche markets and enhance awareness of the specificity of such products. For example, in Ecuador, the Chakra label primarily targets local markets and sensitizes consumers about the distinctive sociocultural aspect of the Chakra system as well as the nutritional value of local products.[152] However, given the large number of different labels on the market and existing barriers to compete with global commodity prices, innovative labels alone may not enable an upscaling of Indigenous Peoples' product sales. Therefore, building relationships and collective processes together with trusted representatives of the private sector, especially relevant market players, as well as governments and researchers in both social and natural sciences, can be critical in developing sustainable marketing strategies for Indigenous Peoples' food products.

The use of **whole genome sequencing** can be an effective tool for identifying and tracing foodborne pathogens, and for detecting contaminants as well as outbreak investigations.[153] **Traceability data**, including through mobile applications, helps inform consumers about the origin of food sold in supermarkets, promoting transparency in pricing and making supply chains more efficient and accountable.[154]

av A nudge is any form of choice architecture that alters people's behaviour in a predictable way without restricting options or significantly changing their economic incentives.[142]

Online **food sharing services** can gather and redistribute food surpluses across local communities and supermarkets in urban and rural areas, thus helping to reduce food waste. They can also have a positive impact on food environments, especially when surplus nutritious foods such as fruits and vegetables are "rescued" and redistributed. Smartphone applications that enable users to make small donations to specific initiatives can provide support for a range of operations, from building resilience to implementing school feeding programmes to delivering food assistance in emergency situations.[155]

The increased use of mobile phones in LMICs has contributed to the adoption of other services such as **mobile money**, enabling reduced transaction costs and enhanced financial inclusion. Mobile money can improve farmers' access to higher-value markets (thus increasing their income) and to off-farm income sources as well.[156] In Kenya, Uganda and the United Republic of Tanzania, it has been shown to have positive impacts on household welfare, including in some cases by diversifying food purchases and improving dietary diversity.[157] While the benefits of using mobile money in rural areas are already established, the advantages for urban areas are now being recognized as well – as seen in Zimbabwe, for instance, where cash transfers are delivered in urban settings through mobile money.[158]

Food labs involve the coming together of a group of people in complementary roles in order to experiment with finding novel solutions[159] to complex challenges in agrifood systems, including food insecurity and unaffordability of healthy diets. Experimenting with, *inter alia*, technologies, policies, participatory approaches, actions and ideas can be an important source of innovation and capacity building. For example, the Uganda Food Change Lab was set up to address district-level issues of limited local processing facilities, depleted local soils and child malnutrition, largely a result of undiversified diets. The lab carried out food dialogues, research and workshops with a group of diverse actors[aw] in agrifood systems, including those not normally given a voice, in order to generate stakeholder awareness. The country's first People's Summit on Food was then convened, resulting in a range of commitments from all stakeholder groups.[160] In Brazil, the collaborative platform, Urban Laboratory of Public Food Policies (LUPPA), supports the development and strengthening of an integrated urban food agenda, while providing data and content on municipal experiences. It includes a year-long programme that delivers an extended repertoire of tools for cities to become better able to develop their local food policy strategies. LUPPA's participant cities encompass Brazil's 5 regions, covering 18 of the 26 Brazilian states, and comprising more than 11 million people.[161]

aw Including civil society organizations, local politicians, food vendors, farmers and traders.

Midstream food supply chain-related technology and innovation

Urbanization is leading to a growing demand for packaged and pre-prepared foods, even in low-income countries. As analysed in **Chapter 4**, consumption of processed foods and food away from home is higher in urban areas, but there is a diffusion across the rural–urban continuum. There is also a noticeable rise in the number of midstream SMEs involved in wholesale, transport and processing, as well as upstream SMEs involved in supplying inputs, especially in Africa and Southern Asia.[162] Small and medium enterprises are typically embedded in rural agricultural areas and play an important role in expanding market opportunities and strengthening the linkages between urban and rural areas. As such, innovative approaches that enhance the capacity of SMEs to increase the availability of nutritious and safe food, improve the food environment, and facilitate the consumption of healthy diets are key.

Innovative business models such as the Egg Hub operator model (Box 12) can support the consumption of healthy diets, while providing small-scale producers with quality inputs and services as well as market access.

The increasing demand for perishable products such as fruits and vegetables, dairy products, meat and aquatic foods has led to a proliferation of **freezing and packaging technologies**.

BOX 12 EGG HUB OPERATOR MODEL: A SCALABLE WIN–WIN SOLUTION FOR SMALL-SCALE PRODUCERS AND LOW-INCOME CONSUMERS

The Egg Hub operator model has been piloted by Sight and Life, a non-profit foundation, in several countries including Ethiopia, India and Malawi. This model offers rural small-scale producers access to urban and peri-urban markets for their surplus. The producers are organized into groups of five and given input packages, loans, training and market support to sell their eggs, as well as wholesale rates for improved feed. The eggs produced by these groups are primarily sold within their communities, and not to commercial establishments where eggs would be used as ingredients. Any excess eggs are collected and sold in urban and peri-urban markets. The farmers repay their loans within three to five years, and the money from the loan repayments is used to create a revolving fund to help increase the number of farmers in the hub. An Egg Hub operator and its affiliated farmers can cater to a catchment area with a maximum radius of 100 km.

In Malawi, the first Egg Hub operator model aimed to produce over 10 million eggs annually for small-scale producers and rural communities. The model's 175 farmers increased their egg production threefold, allowing them to sell eggs to consumers at a 40 percent discount, reaching an estimated number of 210 000 rural poor. Women particularly benefited, as they were extensively involved in small animal raising. The Egg Hub model also provided an added advantage by helping small-scale producers transition from backyard rearing to small-scale farm rearing, reducing the risk of children's exposure to chicken faeces and infections. Additionally, the Malawi model proved to be more sustainable, requiring 69 percent less land usage, 33 percent less water usage, and generating 84 percent fewer greenhouse gas emissions compared to backyard poultry, primarily due to lower levels of egg wastage and better biosecurity. Another crucial aspect of the Egg Hub model is its ability to address the challenge of small-scale producers accessing bank loans. By providing access to quality inputs and a guaranteed market for their products, the model offers farmers a better chance of secure funding for their business.[163]

Mobile pre-cooling and pack house units offer farmers the option of pre-cooling their produce when there is no immediate access to cold storage technology.[164] Cold chains can be augmented with internet of things[ax] sensors and big data, allowing for real-time decision-making for temperature-sensitive products and perishables as they move across the chain or are maintained in storage.

Cold chains provide benefits in terms of maintaining food quality (including nutritional quality) and safety, reducing food loss and waste, and facilitating market access, and they are also key to maintaining the integrity of veterinary medicines and vaccines to help prevent and manage outbreaks of zoonotic diseases. However, cold chains pose significant risks in terms of environmental damage that the refrigeration equipment can cause. Furthermore, many barriers impede the use of cold chains in LMICs: lack of access to reliable power and equipment, limited resources for public and private sector investments, inability of small-scale farmers to afford cooling technologies, and lack of technical skills, among others.[166] Within LMICs, cold chain capacity and utilization is much greater for exported food products than for food destined for domestic markets. Climate-friendly refrigeration systems based on renewable energy can help cold chains become more sustainable, though challenges such as access to reliable and affordable energy need to be addressed.[167]

Innovations in food packaging can maintain the quality, safety and nutritional value of food products, meet consumer needs and preferences, reduce food loss and waste, and reduce the cost of nutritious foods, especially across longer

ax A system in which devices – including mobile phones, sensors, drones, machines and satellites – are connected to the internet.[165]

distribution chains. For example, organic sprays of thin lipids on fruits and vegetables can extend shelf-life, offering great benefits in countries with limited refrigeration.[168] "Intelligent" packaging utilizes materials that can monitor the condition and environment of packaged food, alerting retailers or consumers to any compromise or contamination such as changes in colour. It can also include "smart" labels such as QR codes that track products throughout the supply chain, verifying product safety and providing additional information (e.g. details on allergens and sourcing). Alternatives to plastic packaging include **biopackaging solutions** such as bioplastics from organic waste streams, though materials vary significantly in terms of the quantity of renewable resources used in their formulation, and may not be as readily compostable as claimed. Moreover, these solutions remain difficult to upscale as they must be tailored to usage requirements.[169]

Circular packaging solutions can include redesigning packaging formats and delivery models, introducing reusable packaging, and improving the economics and quality of recycled plastic materials.[170] For example, returnable and transit packaging in the form of returnable plastic crates is widely used in agrifood value chains because of its cost-effectiveness, durability and reusability over extended periods. In Bangladesh, the switch from single-use plastics to returnable plastic crates for long-distance transportation of fresh fruits and vegetables, together with the application of good management practices, has improved fresh produce quality and shelf-life and increased stakeholder incomes while safeguarding consumers against food safety risks and considerably reducing post-harvest losses.[171] The development of cross-collaborative engagement among producers, processors, retailers and distributors will be critical in driving the shift from the current, linear "take–make–consume–dispose" model of the agrifood value chain, towards more circular systemic approaches to ensure sustainability.[172]

E-commerce platforms offer opportunities to increase affordability of healthy diets, by shortening value chains and increasing market access. These platforms can also contribute to women's empowerment by enabling women to earn an independent source of income, work from home, and set their own working hours. Moreover, e-commerce has the potential to reduce the number of intermediaries and balance the power relationships within value chains, resulting in higher prices paid for producers and cheaper produce for consumers.[173, 174] The growth of e-commerce was further accelerated by the COVID-19 pandemic, from 10 to 20 percent per year in China, 30 to 70 percent in India, and 20 to 50 percent in Nigeria,[175] and to some extent, consumers are now more reliant on food e-commerce (and delivery) than they were pre-pandemic.[83] A key barrier to the adoption and scaling of e-commerce, however, is the unequal access to internet connectivity in some regions. This can limit not only the consumer base of e-commerce platforms, but also the possibility for small-scale producers to directly advertise their products on such platforms, therefore maintaining (or even increasing) their reliance on intermediaries for non-traditional supply channels.

With the rising popularity of e-commerce, food safety has become a crucial issue for online retailers. To ensure food safety, retailers must take measures to prevent contamination during storage, transportation and delivery. This includes maintaining appropriate temperatures for perishable goods, using safe packaging materials, and implementing proper sanitation measures. Retailers must also adhere to local and federal regulations governing food safety. Clear and accurate information about the origin, contents and expiration dates of food products is essential for informed consumer choices and to mitigate potential health risks.[176, 177, 178, 179]

The rise of e-commerce due to advances in mobile technology and widespread wireless internet availability is shifting the way people interact with their food environments. This "digitalization" of food environments is enabling food retailers to sell foods online, resulting in unprecedented consumer access to a large variety of foods (both nutritious foods and foods of high energy density and minimal nutritional value). On the downside, online food retail and meal delivery apps often have specific promotions on foods high in fats, sugars and/or salt.[180, 181, 182, 183, 184, 185, 186, 187] Though mainly used in urban settings in high- and middle-income countries, meal delivery apps are growing in popularity and spreading to smaller cities and towns, potentially contributing to an expansion of food swamps by increasing geographic access to foods prepared away from home[188, 189] and/or availability of foods high in fats, sugars and/or salt in areas where physical shops selling nutritious foods are sparse. A study analysing meal delivery apps found, for example, that a greater number of fastfood options were available in the most disadvantaged neighbourhoods.[190]

Food production-related technology and innovation

Family farms produce approximately 80 percent of the world's food in value terms, with farms under 2 hectares producing roughly 35 percent.[191] Additionally, the majority of the world's poor and food insecure live in rural areas and depend on agriculture for their livelihood.[192] Hence it is critical to increase farm productivity and incomes in rural areas, enhance market access for small-scale producers, and improve connectivity to facilitate smoother flows of goods, services and information across the rural–urban continuum.

Simultaneously, rapid urbanization combined with rising incomes is shifting patterns of food supply and demand, accelerating a diet transition. Consumption is also changing in rural areas, leading agricultural production to diversify towards nutritious foods. Growing fruits and vegetables can create economic opportunities for farmers, not only in rural but also in peri-urban and urban areas. Diversification also increases resilience to climate, environmental and market shocks across different production settings.

As already noted, urban and peri-urban agriculture (UPA) can provide easy access to fresh and nutritious foods, and make healthy diets more affordable in peri-urban and urban areas. In addition, it can help optimize the use of scarce urban resources such as land and water, though it is important to exercise caution in areas which may have contamination issues as there could potentially be substantial food safety risks. More than 1 billion individuals residing in urban and peri-urban regions are involved in growing food or agricultural activities, and urban agglomerations encompass a global farm area that exceeds 60 million hectares.[126] Nonetheless, while UPA can improve food security and nutrition in and around cities, it is unlikely that it can satisfy the needs of urban populations, so its development should be complementary to that of rural agriculture and concentrate on activities where there is a distinct comparative advantage, such as production of fresh, perishable foods.

Numerous technologies and innovations can be leveraged for enhancing productivity in rural, peri-urban and urban areas as well as for closing the productivity gap in LMICs, especially in the face of the climate crisis and dwindling natural resources. With water scarcity becoming a reality in many places across the rural–urban continuum, technologies such as **rainwater storage** can optimize water-use efficiency in rainfed agriculture.[193] For example, roof-harvested rainwater can positively impact productivity and improve the sustainable usage of water in UPA.[194] Moreover, the safe use of wastewater can lead to important energy savings for food production, and for cities in general. Nutrients recovered from wastewater can be used instead of inorganic fertilizers as well.[195] In addition, **fog catcher systems** have been implemented in arid zones and have increased the availability of water for food production in several Latin America and the Caribbean countries.[196, 197]

Agroecological innovations[ay] can be market based, institutional, ecological and technological, often with a focus on knowledge co-creation.[199] Agroecology recognizes that food production, distribution and consumption inherently link economic, ecological and social processes, and it is practised in diverse and locally adapted forms across the rural–urban continuum. At the plot, farm and landscape levels, it can help increase farmers' incomes,[200] improve food security and nutrition,[201] use water and soil more efficiently, conserve biodiversity, provide ecosystem services, and enhance nutrient

ay As stated in FAO (2018, p.1) agroecology is "an integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of food and agricultural systems."[198]

recycling, among other benefits.[202] In India, the Andhra Pradesh Community-managed Natural Farming programme that aims to transition all 6 million farmers in the state to agroecological approaches has already reached more than 630 000 farmers, resulting in higher incomes and better yields as well as health benefits.[203] In Ecuador, the Participatory Urban Agriculture Programme emphasizes the social inclusion of vulnerable groups and supports the production, processing and distribution of food from urban and peri-urban areas, generating revenue, creating jobs and promoting agrobiodiversity.[204] It also facilitates the provision of technical assistance, microcredit and capacity building to producers. Blending agroecology with territorial approaches can help empower rural communities and bring agroecology to scale, for example by implementing territorial certification schemes and shorter value chains to improve access to markets and increase incomes of small-scale producers.[205]

As at 2021, **organic agriculture** was practised in 191 countries by nearly 3.7 million producers, but it occupied only 1.6 percent of the total agricultural land.[206] Organic farming systems can provide more profits with less environmental footprint and produce nutritious foods with less pesticide residue.[207] In general, organic agriculture has a positive effect on above- and below-ground biodiversity, soil carbon stocks and soil quality and conservation, but it often produces lower yields than conventional agriculture and has higher labour requirements.[208] MASIPAG, a grassroots farmer-led advocacy network in the Philippines, promotes organic farming as a path for rural development. Farmers are involved in participatory plant breeding of rice varieties, farmer-to-farmer exchanges, and participatory guarantee systems for increased market access of organic products.[209] Organic farming is also a common practice in UPA, with manure and urban waste compost frequently utilized to improve soil fertility. For example, the Kibera Youth Reform Organic Farm, which began on a garbage dump in Africa's largest slum in Nairobi, grows a range of crops for own consumption as well as for sale.[210] Since organic agriculture does not rely on synthetic nitrogen fertilizers, nitrogen availability is the primary impediment to the global expansion of organic agriculture.[211] Additional issues relate to the potential exclusion of small-scale producers due to the cost of certification and to the price of organic products, which are often too high for consumers.[212]

Controlled environment agriculture (CEA), also referred to as **vertical or indoor soil-less farming**, encompasses numerous technologies including hydroponics, aeroponics and aquaponics. Vertical farming requires only a small plot of land and can be carried out indoors, allowing for the cultivation of food in urban and industrial spaces, and leading to shorter supply chains. For short-cycle fast-growing horticultural crops such as lettuce and leafy herbs, production in a controlled environment can cut water use by up to 95 percent while supplying consistent-quality, high-value products all year round. Vertical farms can minimize risks of foodborne illnesses and considerably reduce the need for both inputs (e.g. fertilizers and pesticides) and water (through recycling). For cereals such as wheat, studies have shown that yields in indoor vertical farms could be 220 to 600 times higher than yields in the field, while at the same time using less land.[213] However, the high energy cost of producing artificial lighting and maintaining temperature and air quality makes the adoption of CEA viable mostly in HICs. The largest market share from CEA, and most of its positive results, have been found in this country income group,[214, 215] but it has also been used to support vulnerable communities in LMICs using low-tech hydroponic units.[216]

Biotechnological innovations in genetics and breeding have led to tremendous gains in productivity, adaptation to biotic and abiotic stresses, and enhanced nutritional value. Consumption of **biofortified crops** can enhance nutritional status and promote better health outcomes, especially in rural areas in LMICs, where diets are significantly reliant on self-produced or locally procured staple crops. Hundreds of biofortified varieties of 12 staple crops have been released for planting in over 60 countries, with more than 86 million people in farming households eating biofortified foods. In Nigeria, farmers growing biofortified vitamin A cassava have been linked to aggregators and processors, with labelled processed products sold in rural, peri-urban and urban areas. Additionally, organizing the annual Nutritious Food Fair has been instrumental in fostering linkages among farmers, processors, marketers and consumers.[217]

Gene editing is a relatively new technology that offers improvements in accuracy and precision for plant and animal breeding, with the added advantage of speeding up the component processes at a reduced cost. In particular, gene editing can be exploited to increase the utility of "forgotten" crops as well as neglected and underutilized species that are nutritious and often adapted to harsh environments and conditions. Marketed gene-edited products include a gamma-aminobutyric acid-enriched tomato and two gene-edited fish in Japan, as well as soybean with improved fatty acid composition in the United States of America.[218] There are diverse views, however, on how gene-edited products should be regulated, and legislation can differ widely among countries. In addition, prior debates associated with genetic modification may influence consumer acceptance of gene-edited products. Public perception studies vary on whether consumers can distinguish between genetic modification and gene editing when forming their opinions. In a recent study, respondents viewed gene-edited and genetically modified food similarly, and less favourably than conventional food. Other studies suggest that people may be more accepting of cisgenic[az] modifications than of transgenic[ba] ones, but less accepting compared to conventionally bred crops.[218]

Fundamental lifestyle shifts, income disparities, growing urban population diversity and changing consumer behaviour in response to numerous factors (such as concerns about the impact of food production on environmental sustainability as well as animal welfare) are disrupting the status quo of agrifood systems. New foods and novel ways of producing food are being explored. The popularity of **plant-based alternatives** (e.g. soy- and nut-based products) to animal source foods (e.g. meat, dairy, eggs and aquatic foods) is on the rise, although caution is needed to prevent the inadvertent increase in use of common allergens in diets.[220] In addition to food safety aspects, the price and cultural acceptance of plant-based alternatives must be considered. The affordability of plant-based alternatives is anticipated to improve as consumer demand and supply grow. Currently, plant-based alternatives predominantly cater to a Western-style diet, with limited exploration into more traditional foods in different regions.

While insects have been a traditional part of many cultures' diets for centuries in different regions, the cultivation of **edible insects**, for both human consumption and animal feed, is garnering significant attention worldwide due to the many possible advantages in terms of nutrition, the environment and the economy. Nonetheless, similar to other food items, edible insects can be associated with a number of food safety hazards that require attention and care in the preparation process.[221] Furthermore, a greater push for the consumption of insects could result in the overexploitation of insects in their natural habitats, posing a threat to biodiversity and ecosystem stability.[222]

The commercial landscape for **cell-based food technologies** that use animal or microbial cells grown *in vitro* to produce animal proteins (sometimes referred to as "cultured" or "cultivated" meat) is emerging and rapidly expanding, with Singapore approving the first cell-based "chicken" nuggets in 2020.[223] Cell-based food production is anticipated to require less land than traditional livestock farming, though the latter still plays a vital role in environmental functions such as maintaining soil carbon content and fertility. Further, it is unclear if cell-based foods have a greenhouse gas emissions advantage over livestock when scaled up. Different types of cell-based foods have different environmental impacts; for example, a cell-based food may have high energy requirements but reduced land-use requirements and low eutrophication potential.[220] It is not known how people will perceive cell-based foods and whether they will be acceptable to consumers. Technological advancements for cell-based foods have progressed significantly, but they

az Genetic changes introduced from the same species, such as those produced by some gene-editing technologies.[218]

ba An individual in which a transgene has been integrated into its genome. A transgene is an isolated gene sequence used to transform an organism. Often, but not always, the transgene has been derived from a different species from that of the recipient.[219]

have not yet reached the stage of widespread production or commercialization in the majority of countries. Finally, although the production costs for cell-based foods have fallen, they are still prohibitive for many LMICs.

Digital technologies can guide and facilitate data-driven decision-making at the farm level across the rural–urban continuum by leveraging granular data about fields and animals in conjunction with accurate, timely and location-specific weather and agronomic data. **Precision agriculture** uses information to optimize inputs (especially targeted, timely applications of agrochemicals) and can improve resource-use efficiency in increasingly constrained conditions for agricultural producers. But efficiency gains come with a risk of rebound effects, that is they can lead to enhanced machinery and associated energy use as well as increases in usage of natural resources.[224] **Automation** can replace dull and dangerous manual jobs, address labour shortages in certain areas and attract younger, more skilled workers. For example, agricultural robots can decrease labour and input requirements, and reduce yield losses resulting from the late detection of pests and diseases.[225] However, their high purchase price and operating costs make their use prohibitive for small-scale producers. Additionally, if unskilled workers do not learn new skills quickly enough, it can be difficult to transition to new jobs. Besides, there is a possibility that small-scale producers might be driven out of business and forced to migrate to cities, because they lack the economies of scale to compete if the automation technologies are not scale neutral. Digital services such as **shared asset services** can enhance farmer access to mechanization hire services and significantly reduce transaction costs for small-scale producers.[128] Finally, digital technologies also have the potential to facilitate cost-effective, uninterrupted and scalable extension and advisory services in rural areas. **Mobile phone-based extension systems** can reduce information deficiencies, and in sub-Saharan Africa and India have been estimated to improve crop yields by 4 percent and the odds of adoption of recommended inputs by 22 percent.[226]

Looking ahead: making technology and innovation work well for all across the rural–urban continuum

Globally, urbanization is accelerating, affecting agrifood systems across the rural–urban continuum and consequently the availability and affordability of healthy diets. As evident from the examples provided above, technology and innovation are driving changes in production processes, distribution systems, marketing strategies, and the food products consumed by people, with benefits for producers, consumers, small and medium enterprises and retailers, among others. However, promising technologies and innovations often do not gain traction, especially in low- and middle-income countries, due to issues of contextual readiness and appropriateness, and the lack of an appropriate enabling environment to support development, diffusion and adoption.

The potential of technology and innovation can and must be unlocked for the common good, but all technologies and innovations have pros and cons in terms of how they affect agrifood systems transformation and how they can reinforce inequalities, creating winners and losers across the rural–urban continuum. It is also important to acknowledge regional heterogeneity and the diversity and dynamism of agrifood systems. Therefore, technologies and innovations must be adapted to local needs, opportunities and constraints, to ensure they are accessible to all who want to adopt them. To scale up technologies and innovations in agrifood systems as well as make them more inclusive, policies and investments are needed in a number of areas including infrastructure (e.g. internet and transport connectivity); relevant capacities, skills and knowledge; effective regulatory measures; economic and legal instruments to reduce costs and risks (e.g. overconcentration of market power); appropriate market incentives; and promotion of inclusive agribusiness models. Further, bundling contextually suitable technologies with complementary financial, social and institutional innovations can allow for mitigation of trade-offs, where one innovation can compensate for negative impacts caused by another one.[7]

Increased public investment in agricultural R&D beyond the major staples to include a broader range of plant and animal species (including fruits and vegetables) is necessary to support the diversification of agrifood systems. Further, the research focus must broaden from solely improving productivity to improving the functioning of entire agrifood systems (i.e. the off-farm components that account for up to 70 percent of value added). Urban soils can contain multiple contaminants such as heavy metals, asbestos and petroleum products at different levels, while chemical hazards or pathogens can be found in urban wastewater that has been improperly treated; therefore more research is needed on the potential health risks to humans who consume food that is specifically grown within urban and peri-urban areas. Opportunities exist for achieving more with the resources currently invested by governments. As analysed in the 2022 edition of this report,[14] most of the global support to food and agriculture is oriented towards producers through price incentives and other fiscal subsidies. These subsidies could distort the incentives for adopting certain technologies, favouring some producers over others; instead, public support could be repurposed towards increasing investments in general services support (which includes R&D) to encourage the development and adoption of technologies collectively.[14, 128] Reassessing policy priorities considering the challenges created by urbanization could open the policy window to re-examine – and repurpose – current food and agriculture support.[227] ■

5.3 INTEGRATED PLANNING AND GOVERNANCE MECHANISMS ACROSS THE RURAL–URBAN CONTINUUM

The policies, technologies and innovations presented up until now will require adequate governance mechanisms that, while engaging multiple actors, coherently address the challenges and leverage the opportunities created in agrifood systems under urbanization. Policymaking processes will not work with a traditional, mostly national and top-down approach, because of the need to focus on places and their functional and spatial linkages. Because these linkages often play out across sectoral and administrative boundaries, policymaking processes should facilitate interjurisdictional agreements and regulations, as well as the participation of a variety (including non-governmental) of actors.[5] Hence, agrifood systems governance can be understood as the mechanisms and processes established for stakeholders to articulate their interest, mediate their differences and coordinate around government institutions. Moreover, institutional arrangements need to consider the key role of subnational governments (local and regional) as well as that of non-governmental actors.[5]

Working with the spatial and functional linkages across the rural–urban continuum, with subnational governments as important players, can leverage agrifood systems transformation under urbanization. The national and transnational production-oriented policies and agendas of the last century created gaps in addressing food insecurity and malnutrition. In reaction to these policies, subnational governments have emerged as important players in agrifood systems transformation.

Other factors which have increased the role of subnational governments on the global stage have been the steady increase in political and cultural power of cities of different sizes, the rapid urbanization processes, and the relatively recent wave of decentralization from national to local governments in an increasing number of countries. In the aftermath of these developments, urban food policy pioneers in municipalities around the world got engaged in the agrifood systems agenda to develop food strategies and implement specific local measures.[228]

Due to the multisectoral nature of the challenges and opportunities that urbanization creates across the rural–urban continuum (**Chapter 3**), subnational governments should also be important actors for formulating and implementing coherent policies that go beyond agrifood systems (e.g. environmental, energy,

BOX 13 URBAN FOOD SYSTEMS COALITION: A GLOBAL PLATFORM TO RAISE AWARENESS ON THE KEY ROLE OF SUBNATIONAL GOVERNMENTS IN AGRIFOOD SYSTEMS TRANSFORMATION ACROSS THE RURAL–URBAN CONTINUUM

The United Nations Food Systems Summit, organized in 2021, recognized the importance of subnational governments as key levers for inclusive and sustainable agrifood systems transformation. During the Summit, the Urban Food Systems Coalition was established; it is currently facilitated by the Food and Agriculture Organization of the United Nations and the Global Alliance for Improved Nutrition, and includes UN Agencies, city networks, civil society organizations and academic institutions as active members operating across the rural–urban continuum in multiple countries. The coalition[229] aims to support national and subnational governments to transform their agrifood systems by facilitating coherent, coordinated policies and actions. It supports subnational governments to engage in global policy debates and establish themselves as key players in the overall agrifood systems transformation. Moreover, the coalition works across the rural–urban continuum to identify context-specific mechanisms for bridging national and local agrifood systems governance gaps.

health and other systems). They are in close contact with local stakeholders and can ensure that these policies are adapted to local conditions by promoting advantages and addressing bottlenecks. The launch of the Milan Urban Food Policy Pact in 2015 was a global marker of subnational governments' increasing role in formulating and implementing policies at urban and regional levels, promoting agrifood systems linkages across the rural–urban continuum and integrating different systems approaches in local, regional and territorial development plans. The New Urban Agenda, endorsed by the United Nations General Assembly in 2016, has been a turning point in terms of recognizing the role of subnational governments in agrifood systems transformation, as it called for integration of food security and nutrition in urban and territorial planning. This recognition has also been carried over into global processes such as the United Nations Food Systems Summit, with the establishment of the Urban Food Systems Coalition in 2021 (see Box 13).

Subnational agrifood systems governance mechanisms

An important starting point towards streamlining governance based on functional dimensions across the rural–urban continuum is the development of locally based agreements between multiple administrative zones and multistakeholder platforms and networks.

Multistakeholder agrifood systems governance mechanisms, involving multiple non-state actors, farmer organizations, civil society organizations, the private sector and academic institutions, are increasingly emerging as crucial instruments to address gaps in local policies and planning related to food. Among such mechanisms, **food policy councils** (sometimes also referred to as committees, food groups, platforms, etc.) serve as advisory bodies to local or subnational governments, support policy design and implementation, promote stakeholder engagement, and facilitate monitoring and evaluation of progress in policy implementation, effectiveness, efficiency and impact (see Box 14).

There is currently very limited evaluation of the collective impact of food policy councils on changing policy or shifting conventional food governance paradigms.[230] Some food policy councils are formed through bottom-up, citizen-led processes, which makes them cautious about the degree to which they associate with or are dependent on local government, as formalized links with government may compromise the original vision and direction of the platform and restrict the ability to propose

BOX 14 SUBNATIONAL AGRIFOOD SYSTEMS GOVERNANCE AGREEMENTS AMONG METROPOLITAN, INTERMEDIARY AND SMALL CITIES IN PERU

In November 2019, the Peruvian municipalities of Lima, Huancayo, Arequipa, Piura and Maynas signed an agreement with the objective of strengthening agrifood systems linkages across the rural–urban continuum. The agreement covers: i) linkages between producers, markets and fairs in different cities; ii) knowledge exchange on practices related to agroecology and its promotion in rural and peri-urban areas; iii) modernization of food retail market spaces; and iv) context-specific strategies to improve access to healthy diets. It also includes peer-to-peer learning practices, which allow for sharing experiences in areas such as development of new urban food environment ordinances, public purchase of family farming products, and establishment of the food policy council in Lima.

One experience shared with municipalities involves an ordinance in Lima designed to create healthy food environments in both schools and out-of-home areas.[231] The ordinance prohibits the sale or marketing of energy-dense foods high in fats, sugars and/or salt within 200 metres of schools. It also sets minimum health requirements for food and drinks provided to students on school premises, and requires schools to ensure access to fresh drinking water. Furthermore, as part of the Lima Come Sano (Lima Eats Healthy) programme, the ordinance requires local restaurants to adopt new practices to reduce salt and sugar intakes. To promote healthy eating, restaurants are encouraged to prominently display the caloric content of menu items, and to only provide salt shakers and condiments when customers ask for them.

In addition, in October 2020, Lima established the Food System Council of Metropolitan Lima (CONSIAL), which aims to plan, organize, develop and implement sustainable and resilient food policies that guarantee the human right to food and generate a positive impact in reducing rates of poverty and malnutrition. Since its establishment, the council has enacted several local ordinances to promote healthier urban food environments, urban agriculture, the use of public spaces for agroecology farmers' markets, and the recovery of unsold food in wholesale markets. The council includes multiple actors such as representatives from urban and peri-urban agriculture platforms, rural producer organizations, civil society promoters of healthy eating, research centres and universities, the private sector, and non-governmental organizations active beyond the administrative boundaries of the Lima metropolitan area. Likewise, the council is currently developing an agrifood systems strategy across the rural–urban continuum, aligned with the national and international agendas related to agrifood systems, climate change and sustainability.

The city of Hancayo has also established the Comité de Sistemas Alimentarios (Food Systems Council) which is linked to the CONSIAL in Lima, creating the basis for strengthening agrifood systems governance across the rural–urban continuum.

changes to government structures and policy. Others are formed directly within or even by the municipality itself and therefore have strong ties with local government. The strength of food policy councils with closer ties to government is that they can be in a better position to make policy recommendations and receive more support. Being located within a government department can also increase the chances of receiving dedicated resources and ensure continuity.

Food policy councils have existed for 30 years, the earliest in Northern America, but they still require scaling up and strengthened capacity in order to reach their full potential. For example, in Africa, the informal sector is expanding, and street food vending remains key for food purchases. Informal food vendors provide poorer households with better opportunities to achieve food security, as they are spatially accessible and can offer assistance through credit;[232] however, they are barely considered in governance mechanisms, not even in food policy councils, which in most cases are still in an emerging state (Box 15). Support to organize these informal food actors in groups (e.g. cooperatives) can be crucial for their

BOX 15 INCLUSIVE AGRIFOOD SYSTEMS GOVERNANCE MECHANISM IN KISUMU COUNTY, KENYA, LINKING URBAN AND RURAL AREAS

In Kisumu County, Kenya, a food liaison advisory group (FLAG) was established in 2020 under the leadership of the county and with representatives from academia, civil society organizations, the private sector, and farmer organizations operating across the rural–urban continuum. The FLAG provides a space to enable dialogue among different actors and identify priority actions intended to promote local food production and processing as well as employment opportunities and business incubators for women and youth. This group is currently in the process of finalizing the development of an agrifood systems strategy encompassing both rural and urban areas of the county. The strategy identifies priority areas of intervention to foster rural–urban linkages, such as improvement of market infrastructure to improve the spatial and functional connection between Kisumu and other counties and as a way to reconnect rural producers with urban consumers. The strategy is also in the process of considering inclusivity among its priorities, particularly in relation to recognizing and formalizing women street food vendors and improving their businesses.

integration in the decision-making process.[233] However, if formalized, it is important that new forms of democratic governance do not become yet another bureaucratic mechanism. On the contrary, they must remain a place where problems are addressed through participatory multistakeholder processes in a holistic way, and measures are adopted in a way that includes the interests of multiple stakeholders including the most vulnerable.[232]

Once an agrifood systems governance mechanism has been established, a major common challenge in local institutions is to ensure its continuity. Monitoring and evaluation – but also adaptation as necessary – are required for continuous learning of local institutions and to report progress to a wider audience, which could potentially bring new stakeholders on board and provide access to additional funding and technical resources.[234]

Experience shows that agrifood governance mechanisms such as food policy councils perform better if they are institutionalized within subnational governments. Institutionalization refers to the formalization of structures, rules and practices that enable agrifood initiatives to endure. It involves creating the policy and governance infrastructure that will allow a municipality and key stakeholders to design new agrifood initiatives and adapt existing policies and strategies in consideration of new circumstances;[235] to do so requires the mobilization of human and financial resources. Finding an institutional "home" to host agrifood systems-related multistakeholder platforms, usually in the format of an agrifood systems "unit" within a municipality, is key to the sustainability of these initiatives.[236]

A dedicated budget is also crucial for sustaining continuity. In most cases, multistakeholder platforms have limited power to influence budget allocation for agrifood systems initiatives. Municipalities themselves have therefore a critical role to play in integrating the initiative of an informal food governance platform into the municipality's regulatory framework and budget via ordinances, annual budgetary and programme planning, or other types of formal decisions. Due to the diversity of organizational structures and priorities, there is no single model for successfully securing funding. And ultimately, there is no guarantee that agrifood systems governance will continue in perpetuity. However, institutionalizing governance processes can make it harder for future administrations to erode or dismantle them.[237]

Integrated local agrifood systems policies and planning

The design and implementation of local agrifood systems policies, investments and legislation for addressing multiple agrifood systems challenges and opportunities require working outside the municipal departmental "silos" and bridging the gaps between departments and policy areas in order to achieve systemic changes. Until now however, most urban food policies have targeted specific sectors such as food production, food distribution, waste management, public health or the environment.[238] In the process of integrating food into urban planning and policy, holistic **food strategies** (connecting different and relevant sectoral domains, municipal departments and disciplines) are just emerging, setting the overall framework and agenda within which targeted policies and actions can be implemented.[239] Furthermore, local institutions can align agrifood systems goals with their broader development goals through different **planning instruments** such as ordinances, by-laws, declarations, resolutions and codes.

Local agrifood systems policies, planning and strategies are quite often introduced through dynamic leadership of "champions" in municipalities of cities of all sizes, in some cases working in collaboration with other government levels and with non-state actors such as non-governmental organizations, civil society organizations and academic institutions.[240, 241, 242] The history of local agrifood systems strategies[bb] over the past decades has demonstrated how it is possible to create an effective enabling environment for mainstreaming agrifood systems within the local agenda[243] and improve the linkage between rural and urban areas. Specifically, the development of local agrifood systems policies, ordinances and regulations has led to scaling up of ad hoc initiatives and projects, contributing to the overall agrifood systems transformation at the national level with clear multistakeholder engagement (Box 16).

Gathering evidence is the first crucial step to support the development of local agrifood systems policies and planning. This process can include a wide range of instruments and tools: assessment studies, indicators, open databases, information sharing platforms, etc. Multiple tools have already been developed that can inform policymakers about agrifood systems bottlenecks – i.e. points in the systems that produce constraints in economic, social, health or environmental terms – in order to prioritize interventions, measure progress and, just as important, draw lessons on how to effectively integrate agrifood systems into urban and territorial planning. Developing comprehensive agrifood systems profiles without losing the systemic view remains a challenge for urban policymakers.

The Rapid Urban Food Systems Appraisal Tool is one example of a tool supporting evidence-based policymaking at local levels.[bc] It assists policymakers and other agrifood systems stakeholders in developing policies and strategies that improve food security and nutrition of urban dwellers and promote sustainable development of agrifood systems (see Box 17).

Agrifood systems analysis is usually complemented with evidence gathered through multistakeholder engagement. While the availability of disaggregated data for the local level may be limited, engagement with local agrifood systems stakeholders can generate deeper insights for identifying bottlenecks and prioritizing action. However, it should be noted that partnerships with stakeholders with interests that run counter to improving human and ecosystem health can result in damage and mistrust. New models for private–public sector funding will be required to avoid conflicts of interest and ensure impartiality, accountability and transparency.[244] It is always important to safeguard against conflicts of interest in policy development and decision-making – particularly when multiple stakeholders are involved – and tools are available to help countries prevent and manage such conflicts of interest.[245, 246]

bb Food strategies can initially be developed as a strategic declaration or a food charter (including strategic lines and communicative in nature). They can then be further developed as an action plan (including operative content and defined interventions) and can be politically endorsed with a budget allocated for their implementation.[242]

bc Agrifood systems analysis across the rural–urban continuum is also included in other tools such as the City Region Food System Toolkit, an online repository of global resources.

BOX 16 LOCAL AGRIFOOD SYSTEMS STRATEGIES LINKING LARGE METROPOLITAN AREAS WITH RURAL HINTERLAND IN ANTANANARIVO, NAIROBI AND QUITO

In **Madagascar,** the Municipality of Antananarivo (Analamanga region), collaborating with the Ministry of Agriculture and other stakeholders, created a stakeholder advisory group through which the Agrifood Systems Resilience Strategy 2023–2028 for the city of Antananarivo and its surrounding region was developed and validated. The strategy promotes multisectoral, multilevel and multistakeholder collaboration, recommending coherent and integrated implementation of policies and programmes such as: i) the Integrated Water Resource Management programme led by the Ministry of Water, Sanitation and Hygiene; ii) the national Agriculture, Livestock and Fisheries Investments Programme led by the Ministry of Agriculture and Livestock; and iii) the Analamanga Regional Land-Use Plan 2023–2043. The implementation of these policies and programmes in Antananarivo and its surrounding region has the potential to empower local communities while strengthening resilience to shocks, improving food distribution, creating employment opportunities and supporting food small and medium enterprises.

In **Kenya,** the Nairobi Food Systems Strategy was endorsed by Nairobi City County and integrated in the Nairobi City County Development Plan. Currently in the process of implementation, this food strategy aims to ensure affordable, accessible, nutritious and safe food for all, using a multisectoral approach and working across all levels of government. An Intergovernmental Relations Committee on Nairobi City Food Systems was established including representatives from Nairobi City County Government and representatives from various ministries (responsible for food, agriculture, health, environment, land, water, social protection, etc.). A multistakeholder food governance mechanism (food liaison advisory group), which includes non-state actors, was also established and aims to advise decision-makers at all levels on the implementation of the food strategy. Agrifood systems actions across the continuum will be ensured through the strong engagement of the intercounty coordination platform at the national level.

In **Ecuador,** the Municipality of the Metropolitan District of Quito endorsed the Quito Agri-food Strategy in 2019, allowing agrifood systems to be progressively integrated in city planning tools such as the Quito Resilience Strategy, Vision 2040, the Climate Action Plan and the Metropolitan Development and Land Management Plan (which recognizes food security as the strategic axis of the city's socioeconomic development). The strategy was developed in collaboration with multiple actors engaged in the agrifood systems governance platform. The platform includes local, provincial and national government representatives; social movements; international cooperation actors; United Nations Agencies; academia; and the private sector (mainly agribusinesses aiming to work in both urban and rural areas).

The priority areas identified at the local level to develop holistic food strategies and planning usually include urban and peri-urban agriculture; short supply chains; inclusive food markets; healthier food outlets and street food; public food procurement; sectoral planning and programming such as school feeding programmes; inspection of food outlets; planning and zoning rules on food outlets and/or marketing; and food waste prevention, reduction and management.[238, 240, 241] **Urban and peri-urban agriculture** initiatives have been one of the catalysing entry points to put food on the local political agenda. Urban and peri-urban agriculture has a close relationship with urban food governance, as it often goes beyond agroecological production and sustainable consumption to incorporate other aspects such as social cohesion, economic development and environmental issues. Another common entry point is **school feeding** whose potential for improving children's nutrition, dietary habits and educational attainment is inspiring many municipalities, even smaller ones, to action. School feeding programmes are also valued for their multiplier effects. They can

BOX 17 THE RAPID URBAN FOOD SYSTEMS APPRAISAL TOOL: ONE POSSIBLE TOOL TO ANALYSE AGRIFOOD SYSTEMS ACROSS THE RURAL–URBAN CONTINUUM

The Rapid Urban Food Systems Appraisal Tool (RUFSAT) aims to assist policymakers and other agrifood systems stakeholders to develop and prioritize evidence-based policies and strategies that address bottlenecks constraining the economic, social and environmental performance of agrifood systems. This is achieved through four interlinked components: i) stakeholder mapping; ii) value chain analysis; iii) mapping of the institutional and policy environment; and iv) a consumer survey that includes a mapping of the food retail environment.

These components are underpinned by geospatial information systems that bring all the information related to the agrifood systems and food consumption patterns within the urban setting onto a common base map. Maps and information in RUFSAT comprise the use of satellite imagery, mobile apps for field surveys, information available in the public domain, and data collected from local authorities. From these sources, RUFSAT identifies challenges and opportunities for planning and transformation of urban agrifood systems. It relies on feedback and technical advice from a food liaison advisory group – a working group of policymakers and subject matter experts created through a consultative process at the city level designed to provide input on the assessment findings as well as guidance on prioritization of challenges and opportunities at the city level.

RUFSAT assessments provide useful data and information for the development of local agrifood systems strategies, ordinances and regulations at the local level, and have been used in some of the case studies included in this chapter: the CONSIAL experience in Lima (Box 14), the Kisumu County initiative (Box 15) and the Nairobi Food Systems Strategy (Box 16).

BOX 18 STRENGTHENING MULTILEVEL INSTITUTIONAL AGREEMENTS THROUGH PUBLIC FOOD PROCUREMENT IN MANABÍ PROVINCE, ECUADOR

In the framework of the Ecuadorian Food Guidelines, the Provincial Government of Manabí together with the municipalities of Portoviejo, Chone and Santa Ana, and in coordination with the Ecuadorian Ministry of Education, established a food procurement scheme to distribute fruits to children as part of their school meal. This initiative aimed at providing access to healthy diets for Manabí students, while promoting income opportunities for farmers. The first deliveries to schools in Portoviejo, the provincial capital, started in October 2021 with local fresh fruits from family farmers located in the rural municipalities of Chone and Santa Ana. The provincial government financed the purchase and carried out the procurement through the public portal, EP Manabí Produce. Thanks to the initiative, nearly 43 000 children from 95 schools in Portoviejo received, on a daily basis, a kit comprising nine fresh fruit items (mandarins and oranges). This initiative has been crucial for fostering multilevel agrifood systems governance and interinstitutional coordination across national, provincial and municipal levels.

be designed to support local agriculture, strengthen and diversify local agrifood systems, and improve economic and social development through public procurement mechanisms focused on local smallholder farmers and sustainable production (Box 18). The same principles can be extended to food procurement and service policies for other locally run institutions or services.[247]

Food waste and circular economy initiatives are another common entry point for initiating food planning and policy processes. Food waste can be converted to compost or used to produce biogas, thereby avoiding harmful methane emissions while also creating employment opportunities; fish offal and waste can also be used to produce fish silage which serves as fishmeal in animal feed. However, this requires municipal organic waste to be properly managed not only at the household level, but also in food retailing outlets. Local institutions play a critical role in creating an enabling environment to reduce food waste and adopt waste management practices. For example, in Bangladesh, municipal food waste in Khulna city is being used to meet the high demand for organic compost fertilizer in the agroforestry sector; but the process has required support from local institutions to produce compost at a suitable level. In relation to food waste management, priority is also given to prevention, recovery and redistribution for human consumption – a process requiring a high level of engagement of local governments.[248] Furthermore, in Kigali, Rwanda, a thematic multistakeholder taskforce on food waste management has been created as part of the broader agrifood systems stakeholder advisory group addressing issues related to prevention, recovery, redistribution and the circular economy. The Kigali Municipality has assumed leadership of the platform to strengthen the spatial and functional agrifood systems linkages across the rural–urban continuum in Rwanda.

The degree of decentralization in different contexts and the level of technical capacity can limit the effectiveness of such local policies and strategies. For example, despite major decentralization efforts in recent decades, local African governments still have low administrative and fiscal capacity; consequently, in some cases strategic plans are not implemented due to lack of funding. Linking food policies and strategies to the fiscal decision-making process is therefore indispensable.[249]

Due to the multisectoral and multilevel nature of agrifood systems, funding to implement the key activities of a food strategy and/or action plan can come from a variety of sources: municipal, provincial, national, and even non-state actors such as non-governmental organizations and international partners. Mobilization of internal and external resources for effective public and private financing is crucial, both in terms of supporting the actions of authorities at all levels and creating incentives to attract private capital towards financially viable investment opportunities.[236, 238, 240]

Policy coherence at national and subnational levels remains a key challenge in establishing the appropriate enabling environment. National and regional governments usually have the mandate and resources to invest in infrastructure development for well-connected rural and urban areas, and have access to policy instruments dealing with the role of the private sector in agrifood systems transformation.[250] As mentioned earlier in this **Chapter 5**, investments in general services support in SICTs could scale up private investments and take advantage of the closer spatial and functional links that urbanization is creating across the rural–urban continuum. Therefore, these policies and investments will require strong multilevel governance across national and regional agrifood systems policies in order to promote the necessary structural transformation of agrifood systems. In order to address a specific issue systemically and encourage agrifood systems transformation, coordinated actions across horizontal and vertical dimensions of governance are needed. *Horizontal governance* refers to the coordination and/or integration among sectoral institutions (e.g. related to trade, agriculture, health and planning) and/or with non-governmental actors such as research institutions, civil society organizations, representatives of the private sector, and financial institutions.

BOX 19 THE MULTISTAKEHOLDER PARTICIPATORY PROCESS FOR ESTABLISHING MULTILEVEL INSTITUTIONAL AGREEMENTS FOR FOOD SECURITY AND NUTRITION IN WESTERN CAPE PROVINCE, SOUTH AFRICA

In 2016, the Western Cape Provincial Government of South Africa published a food security and nutrition strategy, Nourish to Flourish, which offers insights into integrated, transversal and multilevel agrifood systems governance. The strategy is co-led by the Department of the Provincial Premier and the Provincial Department of Agriculture. Informed by the mandates of these provincial co-leads, the scope of the strategy spans the rural–urban continuum including rural areas, small towns and large cities, as well as agrifood systems that flow into the provincial system. The development and implementation of the strategy was founded on a wide-ranging, innovative consultation and curation process, which brought together multiple actors including often unheard voices to improve agrifood systems. The strategy engages multiple government units, many of whom are assumed to hold no food or nutrition mandate (e.g. departments of spatial planning, education, economic development and environment), while supporting existing programmes within the food security realm. Avoiding traditional policy formulation processes, the strategy retains an open-ended governance approach, where the lead government officials continually innovate and adapt in response to evolving lessons learned and implementation feedback. Currently, as the post-2023 South Africa National Food and Nutrition Security Plan is being drafted, the Ministry of the President is exploring how the national government can support this strategy of the Western Cape Provincial Government, and also how such strategies can be applied in other regions and what kind of mechanisms can be created to bridge the national–local governance gap.

For example, as agrifood systems usually fall under the mandate of multiple agencies, to improve national coordination among them, countries are creating interministerial committees or similar mechanisms to manage decentralization processes and implement agroterritorial initiatives. On the other hand, *vertical or multilevel governance* concerns the distribution of power, policymaking capacity and responsibility across supranational, national, regional and local government levels.[243, 251] Multilevel governance means operating and coordinating between and across the two axes and creating cohesion across the rural–urban continuum, empowering all levels of government to take shared ownership[252, 253] (see Box 19).

Conducive policy frameworks for multilevel governance are still not common, although they do exist in a handful of countries. A regional perspective of agrifood systems governance can become an opportunity for initiating the process of establishing multilevel agrifood systems governance mechanisms, such as in the case of the Catalonia Region, Spain (Box 20). Moreover, processes of multilevel agrifood systems governance addressing specific entry points have been initiated in some countries. For example, Denmark has started the process of multilevel agrifood systems governance using public procurement as an entry point (Box 21). The establishment of national networks that engage various levels of government appears to be an important starting point to initiate such multilevel governance mechanisms.

Kenya has started the process of promoting multilevel agrifood systems governance using urban and peri-urban agriculture as an entry point. Since 2011, the Urban Areas and Cities Act in Kenya has required counties to regulate urban and peri-urban agriculture. However, although a small number of counties in Kenya have developed (or are in the process of developing) holistic food strategies, the shift from sectoral to systemic for the establishment of multilevel governance is still at the early stage with only initial discussions between national and local governments underway.

BOX 20 THE STRATEGIC FOOD PLAN FOR CATALONIA 2021–2026 AND THE CATALAN FOOD COUNCIL

The Strategic Food Plan for Catalonia 2021–2026 (Pla Estratègic de l'Alimentació de Catalunya – PEAC) has been promoted by the Ministry of Climate Action, Food and Rural Agenda of the Government of Catalonia. The PEAC is an interministerial and intersectoral tool that defines the vision, objectives and priority initiatives and establishes the bases of the Catalan National Agreement which will serve to guide future public agrifood systems policies. The PEAC is the result of a participatory process lasting more than a year and involving actors of the Catalan agrifood systems, including primary producers, the food industry, food distributors, restaurants and catering, research institutions and universities, and local and national agencies operating in the food-related sector.

The Catalan Food Council (Consell Català de l'Alimentació), attached to the Department of Agriculture, Livestock, Fisheries and Food, is the driving force of the PEAC and acts as a forum for analysis, debate and proposal on issues related to Catalonian agrifood policies. It also acts as an agrifood systems observatory for policy recommendations, and is made up of a broad representation of associations and entities related to agrifood systems in Catalonia.

BOX 21 MULTILEVEL PUBLIC FOOD PROCUREMENT NETWORK IN DENMARK: NATIONAL, REGIONAL AND LOCAL GOVERNMENTS WORKING TOGETHER TO INITIATE THE PROCESS OF ESTABLISHING MULTILEVEL AGRIFOOD SYSTEMS GOVERNANCE

Public food procurement is an important mechanism for strengthening agrifood systems linkages across the rural–urban continuum, thus catalysing noticeable changes in primary production, dietary patterns and food education. In 2018, during the preparation of green public procurement guidelines for food tenders in Denmark, the National Food Procurement Network (Nationale Udbudsjuridiske Fødevarenetværk) – a multilevel food procurement network for public sector officials – was formally established by the Danish Ministry of Environment, together with the chief procurement lawyer of the City of Copenhagen, to connect the different levels of government and strengthen the effectiveness of public food procurement. This formal collaboration engages the ministry, mayors and 44 national, regional and local officials, and is an important step towards the establishment of multilevel agrifood systems governance. The network has been created because of the need for closer and systemic collaboration between the state and the city level of government regarding the implementation of state-level rules and regulations. Without this collaboration, the decisions made at the state level may prove unfeasible at the local level. Building on the Danish procurement network, another public food procurement network has been established at the European and global levels to share experience and initiate the process of strengthening multilevel governance at all levels.

In Indonesia, after the United Nations Food Systems Summit, the national government committed to promoting the agrifood systems approach at all levels. Currently, the national, provincial and district/city levels are each required to develop a food security and nutrition action plan every five years. In Viet Nam on the other hand, cities have the mandate to develop the national agrifood systems action plan. The above frameworks undoubtedly stimulate policy development across the rural–urban continuum. However, there is a risk that the various localities feel obliged to address national priorities rather than respond to different local priorities.[254] Nonetheless, effective institutional mechanisms across government levels, in which the voice of subnational governments inform the national policy agenda, can create bridges across geographies and enhance accountability. ■

BANGLADESH
Harvesting tomatoes in a small urban garden in Dhaka.
©FAO/Saikat Mojumder

CHAPTER 6
CONCLUSION

This 2023 edition of *The State of Food Security and Nutrition in the World* has provided an update on global progress towards the targets of ending both hunger (SDG Target 2.1) and all forms of malnutrition (SDG Target 2.2). Hunger at the global level did not worsen between 2021 and 2022, but there are many places in the world where hunger is on the rise – where people are still struggling to recover income losses in the wake of the COVID-19 pandemic, or have been hit by rising prices of food, agricultural inputs and energy, or whose lives and livelihoods have been disrupted by conflicts or extreme weather events. Progress on important indicators of child nutrition is to be celebrated, and some regions are on track to achieve some of the nutrition targets by 2030. However, rising overweight among children under five years of age in many countries portends growing burdens of non-communicable diseases.

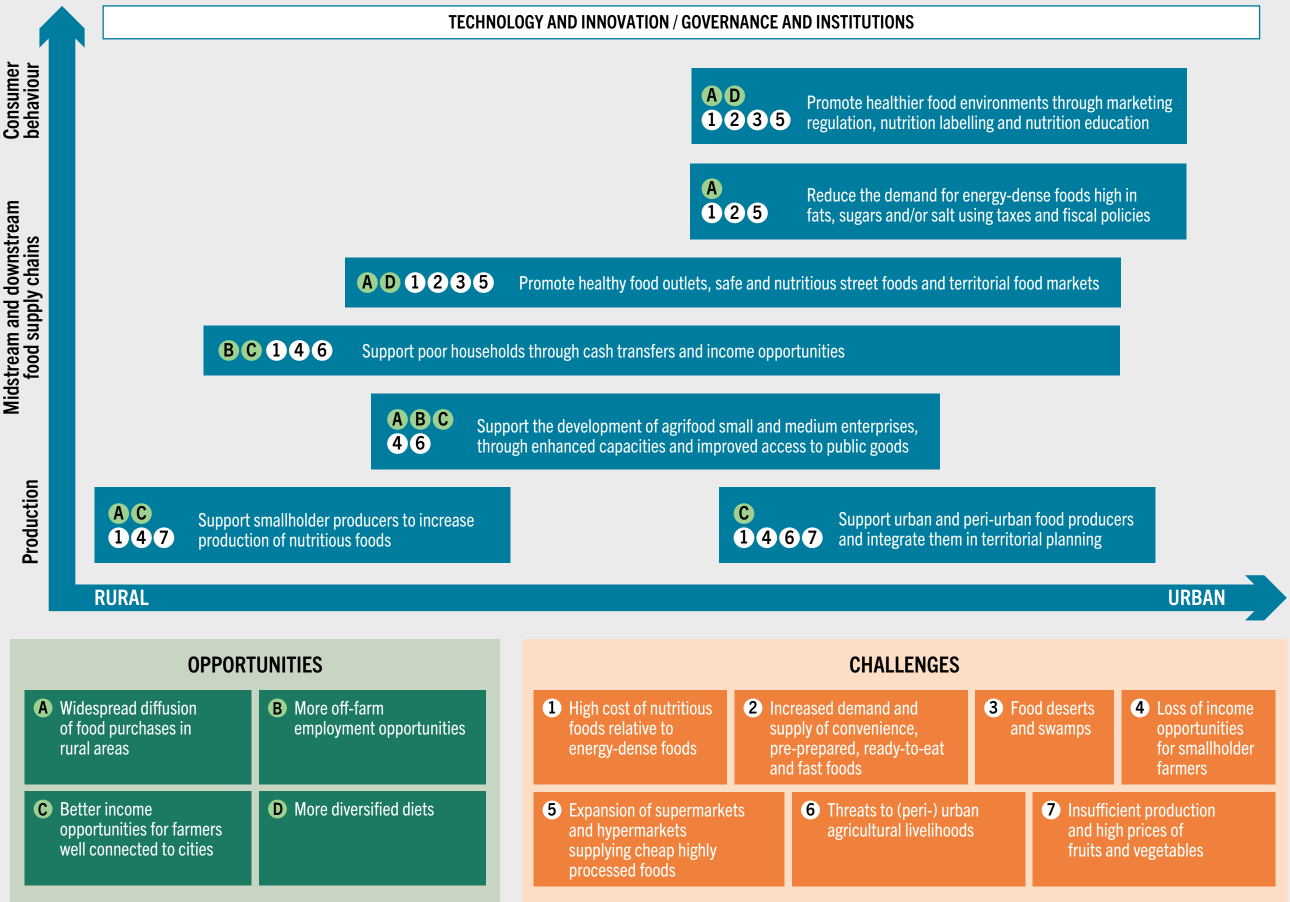
The 2030 Agenda for Sustainable Development is a vision of a healthier, more just and equal world – a world without poverty, hunger and malnutrition. While these goals may seem out of reach, the lack of an increase in hunger may signal the beginning of a turnaround, and any improvement in the nutrition of children bodes well for the future. Achieving food security and nutrition goals is not only good for those suffering from food insecurity and malnutrition, it is good for everyone. A healthier, more just and equal world is better for all.

Since its 2017 edition, this report has offered an in-depth thematic analysis of the underlying causes and drivers of observed food insecurity and malnutrition trends and how food security and nutrition SDG 2 targets are related to other SDG targets. The report has repeatedly highlighted that the intensification and interaction of conflict, climate extremes and economic slowdowns and downturns, combined with highly unaffordable nutritious foods and growing inequality, are pushing us off track to meet the SDG 2 targets. While policy recommendations have been offered to build resilience against these adversities, this year the report underscores the importance of also considering other important megatrends.

Urbanization has featured as the theme of this year's report. With almost seven in ten people projected to live in cities by 2050, this megatrend is shaping agrifood systems and, as a consequence, their capacity to deliver affordable healthy diets for all and to help eradicate hunger, food insecurity and malnutrition. Urbanization also has relevance for SDG 11 (Sustainable Cities and Communities), SDG 1 (No Poverty), SDG 2 (Good Health and Well-Being), SDG 10 (Reduced Inequalities) and SDG 12 (Responsible Consumption and Production). Therefore, the findings and policy recommendations from analysing urbanization in this report can inform efforts of the 2030 Agenda for Sustainable Development, as well as other ongoing efforts, including those in the framework of the United Nations General Assembly-endorsed New Urban Agenda and the coalitions of action established after the United Nations Food Systems Summit.

A key conclusion is that the ways in which urbanization is shaping agrifood systems can only be understood with a rural–urban continuum lens; the simple concept of a rural–urban divide is no longer useful to understand the growing links across urban, peri-urban and rural areas. This growing connectivity across the rural–urban

FIGURE 37 CHALLENGES AND OPPORTUNITIES FOR AGRIFOOD SYSTEMS ARISING FROM URBANIZATION, MAPPED ONTO POLICIES ACROSS THE RURAL–URBAN CONTINUUM



NOTES: The blue boxes indicate policies to leverage agrifood systems transformation for healthy diets across the rural–urban continuum, discussed in **Chapter 5**. The green and orange boxes indicate opportunities and challenges to access affordable healthy diets identified in **Chapter 3**. Policy adequacy for leveraging and addressing specific opportunities and challenges is indicated with letters and numbers, respectively.
SOURCE: Authors' (FAO) own elaboration.

continuum is a key aspect today to understand the functioning of value chains. Only then can the challenges and the opportunities that urbanization creates for agrifood systems be clearly mapped onto appropriate policy, technology and investment solutions, as shown in Figure 37. Implementing these solutions requires that agrifood systems governance mechanisms and institutions cross sectoral and administrative boundaries and rely on subnational and local governments. Local governments in particular are fundamental actors in leveraging multilevel and multistakeholder mechanisms that, as shown with concrete examples in this report, have proved effective in implementing essential policies and solutions for making healthy diets available and affordable for all.

New empirical evidence presented in this report for 11 Western, Eastern and Southern African countries also challenges traditional thinking and reveals important food consumption patterns, including dietary convergence across the rural–urban continuum. For example, it calls into question the traditional notion that Africa's rural farmers largely produce their own food. The affordability of a healthy diet is actually found to be a critical issue for rural households in these countries because they are more – not to say the most – reliant on food purchases. The new evidence also runs counter to conventional thinking that purchase patterns between urban and rural areas differ markedly, at least for some food groups.

In these countries, the diffusion of processed foods, including highly processed foods, associated with urban areas is now seen in rural areas as well. Unfortunately, low-income households living in peri-urban and rural areas in these countries would need to more than double what they spend on food to secure a healthy diet. Moreover, food insecurity is no longer a predominantly rural problem, as levels of both severe and moderate or severe food insecurity across urban areas (large, intermediate and small cities and towns) and peri-urban areas (less than 1 hour travel to large, intermediate and small cities) were found to be similar to or even higher than those in rural areas in some of the countries analysed. The prevalence of stunting, wasting and overweight in children under five years of age can also show important variations across the rural–urban continuum.

Unfortunately, we have learned through this report that such valuable granular analysis of food consumption patterns, affordability of healthy diets, and food insecurity and malnutrition across the rural–urban continuum cannot currently be replicated for more countries and regions of the world, and that renewed efforts in food security and nutrition data collection and analysis are needed. The analysis has relied on the newly available URCA global dataset, which provides a georeferenced mapping of the spatial and functional connectivity across urban, peri-urban and rural areas, using latitudinal and longitudinal data of households from the most recent household surveys. This combination has made it possible to work with different categories of catchment areas defined across the rural–urban continuum for the said 11 African countries. Unfortunately, georeferenced nationally representative household survey data are currently only available for a handful of datasets which have latitude and longitude information that is publicly available, and all of them are for Africa. It is then in the best interest of governments of other countries and regions that such data become available for public use, or, if the data are lacking, that governments invest in data development to bridge this important gap. Only then will decision-makers of those countries and regions be able to rely on an analysis, similar to that presented in this report, to inform their policies and investments in ways that leverage urbanization to accelerate agrifood systems transformation in the quest to secure affordable healthy diets, food security and adequate nutrition for all across the rural–urban continuum. ■

MEXICO
A woman makes tortillas in her home in the village of San Lorenzo.
©Alex Webb/Magnum Photos for FAO

ANNEXES

ANNEX 1A
STATISTICAL TABLES TO CHAPTER 2

TABLE A1.1 PROGRESS TOWARDS THE SUSTAINABLE DEVELOPMENT GOALS AND GLOBAL NUTRITION TARGETS: PREVALENCE OF UNDERNOURISHMENT, MODERATE OR SEVERE FOOD INSECURITY, SELECTED FORMS OF MALNUTRITION, EXCLUSIVE BREASTFEEDING AND LOW BIRTHWEIGHT

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2020–22[4] (%)	2014–16 (%)	2020–22 (%)	2014–16 (%)	2020–22 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2016 (%)	2012 (%)	2019 (%)	2012[6] (%)	2021[7] (%)	2012 (%)	2020 (%)
WORLD	12.0	9.2	7.8	11.3	21.9	29.5	6.8	26.3	22.3	5.5	5.6	11.8	13.1	28.5	29.9	37.0	47.7	15.0	14.7
Least developed countries	25.3	21.7	19.8	24.2	50.4	59.3	7.0	38.7	32.3	3.1	3.2	4.9	6.0	39.1	39.4	45.5	53.5	16.1	15.3
Landlocked developing countries	24.6	19.3	16.4	23.0	44.8	56.2	4.1	35.8	28.3	4.2	3.7	8.3	9.4	32.0	32.9	45.3	53.3	15.2	14.7
Small Island Developing States	17.5	15.3	21.5	20.4	45.5	46.8	4.1	21.3	21.1	6.8	8.0	18.8	20.9	28.2	29.2	37.0	42.9	14.0	14.4
Low-income countries	26.9	27.9	22.5	28.0	55.6	65.7	6.6	39.6	33.5	3.8	3.4	6.0	6.9	38.3	38.5	43.0	53.3	15.3	14.8
Lower-middle-income countries	18.2	13.5	10.9	16.2	27.6	39.6	9.7	35.5	28.1	4.3	4.5	7.0	8.2	41.7	42.1	39.9	51.8	20.0	18.5
Upper-middle-income countries	6.9	<2.5	3.0	4.6	12.7	16.2	1.7	10.1	8.3	8.0	8.8	11.5	13.2	17.6	18.1	28.8	35.8	7.6	8.1
High-income countries	<2.5	<2.5	1.5	1.6	8.3	7.6	0.4	4.0	4.0	7.4	7.6	22.3	24.3	13.1	14.4	n.a.	n.a.	8.0	8.1
Low-income food-deficit countries	27.0	24.9	20.6	26.1	51.8	62.7	n.a.	36.8	30.5	4.0	3.7	7.1	8.2	37.8	37.7	41.0	51.8	14.6	14.0

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2020–22[4] (%)	2014–16 (%)	2020–22 (%)	2014–16 (%)	2020–22 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2016 (%)	2012 (%)	2019 (%)	2012[6] (%)	2021[7] (%)	2012 (%)	2020 (%)
AFRICA	**19.5**	**19.3**	**17.8**	**23.4**	**46.6**	**58.9**	**5.8**	**34.4**	**30.0**	**5.0**	**4.9**	**11.5**	**12.8**	**39.2**	**38.9**	**35.4**	**44.3**	**14.5**	**13.9**
Northern Africa	**6.1**	**6.8**	**9.8**	**10.9**	**28.6**	**32.2**	**6.3**	**23.5**	**21.7**	**11.8**	**12.3**	**23.0**	**25.2**	**31.9**	**31.1**	**40.8**	**n.a.**	**14.0**	**14.1**
Algeria	6.7	<2.5	13.0	5.6	22.9	19.4	2.7	12.1	8.6	13.5	11.9	24.7	27.4	32.9	33.3	25.4	28.6	6.9	7.2
Egypt	6.4	7.2	8.4	8.8	27.8	28.5	n.a.	24.6	20.4	15.7	18.8	29.3	32.0	31.0	28.3	52.8	n.a.	n.a.	n.a.
Libya	4.7	8.4	11.2	21.2	29.1	39.8	n.a.	30.0	52.2	26.4	28.7	30.0	32.5	28.6	29.9	n.a.	n.a.	n.a.	n.a.
Morocco	5.5	6.3	n.r.	n.r.	n.r.	n.r.	2.3[h]	15.8	12.8	9.5	4.9	23.4	26.1	29.8	29.9	27.8	35.0	16.1	14.8
Sudan	–	11.9	13.4[b]	18.1[c]	41.4[b]	51.8[c]	n.a.	36.0	36.0	2.4	2.7	n.a.	n.a.	36.8	36.5	41.0	n.a.	n.a.	n.a.
Tunisia	4.3	3.0	9.1	12.6	18.2	28.5	2.1	8.8	8.6	12.7	19.0	24.6	26.9	30.4	32.1	8.5	13.5	8.1	8.2
Northern Africa (excluding Sudan)	**6.1**	**5.7**	**9.1**	**9.3**	**26.1**	**28.0**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**26.8**	**29.5**	**n.a.**	**n.a.**	**40.7**	**n.a.**	**n.a.**	**n.a.**
Sub-Saharan Africa	**22.9**	**22.1**	**19.6**	**26.2**	**50.8**	**64.9**	**5.7**	**36.2**	**31.3**	**3.8**	**3.7**	**8.0**	**9.2**	**41.2**	**40.7**	**34.4**	**45.1**	**14.5**	**13.9**
Eastern Africa	**32.7**	**28.4**	**23.2**	**28.1**	**59.0**	**67.5**	**5.0**	**38.6**	**30.6**	**3.9**	**3.6**	**5.3**	**6.4**	**31.4**	**31.9**	**48.6**	**59.1**	**14.7**	**14.0**
Burundi	n.a.	n.a.	n.r.	n.r.	n.r.	n.r.	4.9[h]	56.5	56.5	2.2	3.6	4.4	5.4	31.1	38.5	69.3	71.9	15.1	14.8
Comoros	16.8	13.5	n.a.	27.4	n.a.	79.7	n.a.	31.9	18.8	11.5	7.7	6.7	7.8	32.8	33.8	11.4	n.a.	24.1	23.0
Djibouti	30.2	16.8	n.a.	16.5	n.a.	49.2	10.6[h]	29.6	18.7	1.3	3.2	12.3	13.5	31.0	32.3	12.4	n.a.	n.a.	n.a.
Eritrea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	51.6	50.2	1.9	3.0	4.1	5.0	36.2	37.0	68.7	n.a.	15.4	15.2
Ethiopia	37.1	21.9	14.5	21.1	56.2	58.1	6.8	42.1	34.4	2.5	2.7	3.6	4.5	22.4	23.9	52.0	58.8	n.a.	n.a.
Kenya	28.4	27.8	15.0[b, c]	28.0[c]	50.7[b, c]	72.3[c]	4.9	28.6	18.4	4.6	3.8	5.9	7.1	28.4	28.7	31.9	n.a.	10.8	10.0
Madagascar	33.7	51.0	n.a.	12.2	n.a.	64.9	7.2	47.3	38.6	1.8	1.5	4.3	5.3	37.5	37.8	41.9	54.4	19.5	18.7
Malawi	21.9	17.8	47.7[b, c]	52.2[b, c]	78.1[b, c]	82.4[b, c]	2.6	43.6	34.0	4.9	3.9	4.8	5.8	30.6	31.4	70.8	64.1	15.8	15.6
Mauritius	5.1	6.8	5.2	10.5	13.0	32.0	n.a.	9.0[f]	8.6[f]	7.8[f]	6.8[f]	9.6	10.8	19.2	23.5	n.a.	n.a.	19.1	18.7
Mozambique	33.8	30.5	n.a.	39.6	n.a.	75.4	3.9	42.6	36.4	5.5	5.5	6.1	7.2	48.8	47.9	40.0	n.a.	18.1	17.8

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2020–22[4] (%)	2014–16 (%)	2020–22 (%)	2014–16 (%)	2020–22 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2016 (%)	2012 (%)	2019 (%)	2012[6] (%)	2021[7] (%)	2012 (%)	2020 (%)
Rwanda	34.3	31.6	n.r.	n.r.	n.r.	n.r.	1.1	41.2	29.8	6.3	4.7	4.7	5.8	18.3	17.2	83.8	80.9	9.3	9.4
Seychelles	2.6	4.3	3.2[b]	3.3[c]	14.3[b]	14.7[c]	n.a.	7.9	7.2	9.9	9.1	12.4	14.0	23.5	25.1	n.a.	n.a.	12.3	12.5
Somalia	70.4	48.7	n.a.	43.4	n.a.	79.5	n.a.	27.6	18.0	3.0	2.7	7.0	8.3	44.0	43.1	5.3	33.7	n.a.	n.a.
South Sudan	–	21.4	n.a.	63.2[b]	n.a.	87.3[b]	n.a.	30.8	27.9	6.3	4.7	n.a.	n.a.	34.7	35.6	44.5	n.a.	n.a.	n.a.
Uganda	16.9	31.6	21.5[c]	24.9[c]	66.3[c]	74.2[c]	3.6	33.3	23.4	3.9	3.5	4.3	5.3	31.3	32.8	62.2	65.5	n.a.	n.a.
United Republic of Tanzania	28.1	23.5	20.6[c]	26.3[c]	48.9[c]	58.7[c]	3.3	38.1	30.6	4.5	4.6	6.9	8.4	40.3	38.9	48.7	57.8	10.5	9.7
Zambia	51.4	29.8	22.4[c]	32.1[c]	51.2[c]	73.1[c]	4.2	40.8	31.4	6.0	5.4	6.8	8.1	30.5	31.5	59.9	69.9	12.0	11.2
Zimbabwe	30.0	38.4	35.5	28.6	64.7	73.6	2.9	31.1	21.6	4.6	2.7	14.3	15.5	30.0	28.9	31.3	41.9	12.2	11.8
Middle Africa	**31.9**	**28.4**	**n.a.**	**37.7**	**n.a.**	**74.7**	**5.6**	**37.9**	**37.4**	**4.5**	**4.6**	**6.7**	**7.9**	**46.1**	**43.2**	**28.4**	**44.4**	**12.8**	**12.2**
Angola	52.6	21.6	21.0	31.2[b, c]	66.5	78.5[b, c]	n.a.	31.8	43.6	3.0	3.9	6.8	8.2	45.9	44.5	n.a.	37.4	15.7	15.5
Cameroon	15.8	6.4	22.3	26.7	49.9	58.5	4.3	32.1	26.9	7.1	10.5	9.8	11.4	41.2	40.6	19.9	39.4	12.9	12.5
Central African Republic	38.9	48.7	n.a.	61.8	n.a.	81.3	5.4	40.6	39.8	3.5	2.6	6.4	7.5	47.9	46.8	33.0	36.2	15.9	16.4
Chad	38.1	31.4	n.r.	n.r.	n.r.	n.r.	8.3[h]	38.9	32.3	2.5	3.2	5.1	6.1	49.2	45.4	3.2	16.2	n.a.	n.a.
Congo	34.5	33.3	42.6	58.8	82.0	88.2	n.a.	23.1	16.5	5.1	4.5	8.3	9.6	53.1	48.8	20.2	n.a.	11.6	11.9
Democratic Republic of the Congo	28.4	35.3	n.a.	40.7	n.a.	76.6	6.4	42.7	40.3	4.6	3.7	5.6	6.7	46.4	42.4	36.4	53.6	11.0	10.2
Equatorial Guinea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	25.0	16.1	8.5	8.2	6.8	8.0	47.4	44.5	7.4	n.a.	n.a.	n.a.
Gabon	14.4	23.0	n.r.	n.r.	n.r.	n.r.	3.4	17.2	13.4	6.2	5.4	13.5	15.0	55.3	52.4	5.1	n.a.	14.9	14.6
Sao Tome and Principe	10.3	13.1	n.a.	14.1	n.a.	54.6	4.1	18.8	10.0	2.5	4.7	10.7	12.4	45.7	44.2	50.3	63.1	10.6	11.1

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2020–22[4] (%)	2014–16 (%)	2020–22 (%)	2014–16 (%)	2020–22 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2016 (%)	2012 (%)	2019 (%)	2012[6] (%)	2021[7] (%)	2012 (%)	2020 (%)
Southern Africa	**5.2**	**10.2**	**9.0**	**11.5**	**21.7**	**25.1**	**3.5**	**23.4**	**22.8**	**12.3**	**11.4**	**25.0**	**27.1**	**28.5**	**30.3**	**n.a.**	**32.8**	**16.4**	**16.4**
Botswana	22.9	22.9	18.4[c]	26.7[b, c]	46.5[c]	56.3[b, c]	n.a.	24.6	21.6	10.4	10.1	17.5	18.9	31.3	32.5	20.3	30.0	17.3	16.8
Eswatini	9.6	11.6	n.a.	18.3	n.a.	67.0	n.a.	28.0	21.2	10.1	7.9	14.9	16.5	30.0	30.7	43.8	n.a.	10.6	10.2
Lesotho	13.9	46.0	n.a.	32.9[c]	n.a.	56.7[c]	2.1	37.5	31.8	7.0	6.9	14.9	16.6	28.3	27.9	52.9	59.0	14.8	14.4
Namibia	20.3	17.1	28.8[c]	33.0[c]	53.2[c]	57.7[c]	n.a.	24.0	16.8	4.2	5.3	15.1	17.2	24.7	25.2	22.1	n.a.	15.9	15.6
South Africa	3.4	7.9	n.a.	9.0[c]	n.a.	20.3[c]	3.8[h]	22.5	22.8	13.1	12.1	26.1	28.3	28.6	30.5	n.a.	31.6	16.6	16.6
Western Africa	**12.1**	**14.3**	**11.6**	**21.2**	**40.1**	**64.1**	**6.7**	**34.5**	**30.0**	**2.3**	**2.4**	**7.4**	**8.9**	**52.9**	**51.8**	**22.1**	**35.1**	**14.9**	**14.3**
Benin	12.0	9.9	10.4[c]	15.3[c]	55.0[c]	73.6[c]	5.0	33.9	30.4	1.6	2.2	8.2	9.6	55.5	55.2	32.5	41.4	17.5	16.4
Burkina Faso	17.8	16.2	10.0[b, c]	21.2	41.8[b, c]	56.9	10.6	33.3	21.8	1.8	2.0	4.5	5.6	53.3	52.5	38.2	57.9	19.1	18.5
Cabo Verde	11.2	18.2	n.a.	6.3[b]	n.a.	37.0[b]	n.a.	12.6[f]	9.4[f]	n.a.	n.a.	10.3	11.8	26.9	24.3	59.6	41.8	n.a.	n.a.
Côte d'Ivoire	16.9	7.7	6.2[c]	9.7[c]	34.1[c]	44.2[c]	8.4	29.6	20.2	2.6	2.6	8.7	10.3	52.2	50.9	11.8	34.0	19.1	18.3
Gambia	21.5	19.6	n.a.	27.0	n.a.	60.7	5.1	22.3	13.6	1.9	1.8	8.7	10.3	56.4	49.5	33.2	53.6	13.7	13.2
Ghana	11.1	4.9	5.1[b, c]	6.2[c]	38.3[b, c]	39.4[c]	6.8	22.0	12.7	2.3	1.9	9.4	10.9	44.2	35.4	45.7	42.9	14.9	14.4
Guinea	14.9	12.9	44.3	49.5	72.5	73.1	9.2	33.7	27.9	4.4	5.6	6.4	7.7	50.9	48.0	20.4	33.4	n.a.	n.a.
Guinea-Bissau	16.4	37.9	n.a.	32.0[c]	n.a.	77.8[c]	5.1	29.3	27.7	2.8	3.3	7.9	9.5	49.9	48.1	38.3	59.3	21.8	19.5
Liberia	33.5	38.4	38.6	37.5	79.7	81.2	3.4	35.0	26.6	3.3	5.3	8.6	9.9	43.6	42.6	27.8	55.2	19.7	19.9
Mali	13.6	12.8	n.r.	n.r.	n.r.	n.r.	10.6	30.7	23.8	1.6	2.0	7.2	8.6	58.2	59.0	20.2	47.7	n.a.	n.a.
Mauritania	9.1	8.7	4.6[c]	9.5[b, c]	26.3[c]	53.7[b, c]	13.6[h]	26.0	22.1	1.9	2.0	11.0	12.7	45.1	43.3	26.7	40.9	n.a.	n.a.
Niger	19.1	16.1	n.a.	30.5[c]	n.a.	71.4[c]	10.9	46.6	47.4	1.1	2.7	4.5	5.5	49.1	49.5	23.3	25.6	n.a.	n.a.
Nigeria	7.0	15.9	11.0[b, c]	21.3[b, c]	34.7[b, c]	69.7[b, c]	6.5	37.7	34.2	2.5	2.2	7.4	8.9	54.9	55.1	14.7	28.7	n.a.	n.a.
Senegal	18.1	5.7	7.5[c]	11.1[c]	39.0[c]	49.8[c]	8.1	18.5	17.0	1.5	3.4	7.6	8.8	55.9	52.7	39.0	40.8	19.1	17.2
Sierra Leone	46.5	27.8	26.7[b, c]	31.9	75.8[b, c]	89.2	6.3	34.9	26.0	3.3	5.2	7.4	8.7	47.9	48.4	31.2	50.9	11.4	10.3
Togo	28.3	17.4	16.1[c]	19.4[c]	60.4[c]	62.9[c]	5.7	27.3	22.3	1.6	2.2	7.1	8.4	47.4	45.7	62.1	64.3	15.1	14.3

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2020–22[4] (%)	2014–16 (%)	2020–22 (%)	2014–16 (%)	2020–22 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2016 (%)	2012 (%)	2019 (%)	2012[6] (%)	2021[7] (%)	2012 (%)	2020 (%)
Sub-Saharan Africa (including Sudan)	**22.0**	**21.7**	**19.4**	**25.9**	**50.5**	**64.4**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**7.7**	**8.9**	**n.a.**	**n.a.**	**34.6**	**45.1**	**n.a.**	**n.a.**
ASIA*	**13.6**	**8.6**	**6.7**	**9.9**	**17.7**	**24.8**	**9.3**	**28.2**	**22.3**	**4.8**	**5.1**	**6.1**	**7.3**	**31.1**	**32.7**	**39.0**	**51.5**	**17.2**	**17.2**
Central Asia	**14.0**	**3.2**	**1.7**	**4.8**	**9.2**	**18.4**	**2.1**	**14.7**	**7.7**	**8.2**	**5.0**	**15.6**	**17.7**	**28.8**	**28.1**	**29.2**	**44.9**	**6.3**	**6.0**
Kazakhstan	7.2	<2.5	n.a.	0.5[b]	n.a.	2.4[b]	n.a.	11.0	4.9	12.1	7.7	19.0	21.0	27.3	28.7	31.8	37.8	5.7	5.3
Kyrgyzstan	8.0	4.8	n.a.	1.1[c]	n.a.	6.9[c]	2.0	16.0	10.3	7.9	6.4	14.4	16.6	34.1	35.8	56.0	45.6	6.4	6.0
Tajikistan	37.6	9.3	n.r.	n.r.	n.r.	n.r.	5.6	25.7	13.1	5.4	3.0	12.2	14.2	31.0	35.2	32.6	35.8	9.3	8.7
Turkmenistan	4.2	5.7	n.a.	n.a.	n.a.	n.a.	4.1	12.5	6.7	5.4	3.6	16.3	18.6	25.3	26.6	10.9	56.5	4.9	4.3
Uzbekistan	14.8	<2.5	1.9	6.8	11.2	26.1	2.4	13.2	6.9	7.7	4.2	14.4	16.6	28.7	24.8	23.8	49.5	5.8	5.8
Eastern Asia*	**6.9**	**<2.5**	**1.0**	**1.3**	**6.0**	**6.7**	**1.5**	**7.7**	**4.9**	**6.6**	**8.3**	**4.9**	**6.0**	**15.5**	**16.1**	**28.4**	**35.3**	**5.5**	**5.5**
China	7.0	<2.5	n.r.	n.r.	n.r.	n.r.	1.9	7.6	4.6	7.0	8.9	5.0	6.2	14.8	15.5	27.6	34.1	5.1	5.0
China, mainland	7.1	<2.5	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Taiwan Province of China	4.3	3.0	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	27.0	28.4	n.a.	n.a.	n.a.	n.a.
China, Hong Kong SAR	<2.5	<2.5	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
China, Macao SAR	15.9	8.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Democratic People's Republic of Korea	34.3	45.5	n.a.	n.a.	n.a.	n.a.	2.5	25.7	16.8	1.6	2.8	5.9	6.8	31.7	33.9	68.9	71.4	n.a.	n.a.
Japan	<2.5	3.2	<0.5	0.9	2.6	4.4	n.a.	6.5	5.0	1.7	2.1	3.6	4.3	19.7	19.0	n.a.	n.a.	11.1	11.3
Mongolia	28.8	8.0	<0.5	<0.5[b, c]	6.8	5.7[b, c]	0.9	12.2	6.1	9.8	10.7	17.9	20.6	14.3	14.5	65.7	58.0	5.7	4.9
Republic of Korea	<2.5	<2.5	<0.5[b]	0.8	4.8[b]	5.6	0.2[h]	1.9	1.7	6.8	5.4	4.1	4.7	13.7	13.5	n.a.	n.a.	6.3	7.5

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2020–22[4] (%)	2014–16 (%)	2020–22 (%)	2014–16 (%)	2020–22 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2016 (%)	2012 (%)	2019 (%)	2012[6] (%)	2021[7] (%)	2012 (%)	2020 (%)
Eastern Asia (excluding China and Japan)	**9.2**	**11.8**	**<0.5**	**0.9**	**3.7**	**4.9**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**
South-eastern Asia	**17.1**	**5.2**	**2.0**	**2.4**	**14.7**	**16.4**	**7.8**	**30.4**	**26.4**	**6.4**	**7.4**	**5.4**	**6.7**	**25.0**	**27.2**	**33.4**	**48.3**	**12.8**	**12.5**
Brunei Darussalam	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	17.0	10.9	8.6	9.1	12.1	14.1	14.8	16.7	n.a.	n.a.	13.2	13.6
Cambodia	17.8	4.8	16.9	14.8	48.9	51.1	9.6	33.8	22.3	2.2	3.8	3.1	3.9	46.1	47.1	72.8	51.2	12.7	11.4
Indonesia	19.3	5.9	0.7[b]	<0.5[b]	6.0[b]	4.9[b]	10.2	34.6	31.0	9.2	10.6	5.5	6.9	27.0	31.2	40.9	50.7	10.5	9.9
Lao People's Democratic Republic	22.7	4.7	n.a.	7.2	n.a.	34.1	9.0	40.4	27.7	2.2	4.0	4.1	5.3	36.3	39.5	39.7	44.4	17.2	16.7
Malaysia	3.1	2.7	7.8	6.0	17.4	16.0	9.7	17.6	21.9	6.2	5.7	13.1	15.6	30.1	32.0	n.a.	40.3	13.0	13.8
Myanmar	29.0	3.8	n.a.	5.0	n.a.	29.3	7.4[h]	31.1	24.1	1.8	0.8	4.6	5.8	39.4	42.1	23.6	51.2	12.7	12.5
Philippines	14.6	5.2	n.a.	5.7[b, c]	n.a.	44.7[b, c]	n.a.	31.9	28.8	3.5	4.6	5.4	6.4	16.9	12.3	33.0	54.9	21.2	21.1
Singapore	n.a.	n.a.	1.0	1.7	2.8	6.6	n.a.	3.4	3.0	3.0	3.8	5.6	6.1	11.5	13.0	n.a.	n.a.	10.6	11.0
Thailand	11.9	5.2	0.7[c]	1.3[b, c]	4.7[c]	7.1[b, c]	7.7	14.0	11.8	9.1	8.6	7.9	10.0	22.1	24.0	12.3	14.0	10.5	10.3
Timor-Leste	33.1	22.3	n.a.	n.a.	n.a.	n.a.	8.3	52.5	45.1	2.4	1.3	2.9	3.8	26.8	29.9	50.8	65.0	16.8	18.2
Viet Nam	15.2	5.0	n.a.	1.2[c]	n.a.	9.0[c]	4.7	25.4	19.3	4.3	8.1	1.6	2.1	17.0	20.6	17.0	45.4	7.6	6.3
Southern Asia	**19.6**	**15.9**	**13.1**	**19.7**	**27.6**	**41.3**	**14.3**	**40.3**	**30.5**	**2.7**	**2.8**	**4.5**	**5.4**	**48.3**	**48.2**	**47.2**	**60.2**	**26.1**	**24.4**
Afghanistan	34.5	30.1	14.8	28.4	45.1	79.1	5.1	44.3	33.1	5.0	3.7	4.4	5.5	37.5	42.6	n.a.	57.5	n.a.	n.a.
Bangladesh	13.7	11.2	13.3	11.0	32.2	31.1	9.8	39.2	26.4	1.8	2.1	2.8	3.6	35.7	36.7	64.1	62.6	24.3	23.0
Bhutan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	30.2	22.7	6.9	6.5	5.2	6.4	39.8	38.6	48.7	53.2	11.7	11.4
India	21.4	16.6	n.r.	n.r.	n.r.	n.r.	18.7	41.6	31.7	2.2	2.8	3.1	3.9	53.2	53.0	46.4	63.7	29.5	27.4[g]
Iran (Islamic Republic of)	5.4	6.1	9.5	7.4	48.0	40.8	4.3	5.9	4.7	4.8	3.8	23.3	25.8	22.8	24.1	53.1	47.4	n.a.	n.a.

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1] 2004–06 (%)	2020–22[4] (%)	PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3] 2014–16 (%)	2020–22 (%)	PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3] 2014–16 (%)	2020–22 (%)	PREVALENCE OF WASTING IN CHILDREN (<5 YEARS) 2022[5] (%)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS) 2012 (%)	2022 (%)	PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS) 2012 (%)	2022 (%)	PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS) 2012 (%)	2016 (%)	PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS) 2012 (%)	2019 (%)	PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS) 2012[6] (%)	2021[7] (%)	PREVALENCE OF LOW BIRTHWEIGHT 2012 (%)	2020 (%)
Maldives	n.a.	n.a.	n.a.	2.2	n.a.	13.4	9.1	16.4	13.9	6.0	3.3	6.7	8.6	45.6	52.2	45.3	63.0	13.8	13.7
Nepal	17.0	5.4	10.4	13.2	29.5	37.4	7.7	40.3	26.7	1.2	1.7	3.3	4.1	35.9	35.7	69.6	62.1	20.9	19.7
Pakistan	17.1	18.5	0.9[c]	12.9[b, c, d]	14.1[c]	42.3[b, c, d]	7.1	43.8	34.0	4.6	2.7	7.1	8.6	42.7	41.3	37.0	47.8	n.a.	n.a.
Sri Lanka	13.9	5.3	0.7[c]	1.2[c]	5.9[c]	10.9[c]	15.1	16.7	15.9	1.2	1.3	4.1	5.2	33.5	34.6	75.8	80.9	18.5	18.0
Southern Asia (excluding India)	**15.0**	**14.1**	**7.3**	**12.2**	**27.1**	**39.9**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**8.2**	**9.5**	**n.a.**	**n.a.**	**49.0**	**53.8**	**n.a.**	**n.a.**
Western Asia	**7.8**	**10.5**	**8.9**	**10.1**	**29.4**	**36.5**	**3.5**	**19.1**	**14.0**	**9.1**	**7.2**	**27.2**	**29.8**	**31.7**	**32.5**	**31.9**	**31.7**	**12.2**	**12.2**
Armenia	12.3	<2.5	n.a.	<0.5[b]	n.a.	7.1[b]	4.4	13.9	7.2	15.0	11.5	18.3	20.2	17.6	17.3	34.1	44.5	8.3	8.3
Azerbaijan	4.7	<2.5	<0.5	<0.5	5.9	10.1	n.a.	17.4	13.3	12.2	10.1	17.7	19.9	34.7	35.1	10.8	n.a.	11.0	11.0
Bahrain	n.a.	n.a.	n.r.	n.r.	n.r.	n.r.	n.a.	6.8[f]	5.0[f]	n.a.	n.a.	27.6	29.8	36.3	35.4	n.a.	n.a.	11.6	12.4
Cyprus	7.7	<2.5	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	20.4	21.8	12.0	13.6	n.a.	n.a.	n.a.	n.a.
Georgia	3.9	2.9	7.0	9.7	31.8	36.5	0.6	8.8	4.8	13.9	5.0	19.3	21.7	26.9	27.5	54.8	20.4	6.9	7.4
Iraq	17.8	16.3	n.r.	n.r.	n.r.	n.r.	3.0	19.6	9.9	9.5	6.4	28.0	30.4	29.8	28.6	19.4	25.8	10.8	10.9
Israel	<2.5	<2.5	1.3[b]	3.1[c]	11.0[b]	13.2[c]	n.a.	n.a.	n.a.	n.a.	n.a.	24.8	26.1	11.5	12.9	n.a.	n.a.	9.4	9.0
Jordan	n.a.	n.a.	n.r.	n.r.	n.r.	n.r.	0.6	7.7	6.6	5.9	9.5	33.1	35.5	30.5	37.7	22.7	17.8	17.0	18.9
Kuwait	<2.5	<2.5	4.9	4.5	12.6	10.9	2.3	4.8	6.9	9.0	11.7	35.6	37.9	21.1	23.7	n.a.	n.a.	12.4	14.4
Lebanon	n.a.	n.a.	n.a.	12.6	n.a.	36.5	1.4	11.7	7.4	8.5	8.3	29.7	32.0	25.4	28.3	n.a.	n.a.	12.2	12.6
Oman	9.4	2.8	n.a.	n.a.	n.a.	n.a.	9.3	11.1	12.7	2.9	6.5	24.3	27.0	29.0	29.1	n.a.	23.2	13.3	13.2
Palestine	n.a.	n.a.	n.a.	4.0[b]	n.a.	28.1[b]	1.3	10.3	7.5	7.6	8.3	n.a.	n.a.	30.5	31.0	28.7	38.9	9.8	10.4
Qatar	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6.2[f]	4.4[f]	12.2[f]	11.7[f]	32.4	35.1	27.1	28.1	29.3	n.a.	9.9	10.0
Saudi Arabia	4.9	3.8	n.r.	n.r.	n.r.	n.r.	4.4[h]	11.8	12.4	9.3	10.1	32.8	35.4	25.8	27.5	n.a.	n.a.	n.a.	n.a.
Syrian Arab Republic	4.9	27.8	n.a.	n.a.	n.a.	n.a.	n.a.	26.4	25.4	16.6	11.7	25.1	27.8	31.7	32.8	42.6	28.5	n.a.	n.a.
Türkiye	<2.5	<2.5	n.r.	n.r.	n.r.	n.r.	1.7	9.1	5.5	10.2	8.1	29.5	32.1	n.a.	n.a.	41.6	40.7	14.0	12.9

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2020–22[4] (%)	2014–16 (%)	2020–22 (%)	2014–16 (%)	2020–22 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2016 (%)	2012 (%)	2019 (%)	2012[6] (%)	2021[7] (%)	2012 (%)	2020 (%)
United Arab Emirates	7.6	<2.5	n.a.	1.2[b, c]	n.a.	9.8[b, c]	n.a.	n.a.	n.a.	n.a.	n.a.	29.0	31.7	24.0	24.3	n.a.	n.a.	13.9	13.9
Yemen	27.3	34.5	12.3	12.8	45.7	67.2	n.a.	46.9	35.1	2.4	1.7	14.6	17.1	61.5	61.5	n.a.	n.a.	n.a.	n.a.
Central Asia and Southern Asia	**19.4**	**15.4**	**12.7**	**19.2**	**26.9**	**40.5**	**13.7**	**39.3**	**29.4**	**2.9**	**2.9**	**4.9**	**5.9**	**47.5**	**47.5**	**46.5**	**59.4**	**25.4**	**23.5**
Eastern Asia and South-eastern Asia*	**9.6**	**<2.5**	**1.3**	**1.7**	**8.5**	**9.5**	**4.2**	**16.0**	**13.9**	**6.5**	**8.0**	**5.0**	**6.2**	**18.2**	**19.5**	**30.3**	**41.5**	**8.1**	**8.7**
Western Asia and Northern Africa	**7.0**	**8.8**	**9.3**	**10.5**	**29.1**	**34.5**	**4.9**	**21.2**	**17.9**	**10.4**	**9.8**	**25.3**	**27.7**	**31.8**	**31.8**	**37.2**	**n.a.**	**13.1**	**13.1**
LATIN AMERICA AND THE CARIBBEAN	**9.3**	**6.7**	**7.9**	**13.0**	**27.6**	**39.0**	**1.4**	**12.7**	**11.5**	**7.4**	**8.6**	**22.2**	**24.2**	**18.2**	**17.2**	**34.3**	**42.6**	**9.5**	**9.6**
Caribbean	**18.4**	**15.4**	**n.a.**	**28.8**	**n.a.**	**61.8**	**2.9**	**13.0**	**11.3**	**6.5**	**6.6**	**22.0**	**24.7**	**28.7**	**29.2**	**29.4**	**31.4**	**11.4**	**11.7**
Antigua and Barbuda	n.a.	n.a.	n.a.	7.1	n.a.	33.0	n.a.	n.a.	n.a.	n.a.	n.a.	17.1	18.9	16.7	17.2	n.a.	n.a.	15.1	15.4
Bahamas	n.a.	n.a.	n.a.	3.4	n.a.	17.2	n.a.	n.a.	n.a.	n.a.	n.a.	29.5	31.6	13.3	14.5	n.a.	n.a.	15.3	15.4
Barbados	5.9	<2.5	n.a.	7.4	n.a.	31.1	n.a.	7.5	6.0	11.8	12.5	20.9	23.1	16.9	17.0	19.7	n.a.	n.a.	n.a.
Cuba	<2.5	<2.5	n.a.	n.a.	n.a.	n.a.	2.0	7.0	7.0	9.7	10.2	22.6	24.6	20.2	19.3	48.6	40.6	7.2	7.1
Dominica	5.2	6.7	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	25.6	27.9	20.1	20.8	n.a.	n.a.	n.a.	n.a.
Dominican Republic	19.4	6.3	24.3[b]	22.0[b, c]	54.2[b]	52.1[b, c]	2.2	7.9	5.6	7.5	7.6	24.5	27.6	28.0	26.4	8.0	15.8	12.1	13.4
Grenada	n.a.	n.a.	n.a.	6.6[b]	n.a.	21.1[b]	n.a.	n.a.	n.a.	n.a.	n.a.	19.1	21.3	18.9	19.2	n.a.	n.a.	n.a.	n.a.
Haiti	51.8	45.0	n.a.	42.9	n.a.	82.6	3.7	23.8	19.5	3.4	3.7	19.4	22.7	47.6	47.7	39.3	39.9	n.a.	n.a.
Jamaica	7.9	8.3	25.3	25.6	48.3	54.4	3.2	6.1	6.5	6.9	5.7	22.3	24.7	19.5	19.9	23.8	n.a.	14.3	13.7
Puerto Rico	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	18.4	18.8	n.a.	n.a.	n.a.	n.a.

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2020–22[4] (%)	2014–16 (%)	2020–22 (%)	2014–16 (%)	2020–22 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2016 (%)	2012 (%)	2019 (%)	2012[6] (%)	2021[7] (%)	2012 (%)	2020 (%)
Saint Kitts and Nevis	n.a.	n.a.	8.1	5.6	21.1	29.9	n.a.	n.a.	n.a.	n.a.	n.a.	20.4	22.9	16.0	15.4	n.a.	n.a.	n.a.	n.a.
Saint Lucia	n.a.	n.a.	4.5[b]	4.5	22.2[b]	22.2	n.a.	2.3	2.5	6.0	6.0	17.4	19.7	14.1	14.3	3.5	n.a.	15.9	16.3
Saint Vincent and the Grenadines	8.5	3.1	n.a.	10.3	n.a.	33.3	n.a.	n.a.	n.a.	n.a.	n.a.	21.2	23.7	17.3	17.0	n.a.	n.a.	n.a.	n.a.
Trinidad and Tobago	11.2	12.2	n.a.	10.2	n.a.	43.3	n.a.	8.6	8.8	10.5	13.9	16.3	18.6	17.8	17.7	21.5	n.a.	15.9	16.3
Central America	**8.0**	**5.0**	**6.5**	**8.0**	**29.3**	**34.3**	**1.0**	**18.2**	**16.9**	**6.6**	**6.7**	**25.1**	**27.3**	**15.2**	**14.6**	**21.7**	**37.7**	**10.9**	**10.9**
Belize	5.5	4.9	n.a.	5.9[b]	n.a.	45.5[b]	n.a.	17.5	12.0	8.7	5.9	22.0	24.1	21.2	20.5	14.7	33.2	11.3	11.6
Costa Rica	4.3	3.0	1.8[c]	2.9[b]	12.2[c]	16.2[b]	1.8	6.4	9.5	7.6	7.6	22.9	25.7	12.3	13.7	32.5	25.3	8.5	8.7
El Salvador	9.2	7.7	13.8	16.2	42.2	48.4	n.a.	15.5	10.0	6.2	6.8	22.2	24.6	9.9	10.6	31.4	n.a.	10.4	10.2
Guatemala	19.4	13.3	16.1	21.1	42.7	59.8	0.8	47.1	43.5	5.1	4.8	18.9	21.2	11.0	7.4	49.6	53.2	14.4	14.5
Honduras	22.6	18.7	14.2[c]	23.5[b]	41.6[c]	56.1[b]	1.9	22.0	17.5	5.0	4.7	19.0	21.4	16.6	18.0	30.7	30.2	12.5	13.1
Mexico	4.4	<2.5	3.6[b]	3.6[b]	25.6[b]	27.6[b]	1.7	13.3	12.6	6.8	6.9	26.8	28.9	15.9	15.3	14.4	35.9	10.2	10.2
Nicaragua	22.9	17.8	n.r.	n.r.	n.r.	n.r.	n.a.	17.3	14.9	7.3	8.7	21.5	23.7	13.3	15.7	31.7	n.a.	10.7	10.1
Panama	21.6	5.3	n.r.	n.r.	n.r.	n.r.	1.1	19.9	13.8	10.5	11.4	20.6	22.7	22.1	21.2	n.a.	n.a.	10.7	10.3
South America	**8.8**	**6.5**	**6.0**	**13.5**	**23.4**	**38.7**	**1.4**	**10.1**	**9.0**	**7.9**	**9.7**	**21.1**	**23.0**	**18.4**	**17.3**	**42.2**	**46.8**	**8.6**	**8.8**
Argentina	3.8	3.2	5.8	13.1	19.2	36.9	1.7	7.1	9.5	11.0	12.6	26.3	28.3	12.7	11.9	32.0	n.a.	7.2	7.4
Bolivia (Plurinational State of)	27.1	19.4	n.r.	n.r.	n.r.	n.r.	2.0	19.9	11.1	8.9	9.0	18.3	20.2	28.6	24.4	64.3	55.7	8.3	7.9
Brazil	6.5	4.7	1.9	9.9	18.3	32.8	3.1[h]	6.3	7.2	7.9	10.3	20.1	22.1	18.3	16.1	38.6	45.8	8.3	8.7
Chile	3.2	2.5	2.9[c]	4.1[b]	10.8[c]	18.1[b]	n.a.	1.9	1.6	9.8	8.8	26.1	28.0	7.9	8.7	n.a.	n.a.	6.1	6.8
Colombia	11.5	6.6	n.r.	n.r.	n.r.	n.r.	1.6	12.7	11.2	5.0	6.2	20.4	22.3	22.1	21.2	42.9	36.7	10.5	11.0

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2020–22[4] (%)	2014–16 (%)	2020–22 (%)	2014–16 (%)	2020–22 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2016 (%)	2012 (%)	2019 (%)	2012[6] (%)	2021[7] (%)	2012 (%)	2020 (%)
Ecuador	22.3	13.9	6.0[b, c]	13.0[c]	20.7[b, c]	37.3[c]	3.7	24.4	22.7	7.5	11.9	18.1	19.9	17.3	17.2	n.a.	n.a.	10.9	10.6
Guyana	7.1	<2.5	n.a.	n.a.	n.a.	n.a.	6.5	14.5	7.6	6.2	5.7	17.9	20.2	34.4	31.7	31.3	n.a.	17.0	17.2
Paraguay	9.3	4.2	1.2[c]	6.1[b, c]	8.3[c]	25.9[b, c]	1.0	9.4	3.4	10.4	14.6	18.2	20.3	22.2	23.0	24.4	29.6	10.0	10.0
Peru	18.7	7.0	n.r.	n.r.	n.r.	n.r.	0.4	18.6	10.1	8.1	9.4	18.1	19.7	20.6	20.6	67.4	63.9	8.3	7.5
Suriname	9.8	9.0	n.a.	7.2	n.a.	35.9	5.5	8.3	7.6	3.7	3.8	24.4	26.4	20.3	21.0	2.8	8.9	15.7	16.5
Uruguay	2.9	<2.5	1.7[c]	2.9[b, c]	13.3[c]	15.2[b, c]	1.4	9.1	6.1	9.3	11.5	26.0	27.9	13.2	15.0	n.a.	57.7	8.0	7.8
Venezuela (Bolivarian Republic of)	8.3	17.9	n.r.	n.r.	n.r.	n.r.	n.a.	12.1	10.5	6.2	6.9	24.0	25.6	20.9	24.2	n.a.	n.a.	9.0	9.3
OCEANIA	**6.8**	**6.6**	**2.8**	**3.5**	**11.1**	**12.7**	**n.a.**	**20.0**	**22.0**	**11.0**	**16.8**	**25.8**	**28.1**	**14.4**	**16.0**	**n.a.**	**n.a.**	**11.3**	**11.8**
Australia and New Zealand	**<2.5**	**<2.5**	**2.8**	**3.4**	**10.6**	**12.0**	**n.a.**	**3.4**	**3.4**	**12.4**	**19.3**	**27.0**	**29.3**	**7.6**	**8.8**	**n.a.**	**n.a.**	**6.4**	**6.4**
Australia	<2.5	<2.5	2.8	3.4	10.8	11.4	n.a.	3.2	3.4	13.7	21.8	26.7	29.0	7.4	8.5	n.a.	n.a.	6.4	6.6
New Zealand	<2.5	<2.5	2.8	3.3	10.0	15.1	n.a.	n.a.	n.a.	n.a.	n.a.	28.4	30.8	8.8	10.4	n.a.	n.a.	6.0	5.9
Oceania excluding Australia and New Zealand	**21.1**	**19.8**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**8.3[a]**	**40.9**	**44.0**	**9.3**	**13.9**	**21.3**	**23.6**	**32.9**	**33.9**	**56.6**	**59.5**	**17.4**	**17.9**
Melanesia	**23.4**	**21.1**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**43.3**	**46.4**	**9.6**	**14.4**	**20.1**	**22.3**	**33.3**	**34.2**	**56.8**	**59.8**	**17.6**	**18.0**
Fiji	3.5	6.6	n.a.	6.3	n.a.	24.2	4.6	8.5	7.1	6.3	7.4	27.7	30.2	31.5	32.0	n.a.	42.9	7.4	7.4
New Caledonia	10.1	4.8	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Papua New Guinea	28.0	23.4	n.a.	n.a.	n.a.	n.a.	n.a.	48.0	51.2	10.5	16.0	19.0	21.3	33.4	34.4	56.1	59.7	19.0	19.4
Solomon Islands	12.0	19.0	n.a.	n.a.	n.a.	n.a.	n.a.	31.8	29.8	3.5	5.5	19.9	22.5	38.4	37.7	73.7	76.2	13.2	13.2
Vanuatu	6.9	9.5	n.a.	2.4	n.a.	23.3	n.a.	27.0	31.4	4.8	5.1	22.6	25.2	24.1	28.5	39.5	n.a.	12.7	13.1

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2020–22[4] (%)	2014–16 (%)	2020–22 (%)	2014–16 (%)	2020–22 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2016 (%)	2012 (%)	2019 (%)	2012[6] (%)	2021[7] (%)	2012 (%)	2020 (%)
Micronesia	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**16.3**	**13.5**	**4.4**	**4.4**	**43.2**	**45.9**	**27.9**	**29.1**	**55.3**	**59.6**	**12.4**	**12.3**
Kiribati	6.1	12.1	n.a.	8.0	n.a.	41.0	3.5	16.2	14.2	2.1	2.0	43.5	46.0	31.8	32.6	66.4	63.6	9.3	9.0
Marshall Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.5	37.0	30.5	4.1	4.4	50.7	52.9	29.7	30.6	27.3	43.1	n.a.	n.a.
Micronesia (Federated States of)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	42.9	45.8	22.7	25.0	n.a.	n.a.	n.a.	n.a.
Nauru	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	21.0	14.8	4.0	4.5	59.6	61.0	29.5	29.6	67.2	n.a.	n.a.	n.a.
Palau	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	53.1	55.3	27.3	28.5	n.a.	n.a.	13.7	13.5
Polynesia	**3.5**	**4.9**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**7.3**	**6.5**	**8.2**	**8.2**	**44.9**	**47.6**	**25.6**	**27.4**	**51.1**	**48.1**	**16.3**	**16.8**
American Samoa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cook Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	53.8	55.9	25.8	27.1	n.a.	n.a.	10.1	10.3
French Polynesia	3.9	5.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Niue	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	46.8	50.0	25.9	27.3	n.a.	n.a.	n.a.	n.a.
Samoa	2.8	4.6	n.a.	3.4	n.a.	23.6	3.1	5.0	7.4	6.0	7.9	44.7	47.3	24.5	26.8	51.3	51.7	n.a.	n.a.
Tokelau (Associate Member)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tonga	n.a.	n.a.	n.a.	3.7[b]	n.a.	17.6[b]	1.1	7.2	1.8	15.0	10.9	45.4	48.2	27.2	28.5	52.2	39.6	n.a.	n.a.
Tuvalu	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.8	7.8	5.2	5.2	4.2	48.6	51.6	26.0	27.5	34.7	43.8	n.a.	n.a.
NORTHERN AMERICA AND EUROPE	**<2.5**	**<2.5**	**1.3**	**1.4**	**9.1**	**7.8**	**n.a.**	**4.2**	**3.8**	**9.0**	**7.6**	**25.0**	**26.9**	**13.1**	**14.6**	**n.a.**	**n.a.**	**7.4**	**7.4**
Northern America**	**<2.5**	**<2.5**	**1.0**	**0.7**	**9.9**	**7.8**	**0.2**	**2.6**	**3.6**	**8.6**	**8.2**	**32.9**	**35.5**	**9.9**	**11.7**	**25.5**	**25.8**	**8.0**	**8.1**
Bermuda	19.4	<2.5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Canada	<2.5	<2.5	n.a.	1.2[c]	n.a.	7.7[c]	n.a.	n.a.	n.a.	11.4	11.1	27.1	29.4	8.8	10.4	n.a.	n.a.	6.2	6.6

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2020–22[4] (%)	2014–16 (%)	2020–22 (%)	2014–16 (%)	2020–22 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2016 (%)	2012 (%)	2019 (%)	2012[6] (%)	2021[7] (%)	2012 (%)	2020 (%)
Greenland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
United States of America	<2.5	<2.5	1.1[b]	0.7[b]	10.5[b]	7.8[b]	0.1	2.5	3.6	8.4	7.9	33.6	36.2	10.0	11.8	25.5	25.8	8.2	8.3
Europe	**<2.5**	**<2.5**	**1.5**	**1.7**	**8.7**	**7.8**	**n.a.**	**5.1**	**4.0**	**9.2**	**7.3**	**21.4**	**22.9**	**14.5**	**16.0**	**n.a.**	**n.a.**	**7.1**	**7.0**
Eastern Europe	**<2.5**	**<2.5**	**1.5**	**1.7**	**11.2**	**10.5**	**n.a.**	**7.2**	**5.3**	**12.1**	**7.4**	**22.0**	**23.4**	**19.2**	**20.5**	**n.a.**	**n.a.**	**7.1**	**7.0**
Belarus	<2.5	<2.5	n.r.	n.r.	n.r.	n.r.	n.a.	3.9	3.6	8.0	5.3	23.0	24.5	19.1	20.6	19.0	21.7	5.0	5.1
Bulgaria	4.8	<2.5	1.9	3.5	14.9	15.8	n.a.	7.1	5.6	7.0	3.8	23.2	25.0	22.5	23.6	n.a.	n.a.	11.0	11.4
Czechia	<2.5	<2.5	0.7	2.3	5.8	8.5	n.a.	2.5	2.5	5.3	6.1	24.5	26.0	20.0	21.1	n.a.	n.a.	7.3	7.6
Hungary	<2.5	<2.5	1.4	3.0	11.3	12.6	n.a.	n.a.	n.a.	n.a.	n.a.	24.5	26.4	19.6	19.7	n.a.	n.a.	8.4	8.3
Poland	<2.5	<2.5	1.8	1.0	8.9	7.5	n.a.	2.1	2.3	5.6	6.0	21.5	23.1	n.a.	n.a.	n.a.	n.a.	5.8	5.6
Republic of Moldova	33.4	<2.5	1.6	4.8	19.3	23.5	n.a.	6.8	3.9	5.4	2.9	17.5	18.9	26.0	26.1	36.4	n.a.	6.5	6.5
Romania	<2.5	<2.5	5.6	5.7	19.3	16.3	n.a.	9.3	7.7	7.9	4.5	20.7	22.5	22.1	22.7	n.a.	n.a.	9.5	8.8
Russian Federation	<2.5	<2.5	0.7	<0.5[b]	8.2	5.0[b]	n.a.	n.a.	n.a.	12.2	7.4	21.9	23.1	20.0	21.1	n.a.	n.a.	7.3	7.3
Slovakia	5.5	2.8	1.1	1.8	6.2	8.3	n.a.	n.a.	n.a.	n.a.	n.a.	19.1	20.5	22.3	23.5	n.a.	n.a.	7.5	7.8
Ukraine	<2.5	4.8	2.0	4.3	19.8	28.2	n.a.	18.2	12.3	23.6	13.6	22.7	24.1	14.4	17.7	19.7	n.a.	6.0	5.7
Northern Europe	**<2.5**	**<2.5**	**1.8**	**1.7**	**6.7**	**5.1**	**n.a.**	**3.7**	**3.0**	**8.7**	**9.7**	**23.7**	**25.8**	**10.6**	**12.0**	**n.a.**	**n.a.**	**6.3**	**6.0**
Denmark	<2.5	<2.5	1.0	1.8	5.9	6.8	n.a.	n.a.	n.a.	n.a.	n.a.	18.1	19.7	11.5	12.2	n.a.	n.a.	5.1	4.8
Estonia	<2.5	<2.5	0.9	0.7	9.5	8.5	n.a.	1.3	1.2	4.8	5.1	20.1	21.2	20.7	21.7	n.a.	n.a.	4.5	4.2
Finland	<2.5	<2.5	2.4	2.6	9.3	10.5	n.a.	n.a.	n.a.	n.a.	n.a.	20.7	22.2	9.7	10.9	n.a.	n.a.	4.1	4.1
Iceland	<2.5	<2.5	1.7	1.6	6.4	6.1	n.a.	n.a.	n.a.	n.a.	n.a.	20.3	21.9	9.4	10.3	n.a.	n.a.	3.8	4.0
Ireland	<2.5	<2.5	3.4	2.4	8.9	5.4	n.a.	n.a.	n.a.	n.a.	n.a.	22.8	25.3	10.9	12.1	n.a.	n.a.	5.5	5.6
Latvia	<2.5	<2.5	0.6	1.0	9.9	9.4	1.6[h]	2.4	1.8	10.3	6.4	22.4	23.6	20.9	21.6	n.a.	n.a.	4.5	4.2

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1]		PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1, 2, 3]		PREVALENCE OF WASTING IN CHILDREN (<5 YEARS)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS)		PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS)		PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS)		PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS)		PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS)		PREVALENCE OF LOW BIRTHWEIGHT	
	2004–06 (%)	2020–22[4] (%)	2014–16 (%)	2020–22 (%)	2014–16 (%)	2020–22 (%)	2022[5] (%)	2012 (%)	2022 (%)	2012 (%)	2022 (%)	2012 (%)	2016 (%)	2012 (%)	2019 (%)	2012[6] (%)	2021[7] (%)	2012 (%)	2020 (%)
Lithuania	<2.5	<2.5	2.5	2.1	15.3	8.5	4.8[h]	5.4	4.5	8.0	4.7	25.0	26.3	18.8	19.9	n.a.	n.a.	4.7	4.4
Norway	<2.5	<2.5	1.1	1.2	4.8	5.2	n.a.	n.a.	n.a.	n.a.	n.a.	21.3	23.1	10.7	12.0	n.a.	n.a.	4.7	4.4
Sweden	<2.5	<2.5	0.8	1.4	4.5	5.4	n.a.	n.a.	n.a.	n.a.	n.a.	19.0	20.6	11.7	13.6	n.a.	n.a.	4.2	4.1
United Kingdom of Great Britain and Northern Ireland	<2.5	<2.5	1.9	1.6	6.3	4.1	0.3[h]	n.a.	n.a.	9.7	11.3	25.4	27.8	9.4	11.1	n.a.	n.a.	7.1	6.8
Southern Europe	**<2.5**	**<2.5**	**1.7**	**2.3**	**9.9**	**8.5**	**n.a.**	**4.6**	**3.9**	**8.7**	**8.3**	**20.4**	**21.8**	**13.5**	**15.1**	**n.a.**	**n.a.**	**8.0**	**8.2**
Albania	8.9	4.1	10.0	7.5	38.8	30.2	1.6	16.4	8.3	22.4	13.4	19.3	21.7	21.6	24.8	37.1	36.5	6.0	6.0
Andorra	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	24.8	25.6	10.6	12.1	n.a.	n.a.	9.1	9.4
Bosnia and Herzegovina	<2.5	<2.5	1.5	3.1	9.6	13.4	n.a.	9.2	8.0	18.7	9.4	16.3	17.9	23.8	24.4	18.2	n.a.	5.2	5.2
Croatia	<2.5	<2.5	0.6	1.9	6.5	9.7	n.a.	n.a.	n.a.	n.a.	n.a.	22.5	24.4	20.4	21.0	n.a.	n.a.	5.0	5.0
Greece	<2.5	<2.5	2.6	1.5[b, e]	15.8	6.3[b, e]	n.a.	2.0	2.2	15.8	14.6	23.2	24.9	12.8	15.1	n.a.	n.a.	10.9	11.4
Italy	<2.5	<2.5	1.2	1.8	8.6	5.7	n.a.	n.a.	n.a.	n.a.	n.a.	18.7	19.9	11.8	13.6	n.a.	n.a.	7.1	7.2
Malta	<2.5	4.6	1.5	1.9	5.8	7.2	n.a.	n.a.	n.a.	n.a.	n.a.	27.5	28.9	12.3	13.7	n.a.	n.a.	7.0	7.2
Montenegro	5.4	<2.5	2.1	3.3	12.6	12.9	2.2	8.4	8.2	15.8	8.0	21.6	23.3	16.1	17.2	19.3	19.5	6.4	6.2
North Macedonia	4.9	3.6	3.6	6.9	15.1	24.0	3.4	5.8	3.7	13.6	9.9	20.8	22.4	17.2	19.3	23.0	27.5	8.2	8.3
Portugal	<2.5	<2.5	4.1	3.9	14.7	12.4	1.1[h]	3.8	3.1	8.2	8.9	19.0	20.8	12.0	13.2	n.a.	n.a.	8.4	8.9
Serbia	<2.5	<2.5	1.7	4.1	11.4	14.8	2.6	5.9	4.6	15.6	9.9	20.0	21.5	21.8	22.8	13.4	23.6	6.0	6.2
Slovenia	<2.5	<2.5	0.9	0.9	12.3	7.0	n.a.	n.a.	n.a.	n.a.	n.a.	18.8	20.2	20.2	21.8	n.a.	n.a.	6.2	6.3
Spain	<2.5	<2.5	1.1	1.8	7.1	8.0	n.a.	n.a.	n.a.	n.a.	n.a.	22.4	23.8	12.0	13.4	n.a.	n.a.	9.5	9.6

TABLE A1.1 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1] 2004–06 (%)	PREVALENCE OF UNDERNOURISHMENT IN THE TOTAL POPULATION[1] 2020–22[4] (%)	PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3] 2014–16 (%)	PREVALENCE OF SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3] 2020–22 (%)	PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3] 2014–16 (%)	PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY IN THE TOTAL POPULATION[1,2,3] 2020–22 (%)	PREVALENCE OF WASTING IN CHILDREN (<5 YEARS) 2022[5] (%)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS) 2012 (%)	PREVALENCE OF STUNTING IN CHILDREN (<5 YEARS) 2022 (%)	PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS) 2012 (%)	PREVALENCE OF OVERWEIGHT IN CHILDREN (<5 YEARS) 2022 (%)	PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS) 2012 (%)	PREVALENCE OF OBESITY IN THE ADULT POPULATION (≥18 YEARS) 2016 (%)	PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS) 2012 (%)	PREVALENCE OF ANAEMIA IN WOMEN (15–49 YEARS) 2019 (%)	PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS) 2012[6] (%)	PREVALENCE OF EXCLUSIVE BREASTFEEDING AMONG INFANTS (0–5 MONTHS) 2021[7] (%)	PREVALENCE OF LOW BIRTHWEIGHT 2012 (%)	PREVALENCE OF LOW BIRTHWEIGHT 2020 (%)
Western Europe	**<2.5**	**<2.5**	**1.3**	**1.4**	**5.2**	**4.9**	**n.a.**	**2.8**	**2.6**	**5.0**	**5.1**	**20.1**	**21.7**	**9.6**	**11.6**	**n.a.**	**n.a.**	**7.0**	**6.8**
Austria	<2.5	<2.5	1.1	1.6	5.5	4.3	n.a.	n.a.	n.a.	n.a.	n.a.	18.4	20.1	11.5	13.0	n.a.	n.a.	6.7	6.3
Belgium	<2.5	<2.5	n.a.	1.5	n.a.	5.8	n.a.	2.8	2.4	3.6	4.0	20.7	22.1	11.3	13.6	n.a.	n.a.	7.0	6.8
France	<2.5	<2.5	1.6	1.6	6.8	6.6	n.a.	n.a.	n.a.	n.a.	n.a.	20.1	21.6	8.8	10.6	n.a.	n.a.	7.5	7.4
Germany	<2.5	<2.5	1.0	1.4	4.1	3.8	0.4[h]	1.5	2.1	3.4	3.1	20.7	22.3	9.6	11.7	n.a.	n.a.	6.9	6.7
Luxembourg	<2.5	<2.5	1.8	0.6	4.7	2.7	n.a.	n.a.	n.a.	n.a.	n.a.	20.9	22.6	9.0	10.2	n.a.	n.a.	7.5	7.7
Netherlands (Kingdom of the)	<2.5	<2.5	1.5	1.4	5.7	4.5	n.a.	1.5	1.6	4.1	5.1	18.6	20.4	10.9	12.8	n.a.	n.a.	6.1	5.7
Switzerland	<2.5	<2.5	1.5	0.6	4.8	2.1	n.a.	n.a.	n.a.	n.a.	n.a.	18.0	19.5	9.6	11.3	n.a.	n.a.	6.4	6.4

NOTES:
1. Regional estimates are included when more than 50 percent of population is covered. To reduce the margin of error, estimates are presented as three-year averages.
2. FAO estimates of the number of people living in households where at least one adult has been found to be food insecure.
3. Country-level results are presented only for those countries for which estimates are based on official national data (see note b) or as provisional estimates, based on FAO data collected through the Gallup© World Poll, Geopoll or Kantar for countries whose national relevant authorities expressed no objection to their publication. Note that consent to publication does not necessarily imply validation of the estimate by the national authorities involved and that the estimate is subject to revision as soon as suitable data from official national sources are available. Global, regional and subregional aggregates are based on data collected in approximately 150 countries.
4. The estimates referring to the middle of the projected ranges for the years 2020 to 2022 were used to calculate the three-year averages.
5. For regional estimates, values correspond to the model predicted estimates for 2022. For countries, the latest data available from 2016 to 2022 are used.
6. Regional estimates are included when more than 50 percent of population is covered. For countries, the latest data available from 2005 to 2012 are used.
7. Regional estimates are included when more than 50 percent of population is covered. For countries, the latest data available from 2015 to 2021 are used.
* Wasting under five years of age regional aggregates exclude Japan.
** The Northern America wasting estimates are derived applying mixed-effect models with subregions as fixed effects; data were available only for the United States of America, preventing the estimation of standard errors (and confidence intervals). Further details on the methodology are described in De Onis, M., Blössner, M., Borghi, E., Frongillo, E.A. & Morris, R. 2004. Estimates of global prevalence of childhood underweight in 1990 and 2015. *Journal of the American Medical Association*, 291(21): 2600–2606. Model selection is based on best fit.

a. Consecutive low population coverage; interpret with caution.
b. Based on official national data.
c. For years when official national data are not available, the estimates are integrated with FAO data. See **Annex 1B** for further details.
d. Data informing the 2020 food insecurity estimates come from a national COVID-19 impact assessment survey with a reference period of 3 months; therefore, comparability with the rest of the series may be affected.
e. Based on official national data collected in 2019–2022 through EU statistics on income and living conditions.
f. Most recent input data are from before 2000, interpret with caution.
g. The UNICEF-WHO low birthweight estimates are derived through standard methodology applied to all countries to ensure comparability and are not the official statistics of the Government of India. India's most recent national official low birthweight prevalence is 18.2 percent from the 2019–2021 National Family Health Survey–5 (NFHS-5), which is used as the basis of the UNICEF-WHO global estimation model to support cross-country comparability.
h. This estimate has been adjusted because the original estimate did not cover the full age range or the data source was only representative of rural areas.
<2.5 = prevalence of undernourishment less than 2.5 percent; <0.5 = prevalence of severe food insecurity less than 0.5 percent.
n.a. = data not available; n.r. = not reported.

SOURCES: Data for undernourishment and food insecurity are from FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS; data for stunting, wasting and overweight are based on UNICEF, WHO & World Bank. 2023. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2023 edition)*. [Cited 27 April 2023]. https://data.unicef.org/resources/jme-report-2023, www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition; data for obesity are based on WHO. 2020. Global Health Observatory (GHO) data repository. In: *WHO*. [Cited 28 April 2020]. https://apps.who.int/gho/data/node.main.A900A?lang=en; data on anaemia are based on WHO. 2021. Global anaemia estimates, Edition 2021. In: *WHO | Global Health Observatory (GHO) data repository*. [Cited 20 April 2023]. www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children; data for exclusive breastfeeding are based on UNICEF. 2022. Infant and young child feeding. In: *UNICEF*. [Cited 6 April 2023]. https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding; and data for low birthweight are from UNICEF & WHO. 2023. *Low birthweight joint estimates 2023 edition*. [Cited 12 July 2023]. https://data.unicef.org/topic/nutrition/low-birthweight; www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-low-birthweight-estimates

TABLE A1.2 PROGRESS TOWARDS THE SUSTAINABLE DEVELOPMENT GOALS AND GLOBAL NUTRITION TARGETS: NUMBER OF PEOPLE WHO ARE AFFECTED BY UNDERNOURISHMENT, MODERATE OR SEVERE FOOD INSECURITY AND SELECTED FORMS OF MALNUTRITION; NUMBER OF INFANTS EXCLUSIVELY BREASTFED AND NUMBER OF BABIES BORN WITH LOW BIRTHWEIGHT

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1,2,3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1,2,3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2020–22[4] (millions)	2014–16 (millions)	2020–22 (millions)	2014–16 (millions)	2020–22 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2016 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2021[7] (millions)	2012 (millions)	2020 (millions)
WORLD	**786.7**	**725.1**	**575.7**	**892.7**	**1 626.1**	**2 335.5**	**45.0**	**177.9**	**148.1**	**37.0**	**37.0**	**574.3**	**675.7**	**519.5**	**570.8**	**24.3**	**31.2**	**21.6**	**19.8**
Least developed countries	**189.8**	**238.8**	**188.5**	**265.9**	**480.2**	**652.3**	**11.1**	**52.5**	**51.7**	**4.2**	**5.1**	**22.5**	**30.8**	**83.6**	**101.4**	**7.5**	**8.8**	**4.9**	**5.2**
Landlocked developing countries	**93.1**	**106.1**	**78.7**	**126.8**	**214.3**	**309.3**	**3.3**	**24.7**	**22.8**	**2.9**	**3.0**	**19.3**	**24.5**	**34.3**	**42.4**	**3.8**	**4.4**	**2.3**	**2.5**
Small Island Developing States	**10.4**	**10.9**	**14.5**	**14.5**	**30.7**	**33.4**	**0.2**	**1.3**	**1.3**	**0.4**	**0.5**	**8.1**	**9.5**	**4.6**	**4.9**	**0.2**	**0.3**	**0.2**	**0.2**
Low-income countries	**121.3**	**195.1**	**133.4**	**195.8**	**330.5**	**459.3**	**7.6**	**37.8**	**38.4**	**3.7**	**3.9**	**16.3**	**21.3**	**49.4**	**61.3**	**5.1**	**6.3**	**3.3**	**3.6**
Lower-middle-income countries	**490.0**	**458.7**	**344.0**	**551.5**	**869.8**	**1 351.8**	**32.5**	**119.3**	**94.6**	**14.3**	**15.3**	**128.9**	**162.9**	**318.5**	**355.1**	**13.5**	**17.5**	**14.4**	**12.9**
Upper-middle-income countries	**156.4**	**n.r.**	**73.6**	**116.7**	**311.8**	**411.0**	**2.5**	**17.5**	**12.2**	**13.9**	**12.9**	**205.7**	**244.4**	**113.7**	**113.7**	**3.9**	**4.9**	**2.8**	**2.3**
High-income countries	**n.r.**	**n.r.**	**18.3**	**20.0**	**98.3**	**92.3**	**0.2**	**2.7**	**2.5**	**5.0**	**4.7**	**206.5**	**231.3**	**36.2**	**38.9**	**n.a.**	**n.a.**	**1.1**	**1.0**
Low-income food-deficit countries	**179.6**	**249.4**	**177.0**	**261.6**	**444.5**	**627.2**	**n.a.**	**47.6**	**46.9**	**5.2**	**5.6**	**28.6**	**37.0**	**71.1**	**86.3**	**5.6**	**8.2**	**4.2**	**4.6**
AFRICA	**181.0**	**269.0**	**213.3**	**326.0**	**559.7**	**821.5**	**12.2**	**61.3**	**63.1**	**8.8**	**10.2**	**65.5**	**81.5**	**103.1**	**122.7**	**7.7**	**9.6**	**5.8**	**6.2**
Northern Africa	**11.5**	**17.4**	**22.4**	**27.9**	**65.4**	**82.4**	**1.8**	**6.2**	**6.3**	**3.1**	**3.6**	**30.2**	**35.7**	**17.6**	**18.9**	**1.2**	**n.a.**	**0.8**	**0.8**
Algeria	2.2	n.r.	5.2	2.5	9.0	8.6	0.1	0.5	0.4	0.6	0.6	6.2	7.4	3.4	3.6	0.1	0.1	0.1	0.1
Egypt	5.0	7.8	8.2	9.7	27.1	31.1	n.a.	2.8	2.5	1.8	2.3	15.6	18.4	6.9	7.0	0.6	n.a.	n.a.	n.a.
Libya	0.3	0.6	0.7	1.4	1.8	2.7	n.a.	0.2	0.3	0.2	0.2	1.2	1.4	0.5	0.6	n.a.	n.a.	n.a.	n.a.

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1] 2004–06 (millions)	NUMBER OF UNDERNOURISHED PEOPLE[1] 2020–22[4] (millions)	NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3] 2014–16 (millions)	NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3] 2020–22 (millions)	NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3] 2014–16 (millions)	NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3] 2020–22 (millions)	NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING 2022[5] (millions)	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED 2012 (millions)	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED 2022 (millions)	NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT 2012 (millions)	NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT 2022 (millions)	NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE 2012 (millions)	NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE 2016 (millions)	NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA 2012 (millions)	NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA 2019 (millions)	NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED 2012[6] (millions)	NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED 2021[7] (millions)	NUMBER OF BABIES WITH LOW BIRTHWEIGHT 2012 (millions)	NUMBER OF BABIES WITH LOW BIRTHWEIGHT 2020 (millions)
Morocco	1.7	2.3	n.r.	n.r.	n.r.	n.r.	0.1[h]	0.5	0.4	0.3	0.2	5.2	6.2	2.7	2.9	0.1	0.1	0.1	0.1
Sudan	–	5.4	5.1[b]	8.2[c]	15.8[b]	23.7[c]	n.a.	2.1	2.6	0.1	0.2	n.a.	n.a.	3.1	3.8	0.3	n.a.	n.a.	n.a.
Tunisia	0.4	0.4	1.1	1.6	2.1	3.5	<0.1	0.1	0.1	0.1	0.2	1.9	2.2	0.9	1.0	<0.1	<0.1	<0.1	<0.1
Northern Africa (excluding Sudan)	**9.7**	**12.0**	**17.3**	**19.6**	**49.6**	**58.7**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**30.2**	**35.7**	**n.a.**	**n.a.**	**0.9**	**n.a.**	**n.a.**	**n.a.**
Sub-Saharan Africa	**169.6**	**251.5**	**190.9**	**298.1**	**494.4**	**739.1**	**10.3**	**55.1**	**56.8**	**5.7**	**6.6**	**35.3**	**45.9**	**85.4**	**103.8**	**6.5**	**8.5**	**5.0**	**5.4**
Eastern Africa	**97.4**	**130.7**	**91.2**	**129.8**	**232.3**	**311.5**	**3.5**	**23.6**	**21.8**	**2.4**	**2.6**	**9.3**	**12.7**	**26.5**	**33.8**	**3.6**	**4.3**	**2.0**	**2.1**
Burundi	n.a.	n.a.	n.r.	n.r.	n.r.	n.r.	0.1[h]	1.1	1.2	<0.1	0.1	0.2	0.3	0.7	1.0	0.1	0.2	0.1	0.1
Comoros	<0.1	0.1	n.a.	0.2	n.a.	0.7	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	n.a.	<0.1	<0.1
Djibouti	0.3	0.2	n.a.	0.2	n.a.	0.5	<0.1[h]	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	<0.1	n.a.	n.a.	n.a.
Eritrea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.3	0.2	<0.1	<0.1	0.1	0.1	0.3	0.3	<0.1	n.a.	<0.1	<0.1
Ethiopia	28.7	26.4	14.9	25.3	57.6	69.9	1.2	6.4	6.3	0.4	0.5	1.6	2.4	4.8	6.6	0.8	1.1	n.a.	n.a.
Kenya	10.2	14.7	7.0[b, c]	14.8[c]	23.8[b, c]	38.3[c]	0.3	2.0	1.3	0.3	0.3	1.3	1.8	3.1	3.9	0.2	n.a.	0.2	0.1
Madagascar	6.3	14.8	n.a.	3.5	n.a.	18.8	0.3	1.7	1.6	0.1	0.1	0.5	0.7	2.0	2.5	0.2	0.2	0.2	0.2
Malawi	2.8	3.5	8.1[b, c]	10.4[b, c]	13.2[b, c]	16.4[b, c]	0.1	1.2	1.0	0.1	0.1	0.3	0.5	1.1	1.4	0.2	0.2	0.1	0.1
Mauritius	<0.1	<0.1	<0.1	0.1	0.2	0.4	n.a.	<0.1[f]	<0.1[f]	<0.1[f]	<0.1[f]	0.1	0.1	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Mozambique	6.8	9.8	n.a.	12.7	n.a.	24.2	0.2	1.9	2.0	0.2	0.3	0.7	1.0	2.9	3.5	0.2	n.a.	0.2	0.2
Rwanda	3.1	4.3	n.r.	n.r.	n.r.	n.r.	<0.1	0.7	0.6	0.1	0.1	0.3	0.4	0.5	0.5	0.1	0.2	<0.1	<0.1
Seychelles	<0.1	<0.1	<0.1[b]	<0.1[c]	<0.1[b]	<0.1[c]	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
Somalia	7.4	8.3	n.a.	7.4	n.a.	13.6	n.a.	0.7	0.6	0.1	0.1	0.4	0.5	1.2	1.5	<0.1	0.1	n.a.	n.a.
South Sudan	–	2.3	n.a.	6.8[b]	n.a.	9.4[b]	n.a.	0.5	0.4	0.1	0.1	n.a.	n.a.	0.8	0.9	0.1	n.a.	n.a.	n.a.
Uganda	4.7	14.5	8.1[c]	11.4[c]	24.9[c]	34.0[c]	0.3	2.1	1.8	0.2	0.3	0.7	1.0	2.5	3.4	0.4	0.5	n.a.	n.a.

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2020–22[4] (millions)	2014–16 (millions)	2020–22 (millions)	2014–16 (millions)	2020–22 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2016 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2021[7] (millions)	2012 (millions)	2020 (millions)
United Republic of Tanzania	11.1	14.9	10.8[c]	16.7[c]	25.7[c]	37.4[c]	0.4	3.2	3.3	0.4	0.5	1.6	2.2	4.4	5.3	0.4	0.6	0.2	0.2
Zambia	5.9	5.8	3.6[c]	6.2[c]	8.3[c]	14.2[c]	0.1	1.1	1.0	0.2	0.2	0.5	0.6	1.0	1.4	0.2	0.2	0.1	0.1
Zimbabwe	3.7	6.1	5.0	4.6	9.2	11.8	0.1	0.7	0.5	0.1	0.1	1.0	1.1	1.0	1.1	0.1	0.1	0.1	0.1
Middle Africa	**36.2**	**54.1**	**n.a.**	**71.7**	**n.a.**	**142.2**	**1.9**	**10.0**	**12.9**	**1.2**	**1.6**	**4.5**	**6.0**	**14.6**	**17.2**	**1.0**	**1.6**	**0.8**	**0.9**
Angola	10.2	7.4	5.9	10.8[b, c]	18.7	27.1[b, c]	n.a.	1.5	2.7	0.1	0.2	0.8	1.1	2.6	3.3	n.a.	0.2	0.2	0.2
Cameroon	2.7	1.7	5.1	7.3	11.5	15.9	0.2	1.2	1.2	0.3	0.5	1.0	1.4	2.1	2.5	0.1	0.2	0.1	0.1
Central African Republic	1.6	2.7	n.a.	3.4	n.a.	4.4	0.1	0.4	0.4	<0.1	<0.1	0.1	0.2	0.5	0.5	<0.1	<0.1	<0.1	<0.1
Chad	3.8	5.4	n.r.	n.r.	n.r.	n.r.	0.3[h]	1.0	1.1	0.1	0.1	0.3	0.4	1.4	1.6	<0.1	0.1	n.a.	n.a.
Congo	1.3	1.9	2.2	3.4	4.2	5.1	n.a.	0.2	0.1	<0.1	<0.1	0.2	0.2	0.6	0.6	<0.1	n.a.	<0.1	<0.1
Democratic Republic of the Congo	16.1	33.8	n.a.	39.0	n.a.	73.5	1.0	5.7	7.3	0.6	0.7	1.8	2.5	7.1	8.2	0.5	1.0	0.4	0.4
Equatorial Guinea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	<0.1	n.a.	n.a.	n.a.
Gabon	0.2	0.5	n.r.	n.r.	n.r.	n.r.	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2	0.2	0.3	<0.1	n.a.	<0.1	<0.1
Sao Tome and Principe	<0.1	<0.1	n.a.	<0.1	n.a.	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	<0.1	<0.1	<0.1	<0.1
Southern Africa	**2.9**	**6.9**	**5.7**	**7.8**	**13.8**	**17.1**	**0.2**	**1.5**	**1.6**	**0.8**	**0.8**	**9.6**	**11.2**	**4.7**	**5.5**	**n.a.**	**0.2**	**0.2**	**0.2**
Botswana	0.4	0.6	0.4[c]	0.7[b, c]	1.1[c]	1.5[b, c]	n.a.	0.1	0.1	<0.1	<0.1	0.2	0.2	0.2	0.2	<0.1	<0.1	<0.1	<0.1
Eswatini	0.1	0.1	n.a.	0.2	n.a.	0.8	n.a.	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	<0.1	n.a.	<0.1	<0.1
Lesotho	0.3	1.0	n.a.	0.7[c]	n.a.	1.3[c]	<0.1	0.1	0.1	<0.1	<0.1	0.2	0.2	0.1	0.2	<0.1	<0.1	<0.1	<0.1
Namibia	0.4	0.4	0.7[c]	0.8[c]	1.2[c]	1.5[c]	n.a.	0.1	0.1	<0.1	<0.1	0.2	0.2	0.1	0.2	<0.1	n.a.	<0.1	<0.1
South Africa	1.7	4.7	n.a.	5.3[c]	n.a.	12.1[c]	0.2[h]	1.3	1.3	0.7	0.7	9.0	10.4	4.2	4.8	n.a.	0.2	0.2	0.2

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2020–22[4] (millions)	2014–16 (millions)	2020–22 (millions)	2014–16 (millions)	2020–22 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2016 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2021[7] (millions)	2012 (millions)	2020 (millions)
Western Africa	**33.1**	**59.8**	**41.6**	**88.8**	**143.5**	**268.4**	**4.6**	**19.9**	**20.5**	**1.3**	**1.7**	**11.9**	**15.9**	**39.6**	**47.3**	**1.6**	**2.5**	**2.0**	**2.1**
Benin	1.0	1.3	1.1[c]	2.0[c]	6.0[c]	9.6[c]	0.1	0.6	0.7	<0.1	<0.1	0.4	0.5	1.3	1.5	0.1	0.1	0.1	0.1
Burkina Faso	2.5	3.6	1.9[b, c]	4.7	7.8[b, c]	12.6	0.4	1.0	0.8	0.1	0.1	0.4	0.5	2.0	2.5	0.1	0.2	0.1	0.1
Cabo Verde	<0.1	0.1	n.a.	<0.1[b]	n.a.	0.2[b]	n.a.	<0.1[f]	<0.1[f]	n.a.	n.a.	<0.1	<0.1	<0.1	0.0	<0.1	<0.1	n.a.	n.a.
Côte d'Ivoire	3.2	2.1	1.5[c]	2.7[c]	8.0[c]	12.1[c]	0.4	1.1	0.9	0.1	0.1	0.9	1.2	2.6	3.2	<0.1	0.2	0.2	0.2
Gambia	0.4	0.5	n.a.	0.7	n.a.	1.6	<0.1	0.1	0.1	<0.1	<0.1	0.1	0.1	0.3	0.3	<0.1	<0.1	<0.1	<0.1
Ghana	2.5	1.6	1.5[b, c]	2.0[c]	11.1[b, c]	12.9[c]	0.3	0.9	0.6	0.1	0.1	1.3	1.7	2.9	2.7	0.2	0.2	0.1	0.1
Guinea	1.4	1.8	5.1	6.7	8.4	9.9	0.2	0.6	0.6	0.1	0.1	0.3	0.4	1.3	1.5	<0.1	0.1	n.a.	n.a.
Guinea-Bissau	0.2	0.8	n.a.	0.7[c]	n.a.	1.6[c]	<0.1	0.1	0.1	<0.1	<0.1	0.1	0.1	0.2	0.2	<0.1	<0.1	<0.1	<0.1
Liberia	1.1	2.0	1.8	1.9	3.7	4.2	<0.1	0.2	0.2	<0.1	<0.1	0.2	0.2	0.4	0.5	<0.1	<0.1	<0.1	<0.1
Mali	1.8	2.8	n.r.	n.r.	n.r.	n.r.	0.4	1.0	1.0	0.1	0.1	0.5	0.7	2.0	2.6	0.1	0.2	n.a.	n.a.
Mauritania	0.3	0.4	0.2[c]	0.4[b, c]	1.0[c]	2.5[b, c]	0.1[h]	0.2	0.2	<0.1	<0.1	0.2	0.3	0.4	0.5	<0.1	<0.1	n.a.	n.a.
Niger	2.6	4.1	n.a.	7.7[c]	n.a.	18.0[c]	0.6	1.7	2.4	<0.1	0.1	0.3	0.5	1.8	2.4	0.1	0.1	n.a.	n.a.
Nigeria	9.8	34.0	20.3[b, c]	45.4[b, c]	63.8[b, c]	148.7[b, c]	2.2	11.4	12.1	0.8	0.8	6.1	8.2	20.9	25.5	0.5	1.1	n.a.	n.a.
Senegal	2.0	1.0	1.1[c]	1.9[c]	5.6[c]	8.4[c]	0.2	0.4	0.4	<0.1	0.1	0.5	0.7	1.8	2.1	0.1	0.1	0.1	0.1
Sierra Leone	2.6	2.3	2.0[b, c]	2.7	5.5[b, c]	7.5	0.1	0.4	0.3	<0.1	0.1	0.3	0.3	0.8	0.9	<0.1	0.1	<0.1	<0.1
Togo	1.6	1.5	1.2[c]	1.7[c]	4.5[c]	5.4[c]	0.1	0.3	0.3	<0.1	<0.1	0.2	0.3	0.8	0.9	0.1	0.1	<0.1	<0.1
Sub-Saharan Africa (including Sudan)	**169.6**	**257.0**	**196.0**	**306.3**	**510.1**	**762.8**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**35.3**	**45.9**	**n.a.**	**n.a.**	**6.8**	**8.8**	**n.a.**	**n.a.**
ASIA*	**542.6**	**404.0**	**297.4**	**464.2**	**789.2**	**1 164.4**	**31.6**	**106.8**	**76.6**	**18.2**	**17.7**	**181.7**	**231.3**	**351.9**	**380.7**	**13.0**	**17.1**	**13.7**	**11.8**
Central Asia	**8.3**	**2.4**	**1.2**	**3.6**	**6.4**	**14.0**	**0.2**	**1.1**	**0.7**	**0.6**	**0.4**	**6.6**	**8.1**	**5.2**	**5.3**	**0.3**	**0.4**	**0.1**	**0.1**
Kazakhstan	1.1	n.r.	n.a.	<0.1[b]	n.a.	0.5[b]	n.a.	0.2	0.1	0.2	0.2	2.2	2.6	1.3	1.3	0.1	0.1	<0.1	<0.1
Kyrgyzstan	0.4	0.3	n.a.	<0.1[c]	n.a.	0.5[c]	<0.1	0.1	0.1	0.1	0.1	0.5	0.6	0.5	0.6	<0.1	<0.1	<0.1	<0.1

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2020–22[4] (millions)	2014–16 (millions)	2020–22 (millions)	2014–16 (millions)	2020–22 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2016 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2021[7] (millions)	2012 (millions)	2020 (millions)
Tajikistan	2.6	0.9	n.r.	n.r.	n.r.	n.r.	0.1	0.3	0.2	0.1	<0.1	0.6	0.7	0.6	0.8	<0.1	<0.1	<0.1	<0.1
Turkmenistan	0.2	0.4	n.a.	n.a.	n.a.	n.a.	<0.1	0.1	<0.1	<0.1	<0.1	0.6	0.7	0.4	0.4	<0.1	<0.1	<0.1	<0.1
Uzbekistan	3.9	n.r.	0.6	2.3	3.5	8.9	0.1	0.4	0.3	0.2	0.2	2.8	3.5	2.4	2.2	0.1	0.2	<0.1	<0.1
Eastern Asia*	**105.7**	**n.r.**	**16.5**	**22.2**	**98.5**	**111.6**	**1.1**	**7.7**	**3.7**	**6.6**	**6.4**	**61.1**	**77.5**	**67.1**	**64.4**	**1.9**	**2.3**	**1.2**	**0.8**
China	93.6	n.r.	n.r.	n.r.	n.r.	n.r.	1.7	6.7	3.1	6.2	6.0	53.8	68.7	56.1	54.0	2.5	2.0	1.0	0.6
China, mainland	92.5	n.r.	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Taiwan Province of China	1.0	0.7	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.7	1.7	n.a.	n.a.	n.a.	n.a.
China, Hong Kong SAR	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
China, Macao SAR	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Democratic People's Republic of Korea	8.3	11.8	n.a.	n.a.	n.a.	n.a.	<0.1	0.4	0.3	<0.1	<0.1	1.1	1.3	2.1	2.2	0.1	0.1	n.a.	n.a.
Japan	n.r.	4.0	n.r.	1.2	3.3	5.5	n.a.	0.3	0.2	0.1	0.1	3.9	4.6	5.3	4.8	n.a.	n.a.	0.1	0.1
Mongolia	0.7	0.3	n.r.	n.r.	0.2	0.2[b, c]	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.4	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Republic of Korea	n.r.	n.r.	n.r.	0.4	2.4[b]	2.9	<0.1[h]	<0.1	<0.1	0.2	0.1	1.7	2.0	1.8	1.6	n.a.	n.a.	<0.1	<0.1
Eastern Asia (excluding China and Japan)	**6.8**	**9.5**	**n.r.**	**2.1**	**8.9**	**11.6**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**
South-eastern Asia	**96.3**	**35.1**	**12.6**	**16.5**	**93.9**	**110.9**	**4.3**	**17.2**	**14.4**	**3.6**	**4.1**	**22.2**	**29.5**	**41.7**	**47.4**	**1.8**	**2.6**	**1.5**	**1.4**
Brunei Darussalam	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	n.a.	n.a.	<0.1	<0.1

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2020–22[4] (millions)	2014–16 (millions)	2020–22 (millions)	2014–16 (millions)	2020–22 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2016 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2021[7] (millions)	2012 (millions)	2020 (millions)
Cambodia	2.4	0.8	2.6	2.5	7.5	8.5	0.2	0.6	0.4	<0.1	0.1	0.3	0.4	1.9	2.1	0.1	0.1	<0.1	<0.1
Indonesia	44.2	16.2	1.8[b]	n.r.	15.5[b]	13.4[b]	2.4	8.3	6.9	2.2	2.4	9.1	12.2	18.3	22.3	1.0	1.1	0.5	0.4
Lao People's Democratic Republic	1.3	0.4	n.a.	0.5	n.a.	2.5	0.1	0.3	0.2	<0.1	<0.1	0.2	0.2	0.6	0.8	<0.1	<0.1	<0.1	<0.1
Malaysia	0.8	0.9	2.4	2.0	5.4	5.4	0.3	0.4	0.6	0.2	0.1	2.6	3.3	2.4	2.8	n.a.	0.1	0.1	0.1
Myanmar	13.8	2.1	n.a.	2.7	n.a.	15.8	0.3[h]	1.4	1.1	0.1	<0.1	1.5	2.1	5.7	6.3	0.1	0.2	0.1	0.1
Philippines	12.6	5.9	n.a.	6.5[b, c]	n.a.	50.9[b, c]	n.a.	3.7	3.5	0.4	0.6	3.2	4.1	4.2	3.5	0.4	0.7	0.5	0.5
Singapore	n.a.	n.a.	<0.1	0.1	0.2	0.4	n.a.	<0.1	<0.1	<0.1	<0.1	0.2	0.3	0.2	0.2	n.a.	n.a.	<0.1	<0.1
Thailand	7.8	3.7	0.5[c]	0.9[b, c]	3.3[c]	5.1[b, c]	0.3	0.6	0.4	0.4	0.3	4.1	5.4	4.1	4.2	<0.1	<0.1	0.1	0.1
Timor-Leste	0.3	0.3	n.a.	n.a.	n.a.	n.a.	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Viet Nam	12.6	4.9	n.a.	1.1[c]	n.a.	8.7[c]	0.3	1.8	1.4	0.3	0.6	1.0	1.4	4.3	5.3	0.1	0.3	0.1	0.1
Southern Asia	**315.9**	**315.8**	**243.5**	**392.8**	**512.6**	**822.2**	**25.1**	**75.3**	**53.7**	**5.0**	**4.9**	**49.7**	**65.4**	**218.4**	**241.0**	**8.3**	**10.6**	**10.2**	**8.8**
Afghanistan	8.5	12.0	5.0	11.4	15.2	31.7	0.3	2.3	2.2	0.3	0.2	0.6	0.9	2.5	3.8	n.a.	0.4	n.a.	n.a.
Bangladesh	19.2	18.9	20.9	18.7	50.9	52.7	1.4	6.0	3.9	0.3	0.3	2.7	3.7	14.9	16.8	1.0	0.9	0.7	0.7
Bhutan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1
India	247.2	233.9	n.r.	n.r.	n.r.	n.r.	21.9	52.5	36.1	2.8	3.2	25.2	34.3	171.5	187.3	5.9	7.2	7.7	6.3[g]
Iran (Islamic Republic of)	3.8	5.3	7.8	6.5	39.2	35.9	0.3	0.4	0.3	0.3	0.2	12.6	14.8	5.1	5.5	0.4	0.3	n.a.	n.a.
Maldives	n.a.	n.a.	n.a.	<0.1	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Nepal	4.5	1.6	2.9	4.0	8.2	11.2	0.2	1.2	0.8	<0.1	<0.1	0.5	0.7	2.6	3.2	0.2	0.2	0.1	0.1
Pakistan	29.8	42.8	1.9[c]	29.9[b, c, d]	29.6[c]	97.9[b, c, d]	2.1	12.5	10.1	1.3	0.8	7.5	10.2	19.8	22.4	1.1	1.5	n.a.	n.a.
Sri Lanka	2.7	1.1	0.1[c]	0.3[c]	1.2[c]	2.4[c]	0.3	0.3	0.2	<0.1	<0.1	0.6	0.8	1.8	1.8	0.1	0.1	0.1	0.1

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2020–22[4] (millions)	2014–16 (millions)	2020–22 (millions)	2014–16 (millions)	2020–22 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2016 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2021[7] (millions)	2012 (millions)	2020 (millions)
Southern Asia (excluding India)	**68.7**	**81.9**	**38.7**	**70.8**	**144.7**	**232.2**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**24.5**	**31.1**	**n.a.**	**n.a.**	**3.1**	**3.4**	**n.a.**	**n.a.**
Western Asia	**16.4**	**30.4**	**23.5**	**29.2**	**77.9**	**105.7**	**1.0**	**5.3**	**3.9**	**2.5**	**2.0**	**42.4**	**51.4**	**19.6**	**22.5**	**0.9**	**0.9**	**0.7**	**0.7**
Armenia	0.4	n.r.	n.a.	n.r.	n.a.	0.2[b]	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.5	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Azerbaijan	0.4	n.r.	n.r.	n.r.	0.6	1.0	n.a.	0.2	0.1	0.1	0.1	1.2	1.4	0.9	0.9	<0.1	n.a.	<0.1	<0.1
Bahrain	n.a.	n.a.	n.r.	n.r.	n.r.	n.r.	n.a.	<0.1[f]	<0.1[f]	n.a.	n.a.	0.3	0.3	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Cyprus	<0.1	n.r.	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	0.2	0.2	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Georgia	0.2	0.1	0.3	0.4	1.2	1.4	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	0.7	0.3	0.2	<0.1	<0.1	<0.1	<0.1
Iraq	5.1	7.1	n.r.	n.r.	n.r.	n.r.	0.2	1.0	0.6	0.5	0.4	4.7	6.1	2.3	2.8	0.1	0.2	0.1	0.1
Israel	n.r.	n.r.	0.1[b]	0.3[c]	0.9[b]	1.2[c]	n.a.	n.a.	n.a.	n.a.	n.a.	1.3	1.4	0.2	0.3	n.a.	n.a.	<0.1	<0.1
Jordan	n.a.	n.a.	n.r.	n.r.	n.r.	n.r.	<0.1	0.1	0.1	0.1	0.1	1.5	2.0	0.6	1.0	<0.1	<0.1	<0.1	<0.1
Kuwait	n.r.	n.r.	0.2	0.2	0.5	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	1.1	0.2	0.2	n.a.	n.a.	<0.1	<0.1
Lebanon	n.a.	n.a.	n.a.	0.7	n.a.	2.0	<0.1	0.1	<0.1	<0.1	<0.1	1.1	1.5	0.4	0.5	n.a.	n.a.	<0.1	<0.1
Oman	0.2	0.1	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	0.1	<0.1	<0.1	0.6	0.9	0.2	0.3	n.a.	<0.1	<0.1	<0.1
Palestine	n.a.	n.a.	n.a.	0.2[b]	n.a.	1.4[b]	<0.1	0.1	0.1	<0.1	0.1	n.a.	n.a.	0.3	0.4	<0.1	<0.1	<0.1	<0.1
Qatar	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1[f]	<0.1[f]	<0.1[f]	<0.1[f]	0.6	0.8	0.1	0.1	<0.1	n.a.	<0.1	<0.1
Saudi Arabia	1.2	1.4	n.r.	n.r.	n.r.	n.r.	0.1[h]	0.4	0.4	0.3	0.3	6.4	8.1	1.9	2.3	n.a.	n.a.	n.a.	n.a.
Syrian Arab Republic	0.9	5.9	n.a.	n.a.	n.a.	n.a.	n.a.	0.8	0.5	0.5	0.2	3.0	3.0	1.7	1.5	0.1	0.1	n.a.	n.a.
Türkiye	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	0.1	0.6	0.4	0.7	0.5	15.1	17.8	n.a.	n.a.	0.3	0.3	0.2	0.2
United Arab Emirates	0.3	n.r.	n.a.	0.1[b, c]	n.a.	0.9[b, c]	n.a.	n.a.	n.a.	n.a.	n.a.	2.2	2.5	0.4	0.5	n.a.	n.a.	<0.1	<0.1
Yemen	5.8	11.4	3.5	4.2	13.0	22.2	n.a.	2.0	1.7	0.1	0.1	1.8	2.5	3.7	4.6	n.a.	n.a.	n.a.	n.a.

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2020–22[4] (millions)	2014–16 (millions)	2020–22 (millions)	2014–16 (millions)	2020–22 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2016 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2021[7] (millions)	2012 (millions)	2020 (millions)
Central Asia and Southern Asia	**324.2**	**318.2**	**244.7**	**396.4**	**518.9**	**836.2**	**25.3**	**76.4**	**54.3**	**5.6**	**5.3**	**56.4**	**73.5**	**223.5**	**246.3**	**8.6**	**11.0**	**10.3**	**8.9**
Eastern Asia and South-eastern Asia*	**202.0**	**n.r.**	**29.2**	**38.6**	**192.3**	**222.4**	**5.4**	**25.0**	**18.3**	**10.2**	**10.4**	**83.3**	**107.0**	**108.8**	**111.9**	**3.6**	**5.0**	**2.7**	**2.2**
Western Asia and Northern Africa	**27.8**	**47.8**	**46.0**	**57.0**	**143.3**	**188.1**	**2.8**	**11.5**	**10.2**	**5.6**	**5.6**	**72.6**	**87.0**	**37.2**	**41.4**	**2.1**	**n.a.**	**1.5**	**1.5**
LATIN AMERICA AND THE CARIBBEAN	**51.8**	**43.7**	**49.1**	**85.4**	**172.1**	**256.2**	**0.7**	**6.8**	**5.7**	**3.9**	**4.2**	**90.8**	**106.0**	**29.6**	**29.6**	**1.6**	**2.0**	**1.0**	**0.9**
Caribbean	**7.4**	**6.8**	**n.a.**	**12.7**	**n.a.**	**27.3**	**0.1**	**0.5**	**0.4**	**0.2**	**0.2**	**6.3**	**7.3**	**3.0**	**3.1**	**0.1**	**0.1**	**0.1**	**0.1**
Antigua and Barbuda	n.a.	n.a.	n.a.	<0.1	n.a.	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
Bahamas	n.a.	n.a.	n.a.	<0.1	n.a.	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	0.1	0.1	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
Barbados	<0.1	n.r.	n.a.	<0.1	n.a.	<0.1	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.0	<0.1	n.a.	n.a.	n.a.
Cuba	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	0.1	0.1	2.0	2.2	0.6	0.5	<0.1	<0.1	<0.1	<0.1
Dominica	<0.1	<0.1	n.r.	n.r.	n.r.	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Dominican Republic	1.8	0.7	2.5[b]	2.4[b, c]	5.6[b]	5.8[b, c]	<0.1	0.1	0.1	0.1	0.1	1.6	1.9	0.7	0.7	<0.1	<0.1	<0.1	<0.1
Grenada	n.a.	n.a.	n.a.	<0.1[b]	n.a.	<0.1[b]	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Haiti	4.7	5.1	n.a.	4.9	n.a.	9.5	<0.1	0.3	0.2	<0.1	<0.1	1.2	1.5	1.3	1.4	0.1	0.1	n.a.	n.a.
Jamaica	0.2	0.2	0.7	0.7	1.3	1.5	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.5	0.1	0.2	<0.1	n.a.	<0.1	<0.1
Puerto Rico	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.2	0.1	n.a.	n.a.	n.a.	n.a.
Saint Kitts and Nevis	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Saint Lucia	n.a.	n.a.	<0.1[b]	<0.1	<0.1[b]	<0.1	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	<0.1	n.a.	<0.1	<0.1

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2020–22[4] (millions)	2014–16 (millions)	2020–22 (millions)	2014–16 (millions)	2020–22 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2016 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2021[7] (millions)	2012 (millions)	2020 (millions)
Saint Vincent and the Grenadines	<0.1	<0.1	n.a.	<0.1	n.a.	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Trinidad and Tobago	0.2	0.2	n.a.	0.2	n.a.	0.7	n.a.	<0.1	<0.1	<0.1	<0.1	0.2	0.2	0.1	0.1	<0.1	n.a.	<0.1	<0.1
Central America	**11.6**	**8.9**	**10.8**	**14.2**	**49.1**	**60.9**	**0.1**	**2.9**	**2.5**	**1.1**	**1.0**	**26.1**	**30.8**	**6.7**	**7.0**	**0.3**	**0.5**	**0.4**	**0.3**
Belize	<0.1	<0.1	n.a.	<0.1[b]	n.a.	0.2[b]	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.0	<0.1	<0.1	<0.1	<0.1
Costa Rica	0.2	0.2	<0.1[c]	0.1[b]	0.6[c]	0.8[b]	<0.1	<0.1	<0.1	<0.1	<0.1	0.8	0.9	0.2	0.2	<0.1	<0.1	<0.1	<0.1
El Salvador	0.6	0.5	0.9	1.0	2.6	3.1	n.a.	0.1	0.1	<0.1	<0.1	0.9	1.0	0.2	0.2	<0.1	n.a.	<0.1	<0.1
Guatemala	2.5	2.3	2.6	3.7	6.8	10.5	<0.1	0.9	0.8	0.1	0.1	1.6	2.0	0.4	0.3	0.1	0.1	0.1	0.1
Honduras	1.7	1.9	1.3[c]	2.4[b]	3.9[c]	5.8[b]	<0.1	0.2	0.2	0.1	0.1	0.9	1.2	0.4	0.5	<0.1	<0.1	<0.1	<0.1
Mexico	4.6	n.r.	4.3[b]	4.5[b]	30.8[b]	35.0[b]	0.2	1.5	1.2	0.8	0.7	20.6	24.0	5.1	5.3	0.2	0.3	0.2	0.2
Nicaragua	1.3	1.2	n.r.	n.r.	n.r.	n.r.	n.a.	0.1	0.1	<0.1	0.1	0.8	0.9	0.2	0.3	<0.1	n.a.	<0.1	<0.1
Panama	0.7	0.2	n.r.	n.r.	n.r.	n.r.	<0.1	0.1	0.1	<0.1	<0.1	0.5	0.6	0.2	0.2	n.a.	n.a.	<0.1	<0.1
South America	32.8	28.0	24.7	58.5	96.8	167.9	0.4	3.4	2.8	2.6	3.0	58.4	67.9	19.9	19.5	1.3	1.4	0.6	0.5
Argentina	1.5	1.4	2.5	5.9	8.3	16.7	0.1	0.3	0.3	0.4	0.4	7.6	8.6	1.3	1.3	0.1	n.a.	0.1	<0.1
Bolivia (Plurinational State of)	2.5	2.3	n.r.	n.r.	n.r.	n.r.	<0.1	0.3	0.1	0.1	0.1	1.1	1.4	0.7	0.7	0.1	0.1	<0.1	<0.1
Brazil	12.1	10.1	4.0	21.1	37.6	70.3	0.5[h]	1.0	1.0	1.2	1.4	28.4	33.3	10.1	9.2	0.6	0.6	0.2	0.2
Chile	0.5	0.5	0.5[c]	0.8[b]	1.9[c]	3.5[b]	n.a.	<0.1	<0.1	0.1	0.1	3.4	3.8	0.4	0.4	n.a.	n.a.	<0.1	<0.1
Colombia	4.8	3.4	n.r.	n.r.	n.r.	n.r.	0.1	0.5	0.4	0.2	0.2	6.4	7.6	2.8	2.9	0.2	0.1	0.1	0.1
Ecuador	3.1	2.5	1.0[b, c]	2.3[c]	3.4[b, c]	6.6[c]	0.1	0.4	0.3	0.1	0.2	1.8	2.2	0.7	0.8	n.a.	n.a.	<0.1	<0.1
Guyana	<0.1	n.r.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	<0.1	n.a.	<0.1	<0.1

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2020–22[4] (millions)	2014–16 (millions)	2020–22 (millions)	2014–16 (millions)	2020–22 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2016 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2021[7] (millions)	2012 (millions)	2020 (millions)
Paraguay	0.5	0.3	<0.1[c]	0.4[b, c]	0.5[c]	1.7[b, c]	<0.1	0.1	<0.1	0.1	0.1	0.7	0.9	0.4	0.4	<0.1	<0.1	<0.1	<0.1
Peru	5.3	2.4	n.r.	n.r.	n.r.	n.r.	<0.1	0.6	0.3	0.2	0.3	3.5	4.1	1.6	1.8	0.2	0.2	0.1	<0.1
Suriname	<0.1	<0.1	n.a.	<0.1	n.a.	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	0.0	<0.1	<0.1	<0.1	<0.1
Uruguay	<0.1	n.r.	<0.1[c]	<0.1[b, c]	0.5[c]	0.5[b, c]	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	0.7	0.1	0.1	n.a.	<0.1	<0.1	<0.1
Venezuela (Bolivarian Republic of)	2.2	5.1	n.r.	n.r.	n.r.	n.r.	n.a.	0.4	0.2	0.2	0.2	4.6	5.1	1.6	1.8	n.a.	n.a.	0.1	<0.1
OCEANIA	**2.3**	**2.9**	**1.1**	**1.6**	**4.5**	**5.6**	**n.a.**	**0.7**	**0.8**	**0.4**	**0.6**	**7.0**	**8.1**	**1.3**	**1.6**	**n.a.**	**n.a.**	**0.1**	**0.1**
Australia and New Zealand	**n.r.**	**n.r.**	**0.8**	**1.1**	**3.0**	**3.7**	**n.a.**	**0.1**	**0.1**	**0.2**	**0.4**	**5.7**	**6.5**	**0.5**	**0.6**	**n.a.**	**n.a.**	**<0.1**	**<0.1**
Australia	n.r.	n.r.	0.7	0.9	2.6	3.0	n.a.	<0.1	0.1	0.2	0.3	4.7	5.4	0.4	0.5	n.a.	n.a.	<0.1	<0.1
New Zealand	n.r.	n.r.	0.1	0.2	0.5	0.8	n.a.	n.a.	n.a.	n.a.	n.a.	1.0	1.1	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Oceania excluding Australia and New Zealand	**2.0**	**2.7**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**0.1[a]**	**0.6**	**0.7**	**0.1**	**0.2**	**1.3**	**1.6**	**0.8**	**1.0**	**0.1**	**0.1**	**0.1**	**0.1**
Melanesia	**1.9**	**2.6**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**0.6**	**0.7**	**0.1**	**0.2**	**1.1**	**1.3**	**0.8**	**0.9**	**0.1**	**0.1**	**0.1**	**0.1**
Fiji	<0.1	<0.1	n.a.	<0.1	n.a.	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2	0.1	0.1	n.a.	<0.1	<0.1	<0.1
New Caledonia	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Papua New Guinea	1.8	2.3	n.a.	n.a.	n.a.	n.a.	n.a.	0.5	0.6	0.1	0.2	0.8	1.0	0.6	0.8	0.1	0.1	<0.1	<0.1
Solomon Islands	<0.1	0.1	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Vanuatu	<0.1	<0.1	n.a.	<0.1	n.a.	<0.1	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	<0.1	n.a.	<0.1	<0.1
Micronesia	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**0.1**	**0.1**	**<0.1**	**0.0**	**<0.1**	**<0.1**	**<0.1**	**<0.1**
Kiribati	<0.1	<0.1	n.a.	<0.1	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	<0.1	<0.1	<0.1	<0.1
Marshall Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	<0.1	0.0	<0.1	<0.1	n.a.	n.a.

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2020–22[4] (millions)	2014–16 (millions)	2020–22 (millions)	2014–16 (millions)	2020–22 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2016 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2021[7] (millions)	2012 (millions)	2020 (millions)
Micronesia (Federated States of)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Nauru	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	<0.1	0.0	<0.1	n.a.	n.a.	n.a.
Palau	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
Polynesia	**<0.1**	**<0.1**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**0.2**	**0.2**	**<0.1**	**0.0**	**<0.1**	**<0.1**	**<0.1**	**<0.1**
American Samoa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cook Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
French Polynesia	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Niue	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.0	n.a.	n.a.	n.a.	n.a.
Samoa	<0.1	<0.1	n.a.	<0.1	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.
Tokelau (Associate Member)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tonga	n.a.	n.a.	n.a.	<0.1[b]	n.a.	<0.1[b]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	<0.1	<0.1	n.a.	n.a.
Tuvalu	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	<0.1	0.0	<0.1	<0.1	n.a.	n.a.
NORTHERN AMERICA AND EUROPE	**n.r.**	**n.r.**	**14.8**	**15.6**	**100.6**	**87.8**	**n.a.**	**2.6**	**2.1**	**5.6**	**4.3**	**216.2**	**237.2**	**33.7**	**36.2**	**n.a.**	**n.a.**	**0.9**	**0.8**
Northern America**	**n.r.**	**n.r.**	**3.7**	**2.7**	**35.8**	**29.4**	**<0.1**	**0.6**	**0.7**	**1.9**	**1.7**	**87.8**	**98.7**	**8.1**	**9.8**	**0.5**	**0.5**	**0.3**	**0.3**
Bermuda	<0.1	n.r.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Canada	n.r.	n.r.	n.a.	0.5[c]	n.a.	2.9[c]	n.a.	n.a.	n.a.	0.2	0.2	7.6	8.6	0.7	0.9	n.a.	n.a.	<0.1	<0.1
Greenland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
United States of America	n.r.	n.r.	3.5[b]	2.3[b]	34.0[b]	26.4[b]	<0.1	0.5	0.7	1.7	1.5	80.2	90.1	7.4	8.9	0.5	0.5	0.3	0.3

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1] 2004–06 (millions)	NUMBER OF UNDERNOURISHED PEOPLE[1] 2020–22[4] (millions)	NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3] 2014–16 (millions)	NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3] 2020–22 (millions)	NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3] 2014–16 (millions)	NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3] 2020–22 (millions)	NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING 2022[5] (millions)	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED 2012 (millions)	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED 2022 (millions)	NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT 2012 (millions)	NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT 2022 (millions)	NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE 2012 (millions)	NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE 2016 (millions)	NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA 2012 (millions)	NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA 2019 (millions)	NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED 2012[6] (millions)	NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED 2021[7] (millions)	NUMBER OF BABIES WITH LOW BIRTHWEIGHT 2012 (millions)	NUMBER OF BABIES WITH LOW BIRTHWEIGHT 2020 (millions)
Europe	**n.r.**	**n.r.**	**11.1**	**12.9**	**64.9**	**58.4**	**n.a.**	**2.1**	**1.4**	**3.7**	**2.6**	**128.4**	**138.4**	**25.5**	**26.5**	**n.a.**	**n.a.**	**0.6**	**0.5**
Eastern Europe	**n.r.**	**n.r.**	**4.3**	**4.9**	**32.8**	**30.6**	**n.a.**	**1.2**	**0.8**	**2.0**	**1.1**	**53.0**	**55.8**	**14.1**	**14.0**	**n.a.**	**n.a.**	**0.3**	**0.2**
Belarus	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.a.	<0.1	<0.1	<0.1	<0.1	1.8	1.9	0.5	0.4	<0.1	<0.1	<0.1	<0.1
Bulgaria	0.4	n.r.	0.1	0.2	1.1	1.1	n.a.	<0.1	<0.1	<0.1	<0.1	1.4	1.5	0.4	0.4	n.a.	n.a.	<0.1	<0.1
Czechia	n.r.	n.r.	<0.1	0.2	0.6	0.9	n.a.	<0.1	<0.1	<0.1	<0.1	2.1	2.3	0.5	0.5	n.a.	n.a.	<0.1	<0.1
Hungary	n.r.	n.r.	0.1	0.3	1.1	1.2	n.a.	n.a.	n.a.	n.a.	n.a.	2.0	2.1	0.5	0.4	n.a.	n.a.	<0.1	<0.1
Poland	n.r.	n.r.	0.7	0.4	3.4	2.9	n.a.	<0.1	<0.1	0.1	0.1	6.7	7.2	n.a.	n.a.	n.a.	n.a.	<0.1	<0.1
Republic of Moldova	1.3	n.r.	<0.1	0.2	0.6	0.7	n.a.	<0.1	<0.1	<0.1	<0.1	0.6	0.6	0.3	0.3	<0.1	n.a.	<0.1	<0.1
Romania	n.r.	n.r.	1.1	1.1	3.8	3.2	n.a.	0.1	0.1	0.1	<0.1	3.4	3.6	1.1	1.0	n.a.	n.a.	<0.1	<0.1
Russian Federation	n.r.	n.r.	1.0	n.r.	11.9	7.2[b]	n.a.	n.a.	n.a.	1.0	0.6	25.7	26.9	7.3	7.2	n.a.	n.a.	0.1	0.1
Slovakia	0.3	0.2	<0.1	<0.1	0.3	0.5	n.a.	n.a.	n.a.	n.a.	n.a.	0.8	0.9	0.3	0.3	n.a.	n.a.	<0.1	<0.1
Ukraine	n.r.	2.0	0.9	1.8	8.9	12.0	n.a.	0.5	0.2	0.6	0.2	8.5	8.8	1.6	1.8	0.1	n.a.	<0.1	<0.1
Northern Europe	**n.r.**	**n.r.**	**1.8**	**1.8**	**6.9**	**5.4**	**n.a.**	**0.2**	**0.2**	**0.5**	**0.5**	**19.0**	**21.2**	**2.5**	**2.8**	**n.a.**	**n.a.**	**0.1**	**0.1**
Denmark	n.r.	n.r.	<0.1	0.1	0.3	0.4	n.a.	n.a.	n.a.	n.a.	n.a.	0.8	0.9	0.1	0.2	n.a.	n.a.	<0.1	<0.1
Estonia	n.r.	n.r.	<0.1	<0.1	0.1	0.1	n.a.	<0.1	<0.1	<0.1	<0.1	0.2	0.2	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Finland	n.r.	n.r.	0.1	0.1	0.5	0.6	n.a.	n.a.	n.a.	n.a.	n.a.	0.9	1.0	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Iceland	n.r.	n.r.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.1	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
Ireland	n.r.	n.r.	0.2	0.1	0.4	0.3	n.a.	n.a.	n.a.	n.a.	n.a.	0.8	0.9	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Latvia	n.r.	n.r.	<0.1	<0.1	0.2	0.2	<0.1[h]	<0.1	<0.1	<0.1	<0.1	0.4	0.4	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Lithuania	n.r.	n.r.	<0.1	<0.1	0.5	0.2	<0.1[h]	<0.1	<0.1	<0.1	<0.1	0.6	0.6	0.1	0.1	n.a.	n.a.	<0.1	<0.1

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2020–22[4] (millions)	2014–16 (millions)	2020–22 (millions)	2014–16 (millions)	2020–22 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2016 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2021[7] (millions)	2012 (millions)	2020 (millions)
Norway	n.r.	n.r.	<0.1	<0.1	0.2	0.3	n.a.	n.a.	n.a.	n.a.	n.a.	0.8	1.0	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Sweden	n.r.	n.r.	<0.1	0.1	0.4	0.6	n.a.	n.a.	n.a.	n.a.	n.a.	1.4	1.6	0.3	0.3	n.a.	n.a.	<0.1	<0.1
United Kingdom of Great Britain and Northern Ireland	n.r.	n.r.	1.2	1.1	4.1	2.7	<0.1[h]	n.a.	n.a.	0.4	0.4	12.9	14.6	1.4	1.7	n.a.	n.a.	0.1	<0.1
Southern Europe	**n.r.**	**n.r.**	**2.6**	**3.4**	**15.2**	**12.9**	**n.a.**	**0.4**	**0.2**	**0.7**	**0.5**	**25.6**	**27.5**	**4.8**	**5.0**	**n.a.**	**n.a.**	**0.1**	**0.1**
Albania	0.3	0.1	0.3	0.2	1.1	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.5	0.2	0.2	<0.1	<0.1	<0.1	<0.1
Andorra	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
Bosnia and Herzegovina	n.r.	n.r.	<0.1	0.1	0.3	0.4	n.a.	<0.1	<0.1	<0.1	<0.1	0.5	0.5	0.2	0.2	<0.1	n.a.	<0.1	<0.1
Croatia	n.r.	n.r.	<0.1	<0.1	0.3	0.4	n.a.	n.a.	n.a.	n.a.	n.a.	0.8	0.8	0.2	0.2	n.a.	n.a.	<0.1	<0.1
Greece	n.r.	n.r.	0.3	0.2[b, e]	1.7	0.7[b, e]	n.a.	<0.1	<0.1	0.1	0.1	2.1	2.2	0.3	0.3	n.a.	n.a.	<0.1	<0.1
Italy	n.r.	n.r.	0.7	1.1	5.2	3.4	n.a.	n.a.	n.a.	n.a.	n.a.	9.3	10.1	1.6	1.7	n.a.	n.a.	<0.1	<0.1
Malta	n.r.	<0.1	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	0.1	0.1	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
Montenegro	<0.1	n.r.	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	0.0	<0.1	<0.1	<0.1	<0.1
North Macedonia	0.1	<0.1	<0.1	0.1	0.3	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.4	0.1	0.1	<0.1	<0.1	<0.1	<0.1
Portugal	n.r.	n.r.	0.4	0.4	1.5	1.3	<0.1[h]	<0.1	<0.1	<0.1	<0.1	1.6	1.8	0.3	0.3	n.a.	n.a.	<0.1	<0.1
Serbia	n.r.	n.r.	0.2	0.4	1.1	1.3	<0.1	<0.1	<0.1	0.1	<0.1	1.4	1.5	0.5	0.5	<0.1	<0.1	<0.1	<0.1
Slovenia	n.r.	n.r.	<0.1	<0.1	0.3	0.1	n.a.	n.a.	n.a.	n.a.	n.a.	0.3	0.3	0.1	0.1	n.a.	n.a.	<0.1	<0.1
Spain	n.r.	n.r.	0.5	0.8	3.3	3.8	n.a.	n.a.	n.a.	n.a.	n.a.	8.7	9.1	1.4	1.4	n.a.	n.a.	<0.1	<0.1

TABLE A1.2 (Continued)

REGIONS/ SUBREGIONS/ COUNTRIES/ TERRITORIES	NUMBER OF UNDERNOURISHED PEOPLE[1]		NUMBER OF SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF MODERATELY OR SEVERELY FOOD-INSECURE PEOPLE[1, 2, 3]		NUMBER OF CHILDREN (<5 YEARS) AFFECTED BY WASTING	NUMBER OF CHILDREN (<5 YEARS) WHO ARE STUNTED		NUMBER OF CHILDREN (<5 YEARS) WHO ARE OVERWEIGHT		NUMBER OF ADULTS (≥18 YEARS) WHO ARE OBESE		NUMBER OF WOMEN (15–49 YEARS) AFFECTED BY ANAEMIA		NUMBER OF INFANTS (0–5 MONTHS) EXCLUSIVELY BREASTFED		NUMBER OF BABIES WITH LOW BIRTHWEIGHT	
	2004–06 (millions)	2020–22[4] (millions)	2014–16 (millions)	2020–22 (millions)	2014–16 (millions)	2020–22 (millions)	2022[5] (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2022 (millions)	2012 (millions)	2016 (millions)	2012 (millions)	2019 (millions)	2012[6] (millions)	2021[7] (millions)	2012 (millions)	2020 (millions)
Western Europe	**n.r.**	**n.r.**	**2.4**	**2.8**	**10.0**	**9.5**	**n.a.**	**0.3**	**0.2**	**0.5**	**0.5**	**30.8**	**33.9**	**4.1**	**4.8**	**n.a.**	**n.a.**	**0.1**	**0.1**
Austria	n.r.	n.r.	<0.1	0.1	0.5	0.4	n.a.	n.a.	n.a.	n.a.	n.a.	1.3	1.5	0.2	0.3	n.a.	n.a.	<0.1	<0.1
Belgium	n.r.	n.r.	n.a.	0.2	n.a.	0.7	n.a.	<0.1	<0.1	<0.1	<0.1	1.8	2.0	0.3	0.3	n.a.	n.a.	<0.1	<0.1
France	n.r.	n.r.	1.0	1.0	4.3	4.2	n.a.	n.a.	n.a.	n.a.	n.a.	10.0	10.9	1.2	1.5	n.a.	n.a.	0.1	0.1
Germany	n.r.	n.r.	0.8	1.2	3.3	3.2	<0.1[h]	0.1	0.1	0.1	0.1	14.0	15.3	1.7	2.0	n.a.	n.a.	<0.1	0.1
Luxembourg	n.r.	n.r.	<0.1	<0.1	<0.1	<0.1	n.a.	n.a.	n.a.	n.a.	n.a.	0.1	0.1	<0.1	0.0	n.a.	n.a.	<0.1	<0.1
Netherlands (Kingdom of the)	n.r.	n.r.	0.3	0.2	1.0	0.8	n.a.	<0.1	<0.1	<0.1	<0.1	2.5	2.8	0.4	0.5	n.a.	n.a.	<0.1	<0.1
Switzerland	n.r.	n.r.	0.1	<0.1	0.4	0.2	n.a.	n.a.	n.a.	n.a.	n.a.	1.2	1.3	0.2	0.2	n.a.	n.a.	<0.1	<0.1

NOTES:
1. Regional estimates are included when more than 50 percent of population is covered. To reduce the margin of error, estimates are presented as three-year averages.
2. FAO estimates of the number of people living in households where at least one adult has been found to be food insecure.
3. Country-level results are presented only for those countries for which estimates are based on official national data (see note b) or as provisional estimates, based on FAO data collected through the Gallup© World Poll, Geopoll or Kantar for countries whose national relevant authorities expressed no objection to their publication. Note that consent to publication does not necessarily imply validation of the estimate by the national authorities involved and that the estimate is subject to revision as soon as suitable data from official national sources are available. Global, regional and subregional aggregates are based on data collected in approximately 150 countries.
4. The estimates referring to the middle of the projected ranges for the years 2020 to 2022 were used to calculate the three-year averages.
5. For regional estimates, values correspond to the model predicted estimates for 2022. For countries, the latest data available from 2016 to 2022 are used.
6. Regional estimates are included when more than 50 percent of population is covered. For countries, the latest data available from 2005 to 2012 are used.
7. Regional estimates are included when more than 50 percent of population is covered. For countries, the latest data available from 2015 to 2021 are used.
* Wasting under five years of age regional aggregates exclude Japan.
** The Northern America wasting estimates are derived applying mixed-effect models with subregions as fixed effects; data were available only for the United States of America, preventing the estimation of standard errors (and confidence intervals). Further details on the methodology are described in De Onis, M., Blössner, M., Borghi, E., Frongillo, E.A. & Morris, R. 2004. Estimates of global prevalence of childhood underweight in 1990 and 2015. *Journal of the American Medical Association*, 291(21): 2600–2606. Model selection is based on best fit.

a. Consecutive low population coverage; interpret with caution.
b. Based on official national data.
c. For years when official national data are not available, the estimates are integrated with FAO data. See **Annex 1B** for further details.
d. Data informing the 2020 food insecurity estimates come from a national COVID-19 impact assessment survey with a reference period of 3 months; therefore, comparability with the rest of the series may be affected.
e. Based on official national data collected in 2019–2022 through EU statistics on income and living conditions.
f. Most recent input data are from before 2000, interpret with caution.
g. The UNICEF-WHO low birthweight estimates are derived through standard methodology applied to all countries to ensure comparability and are not the official statistics of the Government of India. India's most recent national official low birthweight prevalence is 18.2 percent from the 2019–2021 National Family Health Survey–5 (NFHS-5), which is used as the basis of the UNICEF-WHO global estimation model to support cross-country comparability.
h. This estimate has been adjusted because the original estimate did not cover the full age range or the data source was only representative of rural areas.
<0.1 = less than 100 000 people.
n.a. = data not available; n.r. = data not reported. In the case of the number of undernourished people, this is because the prevalence is less than 2.5 percent.

SOURCES: Data for undernourishment and food insecurity are from FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS; data for stunting, wasting and overweight are based on UNICEF, WHO & World Bank. 2023. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2023 edition)*. [Cited 27 April 2023]. https://data.unicef.org/resources/jme-report-2023, www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition; data for obesity are based on WHO. 2020. Global Health Observatory (GHO) data repository. In: *WHO*. [Cited 28 April 2020]. https://apps.who.int/gho/data/node.main.A900A?lang=en; data on anaemia are based on WHO. 2021. Global anaemia estimates, Edition 2021. In: *WHO | Global Health Observatory (GHO) data repository*. [Cited 20 April 2023]. www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children; data for exclusive breastfeeding are based on UNICEF. 2022. Infant and young child feeding. In: *UNICEF*. [Cited 6 April 2023]. https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding; and data for low birthweight are from UNICEF & WHO. 2023. *Low birthweight joint estimates 2023 edition*. [Cited 12 July 2023]. https://data.unicef.org/topic/nutrition/low-birthweight; www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-low-birthweight-estimates

TABLE A1.3 PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY, AND SEVERE FOOD INSECURITY ONLY, BY DEGREE OF URBANIZATION IN 2022

	Prevalence of severe food insecurity (%)			Prevalence of moderate or severe food insecurity (%)		
	Rural	Peri-urban	Urban	Rural	Peri-urban	Urban
WORLD	**12.8**	**11.6**	**9.4**	**33.3**	**28.8**	**26.0**
AFRICA	**25.9**	**23.1**	**20.2**	**64.5**	**60.3**	**54.2**
Northern Africa	10.1	8.2	11.9	29.9	23.4	30.0
Sub-Saharan Africa	27.6	26.3	23.0	68.1	68.4	62.5
Eastern Africa	25.7	26.7	20.5	68.3	68.9	60.0
Middle Africa	44.1	44.0	35.4	81.1	82.5	74.0
Southern Africa	15.9	13.1	10.2	31.7	28.2	21.3
Western Africa	24.5	22.1	20.2	67.2	69.3	65.3
ASIA	**10.3**	**11.0**	**8.3**	**26.5**	**25.1**	**21.8**
Central Asia	3.9	3.7	4.9	14.6	17.3	16.5
Eastern Asia	1.3	1.2	0.6	11.0	4.6	4.9
South-eastern Asia	3.1	2.4	2.1	17.8	17.1	12.9
Southern Asia	21.7	20.3	17.6	42.5	40.4	39.0
Western Asia	9.4	12.3	10.2	37.6	44.3	32.9
Western Asia and Northern Africa	*9.8*	*10.0*	*11.0*	*33.9*	*32.8*	*31.6*
LATIN AMERICA AND THE CARIBBEAN	**14.4**	**12.6**	**10.1**	**40.4**	**38.6**	**32.1**
Caribbean	28.0	21.7	20.8	57.8	48.6	47.3
Latin America	13.6	11.6	9.4	39.3	37.5	31.2
Central America	11.9	9.9	5.9	43.5	37.6	27.8
South America	14.5	12.3	10.7	37.2	37.5	32.5
OCEANIA	**2.3**	**3.4**	**2.6**	**9.6**	**13.6**	**11.1**
NORTHERN AMERICA AND EUROPE	**1.2**	**1.3**	**1.4**	**6.8**	**6.5**	**7.5**
Europe	1.4	1.7	1.6	6.7	6.6	6.7
Eastern Europe	1.3	1.6	1.4	7.1	7.3	7.0
Northern Europe	2.2	2.1	1.7	7.6	6.3	6.0
Southern Europe	1.2	1.6	1.6	7.7	7.8	7.4
Western Europe	1.5	1.7	1.8	5.0	4.9	6.1
Northern America	0.7	0.5	0.9	6.9	6.4	9.1
COUNTRY INCOME GROUP						
Low-income countries	30.0	29.0	24.5	71.0	71.5	63.7
Lower-middle-income countries	17.9	16.4	14.5	42.7	38.0	36.7
Upper-middle-income countries	5.1	3.6	4.2	19.0	11.8	14.8
High-income countries	1.5	1.7	1.8	7.7	7.4	8.2

SOURCE: FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS

TABLE A1.4 PREVALENCE OF MODERATE OR SEVERE FOOD INSECURITY, AND SEVERE FOOD INSECURITY ONLY, AMONG ADULT MEN AND WOMEN IN 2022

	Prevalence of severe food insecurity (%)		Prevalence of moderate or severe food insecurity (%)	
	Men	Women	Men	Women
WORLD	**9.5**	**10.6**	**25.4**	**27.8**
AFRICA	**22.9**	**23.4**	**58.7**	**59.9**
Northern Africa	11.3	12.3	30.9	32.8
Sub-Saharan Africa	26.0	26.3	66.0	66.8
Eastern Africa	27.1	27.7	68.1	70.0
Middle Africa	39.6	38.4	78.0	78.4
Southern Africa	12.2	12.4	26.0	25.1
Western Africa	21.5	22.0	66.0	66.4
ASIA	**8.5**	**9.9**	**22.1**	**24.0**
Central Asia	4.4	4.6	17.3	17.4
Eastern Asia	1.0	0.9	6.8	5.6
South-eastern Asia	2.4	2.7	16.1	16.5
Southern Asia	17.8	21.0	37.3	42.7
Western Asia	8.6	11.5	30.8	38.4
Western Asia and Northern Africa	*9.8*	*11.9*	*30.9*	*35.8*
LATIN AMERICA AND THE CARIBBEAN	**11.2**	**13.8**	**32.7**	**41.8**
Caribbean	26.7	29.8	58.9	62.8
Latin America	10.0	12.7	30.8	40.3
Central America	7.3	9.3	29.5	38.7
South America	11.1	14.0	31.3	40.9
OCEANIA	**3.4**	**3.4**	**12.5**	**13.3**
NORTHERN AMERICA AND EUROPE	**1.4**	**1.7**	**6.9**	**9.2**
Europe	1.8	2.0	7.2	9.2
Eastern Europe	1.8	2.1	9.4	12.5
Northern Europe	n.a.	n.a.	n.a.	n.a.
Southern Europe	1.5	1.7	7.2	7.6
Western Europe	1.7	1.9	5.0	6.4
Northern America	0.5	0.9	6.2	9.2

SOURCE: FAO. 2023. FAOSTAT: Suite of Food Security Indicators. In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/FS

ANNEX 1B METHODOLOGICAL NOTES FOR THE FOOD SECURITY AND NUTRITION INDICATORS

PREVALENCE OF UNDERNOURISHMENT

Definition: Undernourishment is defined as the condition of an individual whose habitual food consumption is insufficient to provide, on average, the amount of dietary energy required to maintain a normal, active and healthy life.

How it is reported: The indicator (denominated as "prevalence of undernourishment" [PoU]) is an estimate of the percentage of individuals in the population that are in a condition of undernourishment. National estimates are reported as three-year moving averages, to control for the low reliability of the estimates of some of the underlying parameters due to elements for which complete, reliable information is very scarce, such as the year-to-year variation in food commodity stocks, one of the components of the annual FAO Food Balance Sheets (FBS). Regional and global aggregates, on the other hand, are reported as annual estimates, as possible estimation errors are expected not to be correlated and therefore to be greatly reduced to acceptable levels when aggregating across countries.

The entire series of PoU values is revised with each new edition of this report to reflect new data and information that FAO has obtained since the release of the previous edition. As this process usually implies backward revisions of the entire PoU series, readers are advised to refrain from comparing series across different editions of this report and should always refer to the current edition of the report, including for values in past years.

Methodology: To compute an estimate of the prevalence of undernourishment in a population, the probability distribution of habitual dietary energy intake levels (expressed in kcal per person per day) for the average individual is modelled as a parametric probability density function, f(x).[1, 2] The indicator is obtained as the cumulative probability that the habitual dietary energy intake (x) is below the minimum dietary energy requirement (MDER) (i.e. the lowest limit of the range of energy requirements that is appropriate for the population's representative average individual) as in the formula below:

$$PoU = \int_{x<MDER} f(x|\theta)dx,$$

where θ is a vector of parameters that characterizes the probability density function. In the actual computations, the distribution is assumed to be lognormal and thus fully characterized by only two parameters: the mean dietary energy consumption (DEC) and its coefficient of variation (CV).

Data source: Different data sources are used to estimate the different parameters of the model.

Minimum dietary energy requirement (MDER): Human energy requirements for an individual in a given sex/age class are determined on the basis of normative requirements for basic metabolic rate per kilogram of body mass, multiplied by the ideal weights that a healthy person of that sex/age class may have, given his or her height, and then multiplied by a coefficient of physical activity level (PAL) to take into account physical activity.[bd] Given that both healthy body mass indices (BMIs) and normal PALs vary among active and healthy individuals of the same sex and age, a range of energy requirements applies to each sex and age group of the population. The MDER for the average individual in the population, which is the parameter used in the PoU formula, is obtained as the weighted average of the lower bounds of the energy requirement ranges for each sex and age group, using the shares of the population in each sex and age group as weights. Similar to the MDER, the average dietary energy requirement (ADER) (used to estimate the one component of

bd A person is considered healthy if his or her BMI indicates neither underweight nor overweight. Human energy requirement norms per kilogram of body mass are given in FAO and WHO (2004).[3]

the CV as described below) is estimated using the average values of the PAL category "Active or moderately active lifestyle".

Information on the population structure by sex and age needed to compute the MDER is available for most countries in the world and for each year from the UN Department of Economic and Social Affairs (UN DESA) *World Population Prospects*, revised every two years. This edition of *The State of Food Security and Nutrition in the World* uses the 2022 revision of the *World Population Prospects*.[4]

Information on the median height in each sex and age group for a given country is derived from a recent demographic and health survey (DHS) or from other surveys that collect anthropometry data on children and adults. Even if such surveys do not refer to the same year for which the PoU is estimated, the impact of possible small intervening changes in median heights over the years on the MDER, and therefore on the PoU estimates, is expected to be negligible.

Dietary energy consumption (DEC): Ideally, DEC could be estimated from data on food consumption coming from nationally representative household surveys (such as Living Standards Measurement Study surveys or Household Consumption and Expenditure Surveys). However, only very few countries conduct such surveys on an annual basis. Thus, in FAO's PoU estimates for global monitoring, DEC values are estimated from the dietary energy supply (DES) reported in the FBS, compiled by FAO for most countries in the world.[5]

Since the last edition of this report, the FBS domain on FAOSTAT has been updated with new values of the series up to 2020 for all countries. In addition, at the time of closing this report, the FBS series were updated to 2021 for the following 66 countries, selected as a priority due to the high contribution they make to the total number of undernourished people in the world: Afghanistan, Angola, Argentina, Bangladesh, Benin, Bolivia (Plurinational State of), Brazil, Burkina Faso, Cambodia, Cameroon, Central African Republic, Chad, Colombia, Congo, Côte d'Ivoire, Democratic People's Republic of Korea, Democratic Republic of the Congo, Dominican Republic, Ecuador, Egypt, Ethiopia, Ghana, Guatemala, Haiti, Honduras, India, Indonesia, Iran (Islamic Republic of), Iraq, Japan, Jordan, Kenya, Liberia, Madagascar, Malawi, Mali, Mexico, Morocco, Myanmar, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Papua New Guinea, Peru, Philippines, Rwanda, Saudi Arabia, Senegal, Sierra Leone, Somalia, South Africa, Sudan, Syrian Arab Republic, Tajikistan, Thailand, Togo, Uganda, Ukraine, United Republic of Tanzania, Venezuela (Bolivarian Republic of), Viet Nam, Yemen, Zambia and Zimbabwe.

The revision of the FBS series this year reflects the inclusion of new official data on food production, trade and utilization reported by these countries, as usual, but it also reflects a substantial revision of the FBS series up to 2021 given the introduction of improved nutrient conversion factors[6] and adjustments needed to consider the new population estimates provided by the UN DESA *World Population Prospects*, 2022 revision.[4]

Per capita average DES in 2021 (for countries other than the ones listed above) and in 2022 (for all countries) are nowcast on the basis of the short-run market outlook exercises conducted by FAO to inform the World Food Situation Portal[7] and used to nowcast the 2021 and 2022 values of DEC for each country, starting from the last available year of the DES in the FBS series.

Coefficient of variation (CV): The CV of habitual DEC in the population is obtained as the geometric mean of two components, labelled respectively $CV|y$ and $CV|r$:

$$CV = \sqrt{(CV|y)^2 + (CV|r)^2}$$

The first component refers to variability in the per capita consumption across households belonging to different sociodemographic strata, and therefore is referred to as the CV "due to income", while the second component captures variability across individuals, due to differences in sex, age, body mass and PAL that can be found among members of the same household. As these are the same elements that determine energy requirements, the second component is referred to as CV "due to requirements".

CV|y

When reliable data on food consumption are available from nationally representative household surveys, the CV due to income (CV|y) can be estimated directly. Since the last edition of this report, 14 new surveys from the following 10 countries have been processed to update the CV|y: Argentina (2018), Armenia (2019, 2020, 2021), Benin (2019), Bhutan (2012), Cambodia (2019), Guinea-Bissau (2019), Mexico (2012, 2020), Mongolia (2020, 2021), Peru (2019) and Uruguay (2017). That makes for a total of 129 surveys from 65 countries for which the estimate of the CV|y is based on data from national surveys.

When no suitable survey data are available, Food Insecurity Experience Scale (FIES) data collected by FAO since 2014 are used to project the changes in the CV|y from 2015 (or from the year of the last food consumption survey, if more recent) up to 2019, based on the observed trend in severe food insecurity. The projections are based on the assumption that observed changes in the extent of severe food insecurity measured with the FIES might be indicative of equivalent changes in the PoU. To the extent that such implied changes in the PoU cannot be fully explained by the "supply-side" effects of changes in average food supplies, they can be confidently attributed to unobserved changes in the CV|y that might have occurred at the same time. Analysis of historical PoU estimates reveals that, on average, and once differences in DEC, MDER and CV|r have been controlled for, differences in the CV|y explain about one-third of the differences in PoU across time and space. Based on all this, for each country for which FIES data are available, the change in the CV|y that may have occurred from 2015, or from the date of the last available survey, is therefore estimated as the change that would generate one-third of a percentage point change in the PoU for each observed percentage point change in the prevalence of severe food insecurity. For all other countries, lacking any supporting evidence, the CV|y is kept constant at the last available estimate. As in last year's report, the nowcast of the CV|y for 2020, 2021 and 2022 required special treatment to account for the effects of the COVID-19 pandemic (see **Annex 2, Section A**).

CV|r

CV|r represents the variability of the distribution of dietary energy requirements of a hypothetical average individual representative of a healthy population, which is also equal to the CV of the distribution of dietary energy intakes of a hypothetical average individual if everyone in the population were perfectly nourished. For estimation purposes, the distribution of dietary energy requirements of such a hypothetical average individual is assumed to be normal and its standard deviation can be estimated from any two known percentiles. We use the MDER and the ADER mentioned above to approximate the 1st and the 50th percentiles.[8, 9] The value of CV|r is then derived as the inverse cumulative standard normal distribution of the difference between the MDER and the ADER.

Challenges and limitations: While formally the state of being undernourished or not is a condition that applies to individuals, given the data usually available on a large scale, it is impossible to reliably identify which individuals in a certain group are actually undernourished. Through the statistical model described above, the indicator can only be computed with reference to a population or a group of individuals for which a sufficiently representative sample is available. The prevalence of undernourishment is thus an estimate of the percentage of individuals in that group that are in such condition, but it cannot be further disaggregated.

Due to the probabilistic nature of the inference and the margins of uncertainty associated with estimates of each of the parameters in the model, the precision of the PoU estimates is generally low. While it is not possible to formally compute margins of error around PoU estimates, they are expected to exceed 5 percent in most cases. For this reason, FAO does not consider PoU estimates that result lower than 2.5 percent as sufficiently reliable to be reported.

It is important to note that the ranges presented for the values of the PoU in 2020, 2021 and 2022 should not be interpreted as statistical confidence intervals. Rather, they represent different scenarios used to nowcast the values of CV|y from 2020 to 2022.

Recommended readings:
FAO. 1996. Methodology for assessing food inadequacy in developing countries. In: FAO. *The Sixth World Food Survey*, pp. 114–143. Rome.
FAO. 2003. *Proceedings: Measurement and Assessment of Food Deprivation and Undernutrition: International Scientific Symposium*. Rome.
FAO. 2014. *Advances in hunger measurement: traditional FAO methods and recent innovations*. FAO Statistics Division Working Paper, No. 14–04. Rome.
Naiken, L. 2002. *Keynote paper: FAO methodology for estimating the prevalence of undernourishment*. Paper presented at the Measurement and Assessment of Food Deprivation and Undernutrition International Scientific Symposium, Rome, 26–28 June 2002. Rome, FAO.
Wanner, N., Cafiero, C., Troubat, N. & Conforti, P. 2014. *Refinements to the FAO methodology for estimating the prevalence of undernourishment indicator.* Rome, FAO.

PREVALENCE OF FOOD INSECURITY AS MEASURED BY THE FOOD INSECURITY EXPERIENCE SCALE (FIES)

Definition: Food insecurity as measured by this indicator refers to limited **access to food,** at the level of individuals or households, due to lack of money or other resources. The severity of food insecurity is measured using data collected with the Food Insecurity Experience Scale Survey Module (FIES-SM), a set of eight questions asking respondents to self-report conditions and experiences typically associated with limited access to food. For purposes of annual SDG monitoring, the questions are asked with reference to the 12 months preceding the survey.

Using sophisticated statistical techniques based on the Rasch measurement model, the information obtained in an FIES-SM survey is validated for internal consistency and converted into a quantitative measure along a scale of severity, ranging from low to high. Based on their responses to the survey items, the individuals or households interviewed in a nationally representative survey of the population are assigned a probability of being in one of three classes: i) food secure or only marginally insecure; ii) moderately food insecure; and iii) severely food insecure, as defined by two globally set thresholds. Based on FIES data collected over three years from 2014 to 2016, FAO has established the FIES reference scale, which is used as the global standard for experience-based food-insecurity measures, and to set the two reference thresholds of severity.

SDG Indicator 2.1.2 is obtained as the cumulated probability to be in the two classes of moderate and severe food insecurity. A separate indicator (FI_{sev}) is computed by considering only the severe food insecurity class.

How it is reported: In this report, FAO provides estimates of food insecurity at two different levels of severity: moderate or severe food insecurity ($FI_{mod+sev}$), and severe food insecurity (FI_{sev}). For each of these two levels, two estimates are reported:

- the **prevalence (percent) of individuals** in the population living in households where at least one adult was found to be food insecure; and
- the estimated **number of individuals** in the population living in households where at least one adult was found to be food insecure.

Data source: Since 2014, the eight-question FIES-SM has been applied in nationally representative samples of the adult population (defined as aged 15 or older) in more than 140 countries included in the Gallup© World Poll (GWP), covering more than 90 percent of the world population. In 2022, interviews were conducted in both telephone and face-to-face modality. Telephone interviews were maintained in some countries already covered with this modality in 2020 given the high risk of community transmission from conducting face-to-face data collection during the COVID-19 pandemic. By evaluating dual frame coverage (i.e. the proportion of the adult population that is covered by a combination of landline and mobile phones), countries with a minimum of 70 percent coverage were included as part of the 2020 GWP through computer-assisted telephone interviews.

Gallup© traditionally uses telephone surveys in Northern America, Western Europe, some parts of Asia, and Cooperation Council for the Arab States of the Gulf countries. In Central and Eastern Europe, much of Latin America, and nearly all of Asia, the Near East and Africa, an area frame design is used for face-to-face interviewing.

In most countries, samples include about 1 000 individuals, with larger samples of 3 000 individuals in India, 3 500 in China (mainland) and 2 000 in the Russian Federation. No data were collected in China (mainland) in 2022.

In addition to the GWP, in 2022 FAO collected data in seven countries through Geopoll® and Kantar® with the objective of filling data gaps on access to food.[72] The countries covered were: Cameroon, Democratic Republic of the Congo, Guinea-Bissau, Haiti, Liberia, Rwanda and Zambia.

National government survey data were used to calculate the food insecurity prevalence estimates for 60 countries, covering more than a quarter of the world population, by applying FAO's statistical methods to adjust national results to the same global reference standard. The countries are: Afghanistan, Angola, Armenia, Belize, Benin, Botswana, Burkina Faso, Cabo Verde, Canada, Chad, Chile, Costa Rica, Côte d'Ivoire, Dominican Republic, Ecuador, Fiji, Ghana, Greece, Grenada, Guinea-Bissau, Honduras, Indonesia, Israel, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Lesotho, Malawi, Mexico, Namibia, Niger, Nigeria, Pakistan, Palestine, Paraguay, Philippines, Republic of Korea, Russian Federation, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Senegal, Seychelles, Sierra Leone, South Africa, South Sudan, Sri Lanka, Sudan, Togo, Tonga, Uganda, United Arab Emirates, United Republic of Tanzania, United States of America, Uruguay, Vanuatu, Viet Nam and Zambia. Countries are considered for the year or years when national data are available. For the remaining years, the following strategy was followed:

- When more than one year of national data is available, the missing years are linearly interpolated.
- If only one year of data is available, missing years are informed as follows:
  - using FAO data if considered compatible with the national surveys;
  - imputed using the trend suggested by FAO data if national data are not compatible;
  - imputed using the trend of the subregion if no other reliable and timely information is available; or
  - considered constant to the level of the national survey if the subregion cannot be computed or the trend of other surveys or the subregion is not applicable to the country-specific situation considering evidence found in support of the trend (for instance, evolution of poverty, extreme poverty, employment and food inflation, among others); this applies also to countries where the prevalence of food insecurity is very low (below 3 percent at the severe level) or very high (above 85 percent at the moderate or severe level).

Given the heterogeneity of the survey sources and the small sample size of some of the FAO surveys, new data can occasionally predict a notably large increase or decrease from one year to the next. In such situations, the protocol is to look for external information for the country (data and/or reports, possibly in consultation with country experts like FAO country or regional officers) to explore whether big shocks or interventions have occurred. If the trend can be justified by supporting evidence, but seems excessive, the trend is kept but smoothed (for example, using the three-year average). Otherwise, the same protocol used for missing years is applied (i.e. keeping the level constant or applying the subregional trend). In 2022, no FIES data were collected in China (mainland), therefore the trend was kept constant.

Methodology: The data were validated and used to construct a scale of food-insecurity severity using the Rasch model, which postulates that the probability of observing an affirmative answer by respondent *i* to question *j* is a logistic function of the distance, on an underlying scale of severity, between the position of the respondent, a_i, and that of the item, b_j.

$$Prob(X_{i,j} = \text{Yes}) = \frac{\exp(a_i - b_j)}{1 + \exp(a_i - b_j)}$$

By applying the Rasch model to the FIES data, it is possible to estimate the cross-country comparable probability of being food insecure ($p_{i,L}$) at each level of severity of food insecurity L (moderate or severe, or severe only), for each respondent i, with $0 < p_{i,L} < 1$.

The prevalence of food insecurity at each level of severity (FI_L) in the population is computed as the weighted sum of the probability of being food insecure for all respondents (*i*) in a sample:

$$FI_L = \sum p_{i,L} w_i$$

where w_i are post-stratification sampling weights that indicate the proportion of individuals or households in the national population represented by each record in the sample.

As only individuals aged 15 years or more are sampled in the GWP, the prevalence estimates directly produced from these data refer to the population aged 15 years and older. To arrive at the **prevalence and number of individuals (of all ages) in the population**, an estimate is required of the number of people living in households where at least one adult is estimated to be food insecure. This involves a multistep procedure detailed in Annex II of the *Voices of the Hungry Technical Report* (see link in the "Recommended readings" section, below).

Regional and global aggregates of food insecurity at moderate or severe, and severe levels, $FI_{L,r}$, are computed as:

$$FI_{L,r} = \frac{\sum_c FI_{L,c} \times N_c}{\sum_c N_c}$$

where r indicates the region, $FI_{L,c}$ is the value of FI at level L estimated for country c in the region, and N_c is the corresponding population size. When no estimate of FI_L is available for a country, it is assumed to be equal to the population-weighted average of the estimated values of the remaining countries in the same subregion. A regional aggregate is produced only if the countries for which an estimate is available cover at least 50 percent of the region's population.

Universal thresholds are defined on the FIES global standard scale (a set of item parameter values based on results from all countries covered by the GWP in 2014–2016) and converted into corresponding values on local scales. The process of calibrating each country's scale against the FIES global standard can be referred to as **equating** and permits the production of **internationally comparable** measures of food insecurity severity for individual respondents, as well as comparable national prevalence rates.

The problem stems from the fact that, when defined as a *latent* trait, the severity of food insecurity has no absolute reference against which it could be evaluated. The Rasch model enables identification of the relative position that the various items occupy on a scale that is denominated in logit units but whose "zero" is arbitrarily set, usually to correspond to the mean estimated severity. This implies that the zero of the scale changes in each application. To produce comparable measures over time and across different populations requires establishing a common scale to use as a reference and finding the formula needed to convert measures across different scales. As is the case for converting measures of temperature across difference measuring scales (such as Celsius and Fahrenheit), this requires the identification of a number of "anchoring" points. In the FIES methodology, these anchoring points are the severity levels associated with the items whose *relative* position on the scale of severity can be considered equal to that of the corresponding items on the global reference scale. The "mapping" of the measures from one scale to the other is then obtained by finding the formula that equates the mean and the standard deviation (SD) of the common items' severity levels.

Challenges and limitations: When food-insecurity prevalence estimates are based on FIES data collected in the GWP, with national sample sizes of about 1 000 individuals in most countries, confidence intervals rarely exceed 20 percent of the measured prevalence (that is, prevalence rates of 50 percent would have margins of error of up to plus or minus 5 percent). Confidence intervals are likely to be much smaller, however, when national prevalence rates are estimated using larger samples and for estimates referring to aggregates of several countries. To reduce the impact of year-to-year sampling variability, country-level estimates are presented as three-year averages, computed as averages of all available years in the considered triennia.

Recommended readings:

FAO. 2016. *Methods for estimating comparable rates of food insecurity experienced by adults throughout the world*. Rome. www.fao.org/3/a-i4830e.pdf

FAO. 2018. Voices of the Hungry. In: *FAO*. [Cited 28 April 2020]. www.fao.org/in-action/voices-of-the-hungry

Gallup. 2020. Gallup Keeps Listening to the World Amid the Pandemic. In: *Gallup*. [Cited 25 May 2021]. https://news.gallup.com/opinion/gallup/316016/gallup-keeps-listening-world-amid-pandemic.aspx

STUNTING, WASTING AND OVERWEIGHT IN CHILDREN UNDER FIVE YEARS OF AGE

Definition of stunting (children under five years of age): Height/length (cm) for age (months) <–2 SD of the WHO Child Growth Standards median. Low height-for-age is an indicator that reflects the cumulative effects of undernutrition and infections since and even before birth. It may be the result of long-term nutritional deprivation, recurrent infections and lack of water and sanitation infrastructures.

How it is reported: The percentage of children aged 0 to 59 months who are below –2 SD from the median height-for-age of the WHO Child Growth Standards.

Definition of wasting: Weight (kg) for height/length (cm) <–2 SD of the WHO Child Growth Standards median. Low weight-for-height is an indicator of acute weight loss or a failure to gain weight and can be a consequence of insufficient food intake and/or an incidence of infectious diseases, especially diarrhoea.

How it is reported: The percentage of children aged 0 to 59 months who are below –2 SD from the median weight-for-height of the WHO Child Growth Standards.

Definition of overweight: Weight (kg) for height/length (cm) >+2 SD of the WHO Child Growth Standards median. This indicator reflects excessive weight gain for height generally due to energy intakes exceeding children's energy requirements.

How it is reported: The percentage of children aged 0 to 59 months who are above +2 SD from the median weight-for-height of the WHO Child Growth Standards.

Data source: UNICEF, WHO & World Bank. 2023. *UNICEF-WHO-World Bank: Joint child malnutrition estimates – Levels and trends (2023 edition).* [Cited 27 April 2023]. https://data.unicef.org/resources/jme-report-2023, www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition

Methodology:

Country-level estimates

The UNICEF/WHO-World Bank Group Joint Child Malnutrition Estimates (JME) country dataset

The UNICEF/WHO-World Bank Group JME dataset of country estimates requires the collection of national data sources that contain information on child malnutrition – specifically, data on the height, weight and age of children under five years, which can be used to generate national-level prevalence estimates for stunting, wasting and overweight. These national-level data sources mainly comprise household surveys (e.g. Multiple Indicator Cluster Surveys [MICS], DHS). Some administrative data sources (e.g. from surveillance systems) are also included where population coverage is high. As of the latest review closure on 28 February 2023, the primary source dataset contained 1 100 data sources from 162 countries and territories, with nearly 80 percent of children living in countries with at least one data point within the past five years on stunting, wasting and overweight. This suggests that the global estimates are highly representative of the majority of children across the globe for the most recent period. The dataset contains the point estimate (and where available, the standard error), the 95 percent confidence bounds and the unweighted sample size. Where microdata are available, the JME uses estimates that have been recalculated to adhere to the global standard definition. Where microdata are not available, reported estimates are used, except in cases where adjustments are required to standardize for: i) use of an alternate growth reference from the 2006 WHO Growth Standards; ii) age ranges that do not include the full 0–59-month age group; and iii) data sources that were only nationally representative for populations residing in rural areas. Further details related to data source compilation, re-analysis of microdata, and data source review are described elsewhere.[10]

The JME country dataset serves different purposes for different indicators. For wasting, the JME country dataset serves as the country estimates themselves (i.e. the wasting prevalence in the JME country dataset from a household survey for a country in a given year is the wasting prevalence reported for that country in that year). For stunting and overweight, the JME country dataset is used to generate country-modelled estimates which serve as the official JME estimates (i.e. the stunting prevalence from a household survey for a given country in a given year is not reported as the prevalence for that country in that year; rather, it feeds into the modelled estimates described in the next section below).

Country-level model for stunting and overweight estimates

The technical details of the statistical models are provided elsewhere.[10] Briefly, for both stunting and overweight, the prevalence was modelled at logit (log-odds) scale using a penalized longitudinal mixed model with a heterogeneous error term. The quality of the models was quantified with model-fit criteria that balance the complexity of the model with the closeness of the fit to the observed data. The proposed method has important characteristics, including non-linear time trends, regional trends, country-specific trends, covariate data and a heterogeneous error term. All countries with data contribute to estimates of the overall time trend and the impact of covariate data on the prevalence. For overweight, the covariate data consisted of linear and quadratic sociodemographic index (SDI),[be] and data source type. The same covariates were used for stunting, plus an additional covariate of the average health system access over the previous five years.

Annual country-level modelled estimates from 2000 to 2022 on stunting and overweight were disseminated by the JME in 2023 for 160 countries with at least one data point (e.g. from a household survey) included in the JME country dataset described above. Modelled country estimates were also produced for an additional 45 countries, used solely for generation of regional and global aggregates. Modelled estimates for these 45 countries are not shown because they did not have any household surveys in the JME country dataset or because the modelled estimates remained pending final review at the time of publication. The results for the 205 countries can be used to calculate estimates and uncertainty intervals for any group of countries aggregated. The uncertainty intervals are important in monitoring trends, especially for countries with sparse data and where primary data sources present large primary data source sampling errors. When only sparse data are available in the most recent period, the inclusion of a survey can affect a substantial change in the predicted trajectory. For this reason, uncertainty intervals are needed to enhance trend interpretability in terms of the caution level employed. The uncertainty intervals for the new JME method have been tested and validated with various data types.

Regional and global estimates

Regional and global wasting estimates are only presented for the most recent year, 2022, unlike stunting and overweight estimates, for which an annual time series is available from 2000 to 2022. This is because the JME are based on national-level country prevalence data, which come from cross-sectional surveys (i.e. a snapshot at one point in time) that are collected infrequently (every three to five years) in most countries. Since stunting and overweight are relatively stable over the course of a calendar year, it is reasonable to track changes in these two conditions over time with these data, whereas wasting is an acute condition that can change frequently and rapidly. An individual child can be affected by wasting more than once in a calendar year (i.e. can recover but then become wasted again in the same year), and the risk of wasting in many contexts can be driven by seasonal variations, which can result in seasonal spikes in prevalence. For example, wasting prevalence, in some contexts, may double between the post-harvest season (often associated with higher food availability and weather patterns that are less likely to cause disease) and the pre-harvest season (often associated with food shortages, heavy rains and related diseases that can affect nutrition status). Given that country surveys can be collected during any season, the prevalence

be SDI is a summary measure that identifies where countries or other geographic areas sit on the spectrum of development. Expressed on a scale of 0 to 1, SDI is a composite average of the rankings of the income per capita, average educational attainment, and fertility rates of all areas in the Global Burden of Disease study.

estimate from any survey may be at a high or a low; or it may fall somewhere in between if data collection spanned across several seasons. Thus, the prevalence of wasting captures the situation of wasting at a specific point in time and not over an entire year. Variations in seasons across surveys make it difficult to draw inferences on trends. The lack of methods to account for seasonality and incident cases of wasting are the main reasons why the JME does not present annual trends for this form of malnutrition.

Generation of regional and global estimates
Different methods were applied to generate regional and global estimates for stunting and overweight compared to wasting, as described below. In short, results from the new country-level model were used to generate the regional and global estimates for stunting and overweight, while the JME subregional multilevel model was used to generate the global and regional estimates for wasting.

Stunting and overweight
Global and regional estimates for all years from 2000 to 2022 were derived as the respective country averages weighted by the countries' under-five population from the UN DESA *World Population Prospects*, 2022 revision,[4] using model-based estimates for 204 countries. This includes 155 countries with national data sources (e.g. household surveys) included in the JME country dataset described above. It also includes 49 countries with modelled estimates generated for development of regional and global aggregates but for which country modelled estimates are not shown, either because they did not have any household surveys in the JME country dataset or because the modelled estimates remained pending final review at the time of publication. Confidence intervals were generated based on bootstrapping methodology.

Wasting
The wasting prevalence data from national data sources described in the above section about the JME country dataset were used to generate the regional and global estimates for 2020 using the JME subregional multilevel model, applying population weights for children under five years of age from the UN DESA *World Population Prospects*, 2022 revision.

Challenges and limitations: The recommended periodicity for countries to report on stunting, overweight and wasting is every three to five years; however, for some countries, data are available less frequently. While every effort has been made to maximize the comparability of statistics across countries and over time, country data may differ in terms of data collection methods, population coverage and estimation methods used. Survey estimates come with levels of uncertainty due to both sampling errors and non-sampling errors (technical measurement errors, recording errors, etc.). Neither of the two sources of error has been fully taken into account for deriving estimates at the country or regional and global levels.

For the prevalence of wasting, as surveys are generally carried out during a specific period of the year, the estimates can be affected by seasonality. Seasonal factors related to wasting include food availability (e.g. pre-harvest periods) and disease (rainy season and diarrhoea, malaria, etc.), while natural disasters and conflicts can also show real shifts in trends that would need to be treated differently from a seasonal variation. Hence, country-year estimates for wasting may not necessarily be comparable over time. Consequently, only estimates from the most recent year (2022) are provided.

Recommended readings:
de Onis, M., Blössner, M., Borghi, E., Morris, R. & Frongillo, E.A. 2004. Methodology for estimating regional and global trends of child malnutrition. *International Journal of Epidemiology*, 33(6): 1260–1270. https://doi.org/10.1093/ije/dyh202
GBD 2019 Risk Factors Collaborators. 2020. Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*, 396(10258): 1223–1249. https://doi.org/10.1016/s0140-6736(20)30752-2
UNICEF, WHO & World Bank. 2021. *Technical notes from the background document for country consultations on the 2021 edition of the UNICEF-WHO-World Bank Joint Malnutrition Estimates. SDG Indicators 2.2.1 on stunting, 2.2.2a on wasting and 2.2.2b on overweight*. New York, USA, UNICEF. data.unicef.org/resources/jme-2021-country-consultations

UNICEF, WHO & World Bank. 2023. *UNICEF-WHO-World Bank: Joint child malnutrition estimates – Levels and trends (2023 edition).* [Cited 27 April 2023]. https://data.unicef.org/resources/jme-report-2023, www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition
WHO. 2014. *Comprehensive Implementation Plan on maternal, infant and young child nutrition*. Geneva, Switzerland. www.who.int/nutrition/publications/CIP_document/en
WHO. 2019. *Nutrition Landscape Information System (NLIS) country profile indicators: interpretation guide*. Geneva, Switzerland. www.who.int/publications/i/item/9789241516952

EXCLUSIVE BREASTFEEDING

Definition: Exclusive breastfeeding for infants under six months of age is defined as receiving only breastmilk and no additional food or drink, not even water. Exclusive breastfeeding is a cornerstone of child survival and is the best feeding option for newborns, as breastmilk shapes the baby's microbiome, strengthens the immune system and reduces the risk of developing chronic diseases.

Breastfeeding also benefits mothers by preventing postpartum haemorrhage and promoting uterine involution, decreasing risk of iron-deficiency anaemia, reducing the risk of various types of cancer and providing psychological benefits.

How it is reported: Percentage of infants aged 0 to 5 months who are fed exclusively on breastmilk with no additional food or drink, not even water, in the 24 hours preceding the survey.[11]

Data source: UNICEF. 2022. Infant and young child feeding. In: *UNICEF*. [Cited 6 April 2023]. data.unicef.org/topic/nutrition/infant-and-young-child-feeding

Methodology:

$$\frac{\textit{Infants 0–5 months of age who received only breastmilk during the previous day}}{\textit{Infants 0–5 months of age}}$$

This indicator includes breastfeeding by a wet nurse and feeding expressed breastmilk.

The indicator is based on a recall of the previous day's feeding to a cross-section of infants 0 to 5 months of age.

In 2012, the regional and global exclusive breastfeeding estimates were generated using the most recent estimate available for each country between 2005 and 2012. Similarly, 2020 estimates were developed using the most recent estimate available for each country between 2014 and 2020. Global and regional estimates were calculated as weighted averages of the prevalence of exclusive breastfeeding in each country, using the total number of infants aged 0 to 5 months from the *World Population Prospects*, 2022 revision[4] (2012 for the baseline and 2021 for the current) as weights. Estimates are presented only where the available data are representative of at least 50 percent of corresponding regions' total number of births, unless otherwise noted.

Challenges and limitations: While a high proportion of countries collect data for exclusive breastfeeding, data are lacking in high-income countries in particular. The recommended periodicity of reporting on exclusive breastfeeding is every three to five years. However, for some countries, data are reported less frequently, meaning changes in feeding patterns are often not detected for several years after the change occurs.

Regional and global averages may be affected depending on which countries had data available for the periods considered in this report.

Using the previous day's feeding as a basis may cause the proportion of exclusively breastfed infants to be overestimated, as some infants who may have been given other liquids or foods irregularly may not have received these on the day before the survey.

Recommended readings:

UNICEF. 2022. Infant and young child feeding: exclusive breastfeeding. In: *UNICEF*. [Cited 6 April 2023]. data.unicef.org/topic/nutrition/infant-and-young-child-feeding
WHO. 2014. *Comprehensive Implementation Plan on maternal, infant and young child nutrition*. Geneva, Switzerland. www.who.int/nutrition/publications/CIP_document/en

WHO. 2019. *Nutrition Landscape Information System (NLIS) country profile indicators: interpretation guide*. Geneva, Switzerland. www.who.int/publications/i/item/9789241516952
WHO & UNICEF. 2021. Indicators for assessing infant and young child feeding practices: definitions and measurement methods. https://apps.who.int/iris/rest/bitstreams/1341846/retrieve

LOW BIRTHWEIGHT

Definition: Low birthweight is defined as a weight at birth of less than 2 500 g (less than 5.51 lbs), regardless of gestational age. A newborn's weight at birth is an important marker of maternal and foetal health and nutrition.[12]

How it is reported: The percentage of newborns weighing less than 2 500 g (less than 5.51 lbs) at birth.

Data source: UNICEF & WHO. 2023. *Low birthweight joint estimates 2023 edition*. [Cited 12 July 2023]. https://data.unicef.org/topic/nutrition/low-birthweight; www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-low-birthweight-estimates

Methodology: Nationally representative estimates of low birthweight prevalence can be derived from a range of sources, broadly defined as national administrative data or representative household surveys. National administrative data are those coming from national systems including civil registration and vital statistics systems, national health management information systems and birth registries. National household surveys which contain information about birthweight as well as key related indicators including maternal perception of size at birth (MICS, DHS) are also an important source of data on low birthweight especially in contexts where many births are unweighed and/or data heaping is a problem. Prior to entry into the country dataset, country data are reviewed for coverage and quality and adjusted where the source is a household survey. To be included, available birthweights from administrative data need to cover at least 80 percent of the UN DESA *World Population Prospects* estimated live births for that year. To be included in the dataset, survey data need to have:

i. a birthweight in the dataset for a minimum of 30 percent of the sample;
ii. a minimum of 200 birthweights in the dataset;
iii. no indication of severe data heaping – this means that: a) ≤55 percent of all birthweights can fall on the three most frequent birthweights (i.e. if 3 000 g, 3 500 g and 2 500 g were the three most frequent birthweights, when added together, they would have to make up ≤55 percent of all birthweights in the dataset); b) ≤10 percent of all birthweights are ≥4 500 g; and c) ≤5 percent of birthweights fall on tail ends of 500 g and 5 000 g; and
iv. undergone an adjustment for missing birthweights and heaping.[12]

Estimates of low birthweight prevalence at the national level were predicted from a Bayesian multilevel-regression model.[13] The model is fit on the logit (log-odds) scale to ensure that proportions are bounded between zero and one, and then back-transformed and multiplied by 100 to obtain prevalence estimates.

Hierarchical random country-specific intercepts (countries within regions within global) accounted for the correlation within and between the regions. The six SDG regions were adapted and used in the modelling. Penalized splines were used as temporal smoothing across the time series 26–28, meaning that country-level non-linear time trends were captured without random variation affecting the trend. Country-level covariates were also included in the modelling. The final covariates included in the model were: gross national income per person purchasing power parity (constant 2017 international dollars), the prevalence of underweight among female adults, the adult female literacy rate, the modern contraception prevalence rate and the percentage of urban population.

Alongside this, data quality categories (Table A1.5) were used to apply bias shifts and additional variance terms. The bias shift was applied to administrative data from lower quality categories, which approximated the expected bias from heaping that was already accounted for in the survey adjustment. The additional variance was based on 1) the data quality category of the administrative data, and 2) the weighting between administrative and survey data if the country had both.

TABLE A1.5 DATA QUALITY CATEGORIES FOR ADMINISTRATIVE SOURCES

DQC	Criteria 1 – Coverage compared to *World Population Prospects* estimated live births	Criteria 2 – Data source type	Criteria 3 – Denominator used to calculate low birthweight rate	Criteria 4 – Omission of babies around threshold of viability	Criteria 5 – Whether country has only admin data or admin data and surveys
A*	≥90% recorded birthweight coverage** and ≥90% facility births***	Civil registration and vital statistics or medical birth registry	Live births with birthweight for all country-years, and not reported prevalence of low birthweight	<1 000/<2 500g ≥4%* or if <1 000/<2 500g is unavailable, <1 500/<2 500g ≥12.5%***	–
B1	Not meeting criteria for category A	Civil registration and vital statistics or medical birth registry	Denominator is live births only or total births, and not reported prevalence of low birthweight	Not applied as relevant data not available for all years for these countries	Admin data + survey
B2					Admin data only
C1	Not meeting criteria for category A	Any denominator OR reported low birthweight only (i.e. no denominator)	Any denominator	Not applied as relevant data not available for all years for these countries	Admin data + survey
C2					Admin data only

NOTES: DQC – data quality category. * France included as an exception. ** Recorded birthweight coverage was calculated by dividing the number of live births with a birthweight in the administrative data source by the *World Population Prospects 2022* edition estimated live births. *** Across ≥80 percent of the time series 2000–2019 (i.e. ≥16 country-years).
SOURCE: Okwaraji, Y.B., Krasevec, J., Bradley, E., Conkle, J., Stevens, G.A., Gatica-Domínguez, G., Ohuma, E.O. *et al.* 2023. National, regional, and global estimates of low birthweight in 2020, with trends from 2000: a systematic analysis. *The Lancet* (in press).

Standard diagnostic checks were used to assess for convergence and the sampling efficiency. Cross-validation was implemented, averaging over 200 random splits of 20 percent test data, 80 percent training data. Sensitivity analyses were undertaken including checks on covariates, bias method, temporal smoothing and non-informative priors. All models were fitted in R statistical software and the R packages “rjags” and “R2jags”.

The model included all 2 040 country-years of data meeting the inclusion criteria and generated annual estimates from 2000 to 2020 with 95 percent credible intervals for 195 countries and areas.[bf] Only estimates for countries and areas with data are reported. For the 37 (out of 195) countries with no data or data not meeting inclusion criteria, the final model was used to predict estimates of the prevalence of low birthweight based on country intercepts and time trends estimated from the region- and country-level covariates for all country-years. Regional and global aggregates were then produced using estimates from all 195 countries and areas.

Challenges and limitations: A major limitation of monitoring low birthweight globally is the lack of birthweight data for many of the world’s children. Here there is a notable bias, with children born to poorer, less educated, rural mothers being less likely to have a recorded birthweight when compared to their richer, urban counterparts with more highly educated mothers.[13] As the characteristics of the unweighed are risk factors for having a low birthweight, estimates that do not well represent these children may be lower than the true value. Furthermore, poor quality of available data with regard to excessive heaping on multiples of 500 g or 100 g exists in the majority of available data from LMICs[13] and can further bias low birthweight estimates. The methods applied to adjust for missing birthweights and heaping for survey estimates in the current database[13] are meant to address the problem. A recent validation study found that the adjusted low birthweight estimate was similar to the true prevalence while the unadjusted value didn’t capture even half of the low-weight births in one population.[14]

The administrative input data also have limitations, including a lack of individual-level data, and limited information on heaping and missing birthweights. The data quality categorization (Table A1.5) attempted to account for this by grouping countries according to data quality indicators, but more robust methods need to be developed to adjust for administrative data quality differences at an individual country level as opposed to having a single bias adjustment for a group of countries. Furthermore, for surveys, the standard errors are larger than those developed for the administrative input data due to the nature of sampling in household surveys. These differences in standard errors between administrative and survey data may affect the model outcome artificially.

The SDG geographical groupings used in the modelling may not be appropriate for epidemiological or economic regional outliers. In all, the estimates for 37 (of 195) countries without input data may have been affected. For example,

bf While the world comprises 203 countries in the FAO regional grouping, eight countries did not have low birthweight input data or covariate data. It was therefore not possible to generate any estimates for these countries, and they are not included in the regional and global estimates.

the predicted prevalence for Haiti, a country without input data meeting inclusion criteria, was based on country-level covariates as well as country intercepts and time trends from the Latin America and the Caribbean region which may not be appropriate for this particular country.

In addition, the confidence limits of the regional and global estimates may be artificially small given that about half of the modelled countries had a country-specific effect generated at random for each bootstrap prediction, some of which were positive and others negative, making the relative uncertainty at the regional and global level tend to be less than that at the individual country level.

Recommended readings:

Blanc, A. & Wardlaw, T. 2005. Monitoring low birth weight: An evaluation of international estimates and an updated estimation procedure. *Bulletin World Health Organization*, 83(3): 178–185. www.ncbi.nlm.nih.gov/pmc/articles/PMC2624216

Blencowe, H., Krasevec, J., de Onis, M., Black, R.E., An, X., Stevens, G.A., Borghi, E., Hayashi, C., Estevez, D., Cegolon, L., Shiekh, S., Ponce Hardy, V., Lawn, J.E. & Cousens, S. 2019. National, regional, and worldwide estimates of low birthweight in 2015, with trends from 2000: a systematic analysis. *The Lancet Global Health*, 7(7): e849–e860. https://doi.org/10.1016/S2214-109X(18)30565-5

Chang, K.T., Carter, E.D., Mullany, L.C., Khatry, S.K., Cousens, S., An, X., Krasevec, J., LeClerq, S.C., Munos, M.K. & Katz, J. 2022. Validation of MINORMIX approach for estimation of low birthweight prevalence using a rural Nepal dataset. *The Journal of Nutrition*, 152(3): 872–879. https://doi.org/10.1093/jn/nxab417

Okwaraji, Y.B., Krasevec, J., Bradley, E., Conkle, J., Stevens, G.A., Gatica-Domínguez, G., Ohuma, E.O. *et al*. 2023. National, regional, and global estimates of low birthweight in 2020, with trends from 2000: a systematic analysis. *The Lancet* (in press).

ADULT OBESITY

Definition: BMI ≥30.0 kg/m². The body mass index (BMI) is the weight-to-height ratio commonly used to classify the nutritional status of adults. It is calculated as the body weight in kilograms divided by the square of the body height in metres (kg/m²). Obesity includes individuals with BMI equal to or higher than 30 kg/m².

How it is reported: Percentage of the population over 18 years of age with BMI ≥30.0 kg/m² standardized by age and weighted by sex.[15]

Data source: WHO. 2020. Global Health Observatory (GHO) data repository. In: *WHO*. [Cited 28 April 2020]. apps.who.int/gho/data/node.main.A900A?lang=en (1 698 population-based studies with more than 19.2 million participants aged 18 years or older, measured in 186 countries).[16]

Methodology: A Bayesian hierarchical model was applied to selected population-based studies that had measured height and weight in adults aged 18 years and older to estimate trends from 1975 to 2014 in mean BMI and in the prevalence of BMI categories (underweight, overweight and obesity). The model incorporated non-linear time trends and age patterns, national versus subnational and community representativeness, and whether data covered both rural and urban areas versus only one of them. The model also included covariates that help predict BMI, including national income, proportion of the population living in urban areas, mean number of years of education, and summary measures of availability of different food types for human consumption.

Challenges and limitations: Some countries had few data sources, and only 42 percent of included sources reported data for people older than 70 years.

Recommended readings:

NCD-RisC (NCD Risk Factor Collaboration). 2016. Trends in adult body-mass index in 200 countries from 1975 to 2014: a pooled analysis of 1698 population-based measurement studies with 19.2 million participants. *The Lancet*, 387(10026): 1377–1396. https://doi.org/10.1016/S0140-6736(16)30054-X

WHO. 2019. *Nutrition Landscape Information System (NLIS) country profile indicators: interpretation guide*. Geneva, Switzerland. www.who.int/publications/i/item/9789241516952

ANAEMIA IN WOMEN AGED 15 TO 49 YEARS

Definition: Percentage of women aged 15 to 49 years with a haemoglobin concentration of less than 120 g/L for non-pregnant women and lactating women, and less than 110 g/L for pregnant women, adjusted for altitude and smoking.

How it is reported: Percentage of women aged 15 to 49 years with a haemoglobin concentration below 110 g/L for pregnant women and below 120 g/L for non-pregnant women.

Data source:
WHO. 2021. Global anaemia estimates, edition 2021. In: *WHO | Global Health Observatory (GHO) data repository*. [Cited 20 April 2023]. www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children

Methodology: The 2021 edition of anaemia estimates in women aged 15 to 49 years, by pregnancy status, included data sources from the Micronutrients Database, part of the WHO Vitamin and Mineral Nutrition Information System and from anonymized individual-level data which span from 1995 to 2020. Adjustments of data on blood haemoglobin concentrations for altitude and smoking were carried out whenever possible. Biologically implausible haemoglobin values (<25 g/L or >200 g/L) were excluded. A Bayesian hierarchical mixture model was used to estimate haemoglobin distributions and systematically address missing data, non-linear time trends, and representativeness of data sources. Briefly, the model calculates estimates for each country and year, informed by data from that country and year themselves, if available, and by data from other years in the same country and in other countries with data for similar time periods, especially countries in the same region. The model borrows data, to a greater extent, when data are non-existent or weakly informative, and to a lesser extent for data-rich countries and regions. The resulting estimates are also informed by covariates that help predict blood haemoglobin concentrations (e.g. sociodemographic index, meat supply [kcal/capita], mean BMI for women, and log of under-five mortality for children). The uncertainty ranges (credibility intervals) reflect the major sources of uncertainty, including sampling error, non-sampling error due to issues in sample design/measurement, and uncertainty from making estimates for countries and years without data.

Challenges and limitations: Despite a high proportion of countries having nationally representative survey data available for anaemia, there is still a lack of reporting on this indicator, especially in high-income countries. As a result, the estimates may not capture the full variation across countries and regions, thus tending to "shrink" towards global means when data are sparse.

Recommended readings:

Stevens, G.A., Finucane, M.M., De-Regil, L.M., Paciorek, C.J., Flaxman, S.R., Branca, F., Peña-Rosas, J.P., Bhutta, Z.A. & Ezzati, M. 2013. Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995–2011: a systematic analysis of population-representative data. *The Lancet Global Health*, 1(1): e16–e25. https://doi.org/10.1016/s2214-109x(13)70001-9

Stevens, G.A., Paciorek, C.J., Flores-Urrutia, M.C., Borghi, E., Namaste, S., Wirth, J.P., Suchdev, P.S., EzzatI, M., Rohner, F., Flaxman, S.R. & Rogers, L.M. 2022. National, regional, and global estimates of anaemia by severity in women and children for 2000–19: a pooled analysis of population-representative data. *The Lancet Global Health*, 10(5): e627–e639. https://doi.org/10.1016/S2214-109X(22)00084-5

WHO. 2011. *Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System*. Geneva, Switzerland. https://apps.who.int/iris/bitstream/handle/10665/85839/WHO_NMH_NHD_MNM_11.1_eng.pdf

WHO. 2014. *Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition*. Geneva, Switzerland.

WHO. 2021. Global anaemia estimates, edition 2021. In: *WHO | Global Health Observatory (GHO) data repository*. [Cited 20 April 2023]. www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children

WHO. 2021. Vitamin and Mineral Nutrition Information System (VMNIS). In: *WHO*. [Cited 20 April 2023]. www.who.int/teams/nutrition-food-safety/databases/vitamin-and-mineral-nutrition-information-system

WHO. 2021. Nutrition Landscape Information System (NliS) Country Profile. In: *WHO*. [Cited 20 April 2023]. www.who.int/data/nutrition/nlis/country-profile

WHO. 2023. Nutrition Data Portal. In: *WHO*. [Cited 20 April 2023]. https://platform.who.int/nutrition/nutrition-portals ■

ANNEX 2 METHODOLOGIES USED IN CHAPTER 2

A. Methodology for estimating the PoU for 2020, 2021 and 2022

As in previous editions of this report, due to lack of direct information on the most recent values of each of the elements that contribute to computing the prevalence of undernourishment (PoU) and number of undernourished people (NoU) (see **Annex 1B**), estimates referring to the most recent years are nowcasted; in other words, they are predictions of the very recent past.

As already noted in last year's edition of this report, 2020 and 2021 were unique in many respects due to the COVID-19 pandemic and its lingering effects. This demanded special considerations when nowcasting the values of the PoU, especially with respect to estimating the likely change in the coefficient of variation (CV) and to modelling the way in which inequality in access to food contributes to rates of undernourishment. Both aspects required special treatment in consideration of the very special conditions under which food systems operated during the pandemic.

The strategy used to project values of the CV|y from 2019 to 2021 and the ranges of global PoU and NoU estimates followed the same approach as in last year's edition of this report, while additional considerations were made for 2022. Both are described below.

Projecting CV|y up to 2021

While the values of dietary energy consumption (DEC) are nowcasted using the traditional approach based on information provided by the Markets and Trade Division of FAO, used to inform FAO Agricultural Outlooks, the traditional approach used to nowcast the CV had to be modified to reflect the peculiar conditions of 2020 and 2021. Normally, changes in CV|y (the component of the CV associated with differences in households' economic conditions) are derived from differences in three-year averages of the prevalence of severe food insecurity based on the FIES (FI_{sev}) that are not explained by changes in food supplies. Use of the three-year average addressed the need to control for possible excess sampling variability in country-level estimates of the FI_{sev} (which, for most countries, is based on relatively small samples of FIES data) and is consistent with an assumption that CV|y follows a relatively stable trend. The exceptional nature of 2020 and 2021 made it difficult to maintain that last assumption. Because of that, the changes between the 2017–2019 average and the 2020 annual values of FI_{sev} were used to nowcast the 2020 values of CV|y, and the changes between the 2020 and 2021 annual values of FI_{sev} were used to nowcast the 2021 values of CV|y.

Another parameter that needed attention to nowcast the 2020 value of PoU was the percentage of change in FI_{sev} (used as a proxy for the expected change in the PoU) that is attributed to CV|y. Normally, this had been assumed to be equal to one-third, based on an econometric analysis of past values of PoU, DEC and CV|y. The exceptional nature of 2020 and 2021 called into question that regularity. As no national household consumption and expenditure survey data in 2020 or in 2021 were available, there is still no empirical basis to determine how to properly modify it. The solution was to conduct a sensitivity analysis modifying the percentage of change in FI_{sev} that is attributed to CV|y from a minimum of one-third to a maximum of one. This defined the lower and upper bounds of the estimated series for 2020 and 2021.

Special considerations for 2022

While the main effects of the COVID-19 pandemic have receded and data collection began to normalize in 2022, there is still considerable uncertainty regarding the extent of the changes in inequality in access to food that may have occurred that year. It is not yet known whether the pandemic and all other disruptive events that have affected agrifood systems worldwide in the last three years have had any persisting effect on the relative roles of demand and supply side elements in people's access to food. This, in turn, demanded a slight modification of the approach to produce nowcasts of the CV|y, and hence of the PoU, in 2022.

In particular, the value of 33 percent as probable contribution of changes in the CV to the observed

TABLE A2.1 RANGES OF PoU AND NoU NOWCASTED IN 2020, 2021 AND 2022

	2020				2021				2022			
	PoU (%)		NoU (millions)		PoU (%)		NoU (millions)		PoU (%)		NoU (millions)	
	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound
WORLD	**8.4**	**9.5**	**656.6**	**743.7**	**8.5**	**10.1**	**674.6**	**796.9**	**8.7**	**9.8**	**690.6**	**783.1**
AFRICA	**17.6**	**19.8**	**238.4**	**270.0**	**17.7**	**20.9**	**247.1**	**291.9**	**19.0**	**20.5**	**271.6**	**291.9**
Northern Africa	5.6	6.4	15.1	16.0	6.4	7.4	17.6	19.0	7.0	8.1	18.2	21.1
Sub-Saharan Africa	20.3	22.9	224.3	254.0	20.3	23.9	231.0	272.8	21.7	23.2	253.5	270.9
Eastern Africa	26.4	29.8	118.3	134.0	26.0	30.6	119.8	141.5	27.1	29.4	128.1	139.0
Middle Africa	26.0	29.2	47.7	54.0	29.2	30.7	49.5	58.5	29.0	29.4	56.8	57.6
Southern Africa	8.9	10.0	6.0	6.8	9.1	10.7	6.2	7.3	10.8	11.5	7.4	7.9
Western Africa	12.9	14.5	52.3	59.2	13.3	15.6	55.5	65.6	14.2	15.5	61.1	66.3
ASIA	**8.0**	**9.0**	**370.8**	**420.1**	**8.1**	**9.5**	**378.0**	**446.6**	**7.9**	**9.1**	**372.2**	**431.0**
Central Asia	3.1	3.5	2.3	2.6	2.9	3.4	2.2	2.6	3.0	3.5	2.3	2.7
Eastern Asia	<2.5	<2.5	n.r.	n.r.	<2.5	<2.5	n.r.	n.r.	<2.5	<2.5	n.r.	n.r.
South-eastern Asia	4.9	5.6	32.9	37.3	4.9	5.7	32.9	38.8	4.9	5.3	33.2	36.2
Southern Asia	14.7	16.5	288.0	326.3	15.0	17.6	297.6	351.6	14.3	16.9	286.9	338.7
Western Asia	9.8	11.1	28.0	31.8	9.3	11.0	27.0	31.9	10.4	11.2	30.4	32.9
Western Asia and Northern Africa	*7.9*	*8.9*	*42.2*	*47.8*	*7.9*	*9.3*	*43.1*	*50.9*	*8.8*	*9.8*	*48.6*	*54.0*
LATIN AMERICA AND THE CARIBBEAN	**6.1**	**6.9**	**39.6**	**44.8**	**6.3**	**7.5**	**41.6**	**49.2**	**5.8**	**7.7**	**38.5**	**51.0**
Caribbean	14.3	16.1	6.3	7.1	13.4	15.8	5.9	7.0	17.1	18.0	7.6	8.0
Latin America	5.5	6.2	33.3	37.8	5.8	6.9	35.7	42.2	5.0	7.0	30.9	43.0
Central America	4.6	5.1	8.0	9.1	4.6	5.4	9.1	9.6	4.9	5.3	8.9	9.5
South America	5.9	6.6	25.3	28.7	6.4	7.5	27.6	32.6	5.1	7.7	22.1	33.5
OCEANIA	**5.7**	**6.4**	**2.5**	**2.8**	**6.0**	**7.1**	**2.7**	**3.2**	**6.9**	**7.2**	**3.1**	**3.2**
NORTHERN AMERICA AND EUROPE	**<2.5**	**<2.5**	**n.r.**	**n.r.**	**<2.5**	**<2.5**	**n.r.**	**n.r.**	**<2.5**	**<2.5**	**n.r.**	**n.r.**

NOTES: n.r. = not reported, as the prevalence is less than 2.5 percent. For NoU, regional totals may differ from the sum of subregions, due to rounding and non-reported values. For country compositions of each regional/subregional aggregate, see Notes on geographic regions in statistical tables at the end of the report.
SOURCE: Authors' (FAO) own elaboration.

changes in the PoU was used to produce the mid-point of the estimated series, reflecting what would be a "back-to-normal" situation (see **Annex 1B**). Then, additional values of 50, 67 and 100 percent were used, separately for each country, reflecting possible different assumptions about the way in which CV|y might have contributed to PoU in 2022. Note however that, contrary to what was the case in 2020 and 2021, when FIES-based estimates revealed food insecurity worsening practically everywhere, the implications of assuming greater contribution of changes in the CV towards changes in the PoU are somehow opposite for the 2022 value. Considering that estimates of the prevalence of severe food insecurity showed an improvement for many countries from 2021 to 2022, for those countries we project a reduction, rather than an increase in CV|y. Combining the set of all lowest and the set of all highest country estimates, we obtain, respectively, lower and upper bounds for the global and regional series. Overall, the result is a slightly narrower range of global PoU and NoU estimates in 2022 compared to the previous two years (Table A2.1).

Table A2.1 presents the lower and upper bounds of the PoU in 2020, 2021 and 2022 at the global, regional and subregional levels.

B. Methodology for projections of PoU to 2030

To project PoU values to 2030, we project the three fundamental variables that enter in the PoU formula (DEC, CV and MDER) separately, based on different inputs, depending on the scenario considered.

The main source of information is the output of the MIRAGRODEP recursive, dynamic computable general equilibrium model, which provides series of projected values, at the country level, for:

- real per capita GDP (GDP_Vol_pc);
- income Gini coefficient (gini_income);
- an index of real food price (Prices_Real_Food);
- extreme poverty headcount rate (that is, the percentage of the population with real daily income below USD 2.15 (x215_ALL); and
- daily per capita food consumption (DES_Kcal).

The MIRAGRODEP model was calibrated to the pre-pandemic situation of the world economy in 2018 and was used to generate projections of macroeconomic fundamentals into 2019–2030 under three scenarios: 1) "before COVID-19", which aims to capture the implications for food availability and access (and therefore the PoU) of the world economic prospects as seen before the eruption of the pandemic by the IMF *World Economic Outlook* published in October 2019; 2) "before the war in Ukraine", which does the same but considering the *World Economic Outlook* published in October 2021; and 3) "current prospects", which is based on the latest *World Economic Outlook* published in April 2023.[17] A more detailed description of the MIRAGRODEP model, as well as the assumptions used to build the various scenarios, can be found in Laborde and Torero (2023).[18]

In addition, we use the median variant projections of total population (both sexes), its composition by gender and age, and the crude birth rate as provided by the 2022 revision of the UN DESA *World Population Prospects*.[4]

Projections of DEC

To project the series of DEC we use the following formula:

$$DEC_t = DES_{\mathrm{T}} \times \frac{\widehat{DES\_Kcal_t}}{\widehat{DES\_Kcal_{\mathrm{T}}}} \times (1 - WASTE_t), \forall t > T$$

where T = 2019 for "before COVID-19", T = 2021 for "before the war in Ukraine", and T = 2022 for "current prospects".

In other words, we take the model projected series of DES_Kcal and adjust its level so that the value for year T matches the actual value. (This is necessary as the MIRAGRODEP model has been calibrated to an older FBS series.)

Projections of MDER

To project the MDER, we simply compute it based on the data on the composition of the population by sex and age as projected by the 2019 *World Population Prospects*[4] (medium variant).

Projections of the CV

As explained in the methodological note on the PoU in **Annex 1B**, the total CV is computed as $CV = \sqrt{(CV|y)^2 + (CV|r)^2}$, where the two components refer to variability in the per capita habitual dietary energy consumption due to differences across households in terms of income level and variability across individuals based on differences in sex, age, body mass and physical activity level. The projected values for CV in 2025 and 2030 are obtained by applying the formula above to the CV|r and CV|y projected separately. Projected CV|r is computed based on the projected population structures by sex and age as provided by the World Population Prospects (similarly to what we do for the MDER), while the projected CV|y is computed as a linear combination of relevant projected macroeconomic and demographic variables as follows:

$$\widehat{CV|y_t} = \alpha \ + \beta_1 GDP\_vol\_pc_t + \beta_2\, gini\_income_t + \beta_3\, x215\_ALL_t + \beta_4\, Prices\_Real\_Food_t + \beta_5\, cbr_t + \beta_6\, pop_t$$

To estimate the coefficients used in the above formula, in this edition of the report we considered alternative models that represent an improvement compared to the model used in 2022. As summarized in Table A2.2, the coefficients in the three alternative models are very similar and therefore generate very similar predictions when fed with the same series of projected independent variables obtained from the MIRAGRODEP model and from the *World Population Prospects*, 2022 revision.[4]

While the estimation strategy, based on a random-effects linear regression, remains the same as in previous years, the main differences compared to the model used to generate

TABLE A2.2 REGRESSION COEFFICIENTS FROM THREE ALTERNATIVE MODELS ESTIMATED ON HISTORICAL CV|y VALUES (2000–2018) AND COMPARISON WITH THE MODEL USED IN 2022

		Regression model coefficients (standard error in parentheses)			
Regressors	Variable used to project	Model used in 2022	Model 1	Model 2	Model 3
Real GDP per capita	GDP_vol_pc	–0.0625 (0.0654)	–0.1809 (0.1003)	–0.2503 (0.0979)	–0.2572 (0.0994)
Income Gini coefficient	gini_income	0.1523 (0.0839)	0.2489 (0.1183)	0.3277 (0.1200)	0.3286 (0.1210)
Poverty headcount	X215_ALL	0.1630 (0.1387)	0.1839 (0.2798)	0.1231 (0.1341)	0.0904 (0.1205)
Real food CPI	Prices_Real_Food	0.0611 (0.0568)	0.0723 (0.0865)	0.0819 (0.0705)	0.0786 (0.0700)
Crude birth rate	cbr	0.4102 (0.1481)	0.4545 (0.2474)	0.5376 (0.1552)	0.5634 (0.1552)
Total population	pop	–0.1626 (0.0851)	–0.2647 (0.0546)	–0.2564 (0.0539)	–0.2557 (0.0539)
Constant		–0.0254 (0.1033)	–0.0155 (0.1055)	–0.0113 (0.0995)	–0.0102 (0.0997)
N		119	69	75	75
r^2		0.4589	0.499	0.5854	0.5845
r^2_between		0.5044	0.5623	0.5908	0.5877

SOURCE: Authors' (FAO) own elaboration.

projections of CV|y in 2022 reside in the set of historical data used to feed the estimation model.

First, this year we used the new series of historical values of CV|y that inform the current series of PoU estimates presented in Table 1 and Table A1 of this report, which include a revision of some estimates obtained from data from food consumption surveys that had been used before but that have been reprocessed by considering improved and updated food composition tables, and values derived from the brand new analysis of 14 additional surveys (see the methodological note for the PoU in **Annex 1B**).

Most importantly, though, this year we use newly sourced series of historical data on real GDP per capita, income Gini coefficient, real food consumer price index (CPI), poverty headcount, crude birth rate and total population. For poverty headcount and income Gini we restricted our sample to household survey-based estimates that are published on the new Poverty and Inequality Platform (PIP) of the World Bank, which replaces both PovcalNet and the Poverty and Equity Data Portal that were phased out in March 2022. The major consequence of relying only on the household survey-based values in the series sourced from the PIP is a reduction in the number of country/year combinations for which direct estimates of income Gini and poverty headcount are available. That brings the number of data points we can use to estimate our model down to 75 from the 119 used in 2022.

In addition, all economic series available through PIP and IMF *World Economic Outlook* have been updated to reflect the 2017-based revision of purchasing power parity (PPP) published by the International Comparison Program (ICP).[19]

As there have been various data updates and the differences in the estimated coefficients between the model used in 2022 and the model used this year (Model 3) are quite relevant, leading to slightly different and more optimistic projections of reductions in CV|y, we estimated two additional intermediate models to disentangle the reasons for the different results. We first estimated a model (Model 1 in Table A2.2) using the old set of data for both dependent and independent variables but limited to the 69 country/year combinations that overlap between the 119 used in 2022 and the 75 used this year. Then, we moved to using the newly sourced data from PIP but keeping the poverty headcount values from the 2011-based PPP (Model 2), before adopting all new versions of the variables in the model we ultimately use for our projections (Model 3).

By comparing the values of the estimated coefficients in columns 3–6 of Table A2.2, we note that the main impact derives from having dropped country/year combinations that relied on interpolated or modelled poverty headcount and income Gini coefficients: when moving from the model used in 2022 to Model 1, the coefficients of real GDP per capita and of income Gini increase, both in absolute value and in the level of their statistical significance. Another noticeable effect can be linked to the updates of data to their 2023 version and the addition of six more country/year combinations: the coefficients of real GDP per capita, income Gini and of real food CPI further increase, while the one on the poverty headcount decreases in Model 2 compared to Model 1. Finally, updating the poverty headcount to the 2017-based PPP has overall negligible effects as the coefficients in Model 2 and Model 3 are very close to each other for all variables (with the partial exception of the poverty headcount, whose contribution to explaining CV|y drops further).

Our overall assessment is that CV|y projections this year are more robust. The newly estimated coefficients point to contributions of the explanatory variables in predicting the CV|y in the same direction as estimated before but the same model now fits the data considerably better, as captured by the increased r^2 coefficient and increased ratios between estimated coefficients and standard errors, especially for real GDP per capita and income Gini.

The series of CV|y values predicted by the formula separately for each country for the years $T + 1$ to 2030 is then calibrated to the value for year T, similarly to what is done for the DES:

$$CV|y_t = CV|y_T \times \left(\frac{\widehat{CV|y_t}}{\widehat{CV|y_T}}\right), \forall t > T$$

where T = 2019 for "before COVID-19", T = 2021 for "before the war in Ukraine", and T = 2022 for "current prospects".

C. Methodology for the analysis of food insecurity by degree of urbanization and by gender

The prevalence of food insecurity can be disaggregated by respondent/household characteristics when the data are collected directly from individual respondents in nationally representative samples. In **Chapter 2**, food insecurity estimates are presented disaggregated by sex of the respondent (adult men or women) and by Degree of Urbanization (DEGURBA) (i.e. urban, peri-urban or rural residency).

The methodology to disaggregate the indicator by any individual or household characteristics is as follows:

- The cross-country comparable probability of food insecurity for each respondent is computed at two levels of severity: moderate or severe, and severe only. The probabilities are aggregated for each category of the characteristic of interest, by computing the weighted average (using sampling weights) across all respondents in that category, obtaining the prevalence of food insecurity within that group (for example, among female respondents).
- The prevalence of food insecurity in a given category is weighted by the corresponding population (for example, the number of female adults in the country) to obtain the subregional/regional/global estimate (for example, the prevalence of food insecurity in the female adult population in Northern Africa), if reliable population data are available and if there is sufficient geographical coverage in terms of percentage of the population.

The computation of the prevalence of food insecurity by sex is possible because data are collected from individual respondents (adults aged 15 years or older) by FAO via data collection service providers (see **Annex 1B**). For countries for which national government survey data are used to calculate the prevalence estimates of food insecurity (see **Annex 1B**), it is generally not possible to disaggregate the indicator by sex, as data are collected at the household level. This year, for the first time, a protocol was developed to address this issue. Thus, in such cases, the same relative difference by sex estimated based on data collected by FAO is applied to the prevalence of food insecurity in the total population based on national data. This is an approximation, as the difference in the FAO data applies to adult respondents, and not to the whole population. However, the benefit is that the statistics by sex are consistent in terms of levels and trends with those of the overall population. The entire series was revised in this edition of the report resulting in minor updates to the levels of the prevalence of food insecurity by sex at the regional and global levels compared to the 2022 edition.

The disaggregation by DEGURBA is possible for the first time this year because Gallup© began to georeference each interview in countries collected using face-to-face mode in 2021. In 2022, countries covered by telephone interviews were also georeferenced, providing enough geographical representation to produce subregional/regional/global food insecurity estimates by DEGURBA.

Within each country, it is possible to link each georeferenced observation to the DEGURBA dataset, defining whether the observation (respondent) is located in a city, town or rural area, based on population density and size, according to internationally comparable criteria developed by EUROSTAT, ILO, FAO, OECD, UN-Habitat and the World Bank and approved at the 51st session of the UN Statistical Commission in March 2020.[20] The prevalence of food insecurity is computed for each category of urbanization and then aggregated at the subregional/regional/global level using the 2020 updated DEGURBA population distribution published by EUROSTAT.[21] For countries where official food insecurity statistics are informed by national data, the same approximation method described for the disaggregation by sex is applied.

As no FIES data were collected by FAO in China in 2022, and the data collected in 2021 were not georeferenced, the estimates of food insecurity by DEGURBA in China were approximated as follows: the prevalence of food insecurity for 2021 was disaggregated by area of residence as defined in the Gallup© World Poll, where respondents report if they live in: a rural area or on a farm; a small town or village; a large city or the suburb of a large city. Then, these categories were mapped to the DEGURBA by considering people living in a rural area or on a farm as part of the "rural" population, those living in a small town or village as part of the "peri-urban" population and those living in a large city and in the suburb of a large city as "urban" residents. This mapping was justified with the rationale that DEGURBA classifies areas with increasing urbanization based on population density and size. To ensure that no significant bias was induced by this approach, the same mapping was validated as accurate for other Asian countries where data were collected in 2022.

D. Methodology for the cost and affordability of a healthy diet

FAO with support from the World Bank Data Group systematically monitors the cost and affordability of a healthy diet (CoAHD) indicators and recently began to disseminate the updated series on the FAOSTAT database.[22] Estimates are updated for 2021 (see sections below, *Updating the cost of a healthy diet* and *Updating the affordability of a healthy diet*). In addition, periodic revisions of the entire data series are carried out by FAO to continuously improve the methodology and provide robust estimates on the CoAHD indicators.

The cost of a healthy diet

The cost of a healthy diet is defined as the cost of the least expensive locally available foods to meet requirements for energy and food-based dietary guidelines (FBDGs) for a representative person within an energy balance of 2 330 kcal/day. The FBDGs analysed explicitly recommend food quantities for each food group and provide a wide regional representation. Although it is not selected based on nutrient content but is determined by FBDGs, this diet meets on average nearly 95 percent of nutrient needs, so it can therefore almost always be considered as nutrient adequate.

The availability and prices of items in each food group needed for a healthy diet were obtained from the World Bank-led ICP as national averages for 2017. Item definitions are internationally standardized, allowing classification by food group and calculation of the least costs to reach FBDG requirements in each country, representing an average across markets and throughout the year.[19] The cost of a healthy diet indicator is calculated using a standard basket, called the Healthy Diet Basket, which consists of six food groups and reflects the commonalities across ten identified FBDGs. For a detailed description of the healthy diet and related methodology, see Herforth *et al.* (2020, 2022).[23, 24]

Affordability of a healthy diet

In this report, to determine affordability, the cost of a healthy diet is compared with country-specific income distributions that are derived from the World Bank's PIP.[25] The resulting measures of affordability include the percentage and number of people unable to afford a healthy diet in a given country, in 2021. A healthy diet is considered unaffordable when its cost exceeds 52 percent of the income in a country. This percentage accounts for a portion of income that can be credibly reserved for food, based on observations that the population in low-income countries spend, on average, 52 percent of their income on food, as derived from the 2017 ICP national accounts household expenditure data.

Based on this threshold and comparing the cost of the diet with country income distributions, we obtain the percentage of people for whom the cost of the diet is unaffordable. These proportions are then multiplied by the 2021 population in each country using the world development indicators (WDI) of the World Bank,[26] to obtain the number of people unable to afford a healthy diet in a given country. For a detailed description of the affordability indicators and related methodology, see Annex 3 of FAO, IFAD, UNICEF, WFP and WHO (2020).[27]

Updating the cost of a healthy diet

The ICP is currently the only source of retail food price data for internationally standardized items, as part of a larger effort to compute PPP exchange rates across all countries of the world. However, these data are only available once every three to five years, which does not allow for yearly global monitoring of diet costs to guide programmes and policies. In the absence of updated food price data, in this report, the method of updating the cost indicator between ICP publication years relies on consumer price indices (CPIs) published by FAO. This dataset tracks change in monthly general and food CPIs at the national level with reference to a base year of 2015. The annual CPIs are computed as simple averages of the 12 monthly CPIs within a year. In particular, CPI data for food and non-alcoholic beverages are used to update the cost of a healthy diet in 2021 for all countries except the Central African Republic and Guyana, for which the general CPI is used. The cost of a healthy diet is estimated for the complete series (2018–2021) by multiplying each country's 2017 actual cost, expressed in local currency units (LCU), with the CPI ratio and finally dividing by purchasing power parities:

$$\text{Diet cost (PPP dollars)}_t = \frac{\text{Diet cost (LCU)}_{2017} \times \text{(f)CPI ratio}_t}{\text{PPP}_t}$$

where $t = 2018, \ldots, 2021$ and $(f)CPI\ ratio_t = \left(\frac{(f)CPI_t}{(f)CPI_{2017}}\right)$.

The cost of the healthy diet is first updated in LCU and then converted into international dollars using the WDI PPP for private consumption conversion factors,[28] to compare the cost across countries and political entities. For a detailed description of the methodology, see Bai *et al.* (forthcoming).[29]

The cost of the healthy diet was computed for 169 countries and territories in 2017 and updated for 2018–2021 for all of them except Anguilla, Montserrat, and Taiwan Province of China that have information neither on CPIs nor on PPPs. Out of the remaining 166 countries and territories, there are 24 countries with missing PPP data in any year between 2018 and 2021,[bg] and one territory with missing CPI data (Turks and Caicos Islands). For the 24 countries, PPP imputations were applied using an Autoregressive Integrated Moving Average with External Explanatory Variable (ARIMAX) model. In line with the World Bank's WDI methodology for PPP extrapolations, the ratio between a country's general CPI and the CPI for the base country (in this case the United States of America) is included in the model specification as a key predictor of PPP values. Furthermore, per capita GDP and per capita household consumption expenditure are also added as external covariates, and the Holt-Winter smoothing methodology is applied to both the series to fill the gaps, if needed. The ARIMAX approach allows to estimate, for each

bg The 24 countries and territories for which PPPs were imputed are the following: Argentina, Aruba, Bermuda, British Virgin Islands, Cayman Islands, Curaçao, Democratic Republic of the Congo, Djibouti, Dominica, Equatorial Guinea, Eswatini, Gabon, Kazakhstan, Liberia, Malawi, Myanmar, Sao Tome and Principe, Senegal, Seychelles, Sint Maarten (Dutch part), Suriname, Tajikistan, United Arab Emirates and Zimbabwe.

country, several model specifications that include an autoregressive component, an integration component, a moving average, and a combination of the three. The best specification is selected when at least the estimated coefficient of the CPI ratio is statistically significant, followed by the statistical significance of the ARIMAX parameters. For countries and territories showing abnormal PPP series over time, the CPI ratio is found to be the only statistically significant coefficient to affect the variability of the PPP values. On the contrary, for countries and territories with a less volatile PPP series, the historical PPP trend plays also a role in predicting PPP values, as well as the coefficient estimates of per capita GDP and/or per capita expenditure. The ARIMAX computes the predicted values on the best specification selected for each country/territory.

For one territory with missing information on CPIs (Turks and Caicos Islands), cost imputations were applied using the average diet cost in the corresponding subregion:

$$\text{Imputed Cost (PPP dollars)}_t = \left(\frac{\text{Imputed Cost}}{\text{Average Cost}}\right)_{t-1} \times \text{Average Cost}_t$$

Subregional cost averages were computed excluding the Turks and Caicos Islands.

A limitation of this method used to update the cost of a healthy diet in 2018–2021 is that changes in the cost depend on (food) CPIs and do not reflect item-specific changes in food prices, nor any differential changes in the price of different food groups, due to the lack of new item-level food price data for more nutritious food items. FAO is exploring how to expand reporting of item-level prices to allow more frequent and robust monitoring of the cost of a healthy diet.

Updating the affordability of a healthy diet

In this report, affordability was updated for the years 2018 to 2021. Of the 169 countries and territories with cost information in 2017, the affordability indicators were estimated for 143 with income distributions available in the PIP database. This information was updated for all countries and territories for 2018–2021, except Taiwan Province of China for which food CPIs are not available.

Through continuous updates based on incoming national surveys and data imputations, the income distributions in the PIP database[25] are now available and updated for the years 2020 and 2021 in many countries and territories. To update affordability in these years, distributions in the PIP database were used for 78 of the 142 countries/territories in 2020, and for 27 in 2021. For the remaining ones (64 in 2020; 115 in 2021), affordability was estimated by the PIP team using projected distributions,[30] obtained by applying the World Bank's standard methods for nowcasting poverty.[31] Finally, the proportion of people unable to afford a healthy diet, estimated using both methods, was multiplied by each country/territory's population using the WDI of the World Bank, to obtain the number of people who could not afford a healthy diet. The latest estimates of the affordability indicators were performed on 26 April 2023. As the PIP database is currently undergoing continuous updates of income distributions, affordability estimations after this date may marginally change.

In this year's edition, a revision of the methodology involves the affordability data series. Following the recent release of new PPP for 2017, the World Bank adopted these latest conversion factors to express its collection of monetary indicators in 2017 PPP terms, including income distributions in the PIP database.[25] It implies that the indicators of affordability are no longer expressed in 2011 PPP as in previous years but rather in 2017 PPP. Shifting the base year has led to considerable variations in affordability for certain countries. Nonetheless, this change is associated with improvements in the quality of PPPs and better reflects the current economic situations worldwide.[32] Specifically, for seven countries, the share of people unable to afford a healthy diet was at least 7 percentage points lower in 2021 when expressed in 2017 PPP instead of 2011 PPP (Angola, Plurinational State of Bolivia, Egypt, Iraq, Jordan, Sao Tome and Principe, and Suriname). Conversely, it was 14 and 7 percentage points higher in Ghana and Belize, respectively. The World Bank has also acknowledged large changes to the measure of poverty rates for the same countries listed, following the adoption of 2017 PPP. These were carefully evaluated and found to reflect improvements in the quality of the PPPs.[32] In some of these countries, the 2017 PPPs are based on price data from a broader list of items than in the 2011 PPP round; in other countries, price data were collected for the first time in 2017, overcoming the limitation of imputed PPPs prior to this round. In the case of upper-middle-income countries such as Ghana and Belize, the cost thresholds have risen between 2011 and 2017, and hence the share and number of the population whose income falls below the thresholds (i.e. are unable to afford a healthy diet) is larger.[33]

E. Methodology for the rural–urban analysis of nutrition outcomes

A rural–urban analysis in **Section 2.3** was carried out according to urban and rural residence as applied to four nutrition indicators using regional estimates with their confidence intervals. The analysis was performed across regions based on data availability for countries within each region.

The weighted analysis was applied using the latest available data from national surveys between 2015 and 2021. The list of countries contributing to each region is presented in Table A2.3; data sources are included in table notes.

The regional urban and rural results presented are based on a population-weighted analysis of a subset of countries with disaggregated data available by place of residence using the latest available data from national surveys between 2015 and 2021 for exclusive breastfeeding and between 2016 and 2022 for stunting, wasting and overweight. The regional rural and urban estimates are presented only when the regional estimate by residence has a population coverage of 50 percent or more by rural or urban residence. Population coverage is calculated by dividing the sum of the population of children under five years for countries with at least one data point from household surveys within the specified year range by the total population of children under five years for all countries in the region.

F. Methodology for assessment of progress against nutrition targets at the regional and global levels

These methodological notes pertain to results presented in Table 6 in **Section 2.3** of the report which depicts the regional and subregional assessment of progress towards the 2030 nutrition targets. Progress was assessed against the 2030 nutrition targets established by UNICEF/WHO[34] and an adapted version of rules from the WHO-UNICEF Technical Expert Advisory Group on Nutrition Monitoring[35] for all indicators where 2030 targets or progress assessment rules have not been established.

To determine which progress assessment category to use for each indicator and each region, first, two distinct average annual rates of reduction (AARR)[bh] were calculated: i) the AARR required for the region to reach the 2030 target; and ii) the actual AARR that the region has experienced to date. The value of the actual AARR experienced to date is then used to determine which progress assessment category the region is assigned, while also considering the required AARR. See **Table A2.4** for AARR ranges and prevalence thresholds applied for each category and for each indicator, briefly:

- **On track:** regions with an **actual AARR that is greater than the required AARR** are categorized as being **"on track" (green)** to achieve the target. A static threshold for the latest prevalence, as noted for each indicator in Table A2.4, is also used to categorize regions as being "on track"; for example, any region for which the most recent overweight prevalence is below 3 percent is considered "on track", even if their actual AARR is less than their required AARR.
- **Off track:** regions with an **actual AARR that is less than the required AARR** and for which the latest prevalence is above the "on track" static threshold noted in Table A2.4 are considered **"off track"**. The "off track" category is broken down into different subcategories depending on the indicator. For the indicators of child stunting, child overweight and child

bh See technical note on how to calculate AARR at: https://data.unicef.org/resources/technical-note-calculate-average-annual-rate-reduction-aarr-underweight-prevalence

TABLE A2.3 COUNTRIES AND TERRITORIES WITH NUTRITION OUTCOME DATA FROM NATIONAL SURVEYS BETWEEN 2015 AND 2021 FOR EXCLUSIVE BREASTFEEDING AND BETWEEN 2016 AND 2022 FOR STUNTING, WASTING AND OVERWEIGHT THAT CONTRIBUTED TO THE RURAL–URBAN ANALYSIS

Region	Exclusive breastfeeding (82)	Stunting (89)	Wasting (89)	Overweight (89)
Africa	Algeria, Angola, Benin, Burundi, Cameroon, Central African Republic, Chad, Côte d'Ivoire, Democratic Republic of the Congo, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, Togo, Tunisia, Uganda, United Republic of Tanzania, Zambia, Zimbabwe	Algeria, Benin, Burundi, Cameroon, Central African Republic, Chad, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Morocco, Mozambique, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, Togo, Tunisia, Uganda, United Republic of Tanzania, Zambia, Zimbabwe	Algeria, Benin, Burundi, Cameroon, Central African Republic, Chad, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Morocco, Mozambique, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, Togo, Tunisia, Uganda, United Republic of Tanzania, Zambia, Zimbabwe	Algeria, Benin, Burundi, Cameroon, Central African Republic, Chad, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Morocco, Mozambique, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, Togo, Tunisia, Uganda, United Republic of Tanzania, Zambia, Zimbabwe
Asia	Armenia, Bangladesh, Bhutan, Georgia, India, Indonesia, Iraq, Jordan, Kazakhstan, Kyrgyzstan, Lao People's Democratic Republic, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Palestine, Sri Lanka, Tajikistan, Thailand, Timor-Leste, Turkmenistan, Uzbekistan, Viet Nam	Afghanistan, Armenia, Bangladesh, Cambodia, Georgia, India, Indonesia, Iraq, Jordan, Kyrgyzstan, Lao People's Democratic Republic, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Palestine, Republic of Korea, Sri Lanka, Tajikistan, Thailand, Timor-Leste, Türkiye, Turkmenistan, Uzbekistan	Afghanistan, Armenia, Bangladesh, Cambodia, Georgia, India, Indonesia, Iraq, Jordan, Kyrgyzstan, Lao People's Democratic Republic, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Palestine, Republic of Korea, Sri Lanka, Tajikistan, Thailand, Timor-Leste, Türkiye, Turkmenistan, Uzbekistan	Afghanistan, Armenia, Bangladesh, Cambodia, Georgia, India, Indonesia, Iraq, Jordan, Kyrgyzstan, Lao People's Democratic Republic, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Palestine, Republic of Korea, Sri Lanka, Tajikistan, Thailand, Timor-Leste, Türkiye, Turkmenistan, Uzbekistan
Latin America and the Caribbean	Belize, Bolivia (Plurinational State of), Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Guatemala, Haiti, Honduras, Mexico, Paraguay, Peru, Suriname	Bolivia (Plurinational State of), Costa Rica, Cuba, Dominican Republic, Ecuador, Guyana, Haiti, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru, Suriname, Turks and Caicos Islands	Bolivia (Plurinational State of), Costa Rica, Cuba, Dominican Republic, Ecuador, Guyana, Haiti, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru, Suriname, Turks and Caicos Islands	Bolivia (Plurinational State of), Costa Rica, Cuba, Dominican Republic, Ecuador, Guyana, Haiti, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru, Suriname, Turks and Caicos Islands
Northern America, Europe, Australia and New Zealand	Belarus, Montenegro, North Macedonia, Serbia	Albania, Germany, Latvia, Montenegro, North Macedonia, Serbia	Albania, Germany, Latvia, Montenegro, North Macedonia, Serbia	Albania, Germany, Latvia, Montenegro, North Macedonia, Serbia
Oceania excluding Australia and New Zealand	Fiji, Kiribati, Marshall Islands, Papua New Guinea, Samoa, Tonga, Tuvalu	Fiji, Kiribati, Marshall Islands, Samoa, Tonga, Tuvalu	Fiji, Kiribati, Marshall Islands, Samoa, Tonga, Tuvalu	Fiji, Kiribati, Marshall Islands, Samoa, Tonga, Tuvalu

SOURCES: Data for stunting, wasting and overweight are based on UNICEF, WHO & World Bank. 2023. *UNICEF-WHO-World Bank: Joint child malnutrition estimates - Levels and trends (2023 edition).* [Cited 27 April 2023]. https://data.unicef.org/resources/jme-report-2023, www.who.int/teams/nutrition-and-food-safety/monitoring-nutritional-status-and-food-safety-and-events/joint-child-malnutrition-estimates, https://datatopics.worldbank.org/child-malnutrition; data for exclusive breastfeeding are based on UNICEF. 2022. Infant and young child feeding. In: *UNICEF*. [Cited 6 April 2023]. https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding

TABLE A2.4 RULES FOR PROGRESS ASSESSMENT AGAINST THE GLOBAL NUTRITION TARGETS

Indicator	Stunting (<5 years)	Overweight (<5 years)	Wasting (<5 years)	Low birthweight[1]	Non-exclusive breastfeeding[1,2] (<6 months)
2030 target	Reduce the number of children <5 years who are stunted by 50%	Reduce and maintain childhood overweight to less than 3%	Reduce and maintain childhood wasting to less than 3%	Reduce low birthweight prevalence by 30%	Reduce non-exclusive breastfeeding prevalence (<6 months) to 30%
On track	AARR > required[3] or prevalence <3%[4]	AARR > required[5] or prevalence <3%[6]	AARR > required[5] or prevalence <3%[6]	AARR > required (i.e. 1.96)[7] or prevalence <5%[8]	AARR > required[9] or prevalence <30%[10]
Off track – some progress	AARR < required, but >0.5	AARR < required, but >1.5	AARR < required, but >2.0	AARR <1.96 but >0.5	AARR < required, but >0.8
Off track – no progress	-0.5 ≤ AARR <0.5	-1.5 ≤ AARR <1.5	-2.0 ≤ AARR <2.0	AARR <0.5	AARR <0.8
Off track – worsening	AARR <-0.5	AARR <-1.5	AARR <-2.0		
Assessment not possible	*For regions*: assessment possible for all regions[11] *For countries*: assessment not possible when data are insufficient[12]	*For regions*: assessment possible for all regions[11] *For countries*: assessment not possible when data are insufficient[12]	*For regions*: assessment not possible when regional population coverage <50%[13] *For countries*: assessment not possible when data are insufficient[14]	*For regions*: assessment possible for all regions[11] *For countries*: not applicable	*For regions*: assessment not possible when regional population coverage <50%[15] *For countries*: not applicable

NOTES:
1. For low birthweight and exclusive breastfeeding, the categories of "off track – no progress" and "off track – worsening" are combined into one category of "off track – no progress or worsening" because there is insufficient variation in current progress to split these categories for these indicators.
2. For exclusive breastfeeding, the actual target is to increase the prevalence of exclusive breastfeeding (under six months) to 70 percent by 2030; however, it has been revised here to reflect the prevalence of non-exclusive breastfeeding so that the concept of the AARR can be applied as it is for the other six targets.
3. The required AARR is based on the change in stunting prevalence corresponding to a 50 percent reduction in the number of children affected by stunting between 2012 and 2030, considering the population growth estimated by the United Nations *World Population Prospects*. Actual AARR is calculated using all years of data between 2012 and 2022.
4. Regions considered on track are those where the stunting prevalence point estimate or the lower 95 percent confidence interval for 2022 is below 3 percent.
5. The required AARR is based on the required change in overweight or wasting prevalence to reduce from the baseline (2012) prevalence to 3 percent by 2030. Actual AARR is calculated using all years of data between 2012 and 2022. Note that for wasting, unpublished trend estimates from the JME are used to generate the actual AARR.
6. Regions where the overweight or wasting prevalence point estimate for 2022 is below 3 percent are considered on track.
7. The required AARR is based on the change required to reduce the low birthweight prevalence by 30 percent between 2012 (baseline year) and 2030. The same AARR of 1.96 is required for all regions since the target requires a relative change (reduction by 30 percent) in the baseline value. Actual AARR is calculated using all years of data between 2012 and 2020.
8. Regions where the low birthweight prevalence point estimate for 2020 is below 5 percent are considered on track.
9. The required AARR is based on the required change to decrease the non-exclusive breastfeeding prevalence to 30 percent between 2012 (baseline year) and 2030. Actual AARR is calculated using only two estimates for the years of 2012 and 2021, where the regional averages are population weighted using the most recent estimate for each country between 2005 and 2012 for the 2012 estimate, and between 2016 to 2021 for the 2021 estimate.
10. Regions where the non-exclusive breastfeeding prevalence point estimate for 2021 is below 30 percent (i.e. where exclusive breastfeeding is ≥70 percent) are considered on track.
11. The global databases for the indicators of stunting, overweight and low birthweight are based on country-level models which provide annual estimates for all countries for generation of regional and global estimates (i.e. annual estimates are even available for countries without any household survey data, even in cases where country-modelled estimates are not released to the public and used only for generation of global and regional estimates), thus making progress assessment possible for all regions.
12. Progress assessment against the child stunting and child overweight targets is not conducted for countries which did not have any input data (e.g. household survey data) to use in the country model which were more recent than 2022, or for which modelled estimates remain pending final review.
13. Progress assessment is not possible for wasting for regions where population coverage is less than 50 percent. Population coverage is calculated by dividing the sum of the population of children under five years for countries with at least one data point from household surveys between 1990 and 2020 by the total population of children under five years for all countries in the region. Since wasting estimates are generated with a subregional model, even one year of data between 1990 and 2020 counts towards the regional population coverage.
14. Progress assessment against the child wasting target is not conducted for countries which do not have at least two data points (e.g. household surveys) between 2005 and 2022, with at least one point being more recent than 2012.
15. Progress assessment is not possible for exclusive breastfeeding where the population coverage of country survey data for the region is less than 50 percent for the 2012 and/or the 2021 estimate. For 2012, population coverage is calculated by dividing the sum of the population of children under five years for countries with at least one data point from household surveys between 2005 and 2012 by the total population of children under five years for all countries in the region. For 2021, population coverage is calculated by dividing the sum of the population of children under five years for countries with at least one data point from household surveys between 2016 and 2021.
SOURCE: Elaborated using information from: WHO & UNICEF. 2017. *Methodology for monitoring progress towards the global nutrition targets for 2025 – technical report*; and WHO & UNICEF. 2017. *The extension of the 2025 Maternal, Infant and Young Child nutrition targets to 2030*. WHO and UNICEF.

wasting, there are three off track subcategories: "off track – some progress" (yellow), "off track – no progress" (light red) and "off track – worsening" (dark red). For low birthweight and exclusive breastfeeding, the categories of "off track – no progress" (light red) and "off track – worsening" (dark red) are combined into one category of "off track – no progress or worsening" which is represented with an orange colour, because there is insufficient variation in the progress to date to use the two categories for these indicators.

- **Assessment not possible**: For the indicators based on country-modelled data (child stunting, child overweight, low birthweight), an assessment is possible for all regions because a modelled estimate exists for all countries meaning there are enough data to generate representative estimates for all regions and for all years. For indicators where country-modelled estimates are not available (child wasting and exclusive breastfeeding), assessment is not possible for regions where population coverage is less than 50 percent (see footnotes 16 and 17 to Table A2.4).

The years of data used to calculate the actual AARR experienced to date at the regional level vary by indicator as specified in the footnotes for Table A2.4. The actual AARRs for each region are calculated using a trend line comprising all estimates available between 2012 (baseline) and the latest estimate for each indicator, except for exclusive breastfeeding for which modelled estimates are not available and which is calculated using only two estimates: the baseline (2012) and the latest year available (2019). The required AARR is calculated using the baseline prevalence for the region in 2012 and the target prevalence as noted in the 2030 Maternal Infant and Young Child Nutrition targets[34] (e.g. for child overweight, the required is AARR is 3.41 percent per year at the global level, which is the annual rate of change needed to go from the 2012 baseline prevalence of 5.6 percent to the targeted 3.0 percent in 2030). ■

ANNEX 3

UPDATED DATA SERIES OF THE COST AND AFFORDABILITY OF A HEALTHY DIET, 2017–2021

The cost and affordability of a healthy diet, and the change of these indicators from 2019 to 2021, are reported in Table 5 by region, subregion and country income group, following the World Bank classification of countries by income level for 2022, based on per capita gross national income in 2021. Income classification is provided for all countries and territories except Anguilla and Montserrat.

Cost and affordability are also reported at the country level in Table A3.1 for the reference year 2017 when the ICP data were released, as well as for 2018–2021 when the two indicators are updated using the methodology described in **Annex 2, Section D**. In 2018–2021, the cost indicator was updated for 166 of the 169 countries and territories with information available in 2017, while affordability was updated for 142 of the 143 countries and territories. For Argentina and Zimbabwe, cost and affordability in 2018–2021 are used to estimate aggregate indicators shown in Table 5 but are not reported in Table A3.1. To update the costs in 2018–2021, PPP exchange rates for both countries are imputed, but they may not thoroughly reflect the severe currency devaluation and/or economic instability that the countries have experienced. Table A3.2 provides ranges of the affordability indicators globally, as well as by region, subregion and country income group, which show the percentage and number of people unable to afford a healthy diet in 2021. Lower-bound estimates assume that 80 percent of income is allocated to food, as this represents the largest expenditure share on food observed in the ICP 2017 data (in Guinea-Bissau). Upper-bound estimates assume that the share of income reserved for food varies by country income group. Following ICP 2017 national accounts data, food expenditures represent, on average, 14 percent, 27 percent, 38 percent and 52 percent of total expenditures in high-income countries, upper-middle-income countries, lower-middle-income countries and low-income countries, respectively. For a full description of the methodology used to determine these ranges, see Herforth *et al.* (2020).[23] ■

TABLE A3.1 THE COST AND AFFORDABILITY OF A HEALTHY DIET BY REGION, SUBREGION, COUNTRY AND COUNTRY INCOME GROUP, 2017–2021

Regions/ subregions/ countries/ territories	Cost of a healthy diet (PPP dollars per person per day)					People unable to afford a healthy diet (%)					People unable to afford a healthy diet (millions)				
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
WORLD	**3.295**	**3.355**	**3.431**	**3.511**	**3.662**	**43.8**	**41.8**	**41.2**	**43.3**	**42.2**	**3 124.9**	**3 019.1**	**3 005.5**	**3 191.9**	**3 139.5**
Low-income countries	**3.084**	**3.110**	**3.138**	**3.217**	**3.369**	**88.8**	**87.5**	**86.7**	**86.9**	**86.1**	**440.9**	**447.6**	**456.8**	**471.0**	**480.0**
Lower-middle-income countries	**3.397**	**3.478**	**3.549**	**3.652**	**3.879**	**72.3**	**69.3**	**68.3**	**71.0**	**70.2**	**2 246.4**	**2 184.3**	**2 180.7**	**2 296.8**	**2 299.6**
Upper-middle-income countries	**3.498**	**3.555**	**3.648**	**3.721**	**3.912**	**17.3**	**15.2**	**14.4**	**16.6**	**14.1**	**416.1**	**368.2**	**350.5**	**406.4**	**345.5**
High-income countries	**3.152**	**3.210**	**3.294**	**3.363**	**3.432**	**1.9**	**1.7**	**1.5**	**1.5**	**1.3**	**21.4**	**18.9**	**17.4**	**17.6**	**14.3**
AFRICA	**3.222**	**3.274**	**3.309**	**3.383**	**3.571**	**78.5**	**78.0**	**77.4**	**77.9**	**77.5**	**954.6**	**973.4**	**989.4**	**1 020.7**	**1 040.5**
Northern Africa	**3.416**	**3.512**	**3.598**	**3.575**	**3.474**	**54.6**	**56.0**	**54.7**	**54.0**	**51.7**	**126.1**	**131.8**	**131.3**	**131.9**	**128.5**
Algeria	3.763	3.822	3.796	3.760	4.043	32.5	31.2	29.2	31.1	32.4	13.4	13.1	12.5	13.5	14.3
Egypt	3.457	3.507	3.503	3.369	3.506	67.4	70.1	67.2	63.2	61.6	68.6	72.7	70.9	67.9	67.3
Morocco	2.710	2.752	2.759	2.797	2.905	17.7	16.8	15.7	17.7	15.5	6.3	6.0	5.7	6.5	5.7
Sudan	3.674	3.921	4.306	4.308	3.081	88.4	90.9	93.6	94.1	85.4	36.0	38.2	40.5	41.8	39.0
Tunisia	3.476	3.559	3.628	3.639	3.833	15.5	14.9	14.4	18.0	17.1	1.8	1.8	1.7	2.2	2.1
Sub-Saharan Africa	**3.199**	**3.246**	**3.275**	**3.361**	**3.582**	**84.1**	**83.2**	**82.6**	**83.3**	**83.4**	**828.5**	**841.7**	**858.1**	**888.8**	**912.1**
Eastern Africa*	**2.932**	**2.974**	**3.006**	**3.088**	**3.294**	**85.6**	**84.7**	**84.2**	**84.7**	**84.6**	**328.8**	**334.2**	**341.3**	**352.7**	**361.9**
Burundi	2.988	2.804	2.783	2.943	3.138	95.8	95.0	95.0	95.7	95.9	10.7	10.9	11.3	11.7	12.0
Djibouti	2.797	2.866	2.985	3.112	3.250[a]	65.8	66.4	65.2	66.7	65.3	0.7	0.7	0.7	0.7	0.7
Ethiopia	3.108	3.147	3.290	3.407	3.706	85.8	84.1	83.4	83.3	83.8	92.9	93.4	95.2	97.6	100.8
Kenya	2.846	2.823	2.907	2.968	3.189	77.4	74.5	73.7	74.5	74.0	37.9	37.2	37.6	38.7	39.2
Madagascar	2.987	3.122	3.154	3.181	3.382	97.1	97.3	97.1	97.8	97.8	25.4	26.1	26.7	27.6	28.3
Malawi	2.724	2.809	2.989	3.149	3.365[a]	94.5	94.9	95.4	95.8	95.9	16.9	17.4	18.0	18.6	19.1
Mauritius	3.313	3.396	3.439	3.604	3.785	10.9	9.5	8.6	14.7	14.0	0.1	0.1	0.1	0.2	0.2
Mozambique	3.031	2.988	3.057	3.228	3.548	91.2	90.6	90.8	91.9	92.5	26.1	26.7	27.5	28.7	29.7
Rwanda	2.609	2.483	2.537	2.698	2.718	87.0	83.9	81.9	84.6	82.0	10.6	10.5	10.5	11.1	11.0
Seychelles	4.010	3.959	3.948	3.784	4.131[a]	9.1	7.8	7.2	7.5	7.3	0.0	0.0	0.0	0.0	0.0
Uganda	2.749	2.712	2.679	2.671	2.774	84.5	83.4	82.9	82.6	81.7	33.9	34.6	35.6	36.7	37.5
United Republic of Tanzania	2.598	2.648	2.681	2.736	2.866	85.9	85.5	84.8	85.1	85.0	48.3	49.7	50.8	52.5	54.1
Zambia	3.085	3.150	3.245	3.300	3.616	88.5	88.2	88.6	89.6	90.0	15.3	15.7	16.3	17.0	17.5
Zimbabwe	2.200	n.r.	n.r.	n.r.	n.r.	67.8	n.r.	n.r.	n.r.	n.r.	10.0	n.r.	n.r.	n.r.	n.r.
Middle Africa	**3.292**	**3.287**	**3.301**	**3.373**	**3.551**	**84.7**	**83.1**	**82.1**	**82.2**	**81.9**	**141.1**	**143.0**	**145.7**	**150.5**	**154.5**
Angola	4.327	4.293	4.352	4.585	5.031	81.4	82.7	83.9	86.7	88.1	24.6	25.8	27.1	29.0	30.4
Cameroon	2.616	2.684	2.744	2.808	2.997	59.2	58.8	58.7	59.8	60.5	14.4	14.7	15.1	15.8	16.5
Central African Republic	3.423	3.507	3.570	3.615	3.784	94.6	94.5	94.4	94.5	94.6	4.7	4.8	4.9	5.0	5.2
Chad	2.831	2.735	2.666	2.827	2.941	82.7	80.9	79.3	82.4	83.1	12.5	12.6	12.8	13.7	14.3
Congo	3.343	3.385	3.365	3.421	3.626	88.6	90.0	90.0	90.8	91.5	4.7	4.9	5.0	5.2	5.3
Democratic Republic of the Congo	2.921	2.580[a]	2.393[a]	2.242[a]	2.253[a]	94.2	91.0	88.9	87.1	85.5	79.4	79.3	79.9	80.9	82.0
Equatorial Guinea	3.526	3.599	3.635	3.676	3.751[a]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Gabon	3.358	3.403	3.485	3.553	3.704[a]	28.5	28.6	28.4	29.9	29.9	0.6	0.6	0.6	0.7	0.7
Sao Tome and Principe	3.288	3.394	3.503[a]	3.634[a]	3.869[a]	76.6	76.3	76.7	77.3	78.2	0.2	0.2	0.2	0.2	0.2

TABLE A3.1 (Continued)

Regions/ subregions/ countries/ territories	Cost of a healthy diet					People unable to afford a healthy diet									
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
	(PPP dollars per person per day)					(%)					(millions)				
Southern Africa	**3.635**	**3.650**	**3.714**	**3.839**	**4.062**	**65.6**	**65.2**	**65.4**	**67.4**	**67.0**	**42.5**	**42.7**	**43.4**	**45.3**	**45.6**
Botswana	3.622	3.575	3.591	3.701	3.829	63.2	60.8	59.8	63.4	60.3	1.5	1.5	1.5	1.6	1.6
Eswatini	3.428	3.349	3.395	3.406[a]	3.537[a]	77.1	75.8	75.0	75.3	73.8	0.9	0.9	0.9	0.9	0.9
Lesotho	3.770	3.878	4.010	4.266	4.618	83.2	83.4	83.8	87.0	87.9	1.8	1.8	1.9	2.0	2.0
Namibia	3.255	3.300	3.378	3.520	3.761	55.4	55.2	56.6	59.0	59.5	1.3	1.3	1.4	1.5	1.5
South Africa	4.102	4.147	4.199	4.299	4.565	65.3	64.9	65.1	67.0	66.7	37.0	37.2	37.8	39.4	39.6
Western Africa	**3.247**	**3.340**	**3.365**	**3.448**	**3.710**	**85.5**	**84.7**	**84.1**	**85.1**	**85.4**	**316.1**	**321.7**	**327.6**	**340.3**	**350.1**
Benin	3.550	3.670	3.664	3.707	4.041	90.6	86.8	82.4	82.1	82.6	10.5	10.4	10.1	10.4	10.7
Burkina Faso	3.173	3.296	3.240	3.345	3.611	83.0	79.7	76.8	77.6	77.6	16.5	16.3	16.1	16.7	17.2
Cabo Verde	3.358	3.413	3.484	3.563	3.683	44.5	42.2	39.7	44.0	41.2	0.3	0.2	0.2	0.3	0.2
Côte d'Ivoire	3.273	3.357	3.506	3.610	3.909	77.7	73.4	72.0	72.8	72.9	19.3	18.7	18.8	19.5	20.0
Gambia	2.942	3.008	3.054	3.110	3.324	72.6	70.8	69.6	71.8	72.2	1.7	1.7	1.7	1.8	1.9
Ghana	3.767	3.860	3.942	4.036	4.237	80.0	78.6	77.0	78.1	77.4	24.2	24.3	24.3	25.1	25.4
Guinea	3.655	3.863	4.001	4.127	4.443	88.5	89.0	88.8	88.7	89.1	10.8	11.2	11.4	11.7	12.1
Guinea-Bissau	3.164	3.254	3.335	3.434	3.694	84.4	84.9	82.9	83.9	84.6	1.6	1.6	1.6	1.7	1.7
Liberia	4.018	4.032	3.852[a]	3.907[a]	4.447[a]	91.8	91.6	91.4	91.6	92.8	4.4	4.5	4.6	4.7	4.8
Mali	2.900	3.035	2.960	3.053	3.230	77.3	74.5	69.7	71.4	72.0	14.9	14.9	14.3	15.2	15.8
Mauritania	3.451	3.574	3.654	3.692	3.948	61.7	61.1	59.7	60.9	62.4	2.6	2.6	2.6	2.7	2.9
Niger	2.850	2.812	2.792	2.902	3.155	92.9	91.4	90.4	90.9	92.0	20.2	20.6	21.2	22.1	23.2
Nigeria	3.565	3.724	3.870	4.016	4.325	90.2	91.1	91.8	93.1	93.5	174.6	180.6	186.7	194.0	199.5
Senegal	2.190	2.250	2.278	2.330	2.443[a]	53.5	48.0	45.9	46.2	45.0	8.1	7.5	7.3	7.6	7.6
Sierra Leone	2.842	2.952	2.847	2.893	3.167	84.2	84.2	81.3	82.5	83.5	6.5	6.6	6.5	6.8	7.0
ASIA	**3.412**	**3.482**	**3.572**	**3.705**	**3.897**	**47.3**	**44.2**	**43.2**	**46.4**	**44.2**	**2 021.3**	**1 905.8**	**1 877.4**	**2 031.4**	**1 949.9**
Central Asia	**2.796**	**2.796**	**2.907**	**3.102**	**3.324**	**25.3**	**21.9**	**21.3**	**24.6**	**24.4**	**8.4**	**7.4**	**7.3**	**8.6**	**8.7**
Kazakhstan	2.391	2.426	2.537	2.657	2.852[a]	2.5	1.7	1.6	2.6	2.3	0.5	0.3	0.3	0.5	0.4
Kyrgyzstan	2.970	2.931	2.991	3.180	3.510	56.3	47.2	45.0	55.3	58.2	3.5	3.0	2.9	3.6	3.9
Tajikistan	3.027	3.030[a]	3.194[a]	3.468[a]	3.610[a]	49.8	44.6	44.0	46.8	44.3	4.4	4.1	4.1	4.5	4.3
Eastern Asia	**4.168**	**4.343**	**4.447**	**4.674**	**4.866**	**15.1**	**12.4**	**11.2**	**14.5**	**10.0**	**238.7**	**197.0**	**177.8**	**230.9**	**159.4**
China, mainland	2.571	2.630	2.792	2.983	2.960	16.6	13.6	12.2	15.9	10.9	232.2	190.8	171.9	224.4	153.9
Taiwan Province of China	3.990	n.a.	n.a.	n.a.	n.a.	0.2	n.a.	n.a.	n.a.	n.a.	0.1	n.a.	n.a.	n.a.	n.a.
China, Hong Kong SAR	3.659	3.819	4.147	4.513	4.718	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Japan	5.529	5.701	5.565	5.647	5.638	2.7	2.7	2.5	2.7	2.0	3.4	3.4	3.1	3.4	2.5
Mongolia	4.544	4.666	4.900	5.115	5.676	58.5	55.2	55.0	60.0	64.1	1.8	1.7	1.8	2.0	2.1
Republic of Korea	4.712	4.900	4.831	5.111	5.340	2.2	2.0	1.7	2.2	1.5	1.2	1.0	0.9	1.2	0.8
South-eastern Asia	**3.676**	**3.775**	**3.855**	**3.994**	**4.185**	**55.6**	**54.1**	**52.3**	**54.0**	**54.9**	**348.6**	**343.0**	**335.1**	**349.0**	**357.4**
Brunei Darussalam	4.126	4.263	4.327	4.405	4.641	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cambodia	3.618	3.706	3.778	3.888	4.064	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Indonesia	4.129	4.273	4.268	4.466	4.729	72.8	71.0	69.5	70.2	70.8	192.5	189.6	187.4	190.9	193.7
Lao People's Democratic Republic	3.776	3.838	3.959	4.141	4.305	75.3	73.6	72.7	74.7	74.0	5.3	5.2	5.2	5.5	5.5
Malaysia	3.224	3.319	3.412	3.538	3.679	3.0	2.5	2.1	2.8	2.5	1.0	0.8	0.7	0.9	0.8
Myanmar	3.706	3.786	3.861	3.925[a]	4.206[a]	71.0	66.6	63.3	62.3	73.8	37.1	35.1	33.5	33.3	39.7
Philippines	3.843	3.995	4.054	4.118	4.364	70.1	70.0	68.4	74.2	74.0	74.8	76.0	75.5	83.2	84.3
Singapore	2.775	2.867	2.936	3.064	3.186	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

TABLE A3.1 (Continued)

Regions/ subregions/ countries/ territories	Cost of a healthy diet					People unable to afford a healthy diet									
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
	(PPP dollars per person per day)					(%)					(millions)				
Thailand	3.971	4.042	4.181	4.321	4.463	20.5	21.0	19.1	19.8	18.0	14.5	15.0	13.6	14.1	12.9
Viet Nam	3.586	3.663	3.776	4.072	4.216	24.9	22.4	19.8	21.8	21.0	23.4	21.3	19.0	21.1	20.5
Southern Asia	**3.489**	**3.565**	**3.663**	**3.816**	**4.081**	**75.6**	**71.1**	**70.2**	**73.8**	**72.2**	**1 411.3**	**1 343.9**	**1 340.6**	**1 425.9**	**1 408.5**
Bangladesh	2.882	2.971	3.024	3.064	3.201	75.3	72.5	70.8	68.7	66.1	121.8	118.7	117.1	115.0	111.9
Bhutan	4.383	4.587	4.712	5.020	5.339	51.2	45.5	42.3	45.7	45.2	0.4	0.3	0.3	0.4	0.4
India	2.824	2.830	2.877	2.970	3.066	78.8	73.2	71.4	76.2	74.1	1 066.8	1 001.9	986.9	1 064.0	1 043.0
Iran (Islamic Republic of)	3.005	3.212	3.642	3.605	4.167	14.4	16.6	25.7	25.5	30.0	12.2	14.3	22.2	22.3	26.4
Maldives	3.581	3.634	3.662	3.861	4.095	3.4	2.0	1.1	5.3	1.2	0.0	0.0	0.0	0.0	0.0
Nepal	4.127	4.184	4.262	4.403	4.621	80.3	77.2	75.0	77.1	76.4	22.6	22.0	21.6	22.6	22.9
Pakistan	3.408	3.395	3.460	3.685	3.893	81.0	79.8	81.4	83.5	82.8	175.3	175.4	181.8	189.7	191.6
Sri Lanka	3.702	3.705	3.667	3.923	4.268	56.6	52.0	48.5	54.0	55.5	12.1	11.3	10.6	11.8	12.3
Western Asia	**2.989**	**3.064**	**3.148**	**3.218**	**3.363**	**8.5**	**8.6**	**9.7**	**9.7**	**9.0**	**14.3**	**14.6**	**16.7**	**17.0**	**15.9**
Armenia	3.096	3.166	3.237	3.247	3.527	37.1	37.9	40.0	39.0	41.4	1.1	1.1	1.1	1.1	1.2
Azerbaijan	2.348	2.399	2.459	2.533	2.690	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bahrain	3.379	3.463	3.573	3.835	4.036	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cyprus	2.846	2.880	2.947	2.991	2.955	0.1	0.1	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Iraq	3.378	3.464	3.534	3.540	3.665	16.8	16.8	15.5	19.2	18.4	6.7	6.8	6.4	8.2	8.0
Israel	2.436	2.500	2.482	2.473	2.524	1.9	1.2	1.2	1.2	1.2	0.2	0.1	0.1	0.1	0.1
Jordan	3.412	3.454	3.500	3.614	3.737	6.1	5.7	6.5	7.4	7.1	0.6	0.6	0.7	0.8	0.8
Kuwait	3.344	3.407	3.468	3.606	3.997	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Oman	2.815	2.838	2.921	3.021	3.141	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Palestine	3.342	3.398	3.493	3.356	3.285	18.0	18.4	18.0	20.0	15.4	0.8	0.8	0.8	1.0	0.8
Qatar	2.375	2.426	2.484	2.577	2.708	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Saudi Arabia	3.441	3.663	3.888	4.148	4.441	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Türkiye	2.873	2.997	3.189	2.997	3.109	6.1	6.2	8.9	6.9	6.0	5.0	5.1	7.5	5.8	5.1
United Arab Emirates	2.755	2.835	2.902	3.111	3.269[a]	0.1	0.1	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
LATIN AMERICA AND THE CARIBBEAN	**3.619**	**3.692**	**3.775**	**3.876**	**4.081**	**22.0**	**20.9**	**20.8**	**20.9**	**22.7**	**124.5**	**119.5**	**120.0**	**121.9**	**133.4**
Caribbean	**3.837**	**3.953**	**4.064**	**4.200**	**4.411**	**52.4**	**51.1**	**51.6**	**55.2**	**57.0**	**13.6**	**13.4**	**13.7**	**14.8**	**15.4**
Antigua and Barbuda	4.112	4.302	4.391	4.504	4.684	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Aruba	3.418	3.620	3.907	4.007[a]	4.116[a]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Bahamas	4.276	4.387	4.364	4.488	4.661	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
British Virgin Islands	3.235	3.087[a]	3.281[a]	3.220[a]	3.425[a]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cayman Islands	2.928	2.866[a]	2.701[a]	2.910[a]	3.050[a]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Curaçao	2.866	2.988	3.144	3.236[a]	3.495[a]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Dominica	4.000	4.146	4.236	4.345	4.561[a]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Dominican Republic	3.521	3.608	3.744	3.884	4.128	24.9	21.7	20.6	25.0	25.8	2.6	2.3	2.2	2.7	2.9
Grenada	5.382	5.536	5.625	5.796	6.097	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Haiti	3.930	4.075	4.275	4.490	4.814	84.7	84.7	86.9	88.9	92.6	9.2	9.3	9.7	10.1	10.6
Jamaica	5.975	6.141	6.398	6.681	7.033	57.9	57.1	57.9	64.0	62.6	1.6	1.6	1.6	1.8	1.8
Saint Kitts and Nevis	2.998	3.179	3.310	3.405	3.526	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Saint Lucia	3.263	3.400	3.517	3.595	3.673	20.9	20.6	21.2	31.6	27.2	0.0	0.0	0.0	0.1	0.0

TABLE A3.1 (Continued)

Regions/ subregions/ countries/ territories	Cost of a healthy diet (PPP dollars per person per day)					People unable to afford a healthy diet (%)					People unable to afford a healthy diet (millions)				
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
Saint Vincent and the Grenadines	4.131	4.232	4.293	4.454	4.697	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Sint Maarten (Dutch part)	4.462	4.713[a]	4.835[a]	5.094[a]	5.273[a]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Trinidad and Tobago	3.928	4.028	4.083	4.224	4.524	6.5	7.0	7.1	9.1	9.9	0.1	0.1	0.1	0.1	0.2
Turks and Caicos Islands	2.809	2.893	2.974	3.075	3.229	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Central America	**3.368**	**3.419**	**3.454**	**3.482**	**3.625**	**25.8**	**24.9**	**23.6**	**25.4**	**22.2**	**38.3**	**37.3**	**35.7**	**38.7**	**34.2**
Belize	2.476	2.517	2.574	2.632	2.797	50.9	50.7	49.4	57.0	53.0	0.2	0.2	0.2	0.2	0.2
Costa Rica	3.961	4.000	4.048	3.889	3.925	16.0	16.3	16.3	21.0	14.2	0.8	0.8	0.8	1.1	0.7
Honduras	3.360	3.415	3.404	3.486	3.595	48.5	48.0	46.5	49.7	44.8	4.7	4.7	4.6	5.0	4.6
Mexico	2.993	3.071	3.039	3.074	3.205	24.3	23.1	21.6	23.1	20.2	29.9	28.7	27.0	29.1	25.6
Nicaragua	3.191	3.245	3.279	3.335	3.540	32.3	34.4	35.6	37.0	34.2	2.1	2.3	2.4	2.5	2.3
Panama	4.225	4.268	4.382	4.476	4.687	17.5	15.5	15.2	18.9	17.0	0.7	0.6	0.6	0.8	0.7
South America**	**3.417**	**3.439**	**3.504**	**3.589**	**3.818**	**18.6**	**17.4**	**17.7**	**17.0**	**20.6**	**72.5**	**68.8**	**70.6**	**68.4**	**83.8**
Argentina	3.341	n.r.	n.r.	n.r.	n.r.	6.8	n.r.	n.r.	n.r.	n.r.	3.0	n.r.	n.r.	n.r.	n.r.
Bolivia (Plurinational State of)	3.551	3.648	3.769	3.755	3.927	20.9	19.1	16.0	17.2	15.1	2.4	2.2	1.9	2.1	1.8
Brazil	2.809	2.800	2.882	3.084	3.350	19.6	18.5	18.8	12.7	22.4	41.0	38.9	39.9	27.1	48.1
Chile	3.053	3.180	3.276	3.349	3.387	4.6	4.5	4.7	5.9	3.5	0.8	0.8	0.9	1.1	0.7
Colombia	2.863	2.893	2.932	3.080	3.301	24.8	24.3	25.4	33.7	31.3	12.0	12.0	12.7	17.2	16.1
Ecuador	2.788	2.816	2.861	2.928	3.035	17.6	18.3	19.8	25.1	19.7	2.9	3.1	3.4	4.4	3.5
Guyana	4.629	4.742	4.828	4.887	5.117	45.0	44.5	42.0	24.9	18.5	0.3	0.3	0.3	0.2	0.1
Paraguay	3.430	3.511	3.519	3.543	3.867	19.9	18.3	17.7	20.3	20.4	1.3	1.2	1.2	1.3	1.4
Peru	3.084	3.062	3.098	3.133	3.334	26.6	23.5	21.4	34.2	25.7	8.4	7.6	7.0	11.4	8.6
Suriname	4.969	5.311[a]	5.337	5.739	6.090	44.5	45.0	43.9	54.3	58.6	0.3	0.3	0.3	0.3	0.4
Uruguay	3.073	3.170	3.254	3.414	3.543	2.8	3.0	3.3	5.3	5.2	0.1	0.1	0.1	0.2	0.2
Oceania	**2.847**	**2.850**	**2.958**	**3.040**	**3.197**	**2.3**	**2.3**	**2.6**	**2.7**	**2.9**	**0.6**	**0.6**	**0.7**	**0.7**	**0.8**
Australia	2.259	2.283	2.296	2.389	2.437	0.7	0.7	0.7	0.7	0.7	0.2	0.2	0.2	0.2	0.2
Fiji	3.612	3.677	3.858	3.914	4.358	44.9	45.8	52.9	56.8	63.7	0.4	0.4	0.5	0.5	0.6
New Zealand	2.671	2.589	2.722	2.817	2.797	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
NORTHERN AMERICA AND EUROPE	**3.026**	**3.086**	**3.186**	**3.204**	**3.224**	**2.3**	**1.9**	**1.7**	**1.6**	**1.4**	**23.9**	**19.7**	**18.1**	**17.2**	**14.9**
Northern America	**3.386**	**3.313**	**3.343**	**3.373**	**3.320**	**1.9**	**1.6**	**1.4**	**1.2**	**1.1**	**6.8**	**6.0**	**5.2**	**4.4**	**4.1**
Bermuda	4.072	3.789[a]	3.834[a]	3.718[a]	3.395[a]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Canada	2.863	2.911	2.927	3.017	3.065	0.7	0.7	0.7	0.7	0.4	0.3	0.3	0.3	0.3	0.2
United States of America	3.225	3.240	3.268	3.383	3.500	2.0	1.7	1.5	1.2	1.2	6.5	5.7	4.9	4.1	4.0
Europe	**2.998**	**3.068**	**3.174**	**3.190**	**3.217**	**2.5**	**2.0**	**1.8**	**1.8**	**1.5**	**17.2**	**13.7**	**12.9**	**12.7**	**10.7**
Eastern Europe	**3.068**	**3.137**	**3.261**	**3.312**	**3.368**	**3.6**	**3.0**	**2.8**	**2.8**	**2.5**	**9.0**	**7.4**	**6.8**	**7.0**	**6.0**
Belarus	3.177	3.228	3.310	3.310	3.471	2.1	1.1	1.4	0.7	0.5	0.2	0.1	0.1	0.1	0.0
Bulgaria	3.780	3.876	4.036	4.129	4.151	10.6	8.6	8.1	5.8	4.2	0.8	0.6	0.6	0.4	0.3
Czechia	2.899	2.921	3.025	3.003	2.985	0.2	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Hungary	3.302	3.383	3.490	3.507	3.418	3.7	2.4	2.2	2.0	1.5	0.4	0.2	0.2	0.2	0.1
Poland	2.909	2.986	3.162	3.210	3.155	1.0	1.5	1.1	1.3	0.5	0.4	0.6	0.4	0.5	0.2
Republic of Moldova	2.460	2.571	2.687	2.814	2.998	3.5	2.8	3.3	7.0	3.8	0.1	0.1	0.1	0.2	0.1

TABLE A3.1 (Continued)

Regions/ subregions/ countries/ territories	Cost of a healthy diet (PPP dollars per person per day)					People unable to afford a healthy diet (%)					People unable to afford a healthy diet (millions)				
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
Romania	2.921	2.970	3.133	3.207	3.253	11.9	7.2	8.8	8.4	7.2	2.3	1.4	1.7	1.6	1.4
Russian Federation	3.149	3.197	3.264	3.420	3.678	3.3	2.9	2.5	2.8	2.6	4.7	4.2	3.6	4.0	3.7
Slovakia	3.013	3.102	3.242	3.211	3.198	2.1	2.8	1.4	1.4	2.3	0.1	0.2	0.1	0.1	0.1
Northern Europe	**2.702**	**2.748**	**2.822**	**2.832**	**2.802**	**0.6**	**0.6**	**0.5**	**0.5**	**0.4**	**0.6**	**0.6**	**0.5**	**0.6**	**0.4**
Denmark	2.376	2.440	2.491	2.508	2.500	0.2	0.2	0.4	0.3	0.2	0.0	0.0	0.0	0.0	0.0
Estonia	3.125	3.188	3.284	3.350	3.290	1.0	0.8	1.3	1.1	0.8	0.0	0.0	0.0	0.0	0.0
Finland	2.545	2.624	2.704	2.732	2.716	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Iceland	2.213	2.247	2.314	2.420	2.416	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Ireland	2.397	2.341	2.340	2.204	2.150	0.4	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0
Latvia	3.124	3.130	3.245	3.269	3.254	3.4	2.4	1.9	1.9	1.5	0.1	0.0	0.0	0.0	0.0
Lithuania	3.003	3.042	3.148	3.132	3.108	3.3	2.3	1.2	1.1	0.7	0.1	0.1	0.0	0.0	0.0
Norway	3.325	3.432	3.479	3.488	3.361	0.6	0.4	0.4	0.5	0.3	0.0	0.0	0.0	0.0	0.0
Sweden	3.086	3.164	3.274	3.309	3.279	0.6	1.2	0.6	0.8	0.6	0.1	0.1	0.1	0.1	0.1
United Kingdom of Great Britain and Northern Ireland	1.822	1.873	1.937	1.911	1.950	0.5	0.5	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3
Southern Europe	**3.348**	**3.423**	**3.560**	**3.537**	**3.604**	**4.5**	**3.5**	**3.3**	**3.1**	**2.6**	**6.7**	**5.3**	**4.9**	**4.6**	**3.9**
Albania	3.952	4.069	4.262	4.280	4.388	31.3	23.0	22.2	19.9	15.9	0.9	0.7	0.6	0.6	0.4
Bosnia and Herzegovina	3.847	3.907	4.043	3.961	4.105	4.7	4.0	3.9	3.0	3.0	0.2	0.1	0.1	0.1	0.1
Croatia	4.168	4.220	4.273	4.301	4.290	6.2	4.1	3.4	3.3	1.8	0.3	0.2	0.1	0.1	0.1
Greece	3.037	3.102	3.167	3.140	3.174	3.8	2.1	2.9	2.7	2.2	0.4	0.2	0.3	0.3	0.2
Italy	2.885	2.979	3.121	3.154	3.168	2.8	2.8	2.1	1.8	1.5	1.7	1.7	1.2	1.1	0.9
Malta	3.494	3.645	3.866	3.824	3.917	0.3	0.3	0.7	0.8	0.8	0.0	0.0	0.0	0.0	0.0
Montenegro	3.397	3.428	3.644	3.511	3.673	15.9	17.2	17.4	17.3	14.9	0.1	0.1	0.1	0.1	0.1
North Macedonia	3.318	3.324	3.464	3.427	3.616	20.1	17.7	16.6	17.5	15.5	0.4	0.4	0.3	0.4	0.3
Portugal	2.513	2.596	2.673	2.642	2.651	1.1	1.1	0.5	1.4	1.2	0.1	0.1	0.1	0.1	0.1
Serbia	4.070	4.166	4.334	4.268	4.346	27.2	13.1	16.2	13.0	10.9	1.9	0.9	1.1	0.9	0.7
Slovenia	2.798	2.902	3.023	3.095	3.038	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spain	2.699	2.741	2.845	2.841	2.879	1.7	1.9	1.8	2.0	1.8	0.8	0.9	0.8	1.0	0.9
Western Europe	**2.731**	**2.826**	**2.904**	**2.951**	**2.951**	**0.4**	**0.2**	**0.3**	**0.3**	**0.2**	**0.8**	**0.4**	**0.6**	**0.6**	**0.4**
Austria	2.772	2.848	2.915	3.004	3.027	0.6	0.8	0.8	1.0	0.9	0.1	0.1	0.1	0.1	0.1
Belgium	2.862	2.962	3.047	3.159	3.125	0.3	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0
France	2.936	3.019	3.177	3.238	3.254	0.1	0.1	0.3	0.3	0.2	0.0	0.1	0.2	0.2	0.1
Germany	2.786	2.917	2.984	3.038	3.082	0.7	0.2	0.2	0.2	0.2	0.6	0.2	0.2	0.2	0.2
Luxembourg	2.492	2.627	2.619	2.576	2.590	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Netherlands (Kingdom of the)	2.743	2.821	2.932	3.000	2.963	0.4	0.3	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0
Switzerland	2.523	2.591	2.654	2.639	2.619	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

NOTES: The table shows the cost and affordability of a healthy diet at the country level, as well as by region, subregion, and country income group in 2017–2021. For each region, subregion and country income group, the unaffordability estimated as the percentage of the population unable to afford a healthy diet is population weighted. The 2022 World Bank classification of countries by income group is used for all years from 2017 to 2021 and for all countries and territories except Anguilla and Montserrat, for which income classification is not provided.
n.a. = data not available. n.r. = data not reported because of insufficient or unreliable data to update cost and affordability. * Cost and affordability of a healthy diet include Zimbabwe. ** Cost and affordability of a healthy diet include Argentina. [a] PPP was imputed in this year.
SOURCE: FAO. 2023. FAOSTAT: Cost and Affordability of a Healthy Diet (CoAHD). In: *FAO*. [Cited 12 July 2023]. www.fao.org/faostat/en/#data/CAHD

TABLE A3.2 LOWER- AND UPPER-BOUND ESTIMATES OF THE PERCENTAGE AND NUMBER OF PEOPLE (IN MILLIONS) UNABLE TO AFFORD A HEALTHY DIET, BY REGION, SUBREGION AND COUNTRY INCOME GROUP IN 2021

	People unable to afford a healthy diet			
	Lower bound		Upper bound	
	(%)	Total number (millions)	(%)	Total number (millions)
WORLD	**25.8**	**1 915.5**	**60.2**	**4 471.1**
AFRICA	**59.1**	**793.9**	**84.4**	**1 132.9**
Northern Africa	24.5	60.8	68.5	170.1
Sub-Saharan Africa	67.0	733.1	88.0	962.7
Eastern Africa	68.0	290.9	87.6	374.6
Middle Africa	66.4	125.3	85.4	161.2
Southern Africa	52.2	35.5	82.6	56.2
Western Africa	68.7	281.4	90.5	370.8
ASIA	**23.7**	**1 045.6**	**65.9**	**2 903.4**
Central Asia	9.7	3.5	53.6	19.0
Eastern Asia	1.4	22.8	43.8	697.3
South-eastern Asia	33.3	216.7	71.7	467.3
Southern Asia	41.0	799.4	85.0	1 658.1
Western Asia	1.8	3.3	34.8	61.7
LATIN AMERICA AND THE CARIBBEAN	**11.8**	**69.5**	**51.1**	**299.8**
Caribbean	42.1	11.4	80.9	21.9
Latin America	10.4	58.1	49.6	277.8
Central America	10.0	15.4	53.1	81.6
South America	10.5	42.7	48.3	196.3
OCEANIA	**1.5**	**0.4**	**5.6**	**1.5**
NORTHERN AMERICA AND EUROPE	**0.6**	**6.1**	**12.5**	**133.6**
COUNTRY INCOME GROUP				
Low-income countries	69.6	388.2	86.1	480.0
Lower-middle-income countries	42.9	1 404.5	82.8	2 714.3
Upper-middle-income countries	4.7	115.3	45.0	1 103.7
High-income countries	0.7	7.5	15.1	173.1

SOURCE: Authors' (FAO) own elaboration.

ANNEX 4
DATA AND DEFINITIONS FOR CHAPTER 3

A. URCA data definitions and framework

The Urban Rural Catchment Areas (URCA) is a publicly available global geospatial dataset which provides a global mapping of the rural–urban continuum.[36, 37] It is based on the Global Human Settlement Layer[21] and places urban centres on a gradient based on population size and density. As shown in **Chapter 3** (Figure A of Box 2) rural locations are assigned a gradient of their own, using the shortest travel time to urban centres of various sizes. Thus, the URCA disaggregates rural areas into multiple categories, distinguishing, for example, between locations that are less than 1 hour from an urban centre and those that are farther away. In **Chapter 4**, the URCA dataset is combined with household survey data for the country case studies.

The URCA approach builds upon the central place theory, which is a set of assumptions and propositions that explain why hierarchically tiered centres are found at certain favoured locations on the economic landscape. For example, retail trade and service activities often tend to cluster. The URCA approach assumes that city size is a proxy for the breadth of services and opportunities provided by an urban centre. It uses travel time to locations as a proxy for cost and adopts an urban hierarchy based on city size to classify rural locations as gravitating around a specific urban centre. This approach allows for: i) capturing the urban hierarchy that exists between urban centres of different sizes in terms of access to services and employment opportunities for rural locations; ii) defining urban–rural catchment areas (URCAs) in terms of the interconnection between urban centres (of different sizes) and their surrounding rural areas; and iii) adopting a gridded approach that is easily comparable across countries, developing a dataset for the whole world.

Additionally, the URCA approach allows for the identification of the share of the population that falls in a specific category of the rural–urban continuum within an administrative unit, rather than placing all the population in one territory or functional area. This categorization allows for more detailed analyses regarding consumption and production across the continuum. Table A4.1 describes the basic urban URCA categories; consequently, different categories of rural are attributed to urban areas of different sizes, e.g. rural areas less than 1 hour travel to a city of more than 5 million people.

In defining the rural URCA categories based on travel time to an urban agglomerations, the time interval is to be considered as a closed interval on the right. In particular, for the URCA categories used in the report it means that:

- "<1 hour" to any urban centre includes areas located 1 hour or less to a city of any size or town: areas ≤1 hour.
- "1–2 hours" to any urban centre includes areas located more than 1 hour but less or equal to 2 hours to a city of any size or town: 1 hour < area ≤2 hours.
- ">2 hours" to any urban centre includes areas located more than 2 hour to a city of any size or town: areas >2 hours.

Note that for improved readability of the text and figures in **Chapter 4**, this degree of specificity applies, but is not written at this level of detail.

TABLE A4.1 URCA DEFINITION OF CATEGORIES ACROSS THE RURAL–URBAN CONTINUUM

RURAL				URBAN						
Hours travel time to one of seven urban agglomerations				Agglomerations based on population size						
>3 hours*	3–2 hours	2–1 hours	<1 hour	>5 million people	1–5 million people	0.5–1 million people	250–500 thousand people	100–250 thousand people	50–100 thousand people	20–50 thousand people

NOTE: * Considered as either hinterland or dispersed towns, being that they do not gravitate around any urban agglomeration, and are hence not part of the rural–urban continuum.
SOURCE: FAO. 2021. Global Urban Rural Catchment Areas (URCA) Grid – 2021. In: *FAO*. [Cited 4 May 2023]. https://data.apps.fao.org/?share=g-3c88219e20d55c7ce70c8b3b0459001a

B. Methodological approach and tool for the systematic structural literature review

The systematic review of evidence from scientific studies used for **Chapter 3**, designed following the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA),[4] was implemented using an integrated research tool, Expert Search Semantic ENriChmEnt (Essence), developed by the FAO Data Lab.

Essence is based on a web application that offers the possibility of automatically querying scientific articles from multiple data sources (Google Scholar, World Bank, International Monetary Fund, etc.). These articles, including their full text, are then stored and made available for review through a semantic search engine utilizing the Apache Solr database at its core. This allows for the aggregation and filtering of results by selecting values automatically identified when the documents are downloaded or by exploiting annotations added collaboratively.

Advanced methods were used from the tool's web interface, which permitted the filtering of downloaded documents through an algorithm based on an artificial intelligence method that learns and extends user selections of relevant articles. The approach relies on the manual revision of a small subset of documents that are identified as relevant, or not, by the users to be used as a source of ground truth. A preliminary text pre-processing and learning step was then executed directly from the web interface, in order to estimate and generalize the linking function between the content (i.e. terms) of the reviewed documents and their relevance status. The learning step was based on linear logistic regression, which is a classification algorithm used to solve binary classification problems. The logistic regression classifier uses a weighted combination of the input features (the terms in the Tf-idf matrix) and passes them through a sigmoid function that transforms any real number input to a number between 0 and 1. The weights of the combinations are then estimated to minimize the distance between the output of the function and the user's specification of the relevance of the reviewed documents. After this step, the resulting function was applied to all the documents that were downloaded (and also those not reviewed), which were associated to a "score of relevance." A threshold made it possible to classify all the documents that were downloaded and not manually reviewed as "relevant".

Through this iterative process, it was possible to revise the literature in few passages and rely on the features available directly from the Essence Web interface. This is because the proposed relevance score for the non-user-evaluated documents becomes a filter, permitting users to quickly identify and review the most likely relevant documents and add new examples that could help the algorithm to better identify those that are relevant to the set of documents used in the learning step. This iterative process helps users filter out the most relevant documents and helps improve the accuracy of the model so that it is better able to make predictions on the relevance of a document.

For a full description of the implementation of the PRISMA protocol, and the methodological approach for the systematic structural literature review, see de Bruin and Holleman (2023).[18] ■

ANNEX 5
DATA AND DEFINITIONS FOR CHAPTER 4

A. Household surveys

The demand analysis conducted in **Section 4.1** and the estimation of subnational cost of a healthy diet in **Section 4.2** use georeferenced data from national representative LSMS surveys (Table A5.1). The surveys capture apparent household food consumption using quantitative seven-day recalls. The same surveys contain a separate module with eight questions regarding people's access to adequate food, which was used for the estimation of the prevalence of moderate or severe food insecurity in **Section 4.2.**

Finally, malnutrition indicators among children under five years of age assessed in **Section 4.2** were derived using georeferenced data from national representative demographic and health surveys (Table A5.1).

B. URCA categories used in the rural–urban continuum analysis

For the analyses conducted in **Chapter 4**, the URCA categories were simplified and grouped into ten categories, with a further aggregation to urban, peri-urban and rural categories (see Table 9 in **Chapter 4**). This aggregation allowed for a sufficient number of observations in almost all URCAs to conduct the analyses. For more details on the URCA categories, see Box 2 and Box 3 in **Chapter 3**. Table A5.2 reports the number of households interviewed in each URCA and the number of households for which georeferenced variables were not available, and for which it was thus not possible to assign to any URCA.

The surveys are all nationally representative, but they are not meant to be representative at the URCA level. For this reason, the distribution of population surveyed across URCAs was compared with the actual population distribution (estimated based on the 2020 Global Human Settlement Population [GHS-POP] dataset and the URCA dataset), and it was found to be sufficiently similar so as to exclude that any catchment area was under- or overrepresented in each survey.

The URCA dataset was developed based on i) the GHS Settlement Model (GHS-SMOD) grid to identify cities and towns; ii) the GHS-POP grid for 2015 to calculate the urban population in each city; and iii) travel time classifications based on Nelson *et al.* (2019)[38] with updated cost surface from Weiss *et al.* (2020).[39] Accordingly, the matching between the URCA dataset and surveys in Table A5.1 presents some time inconsistencies,

TABLE A5.1 HOUSEHOLD SURVEYS USED IN CHAPTER 4

Country	Year	Survey	Sections where surveys are used
Benin	2018/19	Harmonized Survey on Households Living Standards	Demand analysis (Section 4.1), cost and affordability of healthy diet (Section 4.2), food insecurity based on FIES (Section 4.2)
Burkina Faso	2018/19	Harmonized Survey on Households Living Standards	
Côte d'Ivoire	2018/19	Harmonized Survey on Households Living Standards	
Ethiopia	2018/19	Socioeconomic Survey Panel II	
Guinea-Bissau	2018/19	Harmonized Survey on Households Living Standards	
Malawi	2019/20	Fifth Integrated Household Survey	
Mali	2018/19	Harmonized Survey on Households Living Standards	
Niger	2018/19	Harmonized Survey on Households Living Standards	
Nigeria	2018/19	General Household Survey-Panel, Wave 4	
Senegal	2018/19	Harmonized Survey on Households Living Standards	
Togo	2018/19	Harmonized Survey on Households Living Standards	
Benin	2017/18	Demographic and Health Survey in Benin	Malnutrition estimations (Section 4.2)
Nigeria	2018	Nigeria Demographic and Health Survey	
Senegal	2018	Senegal: Continuous Demographic and Health Survey	

SOURCES: World Bank. 2023. Living Standards Measurement Study (LSMS). In: *World Bank*. [Cited 19 May 2023]. www.worldbank.org/en/programs/lsms; USAID (United States Agency for International Development). 2023. *The Demographic and Health Surveys (DHS) Program*. [Cited 19 May 2023]. https://dhsprogram.com

as surveys are for a one-year period and were conducted between 2018 and 2019 (except Malawi, conducted between 2019 and 2020). However, the information on road and infrastructure used in the URCA dataset was the most updated at the time the dataset was developed, which is around the same time the surveys were conducted. Thus, we expect that the travel time in the URCA dataset does not diverge significantly from the travel time faced by the households in the surveys analysed.

To identify the urban centres in the URCA dataset, the 2015 GHS-POP was used. Accordingly, it is possible that some peri-urban areas are misclassified in the analysis of **Chapter 4** (i.e. if a city has expanded, some areas that were in 2015 classified as "less than 1 hour from the city" could have become part of the city in 2018/19). This is however only the case if the city had expanded geographically and not just in population size. In addition, it is possible that an urban centre may have grown in population size between 2015 and 2018/19 and made the jump from small to intermediate city, or from intermediate to large city.

C. Food processing and food group aggregates used in food demand analyses

Explanatory note on processed foods and food processing classification systems

The term "food processing" involves applying scientific and technological principles to preserve foods by slowing down or stopping the natural processes of decay.[40] Purposes of food processing include converting inedible into edible foods, increasing the digestibility of raw foods (e.g. through cooking), altering the shelf-life (e.g. through fermentation, canning or freezing), simplifying meal preparation, or increasing the palatability of food products (e.g. through the addition of flavourings). The degree of food processing can vary from unprocessed raw foods (e.g. fresh fruit eaten as such) to food products whose ingredients are derived from food but contain little or no whole food (e.g. extruded cereals).[41] Certain food processing

TABLE A5.2 HOUSEHOLD SAMPLE SIZES BY URCA FOR THE SURVEYS USED IN CHAPTER 4

	Large city (>1 million people)	Intermediate city (0.25–1 million people)	Small city (50–250 thousand people)	Town (20–50 thousand people)	<1 hour to a large city	<1 hour to an intermediate city	<1 hour to a small city	<1 hour to a town	1–2 hours to a city or town	>2 hours to a city or town	Missing georeferenced information
	(number)										
High-food-budget countries	3 894	2 081	3 763	1 473	3 444	4 031	8 452	1 222	7 064	1 155	2 057
Senegal	1 079	743	991	394	636	948	1 188	24	780	60	313
Ethiopia	704	517	837	158	362	944	1 770	58	752	411	257
Côte d'Ivoire	671	348	828	468	635	815	3 806	492	3 442	84	1 403
Mali	810	120	720	312	480	216	816	612	1 870	562	84
Nigeria	630	353	387	141	1 331	1 108	872	36	220	38	0
Low-food-budget countries	3 168	2 818	3 213	1 295	3 468	6 044	11 393	644	8 782	2 350	827
Guinea-Bissau		1 066	236	24	118	637	611	36	1 527	965	131
Benin	1 167	497	552	360	1 361	442	2 866	96	659	12	0
Togo	1 093	60	706	141	729	192	2 579	24	567	24	56
Burkina Faso	588	275	969	324	755	443	2 050	84	1 031	132	359
Malawi		637	285	302	194	3 662	2 136	320	3 666	80	152
Niger	320	283	465	144	311	668	1 151	84	1 332	1 137	129

SOURCE: Adapted from Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

methods can help to increase food availability by allowing transport of foods across the globe, thus extending seasonal availability beyond what is produced locally in a specific season, and also making food safer to eat.[42] Foods and food products processed in industrial settings differ from those prepared by hand at home or in artisanal settings; they employ different ingredients and methods.[41]

During the last two decades, numerous classification systems, taking into account various degrees of food processing, have been developed. Among them are food classification systems that emphasize industrial food processing, whereby foods are categorized according to processing-related criteria, each employing different criteria and metrics. They have been used to describe and monitor levels of consumption of different types of processed foods, their impact on overall diet quality and disease outcomes (in several countries), the places where these foods are purchased, or their availability in urban food environments in particular.[41, 43]

The NOVA food classification is one of the available food processing classification systems that has been considered in different scenarios for public health, nutrition and epidemiological research. However, there are important limitations in this classification. The definition of levels of food processing, as proposed by NOVA, is complex and multidimensional, which increases the risk of misclassification of food items.[43] In addition, the first category combines unprocessed and minimally processed foods, which makes it difficult to unambiguously interpret the findings. It has been suggested that there may be few advantages from using the

TABLE A5.3 NOVA FOOD GROUPS WITH DESCRIPTIONS AND EXAMPLES

NOVA food group	Description	Examples
1. Unprocessed and minimally processed foods	Unprocessed foods are of plant origin (leaves, stems, roots, tubers, fruits, nuts, seeds), or animal origin (meat, other flesh, tissue and organs, eggs, milk), consumed shortly after harvesting, gathering, slaughter or husbanding. Minimally processed foods are unprocessed foods altered in ways that do not add or introduce any substance, but that may involve subtracting parts of the food. Minimal processes include cleaning, scrubbing, washing; winnowing, hulling, peeling, grinding, grating, squeezing, flaking; skinning, boning, carving, portioning, scaling, filleting; pressing; drying, skimming, fat reduction; pasteurizing, sterilizing; chilling, refrigerating, freezing; sealing, bottling (as such); simple wrapping, vacuum- and gas-packing. Malting, which adds water, is a minimal process, as is fermenting, which adds living organisms, when it does not generate alcohol. The main aim of these processes is to extend the life of unprocessed foods, enabling their storage for longer use, or to make them edible, and, often, to make their preparation easier or more diverse.	Fresh, chilled, frozen, vacuum-packed vegetables and fruits; grains (cereals) including all types of rice; fresh, frozen and dried beans and other legumes (pulses), roots and tubers; fungi; dried fruits and freshly prepared or pasteurized non-reconstituted fruit juices; unsalted nuts and seeds; fresh, dried, chilled, frozen meats, poultry, fish, seafood; dried, fresh, pasteurized full-fat, low-fat, skimmed milk, fermented milk such as plain yoghurt; eggs; flours, “raw” pastas made from flour and water, teas, coffee, herb infusions; tap, filtered, spring, mineral water. Also includes foods made from two or more items in this group, such as dried mixed fruits, granola made from cereals, nuts and dried fruits with no added sugars, honey or oils; pasta, couscous and polenta made with flours, flakes or grits and water; and foods with vitamins and minerals added generally to replace nutrients lost during processing, such as wheat or cornflour fortified with iron and folic acid.
2. Processed culinary ingredients	Processed culinary ingredients are food products extracted and purified by industry from constituents of foods, or else obtained from nature, such as salt. Stabilizing or “purifying” agents and other additives may also be used. They may contain additives that prolong product duration, protect original properties or prevent proliferation of microorganisms.	Vegetable oils crushed from seeds, nuts or fruits (notably olives); butter and lard obtained from milk and pork; sugar and molasses obtained from cane or beet; honey extracted from combs and syrup from maple trees; starches extracted from corn and other plants, and salt mined or from seawater, vegetable oils with added antioxidants, and table salt with added drying agents. Includes products consisting of two group 2 items, such as salted butter, and group 2 items with added vitamins or minerals, such as iodized salt.
3. Processed foods	These foods are manufactured by adding salt or sugars (or other substance of culinary use such as oils or vinegar) to whole foods, to make them more durable and sometimes also to modify their palatability. They are directly derived from foods and recognizable as versions of the original foods. They are generally produced to be consumed as part of meals or dishes, or may be used, together with highly processed products, to replace food-based freshly prepared dishes and meals. Processes include canning and bottling using oils, sugars or salt, and methods of preservation such as salting, salt pickling, smoking, curing. Processes and ingredients here are designed to increase the durability of group 1 foods and make them more enjoyable by modifying or enhancing their sensory qualities. They may contain additives that prolong product duration, protect original properties, or prevent proliferation of microorganisms. When alcoholic drinks are identified as foods, those produced by fermentation of group 1 foods such as beer, cider and wine, are classified here in group 3.	Canned or bottled vegetables and legumes (pulses) preserved in brine; peeled or sliced fruits preserved in syrup; tinned whole or pieces of fish preserved in oil; salted nuts; un-reconstituted processed meat and fish such as ham, bacon, smoked fish; cheese; and fresh unpackaged breads when made from wheat flour (or other cereal flours), water, ferments and salt.

TABLE A5.3 (Continued)

NOVA food group	Description	Examples
4. Ultra-processed foods and drink products	These products are formulated mostly or entirely from substances derived from foods or other organic sources, and typically contain little or no whole foods. They are durable, convenient, accessible, highly or ultra-palatable, and often habit-forming. These foods are typically not recognizable as versions of foods, although may imitate the appearance, shape and sensory qualities of foods. Many ingredients are not available in retail outlets. Some ingredients are directly derived from foods, such as oils, fats, flours, starches and sugars; others are obtained by further processing of food constituents or synthesized from other organic sources. Numerically the majority of ingredients are preservatives; stabilizers, emulsifiers, solvents, binders, bulkers; sweeteners, sensory enhancers, colours and flavours; processing aids and other additives; bulk may come from added air or water. Micronutrients may "fortify" the products. Most are designed to be consumed by themselves or in combination as snacks. Processes include hydrogenation, hydrolysis; extruding, moulding, re-shaping; pre-processing by frying, baking. Processes and ingredients used to manufacture highly processed foods are designed to create highly profitable products (low-cost ingredients, long shelf-life, emphatic branding), convenience (ready-to-consume) hyper-palatable products liable to displace freshly prepared dishes and meals made from all other NOVA food groups. When alcoholic drinks are identified as foods, those produced by fermentation of group 1 foods followed by distillation of the resulting alcohol, such as whisky, gin, rum, vodka, are classified here in group 4.	Chips (crisps), many types of sweet, fatty or salty snack products; ice cream, chocolates, candies (confectionery); French fries (chips), burgers and hot dogs; poultry and fish "nuggets" or "sticks" ("fingers"); mass manufactured breads, buns, cookies (biscuits); breakfast cereals; pastries, cakes, cake mixes; "energy" bars; preserves (jams); margarines; desserts; canned, bottled, dehydrated, packaged soups, noodles; sauces; meat, yeast extracts; soft, carbonated, cola, "energy" drinks; sugared, sweetened milk drinks, condensed milk, sweetened including "fruit" yoghurts; fruit and "fruit nectar" drinks; instant coffee, cocoa drinks; no-alcohol wine or beer; pre-prepared meat, fish, vegetable, cheese, pizza, pasta dishes; infant formulas, follow-on milks, other baby products; "health", "slimming" products such as powdered or "fortified" meal and dish substitutes.

SOURCES: Monteiro C.A., Cannon, G., Levy, R.B., Moubarac, J-C., Iouzada, M.L.C., Rauber, F., Khandpur, N., Cediel, G. Neri, D., Martinez-Steele, E., Baraldi, L.G. & Jaime, P.C. 2019. Ultra-processed foods: what they are and how to identify them. *Public Health Nutrition*, 22(5): 936-941. https://doi.org/10.1017/s1368980018003762; Monteiro, C.A, Cannon, G., Jaime, P., Canella, D., Louzada, M.L., Calixto, G., Machado, P. *et al.* 2016. Food classification. Public health NOVA. The star shines bright. *World Nutrition*. 7(1–3). https://worldnutritionjournal.org/index.php/wn/article/view/5/4; FAO. 2015. *Guidelines on the collection of information on food processing through food consumption surveys.* Rome. www.fao.org/3/i4690e/i4690e.pdf

NOVA classification compared with the current epidemiologic approach, which relies on the linkage of nutrient intakes to chronic disease, with subsequent identification of foods that merit consideration in public health nutrition strategies.[44] Therefore, results presented in **Chapter 4** should be interpreted with these limitations and considerations in mind.

Food processing and food group classifications used in Section 4.1

The NOVA classification system was developed by researchers from the University of São Paulo, Brazil.[45] The system was published more than ten years ago and has been used in different settings and populations since.[46] For the food demand analyses by level of food processing, a food classification system adapted from NOVA was used, whereby all foods were classified according to the nature, extent and purpose of the industrial processing they undergo. These processes involve physical, biological and/or chemical methods used during the food manufacturing process.[41, 45]

According to the NOVA classification, methods used in households and similar places such as restaurants or artisanal settings where fresh culinary preparations are prepared from scratch by hand or with simple tools, are by definition not industrial processing methods. Home-prepared and artisanal preparations of all types should as far as possible be disaggregated into their components so that each can then be classified into one of the four groups.

NOVA classifies all food items into four main groups: 1) unprocessed and minimally processed foods; 2) processed culinary ingredients; 3) processed foods; and 4) highly processed foods and drink products.[45, 46] The four main

TABLE A5.4 FOOD PROCESSING LEVEL AGGREGATES USED IN SECTION 4.1 ADAPTED FROM NOVA

NOVA food group	Used in this report	Food items – example					
1. Unprocessed and minimally processed	**Unprocessed and minimally processed**	**Fresh/raw:** cereals, roots, tubers, plantains, pulses, seeds, nuts, animal proteins, vegetables, fruits	**Dried:** cereals (rice, maize, wheat, barley, millet, sorghum), pulses (groundnut, soybean, cowpea), tubers, vegetables, fruits	**Flour from starches:** wheat, maize, cassava	**Unsweetened drinks:** bottled water, tea, coffee, fruit juice, milk (fresh, fermented, tinned, powder)		
2. Processed culinary ingredients **3. Processed foods**	**Low processed**	**Fats and oils:** cooking oil, butter, margarine, ghee, shea butter, groundnut oil, coconut oil	**Seasonings:** spices, salt, sugars, honey	**Pastes and purees:** groundnut, tomato, sesame	**Dried/smoked:** fish (including tinned)	**Flour-based goods:** bread, chapati, pasta	Beer and wine
4. Ultra-processed	**Highly processed**	**Sweets and confectionary:** biscuits, cakes, pastries, jams	**Industrial products:** modern bread, breakfast cereals, infant formula	**Canned/processed meats:** sausage	**Other drinks:** soft drinks, spirits	Meals at restaurants	

SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

TABLE A5.5 FAO/WHO GIFT FOOD GROUP LEVEL AGGREGATES

Food groups				
Cereals and their products	Roots, tubers, plantains and their products	Pulses, seeds, nuts and their products	Vegetables and their products	Fruits and their products
Milk and milk products	Eggs and their products	Fish, shellfish and their products	Meat and meat products	Insects, grubs and their products
Fats and oils	Sweets and sugars	Spices and condiments	Beverages	Foods for particular nutritional uses
Food supplements	Food additives	Composite dishes	Savoury snacks	

NOTE: The following FAO/WHO GIFT food group level aggregates have a negligible presence in the LSMS data: insects, grubs and their products; foods for particular nutritional uses; food supplements; food additives; and composite dishes.
SOURCE: FAO. 2022. *FAO/WHO Global Individual Food consumption data Tool (FAO/WHO GIFT): methodological document*. Rome. www.fao.org/3/cb8809en/cb8809en.pdf

groups and their descriptions are given in Table A5.3. For the analysis in **Section 4.1**, food items were classified according to the four NOVA groups;[45, 46] but for the purposes of presentation, these were reduced to three groups, with groups 2 and 3 combined as one group. The three main groups (with food item examples in each) and the names used in this report are shown in Table A5.4.

For the purpose of the analysis in **Section 4.1**, the FAO/WHO Global Individual Food consumption data Tool (GIFT) food grouping (Table A5.5)[47] was adapted to form eight food groups as shown in Table A5.6. For simplicity of presentation, a number of the food groups were combined into broader groups. For instance, the group "staple foods" includes the subgroups "cereals and their products" and "roots, tubers, plantains and their products". The group "animal source foods" is composed of the subgroups "milk and milk products", "eggs and their products", "fish, shellfish and their products", "meat and meat products" and "insects, grubs and their products" and so forth. The group "sweets, condiments and beverages" is composed of the subgroups "sweets and sugars", "spices and condiments" and "beverages". "Food away from home" comprises prepared foods consumed away from home, which is specifically identified in household surveys. Table A5.6 shows the food group aggregates used in **Section 4.1**, along with their food group names which are simplified for presentation purposes in figures and tables.

TABLE A5.6 SUMMARY OF FOOD GROUP AGGREGATES AND TERMINOLOGY OF FOOD GROUPS USED IN SECTION 4.1

Food groups used in figures and tables in Chapter 4	Staple foods	Pulses, seeds and nuts	Animal source foods	Vegetables	Fruits	Fats and oils	Sweets, condiments and beverages	Food away from home
Food item examples	Cereals (rice, wheat, maize, maize flour, sorghum, millet, bread, pasta) Roots, tubers and plantains (potato, cassava, taro, yam, plantains, other)	Soybean, groundnut, cowpea, sesame	Fresh milk, powdered milk, cheese, eggs, fish, shellfish, chicken, beef, pork, mutton	Cabbage, lettuce, tomato, okra, onion	Mango, orange, papaya, sweet banana, avocado, apple, coconut	Palm oil, vegetable oils, cottonseed oil, butter	Pastries, cakes, biscuits, sweets, jams, sugars, salt, ginger, mayonnaise, beer, wine, water, soft drinks, coffee, tea, juices	Savoury snacks, full meals

NOTE: The food demand analysis in **Chapter 4** uses a food grouping originally adapted from the FAO/WHO GIFT classification, but is further aggregated for presentation purposes.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

D. Data and methodology behind analysis in Box 6

The analysis of moderate or severe food insecurity based on the FIES across the rural–urban continuum (URCA) is based on data collected by IFAD between 2019 and 2021 on small-scale producer households and communities including beneficiaries as well as non-beneficiaries (that are used as counterfactual groups) in *ex post* rural project impact assessments.[bi] The data are comprehensive household-level data with detailed GPS coordinates collected from 21 rural development projects implemented in countries from most regions of the world.

The projects are selected for impact assessments to be representative of IFAD's overall project portfolio. Sample sizes range between 1 500 and 3 000 households and around 150 to 300 communities per project. They consist of detailed information related to sociodemographic, economic, and social capital variables, including information on household dietary diversity and food insecurity experiences as captured by the FIES,[48] which were available for 21 countries.[bj] The FIES survey module was used, composed of eight questions about respondents' experiences facing constrained access to food during the 12 months preceding data collection. Respondents were classified into three categories: 1) food secure or only mildly food insecure; 2) moderately food insecure; and 3) severely food insecure, following standard methodology.[49] ■

bi Data from IFAD's Impact Assessment (2019–2021) are collected using the CAPI approach with Survey Solutions and cover sociodemographic, economic, and social capital variables, as well as a large set of variables that determine agricultural and non-agricultural production and incomes. More information about these datasets can be found on the following webpage: www.ifad.org/ifad-impact-assessment-report-2021/index.html

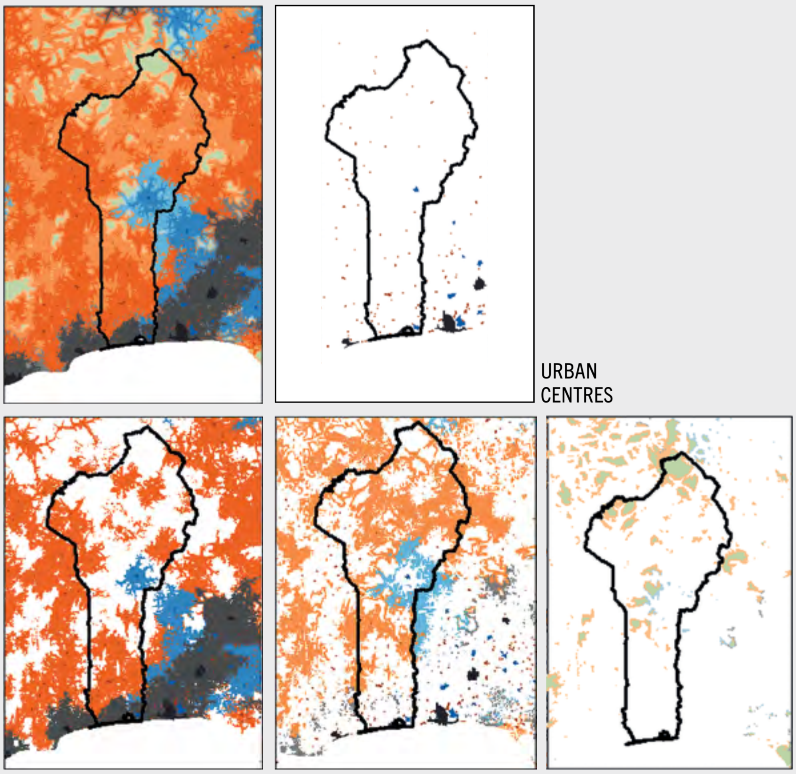
bj The projects represented include: Asia and the Pacific Region (APR) (1) the Post-Tsunami Sustainable Livelihoods Programme for the Coastal Communities of Tamil Nadu (PTSLP) in India, (2) the Productive Partnerships in Agriculture Project (PPAP) in Papua New Guinea, (3) the Second Cordillera Highland Agricultural Resource Management Project (CHARMP2) in the Philippines, (4) the Rural Development Programme – Phase II (RDP II) in Solomon Islands, (5) the Project for Adaption to Climate Change in the Mekong Delta in Ben Tre and Tra Vinh Provinces in Viet Nam; Eastern and Southern Africa Region (ESA) (1) the Rural Financial Intermediation Programme II (RUFIP II) in Ethiopia, (2) the Upper Tana Catchment Natural Resource Management Project (UTaNRMP) in Kenya, (3) the Smallholder Agriculture Development Project (SADP) in Lesotho, (4) the Sustainable Agricultural Production Programme (SAPP) in Malawi, (5) the Marketing Infrastructure, Value Addition and Rural Finance Support Programme (MIVARF) in the United Republic of Tanzania, (6) the Smallholder Productivity Promotion Programme (S3P) in Zambia; Latin America and the Caribbean Region (LAC) (1) the Inclusive Rural Development Programme (PRODERI) in Argentina, (2) the Economic Inclusion Programme for Families and Rural Communities (ACCESOS) in the Territory of the Plurinational State of Bolivia, (3) the Adapting to Markets and Climate Change Project (NICADAPTA) in Nicaragua, (4) the Strengthening Local Development in the Highlands and High Rainforest Areas Project (PSSA) in Peru; Near East, North Africa, Europe and Central Asia Region (NEN) (1) the Programme to Reduce Vulnerability in Coastal Fishing Areas (PRAREV-Pêche) in Djibouti, (2) the Livestock and Market Development Programme II (LMDP II) in Kyrgyzstan, (3) the Livestock and Pasture Development Project II (LPDP II) in Tajikistan, (4) the Agropastoral Development and Local Initiatives Promotion Programme for the South-East – Phase II (PRODESUD II) in Tunisia; West and Central Africa Region (WCA) (1) the Rural Enterprises Programme (REP) in Ghana, (2) the Poverty Reduction Project in Aftout South and Karakoro – Phase II (PASK II) in Mauritania, (3) the Value Chain Development Programme (VCDP) in Nigeria.

ANNEX 6
URCA MAPS SHOWING PATTERNS OF URBANIZATION FOR COUNTRIES ANALYSED IN CHAPTER 4

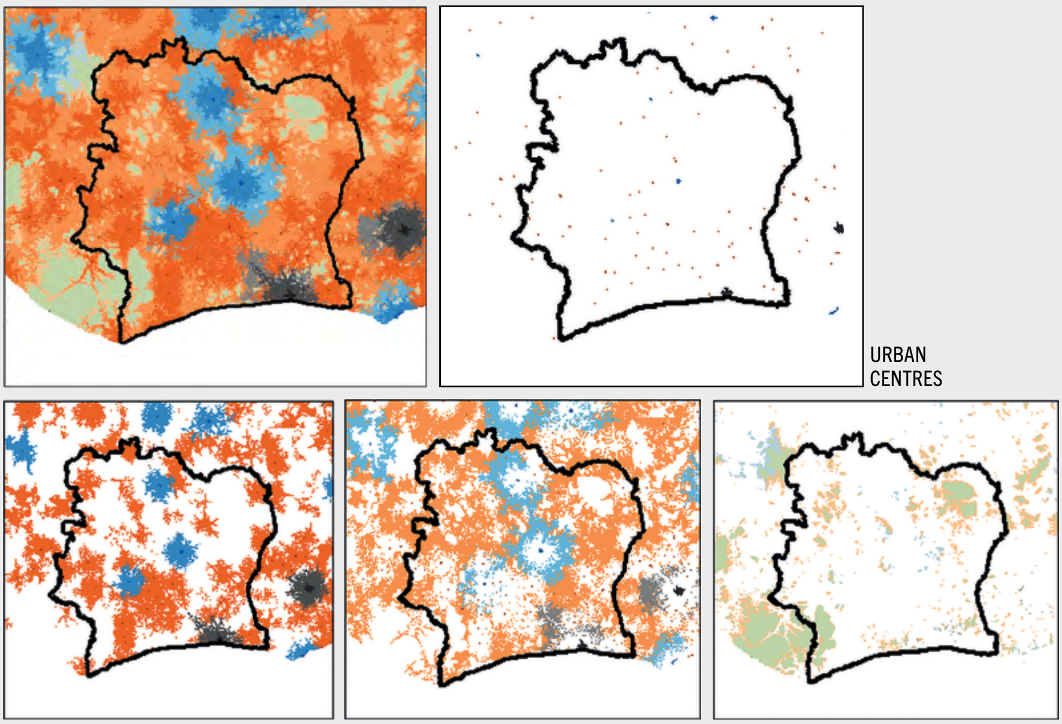
Figure A6.1 presents URCA maps for 9 of the 11 Western, Eastern and Southern African countries analysed in **Chapter 4**. The other two countries are presented in Figure 23 in **Chapter 4**. The maps show different patterns of urbanization, from a denser metropolitan urbanization pattern (example Senegal) to a small city or town dispersed urbanization pattern (example Ethiopia). For each figure, the top left map shows the overlay of all URCA categories and the top right map shows the location of urban centres. The bottom maps show, moving left to right, the areas that are less than 1 hour, 1 to 2 hours, and more than 2 hours travel to any urban centre.

FIGURE A6.1 URBAN–RURAL CATCHMENT AREAS

A) BENIN



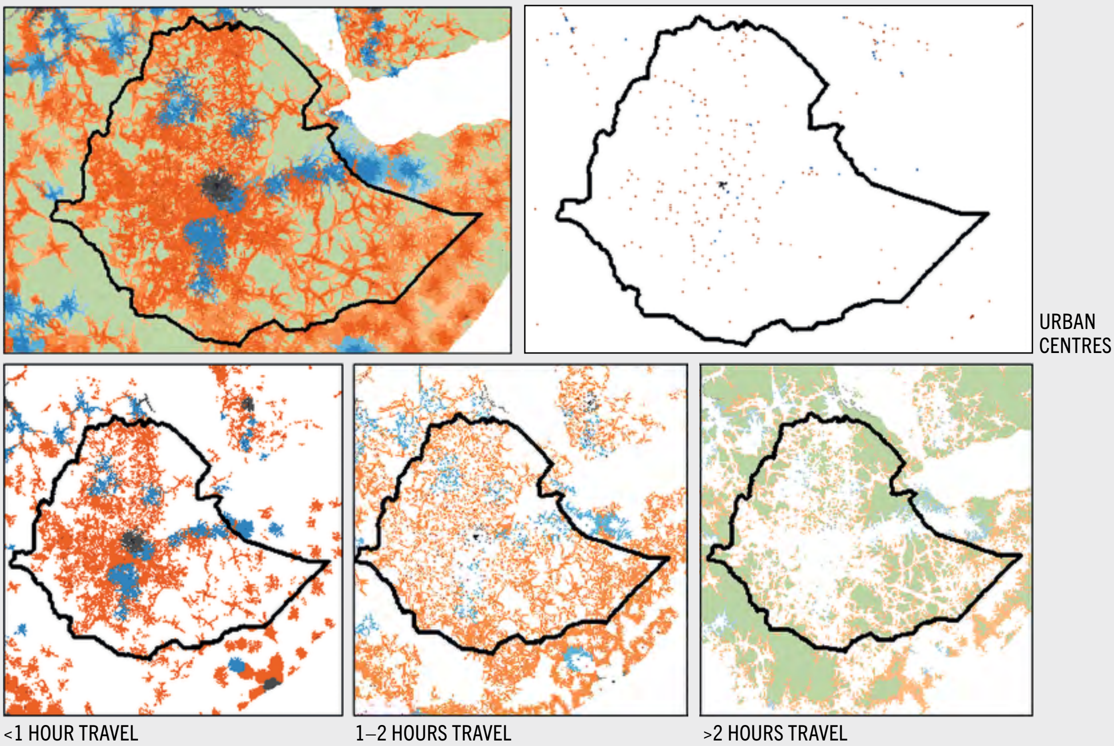
B) CÔTE D'IVOIRE



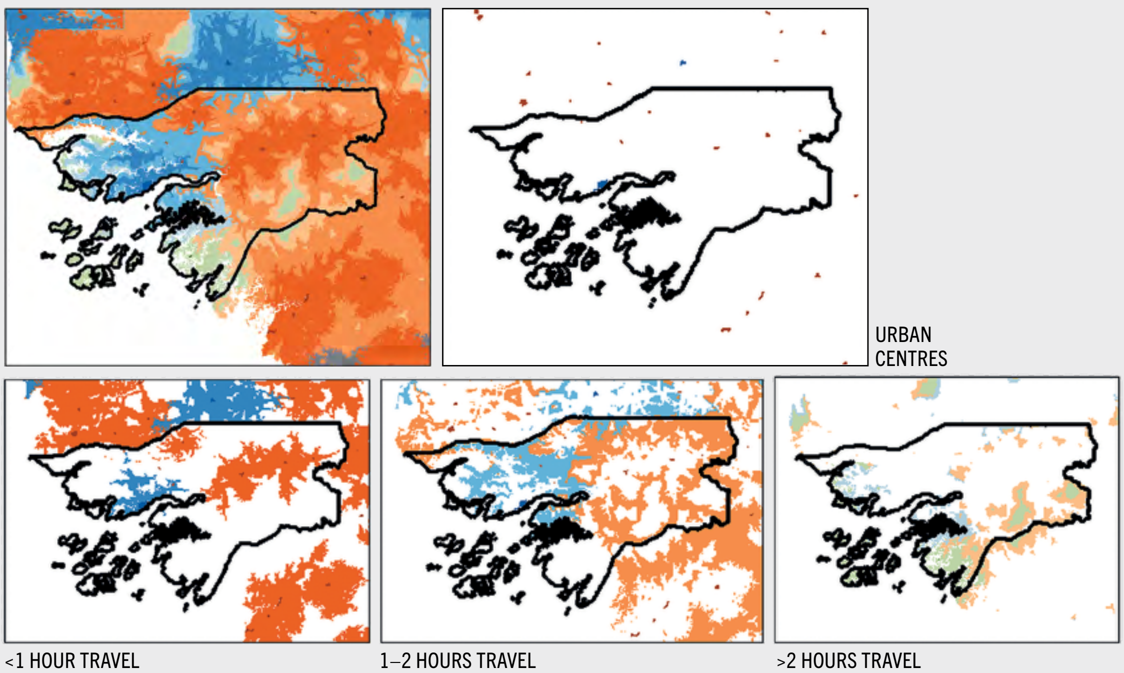
- Large city (>1 million people)
- Intermediate city (0.25–1 million people)
- Small cities and towns (0.02–0.25 million people)
- Dispersed towns
- Hinterlands
- <1 hour to a large city
- <1 hour to an intermediate city
- <1 hour to a small city or town
- 1–2 hours to a large city
- 1–2 hours to an intermediate city
- 1–2 hours to a small city or town
- >2 hours to a large city
- >2 hours to an intermediate city
- >2 hours to a small city or town

FIGURE A6.1 (Continued)

C) ETHIOPIA



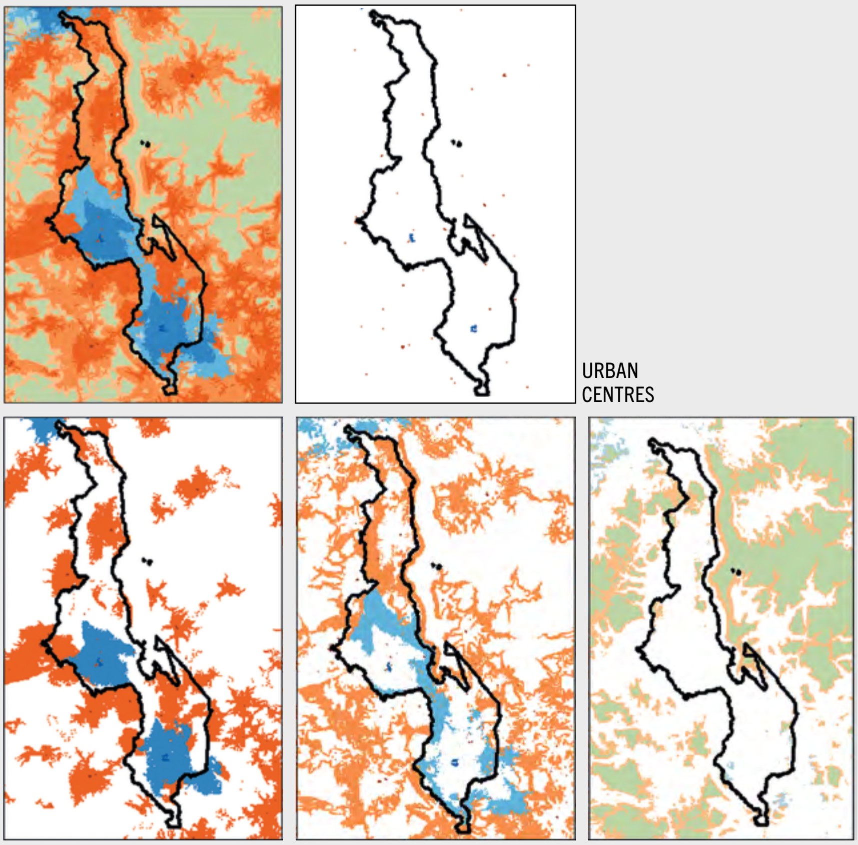
D) GUINEA-BISSAU



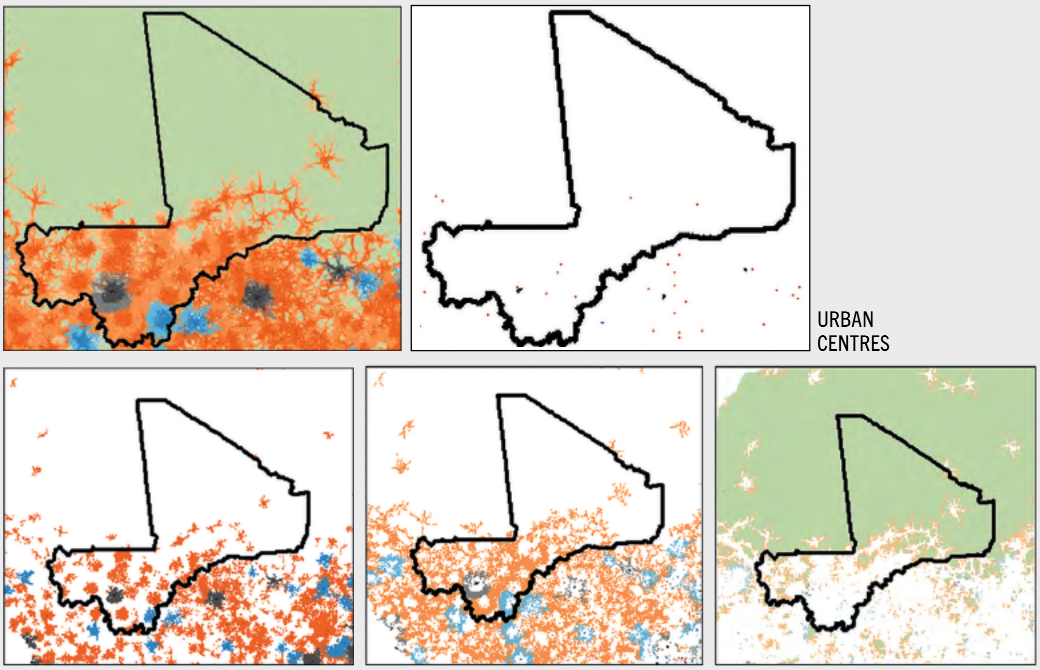
- Large city (>1 million people)
- Intermediate city (0.25–1 million people)
- Small cities and towns (0.02–0.25 million people)
- Dispersed towns
- Hinterlands
- <1 hour to a large city
- <1 hour to an intermediate city
- <1 hour to a small city or town
- 1–2 hours to a large city
- 1–2 hours to an intermediate city
- 1–2 hours to a small city or town
- >2 hours to a large city
- >2 hours to an intermediate city
- >2 hours to a small city or town

FIGURE A6.1 (Continued)

E) MALAWI



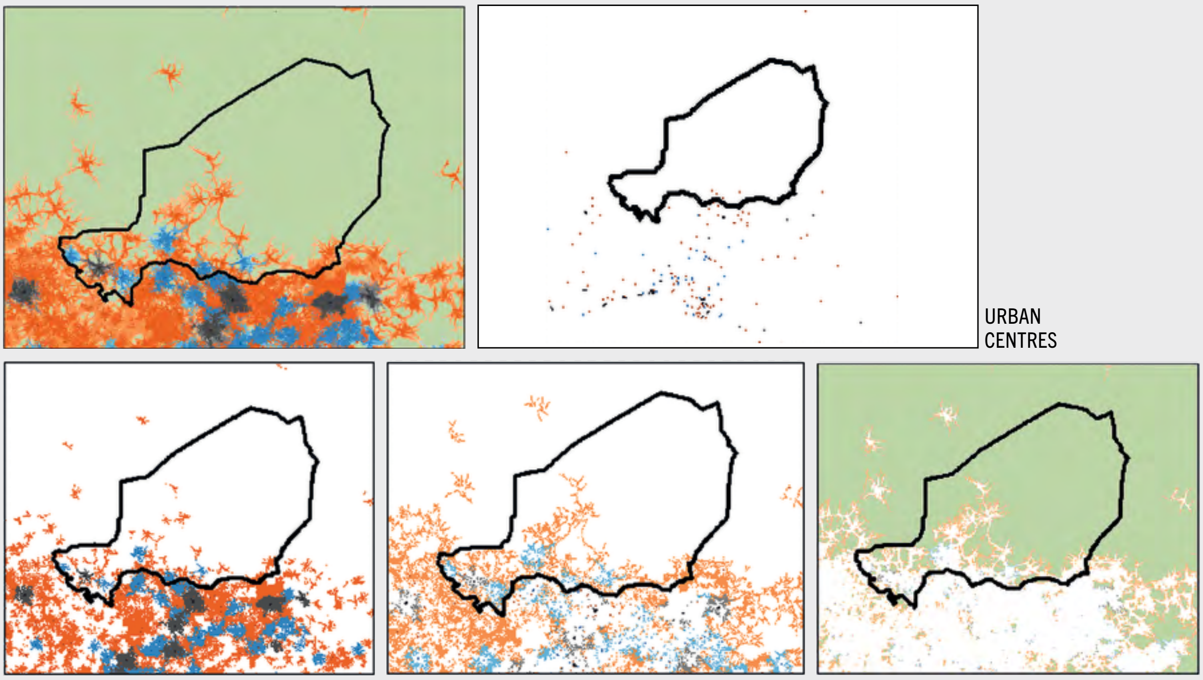
F) MALI



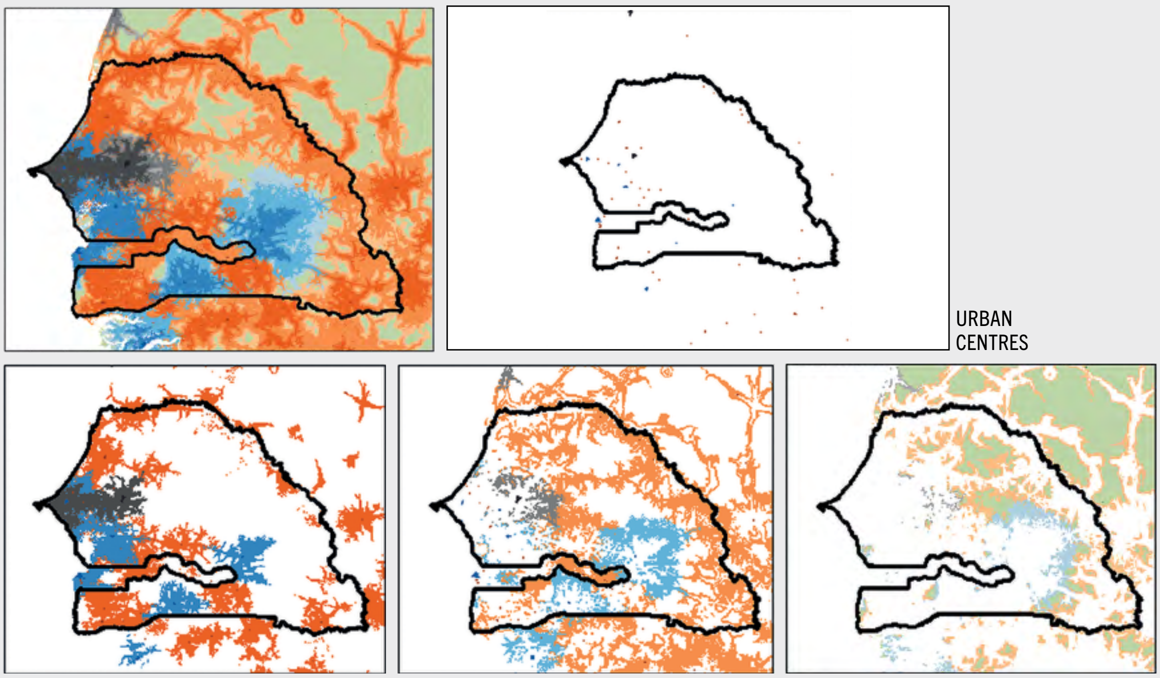
- Large city (>1 million people)
- Intermediate city (0.25–1 million people)
- Small cities and towns (0.02–0.25 million people)
- Dispersed towns
- Hinterlands
- <1 hour to a large city
- <1 hour to an intermediate city
- <1 hour to a small city or town
- 1–2 hours to a large city
- 1–2 hours to an intermediate city
- 1–2 hours to a small city or town
- >2 hours to a large city
- >2 hours to an intermediate city
- >2 hours to a small city or town

FIGURE A6.1 (Continued)

G) NIGER



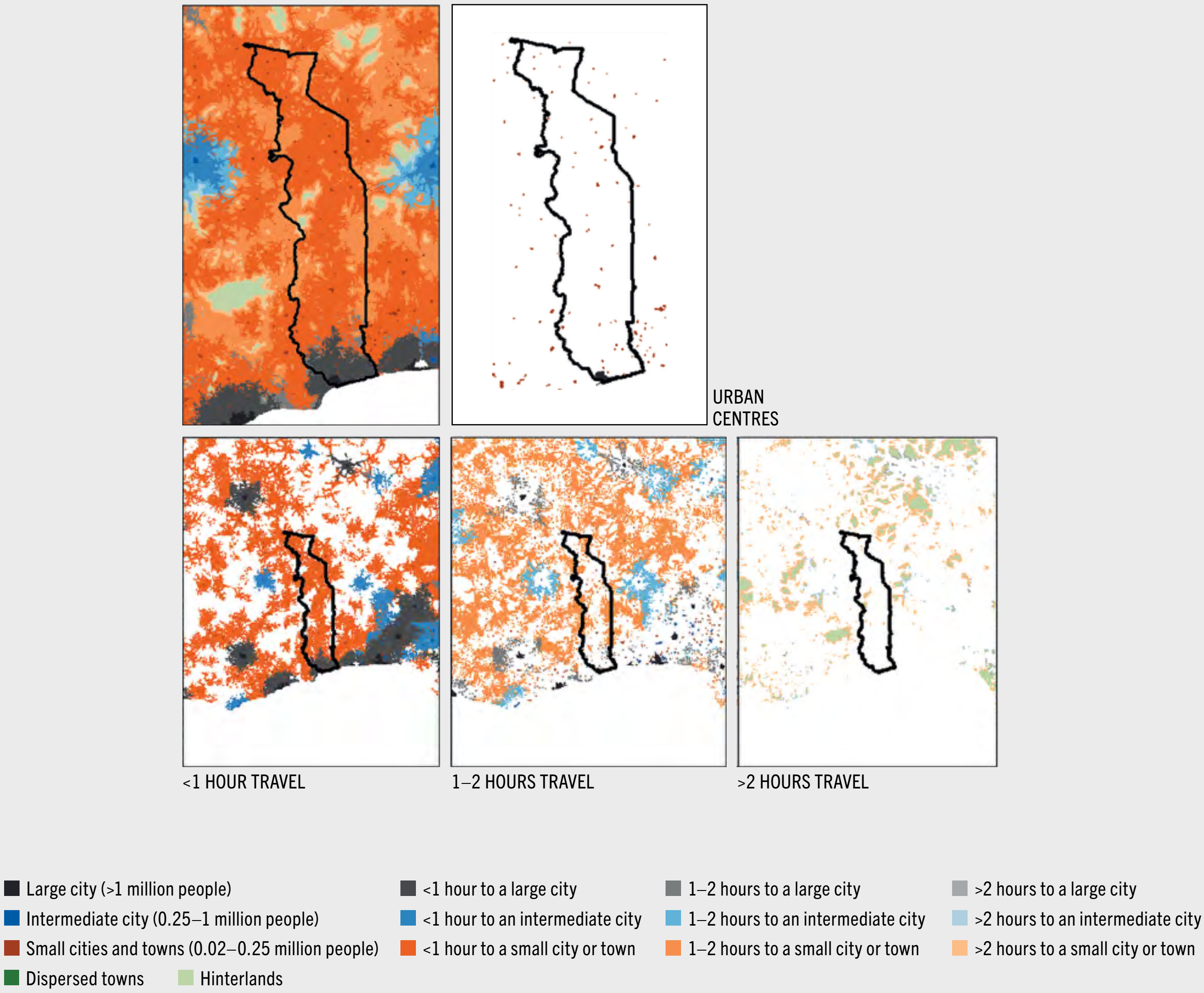
H) SENEGAL



- Large city (>1 million people)
- Intermediate city (0.25–1 million people)
- Small cities and towns (0.02–0.25 million people)
- Dispersed towns
- Hinterlands
- <1 hour to a large city
- <1 hour to an intermediate city
- <1 hour to a small city or town
- 1–2 hours to a large city
- 1–2 hours to an intermediate city
- 1–2 hours to a small city or town
- >2 hours to a large city
- >2 hours to an intermediate city
- >2 hours to a small city or town

FIGURE A6.1 (Continued)

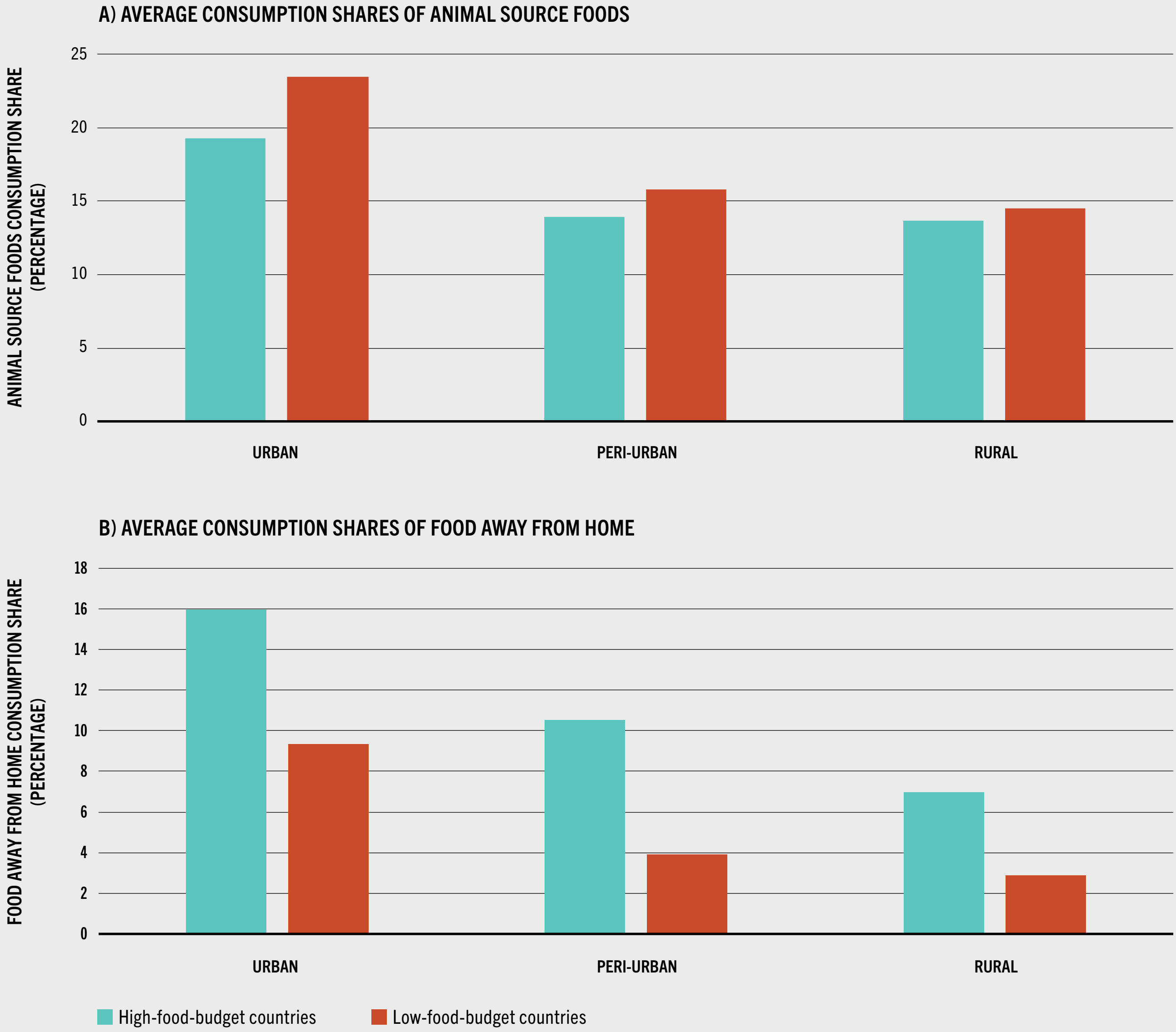
I) TOGO



NOTES: In all panels, the top left map displays all urban–rural catchments areas. The top right map shows only the three categories of urban centres (large, intermediate and small city or town). The bottom left map displays areas 1 hour travel or less to any urban centre, roughly corresponding to what are defined as peri-urban areas in **Chapter 4**. The bottom centre map displays areas 1 to 2 hours travel to any urban centre, and the bottom right map displays areas more than 2 hours travel to any urban centre. The bottom centre and bottom right maps roughly correspond to what are defined as rural areas in **Chapter 4**.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

ANNEX 7
SUPPLEMENTARY RESULTS FROM SECTION 4.1

FIGURE A7.1 AVERAGE SHARES OF TOTAL HOUSEHOLD FOOD CONSUMPTION VALUES FOR ANIMAL SOURCE FOODS AND FOOD AWAY FROM HOME BY URBAN, PERI-URBAN AND RURAL AREA FOR SELECTED HIGH- AND LOW-FOOD-BUDGET COUNTRIES IN AFRICA



NOTES: Average consumption shares of animal source foods (Figure A) and food away from home (Figure B) as a percentage share of total household food consumption (at market value) in urban, peri-urban and rural areas by high- and low-food-budget country group. All surveys are for 2018/19, except Malawi (2019/20). See Table 9 for the definition of urban, peri-urban and rural areas, and Table 10 for the definition and list of high- and low-food-budget countries. See Table A5.6 for the definition of animal source foods and food away from home, and Table A5.1 for the list of 11 Western, Eastern and Southern African countries.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

Tables A7.1 to A7.5 present the econometric results showing the marginal effects[bk] of the determinants of the different food consumption shares of total food consumption (at market value) for: i) consumption shares of purchased food, for home consumption and food away from home (Table A7.1); ii) consumption shares of highly processed foods (Table A7.2); iii) consumption shares of animal source foods (Table A7.3); iv) consumption shares of food away from home (Table A7.4); and v) consumption shares of vegetables (Table A7.5).

Only statistically significant marginal effects (at 10 percent or lower) are presented. The effect of location across the rural–urban continuum is captured by the ten URCA categories defined in **Section 4.1**, with the omission of the town category to serve as a reference category to which the other URCA variables are compared, i.e. the marginal effect of the "large city" category is interpreted as relative to the omitted URCA town variable. The marginal effect of prices and home assets is not shown (see source for full presentation of results). Countries included in the analysis: Benin, Burkina Faso, Côte d'Ivoire, Ethiopia, Guinea-Bissau, Malawi, Mali, Niger, Nigeria, Senegal and Togo. All surveys are 2018/19, except Malawi (2019/20).

For the full details on the data sources, methodology and interpretation see Dolislager *et al.* (forthcoming).[52] ■

bk Marginal effects are partial derivatives of the regression equation with respect to each variable in the model for each unit in the data; average marginal effects are simply the mean of these unit-specific partial derivatives over some sample. In ordinary least squares regression with no interactions or higher-order term, the estimated slope coefficients are marginal effects.[50] Marginal effects tell us how a dependent variable (outcome) changes when a specific independent variable (explanatory variable) changes. Other covariates are assumed to be held constant. Marginal effects are often calculated when analysing regression analysis results.[51]

TABLE A7.1 THE NON-PRICE DETERMINANTS OF PURCHASED FOOD CONSUMPTION SHARES (FOR HOME CONSUMPTION AND FOOD AWAY FROM HOME) IN SELECTED HIGH- AND LOW-FOOD-BUDGET COUNTRIES IN AFRICA

		High-food-budget countries						Low-food-budget countries						
	All countries	High-food-budget countries	Senegal	Ethiopia	Côte d'Ivoire	Mali	Nigeria	Low-food-budget countries	Guinea-Bissau	Benin	Togo	Burkina Faso	Malawi	Niger
Large city (>1 million people)	0.096***	0.095***	0.054***	0.162**	0.113***	0.066***	0.074***	0.118***		0.136***	0.098***	0.177***		0.131***
Intermediate city (0.25–1 million people)	0.047***		0.034***		0.074***		0.040**	0.080***	0.103***			0.235***	0.196***	0.102***
Small city (50–250 thousand people)					0.045***	0.046***		0.034**	0.169***	0.058***		0.136***	0.229***	0.065***
<1 hour to a large city	–0.103***	–0.115***	0.016**	–0.163***	–0.032**		-0.081***	-0.061***			–0.049***	–0.059***	0.256***	
<1 hour to an intermediate city	–0.143***	–0.151***	–0.040***	–0.101**	–0.123***		-0.109***	–0.116***	–0.059*	–0.042**	–0.101***		0.057**	–0.114***
<1 hour to a small city	–0.153***	–0.149***	–0.027***	–0.160***	–0.104***	–0.152***	-0.065***	–0.155***		–0.069***	–0.180***	–0.046***		–0.081***
<1 hour to a town	–0.146***	–0.135***			–0.165***	–0.160***		–0.177***						
1–2 hours to a city or town	–0.193***	–0.202***	–0.027**	–0.140***	–0.136***	–0.172***	-0.119***	–0.149***	–0.098***	–0.140***	–0.157***	–0.056***		–0.108***
>2 hours to a city or town	–0.194***	–0.215***		–0.142***		–0.044*		–0.149***	–0.139***			–0.118***		–0.129***
Total income (log of annual per capita expenditure)	0.025***	0.015***	0.019***	–0.038***		0.047***	0.051***	0.040***	0.037***	0.046***	0.049***	0.086***	0.020***	0.043***
Male full-time non-farm employment	0.044***	0.040***	0.009***	0.068***	0.051***	0.008*	0.032***	0.052***	0.015***	0.046***	0.044***	0.032***	0.045***	0.063***
Female full-time non-farm employment	0.021***	0.018***			0.023***		0.017***	0.028***	–0.013***	0.026***	0.011**	0.034***	0.078***	
Primary schooling of household head	0.020***	0.017***							0.018**	0.031***	0.011*			
Secondary schooling of household head	0.030***	0.028***	0.022***		0.037***	0.049***	0.015**				0.026***	0.039**		
Female-headed households	0.015***	0.019***	0.017***	0.022**	0.023***				0.028***	0.048***	0.023***		–0.037***	0.051***
Household size (adult equivalents)	–0.004***	–0.005***	–0.002***	–0.024***	–0.011***		–0.004**	–0.005***		–0.007***	–0.008***	–0.007***	–0.004**	–0.006***
Dependency ratio				–0.037*	–0.022**		0.021*			0.042***				
Cultivated land (ha)	–0.015***	–0.029***	–0.005**	–0.079***	–0.015***	–0.034***	-0.035***	–0.006***	–0.001*	–0.002*	–0.026***	–0.028***	–0.173***	–0.017***
Tropical livestock units	–0.017***	–0.014***		–0.020***		–0.005**		–0.015***	–0.022***	–0.011***	–0.014***	–0.009***	–0.099***	–0.008**

NOTES: Regressions of the share of food purchases (for home consumption and food away from home) in total food consumption (at market value): marginal effects; significant results only (at 10 percent or lower); statistical significance is reported for *** p<0.01, ** p<0.05, * p<0.1. Marginal effects of prices and home assets are not shown (see source for full presentation of results). All surveys are 2018/19, except Malawi (2019/20). See Table A5.6 for the definition of food away from home, Table A5.1 for the list of 11 Western, Eastern and Southern African countries, and Table 10 for the definition of high- and low-food-budget countries.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

TABLE A7.2 THE NON-PRICE DETERMINANTS OF CONSUMPTION SHARES OF HIGHLY PROCESSED FOODS IN SELECTED HIGH- AND LOW-FOOD-BUDGET COUNTRIES IN AFRICA

		High-food-budget countries						Low-food-budget countries						
	All countries	High-food-budget countries	Senegal	Ethiopia	Côte d'Ivoire	Mali	Nigeria	Low-food-budget countries	Guinea-Bissau	Benin	Togo	Burkina Faso	Malawi	Niger
Large city (>1 million people)	0.006**	0.009***	0.009*		0.008*	0.015***		–0.004*	0	0.013***		0.027***		
Intermediate city (0.25–1 million people)	0.005*	0.008**							0.030***			0.018***		
Small city (50–250 thousand people)					0.011***				0.031**	0.016***		0.023***		
<1 hour to a large city			0.019***					–0.009***		0.007**	–0.008*	0.009**		–0.013***
<1 hour to an intermediate city	–0.011***	–0.010***	–0.020***					–0.015***		–0.009**			–0.007***	–0.023***
<1 hour to a small city	–0.011***	–0.012***				–0.009**		–0.007***				0.010***	–0.011***	–0.010**
<1 hour to a town	–0.008**	–0.009**			–0.011***	–0.010**		–0.014***					–0.008**	
1–2 hours to a city or town	–0.005**	–0.011***	–0.025***		–0.005*	–0.014***		–0.008***				0.012***	–0.012***	–0.020***
>2 hours to a city or town		–0.017***				–0.023***		0.018***	0.022**					–0.010**
Total income (log of annual per capita expenditure)	0.014***	0.014***	–0.006*	0.008***	0.009***	0.017***	0.004**	0.019***	0.047***	0.014***	0.006***	0.015***	0.027***	
Male full-time non-farm employment	0.005***	0.005***	0.003***	0.005***	0.005***	0.002**		0.004***		0.004***		0.003*	0.006***	0.005***
Female full-time non-farm employment	0.004***	0.005***	0.005***	0.002*		0.002**	0.002**				0.003**		0.005***	0.007***
Primary schooling of household head	0.004***	0.006***	0.012***	–0.004*				–0.003**			–0.009***		0.004**	0.006*
Secondary schooling of household head	–0.004***	–0.004***												
Female-headed households	0.002*	0.003**	0.017***	–0.003*	0.004**	0.006**	0.005**	–0.004***		0.007***			–0.007***	
Household size (adult equivalents)	–0.000**		–0.001*		–0.003***		–0.003***	0.000***	0.002***	–0.001**		–0.001***	0.003***	–0.003***
Dependency ratio	0.014***	0.013***	0.023***		0.009**	0.019***	0.012***	0.015***	0.028***	0.017***	0.006*	0.015***	0.007***	
Cultivated land (ha)	0.002***	0.004***	–0.005**		–0.001**							–0.005***	–0.012***	
Tropical livestock units	–0.005***	–0.006***		–0.002**		–0.001***			–0.003**		–0.003**			

NOTES: Regressions of the share of highly processed foods in total food consumption (at market value): marginal effects; significant results only (at 10 percent or lower); statistical significance is reported for *** p<0.01, ** p<0.05, * p<0.1. Marginal effects of prices and home assets are not shown (see source for full presentation of results). All surveys are 2018/19, except Malawi (2019/20). See Table A5.4 for full definition of highly processed foods, Table A5.1 for the list of 11 Western, Eastern and Southern African countries, and Table 10 for the definition of high- and low-food-budget countries.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

TABLE A7.3 THE NON-PRICE DETERMINANTS OF CONSUMPTION SHARES OF ANIMAL SOURCE FOODS IN SELECTED HIGH- AND LOW-FOOD-BUDGET COUNTRIES IN AFRICA

	All countries	High-food-budget countries						Low-food-budget countries						
		High-food-budget countries	Senegal	Ethiopia	Côte d'Ivoire	Mali	Nigeria	Low-food-budget countries	Guinea-Bissau	Benin	Togo	Burkina Faso	Malawi	Niger
Large city (>1 million people)	0.014**	0.017**	–0.014*			–0.028***				0.021**				–0.024*
Intermediate city (0.25–1 million people)										0.023**				
Small city (50–250 thousand people)						–0.017*	0.019*			0.018**				
<1 hour to a large city			–0.016**		0.024**		0.015*					–0.032***		
<1 hour to an intermediate city	0.013**	0.011*	–0.025***	0.030**		–0.024**	0.023**					0.025**	-0.026***	
<1 hour to a small city	0.010*	0.012*		0.039***			0.025**				–0.028***			
<1 hour to a town	0.038***	0.045***			–0.027***					0				
1–2 hours to a city or town	0.021***	0.028***				–0.018*	0.036**			0.020*				
>2 hours to a city or town	0.020***	0.064***						–0.015**		0				
Total income (log of annual per capita expenditure)	0.061***	0.056***	0.113***	0.051***	0.108***	0.112***	0.035***	0.081***	0.105***	0.069***	0.057***	0.058***	0.083***	0.123***
Male full-time non-farm employment	0.002*				0.006**								0.005**	
Female full-time non-farm employment	0.009***	0.009***	0.004**			–0.005*	0.005**	0.007***		0.005***	0.006**	0.008***	0.005*	
Primary schooling of household head	0.014***	0.012***						0.011***			0.009**			
Secondary schooling of household head							0.008**	0.006***	–0.010*	0.010**	–0.009*	0.015**		
Female-headed households			0.008**			–0.012*		–0.013***		–0.010**			–0.018***	–0.019***
Household size (adult equivalents)	0.003***	0.004***	0.004***	0.013***	0.007***	0.003***		0.002***	0.003***	0.002***	0.002**		0.008***	0.004***
Dependency ratio	0.043***	0.045***	0.073***	0.047***	0.076***	0.052***	0.016**	0.033***	0.022**	0.042***	0.048***	0.048***	0.026***	0.046***
Cultivated land (ha)	0.004***	0.009***	–0.007***	–0.034***		–0.005**							–0.024**	
Tropical livestock units	0.004***	0.004***		0.011***		0.008***		0.006***	0.003*	0.005***	0.011***	0.008***	0.023**	0.012***

NOTES: Regression of the share of animal products in total food consumption (at market value): marginal effects; significant results only (at 10 percent or lower); statistical significance is reported for *** p<0.01, ** p<0.05, * p<0.1. Marginal effects of prices and home assets are not shown (see source for full presentation of results). All surveys are 2018/19, except Malawi (2019/20). See Table A5.6 for details on composition of animal source foods, see Table A5.1 for the list of 11 Western, Eastern and Southern African countries, and Table 10 for the definition of high- and low-food-budget countries.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

TABLE A7.4 THE NON-PRICE DETERMINANTS OF THE CONSUMPTION SHARES OF FOOD AWAY FROM HOME IN SELECTED HIGH- AND LOW-FOOD-BUDGET COUNTRIES IN AFRICA

	All countries	High-food-budget countries						Low-food-budget countries						
		High-food-budget countries	Senegal	Ethiopia	Côte d'Ivoire	Mali	Nigeria	Low-food-budget countries	Guinea-Bissau	Benin	Togo	Burkina Faso	Malawi	Niger
Large city (>1 million people)	0.022***	0.024**	0.044***		0.038***	0.008**		0.030***			0.035***	0.027***		0.057***
Intermediate city (0.25–1 million people)	0.020**	0.030**			0.016**				0.033**	0.036***		0.023**		
Small city (50–250 thousand people)				0.096**	0.014**				0.040*		–0.013*	0.015***		0.014**
<1 hour to a large city				0.070*	0.010*	0.013***					–0.012*	0.013**	0.024**	
<1 hour to an intermediate city				0.082***	–0.009*	0.012**	–0.029**	–0.021***			–0.032***	0.015*		
<1 hour to a small city	–0.013**			0.089***	–0.017***			–0.019***		–0.024***	–0.047***			–0.009***
<1 hour to a town	–0.033***	–0.036***		0	–0.033***			–0.018***						
1–2 hours to a city or town	–0.022***	–0.020**		0.219***	–0.023***			–0.024***		–0.028***	–0.040***			–0.009**
>2 hours to a city or town	–0.041***	–0.042***				–0.005*	0	–0.017***				–0.019*		–0.007*
Total income (log of annual per capita expenditure)	0.025***	0.026***	–0.017***	0.028***	–0.018***	0.012***	0.093***	0.002**	–0.014***	–0.014***	–0.014***	0.013***	0.010***	–0.010***
Male full-time non-farm employment	0.015***	0.016***	0.008***	0.013**	0.012***	0.004***	0.016***	0.009***	0.008***	0.010***	0.014***	0.011***	0.002**	0.007***
Female full-time non-farm employment				–0.011*	0.003**		–0.009***	0.004***						0.005***
Primary schooling of household head	0.031***	0.032***	0.007*		0.007***	0.003*		0.004***	0.011***	0.010***		0.007**		0.005**
Secondary schooling of household head					0.005*								–0.002*	
Female-headed households	–0.022***	–0.026***		–0.014***			–0.035***	–0.003***			–0.017***	–0.009***	–0.002***	0.006**
Household size (adult equivalents)	–0.004***	–0.005***	–0.006***	–0.004***	–0.007***	0.000**		–0.003***	–0.002***	–0.002***	–0.006***	–0.003***	–0.001***	–0.003***
Dependency ratio	–0.023***	–0.025***	–0.076***	–0.013*	–0.058***	–0.015***		–0.020***	–0.054***	–0.028***	–0.047***	–0.034***		–0.014***
Cultivated land (ha)	–0.003*	–0.007**			–0.003**		–0.017**				–0.012***	–0.011***	–0.015***	
Tropical livestock units	–0.014***	–0.017***		–0.005**		–0.001***				–0.006***				

NOTES: Regression of the share of food away from home in total food consumption (at market value): marginal effects; significant results only (at 10 percent or lower); statistical significance is reported for *** p<0.01, ** p<0.05, * p<0.1. Marginal effects of prices and home assets are not shown (see source for full presentation of results). All surveys are 2018/19, except Malawi (2019/20). Food away from home is prepared food consumed away from home. See Table A5.6 for details on definition of food away from home, see Table A5.1 for the list of 11 Western, Eastern and Southern African countries, and Table 10 for the definition of high- and low-food-budget countries.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO.

TABLE A7.5 THE NON-PRICE DETERMINANTS OF THE CONSUMPTION SHARES OF VEGETABLES IN SELECTED HIGH- AND LOW-FOOD-BUDGET COUNTRIES IN AFRICA

	All countries	High-food-budget countries						Low-food-budget countries						
		High-food-budget countries	Senegal	Ethiopia	Côte d'Ivoire	Mali	Nigeria	Low-food-budget countries	Guinea-Bissau	Benin	Togo	Burkina Faso	Malawi	Niger
Large city (>1 million people)	0.025***	0.027***		0.096***		0.022***	0.031***	0.016***				0.027***		
Intermediate city (0.25–1 million people)	0.017***	0.015*					0.023***	0.020***	0.020*					0.036***
Small city (50–250 thousand people)	0.021***	0.024***				0.018***	0.027***	0.013***	0.031**			0.021***		
<1 hour to a large city	0.012**	0.019***					0.024***	0.009**	0.036***	0.006*		0.031***		0.026**
<1 hour to an intermediate city	0.013**	0.020***	0.008*			0.029***	0.023***					0.018*	0.021*	
<1 hour to a small city			–0.008**			0.012**								
<1 hour to a town					0.011*			–0.022***						
1–2 hours to a city or town			–0.020***					–0.009**		–0.017***				–0.014*
>2 hours to a city or town								–0.012***				0.039***		
Total income (log of annual per capita expenditure)	–0.016***	–0.012***		–0.033***	–0.013***	0.007**	–0.017***	–0.023***	0.009***	–0.015***	–0.023***		–0.059***	0.024***
Male full-time non-farm employment	–0.003***	–0.004***			–0.005***	0.004***	–0.004***							
Female full-time non-farm employment			0.002***			0.002*			0.002**	0.003***	0.003**			
Primary schooling of household head	–0.006***	–0.003*					0.007***		–0.006**					
Secondary schooling of household head	–0.006***	–0.004**						–0.007***						
Female-headed households	0.013***	0.012***		0.009***	0.007***		0.009***	0.017***	0.006**	0.011***	0.013***	0.014***	0.007***	0.017***
Household size (adult equivalents)	–0.004***	–0.003***	0.001***	–0.011***	–0.001***	–0.002***	–0.003***	–0.003***	–0.002***	–0.004***	–0.002***		–0.011***	
Dependency ratio			0.027***		0.013***	0.011*		–0.008***		–0.010***			–0.022***	0.016**
Cultivated land (ha)				0.019**		0.002**						0.005*	0.028***	
Tropical livestock units				–0.004*	–0.001***	–0.003***		–0.003***			–0.004***	–0.004***		–0.012***

NOTES: Regression of the share of vegetables in total food consumption (at market value): marginal effects; significant results only (at 10 percent or lower); statistical significance is reported for *** p<0.01, ** p<0.05, * p<0.1. Marginal effects of prices and home assets are not shown (see source for full presentation of results). All surveys are 2018/19, except Malawi (2019/20). See Table A5.6 for the definition of vegetables, see Table A5.1 for the list of 11 Western, Eastern and Southern African countries, and Table 10 for the definition of high- and low-food-budget countries.
SOURCE: Dolislager, M.J, Holleman, C., Liverpool-Tasie, L.S.O. & Reardon, T. (forthcoming). *Evidence and analysis of food demand and supply across the rural–urban continuum in selected countries in Africa.* Background paper for *The State of Food Security and Nutrition in the World 2023.* FAO Agricultural Development Economics Technical Study. Rome, FAO

ANNEX 8
METHODOLOGY USED FOR THE SUBNATIONAL ESTIMATION OF COST AND AFFORDABILITY OF A HEALTHY DIET USING HOUSEHOLD SURVEY DATA FOR SELECTED COUNTRIES IN AFRICA IN CHAPTER 4

The cost and affordability of a healthy diet in selected countries in Africa were estimated across URCAs applying the FAO Healthy Diet Basket (HDB) methodology, which comprises six food groups.[bl] However, results are not comparable with the global CoAHD indicators presented in **Chapter 2** (see Box A8.1). Food prices and income distributions were obtained from 11 household consumption and expenditure surveys conducted between 2018 and 2019 (Table A5.1).

The analysis took place in four stages. In the first stage, the household consumption and expenditure survey data were georeferenced using the URCA dataset. In the second stage, the prices of food items were derived from household food expenditure modules reporting the quantity bought and amount spent by households based on seven-day recall.[bm] Values were reported for specific food items, thus allowing for computing of the revealed price (i.e. the unit cost) by food item. The price for each food item was obtained as a geometric mean[bn] of the revealed prices in each URCA of each country. Note that food items not reported in a specific spatial unit were considered as not available in that area.

In the third stage, the food items for the subnational (i.e. at the URCA level) HDB were selected. The HDB composition was fixed in terms of daily caloric contribution of the six food groups, as per the HDB of the global CoAHD monitoring indicators, but the specific food items in the HDB were allowed to change across URCAs. More specifically, the least-cost item in each food group was selected in each URCA for each country. In this way, the composition of the HDB accounts for spatial variation in terms of prices and availability, as well as reflects items consumed by the population in each URCA.[bo] To compute the

bl For information on the HDB data and methodology and the HDB content by food group in terms of kcal, see FAO (2023).[53]

bm Expenditures were collected across different months, thus the effect of seasonality on the price level is averaged out. The least-cost items chosen for the HDB are therefore the least-cost items during the year.

bn Geometric mean was chosen because of the high fluctuation in the distribution of the unit costs of a food item across households in a specific URCA. Notice that high fluctuations for the same food item are not necessarily due to high volatility of market prices; rather, unit cost reflects price, quantity, and quality of a food item. In household surveys, items are not standardized as in the price data collection run by government, thus the quality and variety of a food item purchased likely change across households, reflecting access, availability and preferences.

bo For example, pork is selected as one of the two items in the animal source foods group in intermediate and small cities in Nigeria, but it is not in the baskets of peri-urban areas (<1 hour away) where "cheese *(wara)*" was picked.

BOX A8.1 METHODOLOGY – GLOBAL AND SUBNATIONAL ESTIMATION OF THE COAHD

The estimation of the global monitoring indicator of the cost and affordability of a healthy diet (CoAHD) (**Chapter 2**) and the subnational estimation by URCA in **Section 4.2** follow the same methodology. However, results are not comparable for three main reasons:

- **Food item prices.** In the global monitoring, prices from the World Bank International Comparison Program (ICP) are used, whereas prices used in the analysis presented in **Chapter 4** are computed from household surveys.
- **Income distribution.** In the global monitoring, the affordability indicator is computed using the estimated income distribution in a given country from the World Bank's Poverty and Inequality Platform (PIP); whereas total household expenditure used in the analysis presented in **Chapter 4** is computed from household survey data to estimate its distribution as a proxy for income distribution.
- **Percentage of income that can be credibly reserved for food.** In the global monitoring, this percentage is set equal to 52 percent – that is, the average percentage of income spent on food in low-income countries based on the national account expenditure data from the World Bank ICP. In the analysis of **Chapter 4**, on the other hand, the average food expenditure shares of households belonging to the lowest expenditure quintile in each URCA are applied.

cost of an item needed to meet the HDB caloric requirement, prices (as described above) and the nutrient conversion table developed for each survey (based mainly on the FAO/INFOODS Food Composition Table for Western Africa [2019]) were used.

In the final stage, the measure of affordability of a healthy diet was obtained by comparing the daily cost of the HDB with the daily per capita household income available for food. Total household expenditure, including value for own production, was used as a proxy for income. The share of expenditure that can be credibly reserved for food was set equal to the average food expenditure share of households belonging to the lowest quintile of the income distribution of each URCA. The choice i) aligns with the global CoAHD indicator methodology where the average food expenditure share of low-income countries is adopted, and ii) takes into account different levels of economic development across the rural–urban continuum.

When summary results are presented, averages across the rural–urban continuum URCA-defined categories are population weighted averages, while average across countries are simple averages, following the methodology used in **Chapter 2** for the calculation of regional CoAHD. ■

ANNEX 9
SUBNATIONAL COST AND AFFORDABILITY OF A HEALTHY DIET BY URBAN–RURAL CATCHMENT AREA IN SELECTED COUNTRIES IN AFRICA

Presented below are complementary results for the analysis of the cost and affordability of subnational healthy diet baskets in 11 Western, Eastern and Southern African countries (see Table A5.1 for list of countries).

Figure A9.1 shows the average share cost of each food group in a subnational healthy diet basket across ten URCA categories for high- and low-food-budget countries. ■

FIGURE A9.1 COST CONTRIBUTION OF EACH FOOD GROUP AS SHARE OF TOTAL COST OF A HEALTHY DIET IN SELECTED HIGH- AND LOW-FOOD-BUDGET COUNTRIES IN AFRICA ACROSS THE RURAL–URBAN CONTINUUM (URCA)

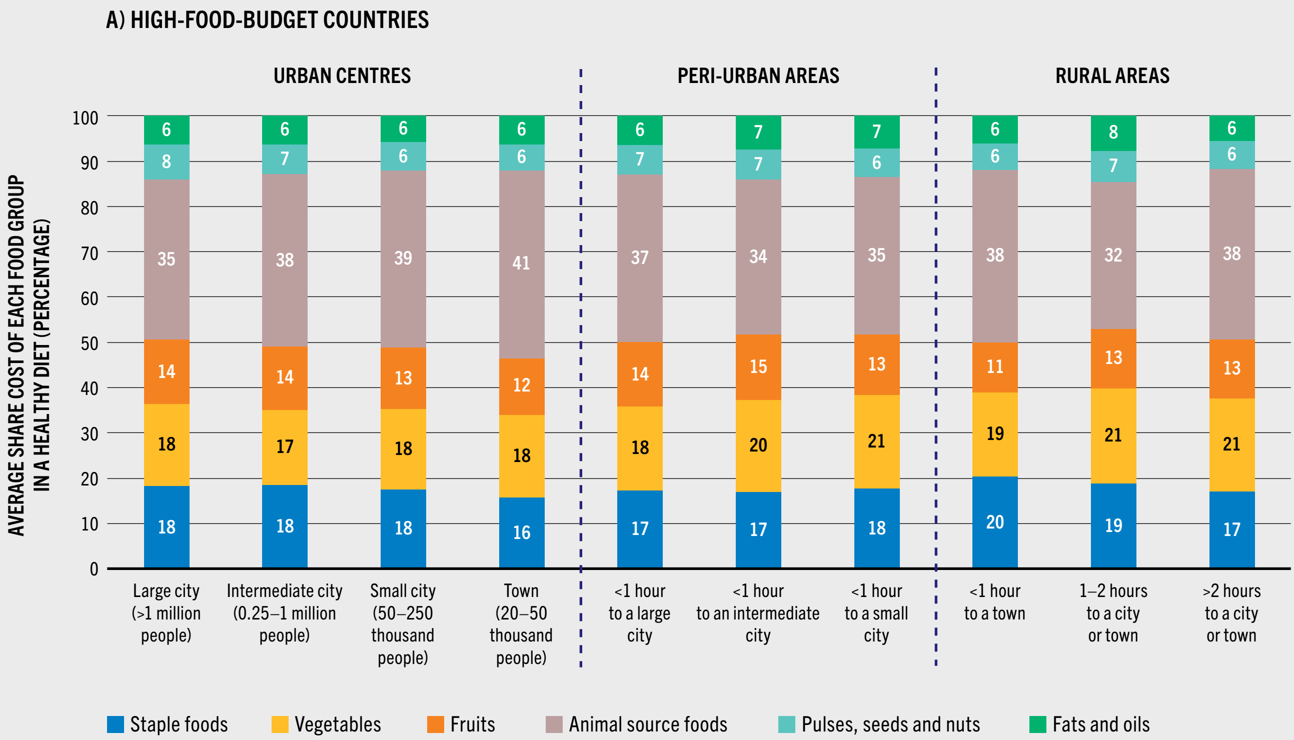
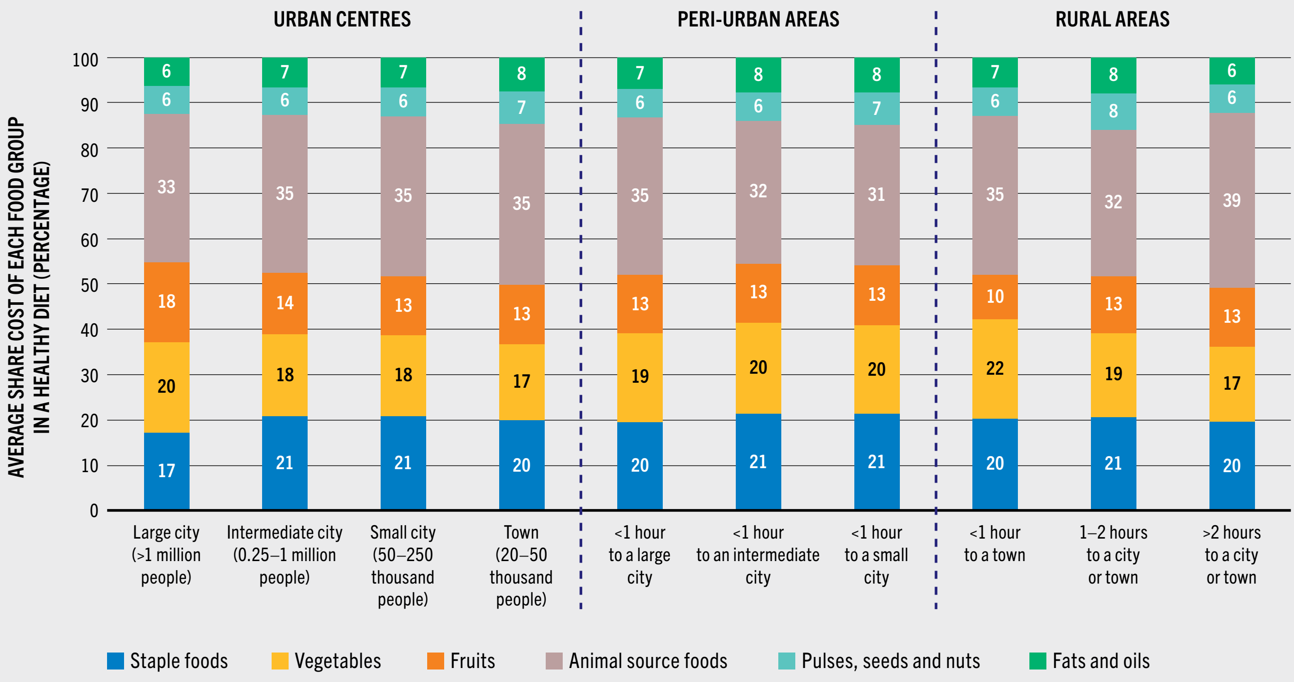


FIGURE A9.1 (Continued)

B) LOW-FOOD-BUDGET COUNTRIES



NOTES: All surveys are 2018/19, except Malawi (2019/20). See Table A5.1 for the list of 11 Western, Eastern and Southern African countries. See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Holleman, C. & Latino, L. (forthcoming). *Variations in the subnational cost and affordability of a heathy diet – Evidence from sub-Saharan Africa*. Background paper for *The State of Food Security and Nutrition in the World 2023*. FAO Agricultural Development Economics Working Paper. Rome, FAO.

TABLE A9.1 COMPARISON OF AVERAGE FOOD EXPENDITURE AND COST OF A HEALTHY DIET BASKET FOR SELECTED HIGH- AND LOW-FOOD-BUDGET COUNTRIES IN AFRICA

	Total household food consumption	Average cost of a healthy diet	Ratio of cost of a healthy diet to average food consumption
	(PPP dollars per person per day)		
HIGH-FOOD-BUDGET COUNTRIES	**2.34**	**2.00**	**0.86**
Senegal	2.57	1.89	0.74
Ethiopia	2.44	2.36	0.97
Côte d’Ivoire	2.29	1.94	0.85
Mali	2.29	1.98	0.86
Nigeria	2.26	1.83	0.81
LOW-FOOD-BUDGET COUNTRIES	**1.62**	**1.61**	**1.00**
Guinea-Bissau	2.06	1.75	0.85
Benin	2.00	1.16	0.58
Togo	1.69	1.31	0.77
Burkina Faso	1.57	2.15	1.37
Malawi	1.52	1.25	0.82
Niger	1.46	2.03	1.39

NOTES: Average household food consumption and average cost of a healthy diet by high- and low-food-budget country and by country, expressed in PPP dollars per person per day (PPP = purchasing power parity), and the ratio of the cost of a healthy diet and average household food consumption. A ratio greater than 1 shows how many times a healthy diet is more expensive than the average food expenditure. All surveys are 2018/19, except Malawi (2019/20). See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Holleman, C. & Latino, L. (forthcoming). *Variations in the subnational cost and affordability of a heathy diet – Evidence from sub-Saharan Africa*. Background paper for *The State of Food Security and Nutrition in the World 2023*. FAO Agricultural Development Economics Working Paper. Rome, FAO.

TABLE A9.2 SUBNATIONAL COST OF A HEALTHY DIET IN SELECTED HIGH- AND LOW-FOOD-BUDGET COUNTRIES IN AFRICA ACROSS THE RURAL–URBAN CONTINUUM (URCA)

	High-food-budget countries					Low-food-budget countries					
	Senegal	Ethiopia	Côte d'Ivoire	Mali	Nigeria	Guinea-Bissau	Benin	Togo	Burkina Faso	Malawi	Niger
	(PPP dollars per person per day)					(PPP dollars per person per day)					
URBAN	**2.06**	**3.15**	**2.07**	**2.23**	**2.15**	**1.84**	**1.44**	**1.72**	**2.50**	**1.72**	**2.20**
Large city (>1 million people)	2.19	3.24	2.18	2.23	2.23	–	1.62	1.84	2.74	–	1.84
Intermediate city (0.25–1 million people)	1.80	3.60	1.98	2.20	2.09	1.85	1.46	1.95	2.14	1.71	2.09
Small city (50–250 thousand people)	1.93	2.87	1.99	2.25	2.16	1.79	1.27	1.33	2.34	1.68	2.39
Town (20–50 thousand people)	1.98	3.03	1.87	2.13	2.00	–	1.05	1.58	2.20	1.76	2.19
PERI-URBAN	1.75	2.21	1.91	1.90	1.73	1.95	1.05	1.03	2.09	1.21	2.03
<1 hour to a large city	1.81	2.65	2.05	2.20	2.03	2.06	1.22	1.09	2.11	1.75	2.25
<1 hour to an intermediate city	1.62	2.13	1.82	2.40	1.62	2.10	1.01	1.51	2.08	1.21	1.91
<1 hour to a small city	1.84	2.19	1.90	1.69	1.53	1.83	0.98	0.96	2.09	1.18	2.07
RURAL	1.71	2.28	1.85	1.87	1.64	1.57	1.00	1.07	1.97	1.18	1.98
<1 hour to a town	–	–	1.76	2.22	2.04	2.59	1.05	–	2.40	1.79	1.86
1–2 hours to a city or town	1.67	2.09	1.85	1.74	1.57	1.54	0.99	1.07	1.96	1.12	1.93
>2 hours to a city or town	2.29	2.70	2.16	2.20	2.70	1.53	–	–	1.80	2.16	2.06

NOTES: PPP = purchasing power parity. Cost in URCAs with fewer than 30 observations is not shown. In Ethiopia, cost of heathy diet basket in areas 1 hour travel or less to a town was not computed for price unavailability. All surveys are for 2018/19, except Malawi (2019/20). See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Holleman, C. & Latino, L. (forthcoming). *Variations in the subnational cost and affordability of a heathy diet – Evidence from sub-Saharan Africa*. Background paper for *The State of Food Security and Nutrition in the World 2023*. FAO Agricultural Development Economics Working Paper. Rome, FAO.

TABLE A9.3 AFFORDABILITY OF A HEALTHY DIET IN SELECTED HIGH- AND LOW-FOOD-BUDGET COUNTRIES IN AFRICA ACROSS THE RURAL–URBAN CONTINUUM (URCA)

	High-food-budget countries					Low-food-budget countries					
	Senegal	Ethiopia	Côte d'Ivoire	Mali	Nigeria	Guinea-Bissau	Benin	Togo	Burkina Faso	Malawi	Niger
	(%)					(%)					
URBAN	**18.1**	**57.1**	**18.4**	**18.3**	**35.9**	**29.9**	**12.8**	**33.3**	**52.6**	**54.2**	**47.4**
Large city (>1 million people)	17.7	51.3	13.9	19.2	27.6	–	20.2	35.8	52.6	–	16.2
Intermediate city (0.25–1 million people)	14.9	73.4	23.6	14.9	47.9	30.5	7.4	46.8	55.0	51.1	37.3
Small city (50–250 thousand people)	21.3	45.8	21.9	18.6	32.5	26.2	6.7	23.8	48.6	52.9	58.0
Town (20–50 thousand people)	22.2	77.1	25.4	14.2	41.3	–	7.8	26.1	56.3	67.5	68.3
PERI-URBAN	41.5	72.2	39.7	33.8	48.4	53.6	10.9	25.6	79.2	68.8	76.7
<1 hour to a large city	35.9	61.2	27.9	32.7	39.7	47.1	13.9	26.7	79.4	67.1	63.1
<1 hour to an intermediate city	42.0	70.4	39.7	52.3	51.6	56.3	13.1	27.2	68.9	70.5	68.6
<1 hour to a small city	45.6	74.7	42.3	31.2	54.5	52.9	9.2	24.9	80.2	65.6	85.7
RURAL	45.3	70.1	40.8	38.5	46.0	40.3	16.4	33.5	74.9	67.8	84.9
<1 hour to a town	–	–	47.3	45.4	66.7	75.3	19.3	–	68.1	85.4	83.0
1–2 hours to a city or town	44.0	60.7	39.9	35.9	44.3	42.6	15.8	33.5	74.7	66.2	83.3
>2 hours to a city or town	64.7	91.0	47.1	46.0	51.6	28.6	–	–	79.4	95.3	87.5

NOTES: Cost in URCAs with fewer than 30 observations is not shown. In Ethiopia, cost of heathy diet basket in areas 1 hour travel or less to a town was not computed for price unavailability. All surveys are for 2018/19, except Malawi (2019/20). See Table 10 for the definition and list of high- and low-food-budget countries.

SOURCE: Holleman, C. & Latino, L. (forthcoming). *Variations in the subnational cost and affordability of a heathy diet – Evidence from sub-Saharan Africa*. Background paper for *The State of Food Security and Nutrition in the World 2023*. FAO Agricultural Development Economics Working Paper. Rome, FAO.

ANNEX 10
FOOD INSECURITY AND MALNUTRITION ACROSS THE RURAL–URBAN CONTINUUM (URCA) FOR SELECTED COUNTRIES IN AFRICA

TABLE A10.1 MODERATE OR SEVERE FOOD INSECURITY BASED ON THE FOOD INSECURITY EXPERIENCE SCALE ACROSS THE RURAL–URBAN CONTINUUM (URCA) FOR SELECTED HIGH- AND LOW-FOOD-BUDGET COUNTRIES IN AFRICA

	High-food-budget countries			Low-food-budget countries					
	Senegal	Côte d'Ivoire	Nigeria	Guinea-Bissau	Benin	Togo	Burkina Faso	Malawi	Niger
	(%)			(%)					
URBAN									
Large city (>1 million people)	36.2	43.3	52.6		64.5	50.8	44.4		37.8
	(±6.1)	(±7.2)	(±6.4)		(±5.0)	(±5.2)	(±6.3)		(±8.)
Intermediate city (0.25–1 million people)	45.0	36.8	44.7	51.7	74.8	56.6	37.4	55.9	42.2
	(±6.9)	(±8.8)	(±9.3)	(±5.0)	(±7.1)	(±21.2)	(±10.0)	(±6.6)	(±6.9)
Small city (50–250 thousand people)	37.1	36.9	34.2	54.5	63.1	61.3	33.9	57.4	48.2
	(±4.1)	(±7.2)	(±7.0)	(±10.0)	(±7.5)	(±6.7)	(±8.3)	(±9.7)	(±6.8)
Town (20–50 thousand people)	45.8	39.6	25.1	67.9	68.2	62.3	34.9	52.7	51.5
	(±6.2)	(±8.0)	(±14.0)		(±9.3)	(±14.7)	(±9.0)	(±11.7)	(±16.2)
PERI-URBAN									
<1 hour to a large city	35.1	40.2	43.6	64.1	67.7	62.2	36.2	60.6	50.4
	(±6.0)	(±8.3)	(±4.7)	(±15.1)	(±4.3)	(±6.3)	(±8.3)	(±14.6)	(±7.5)
<1 hour to an intermediate city	43.3	39.9	51.4	66.8	75.8	59.2	41.3	83.9	50.8
	(±6.1)	(±6.5)	(±5.2)	(±6.6)	(±9.9)	(±12.3)	(±10.2)	(±2.2)	(±7.6)
<1 hour to a small city	40.5	40.5	41.8	61.1	64.2	61.8	34.6	78.2	45.8
	(±5.2)	(±2.8)	(±6.4)	(±5.7)	(±3.0)	(±3.5)	(±4.0)	(±2.0)	(±6.3)
RURAL									
<1 hour to a town	18.8	41.0	61.4	73.5	65.1	56.6	45.5	79.2	62.5
		(±9.2)	(±15.8)		(±16.6)	(±31.8)	(±19.7)	(±6.8)	(±22.3)
1–2 hours to a city or town	40.4	40.4	37.8	66.5	70.8	66.0	41.9	81.2	42.5
	(±6.4)	(±2.9)	(±11.3)	(±4.9)	(±6.4)	(±8.1)	(±5.9)	(±1.5)	(±5.2)
>2 hours to a city or town	22.6	44.7	37.7	68.8	63.9	73.4	35.5	87.6	43.3
	(±16.4)	(±22.3)	(±16.5)	(±5.5)			(±17.5)		(±6.1)

NOTES: Margins of error are shown in parentheses and are not shown for sample size <100. They are not computed for sample size <30, except for Malawi, where the sample size is 80. All surveys are for 2018/19, except Malawi (2019/20). See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Authors' (FAO) own elaboration.

TABLE A10.2 SEVERE FOOD INSECURITY BASED ON THE FOOD INSECURITY EXPERIENCE SCALE ACROSS THE RURAL–URBAN CONTINUUM (URCA) IN SELECTED HIGH- AND LOW-FOOD-BUDGET COUNTRIES IN AFRICA

	High-food-budget countries			Low-food-budget countries					
	Senegal	Côte d'Ivoire	Nigeria	Guinea-Bissau	Benin	Togo	Burkina Faso	Malawi	Niger
		(%)				(%)			
URBAN									
Large city (>1 million people)	7.3	11.0	15.2		14.5	10.7	8		8.1
	(±2.6)	(±4.3)	(±4.0)		(±2.5)	(±2.6)	(±1.3)		(±2.9)
Intermediate city (0.25–1 million people)	9.1	6.3	13.8	6.4	23.4	14.8	5.7	29.2	9.3
	(±1.8)	(±5.4)	(±8.1)	(±2.7)	(±5.0)	(±17.5)	(±2.3)	(±5.1)	(±2.2)
Small city (50–250 thousand people)	7.2	8.0	6.5	6.5	13.5	16.4	6.5	31.9	8.4
	(±0.8)	(±2.9)	(±4.8)	(±6.0)	(±5.9)	(±2.5)	(±6.0)	(±9.5)	(±2.8)
Town (20–50 thousand people)	12.1	8.0	5.4	4.6	17.4	14.2	4.7	29.2	8.1
	(±1.3)	(±2.9)	(±5.9)		(±6.2)	(±4.8)	(±3.9)	(±11.2)	(±4.0)
PERI-URBAN									
<1 hour to a large city	7.5	11.2	12.3	6.6	16.2	14.0	4.8	37.9	9.6
	(±1.8)	(±3.9)	(±2.9)	(±4.8)	(±3.2)	(±4.0)	(±3.9)	(±13.1)	(±1.5)
<1 hour to an intermediate city	11.1	9.7	16.0	10.9	20.9	15.6	7.2	53.8	11.0
	(±2.3)	(±4.0)	(±4.5)	(±3.1)	(±4.3)	(±4.8)	(±4.9)	(±2.6)	(±3.3)
<1 hour to a small city	7.5	9.3	10.9	7.1	15.9	16.6	5.2	48.5	8.2
	(±2.4)	(±1.2)	(±5.8)	(±3.0)	(±2.3)	(±2.0)	(±1.9)	(±3.0)	(±2.0)
RURAL									
<1 hour to a town	3.6	11.4	20.1	8.5	14.8	17.1	9.7	51.3	17.2
		(±2.6)	(±7.3)		(±11.1)	(±10.2)	(±10.1)	(±8.0)	(±6.0)
1–2 hours to a city or town	9.5	9.1	13.9	10.9	18.9	17.9	6.9	51.0	8.2
	(±3.1)	(±1.5)	(±9.3)	(±4.0)	(±4.4)	(±3.5)	(±3.2)	(±2.9)	(±3.0)
>2 hours to a city or town	7.6	11.9	9.6	12.5	7.4	18.0	6.9	53.0	9.4
	(±13.8)	(±11.7)	(±8.0)	(±3.3)			(±4.3)		(±1.1)

NOTES: Margins of error are shown in parentheses and are not shown for sample size <100. They are not computed for sample size <30, except for Malawi, where the sample size is 80. All surveys are for 2018/19, except Malawi (2019/20). See Table 10 for the definition and list of high- and low-food-budget countries.
SOURCE: Authors' (FAO) own elaboration.

TABLE A10.3 PREVALENCE OF MALNUTRITION IN CHILDREN UNDER FIVE YEARS OF AGE ACROSS THE RURAL–URBAN CONTINUUM (URCA) FOR THREE COUNTRIES IN AFRICA

	Stunting			Wasting			Overweight		
	Senegal	Nigeria	Benin	Senegal	Nigeria	Benin	Senegal	Nigeria	Benin
	(%)			(%)			(%)		
URBAN									
Large city (>1 million people)	13.3	23.2	21.1	5.0	5.0	5.5	2.0	2.5	1.6
Intermediate city (0.25–1 million people)	12.5	25.2	23.6	7.5	3.8	4.7	1.8	2.3	1.9
Small city (50–250 thousand people)	15.8	28.9	21.9	7.0	6.5	5.3	2.7	2.6	2.9
Town (20–50 thousand people)	7.8	31.0	29.1	7.1	5.3	5.9	0.0	1.5	1.8
PERI-URBAN									
<1 hour to a large city	19.3	36.4	31.9	8.4	6.1	4.1	1.0	1.2	1.4
<1 hour to an intermediate city	24.7	39.5	35.5	7.1	7.5	5.0	1.7	2.4	1.4
<1 hour to a small city	21.4	50.1	35.4	8.1	9.4	4.5	1.2	2.0	1.9
RURAL									
<1 hour to a town	4.5	62.5	37.7	9.1	0.0	4.4	4.5	0.0	2.9
1–2 hours to a city or town	25.1	51.7	34.5	12.2	7.7	6.4	0.7	2.7	2.0
>2 hours to a city or town	23.2	44.2	53.1	11.6	3.1	2.0	1.3	0.0	0.0

NOTE: Prevalence of malnutrition in children under five years of age in three Western African countries, by URCA (2018).
SOURCE: Authors' (UNICEF) own elaboration.

ANNEX 11
GLOSSARY

Acute food insecurity
Food insecurity found in a specified area at a specific point in time and of a severity that threatens lives or livelihoods, or both, regardless of the causes, context or duration. Has relevance in providing strategic guidance to actions that focus on short-term objectives to prevent, mitigate or decrease severe food insecurity.[54]

Affordability
Affordability refers to the ability of people to buy foods in their local environment. In this report, cost refers to what people have to pay to secure a healthy diet, while affordability refers to the cost relative to a person's income, minus other required expenses. In **Section 2.2**, affordability is determined by comparing the cost of a healthy diet with income distributions available in the Poverty and Inequality Platform (PIP) of the World Bank. This allows to compute the percentage and number of people in each country who are not able to afford a healthy diet.[bp]

Agrifood systems
Agrifood systems, a term increasingly used in the context of transforming food systems for sustainability and inclusivity, are broader as they encompass both agricultural and food systems and focus on both food and non-food agricultural products, with clear overlaps. Agrifood systems encompass the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products. They comprise all food products that originate from crop and livestock production, forestry, fisheries and aquaculture, as well as the broader economic, societal and natural environments in which these diverse production systems are embedded.

Animal source foods
All types of meat, poultry, fish, shellfish, insects, grubs, eggs, milk, cheese, yoghurt and other milk products.[47, 55]

Catchment areas
In this report, catchment areas refer to rural locations that gravitate around a specific urban centre in terms of access to markets, services and employment opportunities. The concept is based on the Central Place Theory (CPT),[56] which incorporates the functional interdependence between a central place (i.e. a town or an urban centre) and its surrounding rural area along with the hierarchical level of the central place's goods and services.[36]

Climate
Climate in a narrow sense is usually defined as the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years.[57]

Climate change
Climate change refers to a change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer.[57]

Climate extreme (extreme weather or climate event)
The occurrence of a value of a weather or climate variable above (or below) a threshold value near the upper (or lower) ends of the range of observed values of the variable. For simplicity, both extreme weather events and extreme climate events are referred to collectively as "climate extremes".[58]

Climate shocks
Climate shocks include not only those disturbances in the usual pattern of rainfall and temperatures but also complex events like droughts and floods. Equivalent to the concept of a natural hazard or stress, they are exogenous events that can have a negative impact on food security and nutrition, depending on the vulnerability of an individual, a household, a community, or systems to the shock.[59, 60, 61, 62]

Climate variability
Refers to variations in the mean state and other statistics (standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability).[57]

bp See **Annex 2**, **Section D** for the full description of the methodology.

Conflict
Conflict as used in this report is defined as struggles between interdependent groups that have either actual or perceived incompatibilities with respect to needs, values, goals, resources or intentions. This definition includes (but is broader than) armed conflict – that is, organized collective violent confrontations between at least two groups, either state or non-state actors.

Diet quality
Comprised of four key aspects: variety and/or diversity (within and across food groups), adequacy (sufficiency of nutrients or food groups compared to requirements), moderation (foods and nutrients that should be consumed with restraint) and overall balance (composition of macronutrient intake). Exposure to food safety hazards is another important quality aspect.

Dietary energy requirements
The amount of dietary energy, measured in kilojoules or kilocalories (often referred to as calories), required by an individual to maintain body functions, health and normal activity. Dietary energy requirements are dependent upon age, sex, body size and level of physical activity. Additional energy is required to support optimal growth and development in children and in women during pregnancy, and for milk production during lactation, consistent with the good health of mother and child.

Downstream food supply chains
Downstream food supply chains involve those segments more directly related to consumer purchases, that is marketing, retail and trade.

Drought
A period of abnormally dry weather lasting long enough to cause a serious hydrological imbalance.[57]

Economic downturn
Refers to a period of decline in economic activity or negative growth as measured by the growth rate in real GDP. It is a synonym for economic recession, a temporary or short-term downturn in economic growth, usually occurring over at least two consecutive quarters of decline. In the analyses and figures presented in this report, an economic downturn is identified using the year as a period of reference.

Economic shock
An unexpected or unpredictable event that is external to the specific economy and can either harm or boost it. A global financial crisis causing bank lending or credit to fall, or an economic downturn in a major trading partner of a country reflect demand-side shocks that can have multiple effects on spending and investment. A steep rise in oil and gas prices, natural disasters that result in sharp falls in production, or conflict that disrupts trade and production, are examples of supply-side shocks.

Economic slowdown
Refers to economic activity that is growing at a slower pace compared with the previous period. An economic slowdown occurs when real GDP growth declines from one period to another, but it is still positive. In the analyses and figures presented in this report, an economic slowdown is identified using the year as the period of reference, although it is usually measured in quarters of a year.

Energy-dense foods
Food with a high content of calories (energy) with respect to its mass or volume.

Extreme poverty
Refers to the percentage of people living on less than USD 2.15 a day (2017 PPP prices) in a country in a given year.[33]

Extreme weather or climate event
The occurrence of a value of a weather or climate variable above (or below) a threshold value near the upper (or lower) ends of the range of observed values of the variable. Many weather and climate extremes are the result of natural **climate variability**, and natural decadal or multi-decadal variations in the climate provide the backdrop for anthropogenic **climate changes**. Even if there were no anthropogenic changes in climate, a wide variety of natural weather and climate extremes would still occur.

Fiscal subsidies
Fiscal subsidies are budget transfers made by governments in the context of policy measures, projects and programmes to individual actors of the food and agriculture sector, such as farmers (fiscal subsidies to producers) or consumers

(fiscal subsidies to consumers). Fiscal subsidies to producers aim to reduce production costs or increase farm income and can be granted depending on output, input use or use of other factors of production. Fiscal subsidies to consumers include transfers under social protection programmes (given to final consumers) and food subsidies to lower the cost of food (provided to intermediaries such as processors, traders, transporters).

Flood

The overflowing of the normal confines of a stream or other body of water, or the accumulation of water over areas not normally submerged. Floods include river (fluvial) floods, flash floods, urban floods, pluvial floods, sewer floods, coastal floods and glacial lake outburst floods.[57]

Food and agricultural marketing

This includes collective schemes for post-production facilities and other services designed to improve the marketing environment for food and agriculture – it includes all the stages of a product value chain, from farm input supply to retail markets. For example, these services may include commodity grading schemes or agricultural machinery services. They may be services related to post-harvest losses, lower transaction costs, facilitating market exchange and trade, and strengthening or expanding supply networks.

Food away from home

Food away from home includes all meals (breakfast and brunch, lunch, dinner and snacks and non-alcoholic beverages) – including fast food, takeouts and deliveries – consumed at concession stands, buffets and cafeterias, and full-service restaurants, and meals purchased at vending machines or from mobile vendors. Also included are board (including at school); meals as pay; special catered events, such as weddings, bar mitzvahs and confirmations; school lunches; and meals away from home on trips.[bq]

bq Please see **Annex 5, Section C** for the definition of food away from home used in the analysis presented in **Chapter 4**.

Food environment

The food environment is the physical, economic, political and sociocultural context in which consumers engage with agrifood systems to make decisions about acquiring, preparing and consuming food.[63]

Food Insecurity Experience Scale (FIES)

An experience-based food security scale used to produce a measure of access to food at different levels of severity that can be compared across contexts. It relies on data obtained by asking people, directly in surveys, about the occurrence of conditions and behaviours that are known to reflect constrained access to food.

Food security

A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Based on this definition, four food security dimensions can be identified: food availability, economic and physical access to food, food utilization and stability over time. The concept of food security is evolving to recognize the centrality of agency and sustainability. See below for the definition of these two additional elements.

Food security dimensions

In this report, food security dimensions refer to the four traditional dimensions of food security:

a. Availability – This dimension addresses whether or not food is actually or potentially physically present, including aspects of production, food reserves, markets and transportation, and wild foods.
b. Access – If food is actually or potentially physically present, the next question is whether or not households and individuals have sufficient physical and economic access to that food.
c. Utilization – If food is available and households have adequate access to it, the next question is whether or not households are maximizing the consumption of adequate nutrition and energy. Sufficient energy and nutrient intake by individuals is the result of good care and feeding practices, food preparation, dietary diversity and intra-household distribution of

food, and access to clean water, sanitation and healthcare. Combined with good biological utilization of food consumed, this determines the nutritional status of individuals.

d. Stability – If the dimensions of availability, access and utilization are sufficiently met, stability is the condition in which the whole system is stable, thus ensuring that households are food secure at all times. Stability issues can refer to short-term instability (which can lead to acute food insecurity) or medium- to long-term instability (which can lead to chronic food insecurity). Climatic, economic, social and political factors can all be a source of instability.

The report also refers to two additional dimensions of food security that are proposed by the High Level Panel of Experts (HLPE) of the Committee on World Food Security (CFS); however, they are not formally agreed upon by FAO or others, and there is not a negotiated agreed upon language. However, due to their relevance in the context of this report, they are included here. These two additional dimensions of food security are reinforced in conceptual and legal understandings of the right to food and are currently referred to and defined as follows:

e. Agency refers to the capacity of individuals or groups to make their own decisions about what foods they eat; what foods they produce; how that food is produced, processed and distributed within food systems; and their ability to engage in processes that shape food system policies and governance.[64]

f. Sustainability refers to the long-term ability of food systems to provide food security and nutrition in a way that does not compromise the economic, social and environmental bases that generate food security and nutrition for future generations.[64]

General services support (GSS)

Refers to public expenditure (or budget transfers) for the provision of public or collective goods and services that aim to create enabling and environmentally sustainable conditions for the food and agriculture sector. These services connect all economic actors of food supply chains and support the nexus between producers and consumers. The most common include research and development and knowledge transfer, inspection services, agricultural related infrastructure, public stockholding, and food and agricultural marketing, and promotion.

Governance

Governance refers to formal and informal rules, organizations, and processes through which public and private actors articulate their interests and make and implement decisions.[65]

Hazard

A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.[66]

Healthcare

The organized provision of medical care to individuals or a community. This includes services provided to individuals or communities by health service providers for the purpose of promoting, maintaining, monitoring or restoring health.

Healthy diets

Healthy diets: 1) start early in life with early initiation of breastfeeding, exclusive breastfeeding until six months of age, and continued breastfeeding until two years of age and beyond combined with appropriate complementary feeding; 2) are based on a great variety of unprocessed or minimally processed foods, balanced across food groups, while restricting highly processed food and drink products; 3) include wholegrains, legumes, nuts and an abundance and variety of fruits and vegetables; 4) can include moderate amounts of eggs, dairy, poultry and fish, and small amounts of red meat; 5) include safe and clean drinking water as the fluid of choice; 6) are adequate (i.e. reaching but not exceeding needs) in energy and nutrients for growth and development and meet the needs for an active and healthy life across the life cycle; 7) are consistent with WHO guidelines to reduce the risk of diet-related non-communicable diseases and ensure health and well-being for the general population; and 8) contain minimal levels or none, if possible, of pathogens, toxins and other agents that can cause foodborne disease. According to WHO, healthy diets include less than 30 percent of total energy intake from fats, with a shift in fat consumption away from saturated fats to unsaturated fats and the elimination of industrial trans fats; less than 10 percent of total energy intake from free sugars (preferably less than 5 percent); consumption of at least 400 g of fruits and vegetables per day; and not more than 5 g per day of salt (to be iodized).

Highly processed foods

Highly processed foods are foods that have been industrially prepared, including those from bakeries and catering outlets, and which require no or minimal domestic preparation apart from heating and cooking (such as bread, breakfast cereals, cheese, commercial sauces, canned foods including jams, commercial cakes, processed meats, biscuits and sauces).[41] Highly processed foods can contain very high quantities of salt, free sugars and saturated or trans fats and these products, when consumed in high amounts, can undermine diet quality.[br]

Hunger

Hunger is an uncomfortable or painful physical sensation caused by insufficient consumption of dietary energy. In this report, the term hunger is synonymous with chronic undernourishment and is measured by the prevalence of undernourishment (PoU).

Input subsidies

Government transfers to agricultural producers arising from policy measures based on farm use of inputs, or measures related to the provision of inputs.

Macronutrients

Macronutrients are needed in larger quantities (in gram range) and are the major source of energy and bulk (volume) in our diets. They include carbohydrates, protein and fats. They are a main source of dietary energy, which is measured in calories. Getting sufficient energy is essential for everyone in order to maintain body growth, development and good health. Carbohydrates, protein and fats, in addition to providing energy, each have very specific functions in the body and must be supplied in sufficient amounts to carry out those functions.

br For more details, please see **Annex 5, Section C**.

Malnutrition

An abnormal physiological condition caused by inadequate, unbalanced or excessive intake of macronutrients and/or micronutrients. Malnutrition includes undernutrition (child stunting and wasting, and vitamin and mineral deficiencies) as well as overweight and obesity.

Micronutrients

Micronutrients include vitamins and minerals and are required in very small (micro) but specific amounts. Vitamins and minerals in foods are necessary for the body to grow, develop and function properly, and are essential for our health and well-being. Our bodies require a number of different vitamins and minerals, each of which has a specific function in the body and must be supplied in different, sufficient amounts.

Midstream food supply chains

Midstream food supply chains comprise the post-farm gate activities related to the logistics, processing and wholesale of food. This includes cleaning, sorting, packaging, transportation, storage and wholesaling of agricultural and food products.

Moderate food insecurity

Refers to the level of severity of food insecurity, based on the Food Insecurity Experience Scale, at which people face uncertainties about their ability to obtain food and have been forced to reduce, at times during the year, the quality and/or quantity of food they consume due to lack of money or other resources. It thus refers to a lack of consistent access to food, which diminishes dietary quality, disrupts normal eating patterns, and can have negative consequences for nutrition, health and well-being.

Nutrition transition

As incomes rise and populations become more urban, diets high in complex carbohydrates and fibre give way to more energy-dense diets high in fats, sugars and/or salt. These global dietary trends are accompanied by a demographic transition with a shift towards increased life expectancy and reduced fertility rates. At the same time, disease patterns move away from infectious and nutrient-deficiency diseases towards higher rates of overweight and obesity and diet-related non-communicable diseases including coronary heart disease, stroke, diabetes and some types of cancer.

Nutritional status
The physiological state of an individual that results from the relationship between nutrient intake and requirements and the body's ability to digest, absorb and use these nutrients.

Nutritious foods
These are referred to as safe foods that contribute essential nutrients such as vitamins and minerals (micronutrients), fibre and other components to healthy diets that are beneficial for growth, and health and development, guarding against malnutrition. In nutritious foods, the presence of nutrients of public health concern including saturated fats, free sugars, and salt/sodium is minimized, industrially produced trans fats are eliminated, and salt is iodized.

Overweight and obesity
Defined as body weight that is above normal for height as a result of an excessive accumulation of fat. It is usually a manifestation of expending less energy than is consumed. In adults, overweight is defined as a body mass index (BMI) of 25 kg/m^2 or more, and obesity as a BMI of 30 kg/m^2 or more. In children under five years of age, overweight is defined as weight-for-height greater than 2 standard deviations above the WHO Child Growth Standards median, and obesity as weight-for-height greater than 3 standard deviations above the WHO Child Growth Standards median.[67]

Prevalence of undernourishment (PoU)
An estimate of the proportion of the population that lacks enough dietary energy for a healthy, active life. It is FAO's traditional indicator used to monitor hunger at the global and regional level, as well as SDG Indicator 2.1.1.

Resilience
Resilience is the ability of individuals, households, communities, cities, institutions, systems and societies to prevent, resist, absorb, adapt, respond and recover positively, efficiently and effectively when faced with a wide range of risks, while maintaining an acceptable level of functioning and without compromising long-term prospects for sustainable development, peace and security, human rights and well-being for all.[68]

Risk
The probability or likelihood of occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur. Risk to food insecurity is the probability of food insecurity resulting from interactions between a natural or human-induced hazard/shock/stress and vulnerable conditions.

Rural–urban continuum
Represents a different way of examining rural–urban spatial relationships across a continuum, rather than the more conventional rural/urban distinction. The rural–urban continuum views rural and urban areas not as separate spaces, but as two ends of a spectrum of settlements and catchment areas of different sizes and their linkages.

Severe food insecurity
The level of severity of food insecurity at which people have likely run out of food, experienced hunger and, at the most extreme, gone for days without eating, putting their health and well-being at grave risk, based on the Food Insecurity Experience Scale.

Staple foods
Staple foods are those eaten regularly, and in such quantities as to constitute the dominant part of the diet and supply a major proportion of total dietary energy. The main kinds of staple foods are cereals (e.g. rice, maize, wheat, rye, barley, oats, millet, sorghum), roots and tubers (e.g. potatoes, cassava, yams) and legumes (e.g. beans, lentils, soybean).[55]

Structural transformation
The theory of structural transformation describes the transformation of economies, initiated with an increase in agricultural productivity in rural areas leading to an agricultural surplus. The additional income from this surplus then generates demand for other goods and services stimulating the off-farm sectors of the economy. As a result, a gradual shift of jobs from the primary agriculture sector to the secondary and tertiary sectors takes place, typically located in urban areas. This encourages rural-to-urban migration, resulting in an economic transformation from a mainly agrarian to a more diversified national economy, attracting rural people to urban areas.[69]

Stunting
Low height-for-age, reflecting a past episode or episodes of sustained undernutrition. In children under five years of age, stunting is defined as height-for-age less than –2 standard deviations below the WHO Child Growth Standards median.

Undernourishment
Undernourishment is defined as the condition in which an individual's habitual food consumption is insufficient to provide the amount of dietary energy required to maintain a normal, active, healthy life. For the purposes of this report, hunger is defined as being synonymous with chronic undernourishment. The prevalence of undernourishment is used to measure hunger.

Undernutrition
The outcome of poor nutritional intake in terms of quantity and/or quality, and/or poor absorption and/or poor biological use of nutrients consumed as a result of repeated instances of disease. It includes being underweight for one's age, too short for one's age (stunted), dangerously thin for one's height (suffering from wasting) or deficient in vitamins and minerals (suffering from micronutrient deficiency).

Urban and peri-urban agriculture (UPA)
Urban and peri-urban agriculture can be defined as practices that yield foods and other outputs from agricultural production and related processes (transformation, distribution, marketing, recycling, etc.), taking place on land and other spaces within cities and surrounding regions. These involve urban and peri-urban actors, communities, methods, places, policies, institutions, systems, ecologies and economies, largely using and regenerating local resources to meet the changing needs of local populations while serving multiple goals and functions.[70]

Urbanization
Urbanization is a multifaceted social, cultural, economic and physical process that is the result of growing urban populations, the physical expansion of cities (i.e. the reclassification of rural to urban) and migration from rural to urban areas. This process is fickle and context-dependent, driven by intertwined factors including diverse economic developments such as the growth of agriculture, policy choices, natural resource availability and other events such as conflict or environmental degradation.[69]

Vulnerability
Refers to the conditions determined by physical, social, economic and environmental factors or processes that increase the susceptibility of an individual, community, assets or systems to the impacts of hazards.[66] Vulnerability to food insecurity is the range of conditions that increases the susceptibility of a household to the impact on food security in case of a shock or hazard.

Wasting
Low weight-for-height, generally the result of weight loss associated with a recent period of inadequate dietary energy intake and/or disease. In children under five years of age, wasting is defined as weight-for-height less than –2 standard deviations below the WHO Child Growth Standards median.

Weather
Weather describes conditions of the atmosphere over a short period of time (minutes to days), whereas climate is how the atmosphere behaves over relatively longer periods of time (the long-term average of weather over time). The difference between weather and climate is a measure of time (see above definitions for climate, climate change, climate variability and climate extremes).[71] ■

NOTES

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NOTES ON GEOGRAPHIC REGIONS IN STATISTICAL TABLES IN CHAPTER 2 AND ANNEXES 1 AND 2

Countries revise their official statistics regularly for past periods as well as for the latest reporting period. The same holds for statistics presented in this report. Whenever this happens, estimates are revised accordingly. Therefore, users are advised to refer to changes in estimates over time only within the same edition of *The State of Food Security and Nutrition in the World* and refrain from comparing data published in editions for different years.

Geographic regions

This publication follows the composition of geographic regions as presented by the Statistics Division of the United Nations Secretariat primarily for use in its publications and databases (https://unstats.un.org/unsd/methodology/m49). The assignment of countries or areas to specific groupings is for statistical convenience and does not imply any assumption regarding political or other affiliation of countries or territories by the United Nations. Please refer to the list below for the country composition of each region in the tables of Annex 1 and Annex 2, as well as in Tables 1–4 in Section 2.1.

Countries, areas and territories for which there were insufficient or unreliable data for conducting the assessment are not reported and not included in the aggregates. Specifically, with respect to the M49 classification:

- **Northern Africa:** In addition to the countries listed in the table, PoU and food insecurity based on the FIES include an estimate for Western Sahara. Child wasting, stunting and overweight, low birthweight, adult obesity, exclusive breastfeeding and anaemia estimates exclude Western Sahara.
- **Eastern Africa:** This grouping excludes Chagos Archipelago, French Southern and Antarctic Territories, Mayotte and Réunion.
- **Western Africa:** This grouping excludes Saint Helena.
- **Asia and Eastern Asia:** Low birthweight and child wasting aggregates exclude Japan.
- **Caribbean:** This grouping excludes Anguilla, Aruba, Bonaire, Sint Eustatius and Saba, British Virgin Islands, Cayman Islands, Curaçao, Guadeloupe, Martinique, Montserrat, Saint Barthélemy, Saint Martin (French Part), Sint Maarten (Dutch part), and Turks and Caicos Islands. Adult obesity, child wasting, low birthweight and exclusive breastfeeding exclude Puerto Rico and United States Virgin Islands.
- **South America:** This grouping excludes Bouvet Island, Falkland Islands (Malvinas), French Guyana, and South Georgia and the South Sandwich Islands.
- **Australia and New Zealand:** This grouping excludes Christmas Island, Cocos (Keeling) Islands, Heard and McDonald Islands, and Norfolk Island.
- **Melanesia:** Anaemia, child wasting, stunting and overweight, low birthweight and exclusive breastfeeding estimates exclude New Caledonia.
- **Micronesia:** Adult obesity, anaemia, child wasting, low birthweight and exclusive breastfeeding estimates exclude Guam, Northern Mariana Islands and US Minor Outlying Islands. Aggregates for child stunting and overweight exclude only US Minor Outlying Islands.
- **Polynesia:** This grouping excludes Pitcairn Islands, and Wallis and Futuna Islands. Adult obesity, child wasting, low birthweight and exclusive breastfeeding estimates exclude American Samoa, French Polynesia and Tokelau (Associate Member). Aggregates for child stunting and overweight exclude only French Polynesia.
- **Northern America:** This grouping excludes Saint Pierre and Miquelon. Adult obesity, anaemia, low birthweight and exclusive breastfeeding aggregates also exclude Bermuda and Greenland. Aggregates for wasting are based only on data for the United States of America.
- **Northern Europe:** This grouping excludes Åland Islands, Channel Islands, Faroe Islands (Associate Member), Isle of Man, and Svalbard and Jan Mayen Islands.
- **Southern Europe:** This grouping excludes Gibraltar, Holy See and San Marino. However, anaemia, child stunting, overweight and low birthweight estimates include San Marino.
- **Western Europe:** This grouping excludes Liechtenstein and Monaco. However, child stunting, overweight, anaemia and low birthweight estimates include Monaco.

Other groupings

Least developed countries, landlocked developing countries and Small Island Developing States groupings include the countries as presented by the Statistics Division of the United Nations (https://unstats.un.org/unsd/methodology/m49).

Small Island Developing States: Estimates for child stunting, wasting and overweight, adult obesity, exclusive breastfeeding and low birthweight exclude Anguilla, Aruba, Bonaire, Sint Eustatius and Saba, British Virgin Islands, Curaçao, French Polynesia, Montserrat, New Caledonia and Sint Maarten (Dutch part). In addition, estimates for child wasting, adult obesity, exclusive breastfeeding and low birthweight also exclude American Samoa and Puerto Rico.

High-income, upper-middle-income, lower-middle-income and low-income countries include the countries as presented by the World Bank classification for the 2022/23 fiscal year (https://datahelpdesk.worldbank.org/knowledgebase/articles/906519).

Low-income food-deficit countries (2023): Afghanistan, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Congo, Democratic People's Republic of Korea, Democratic Republic of the Congo, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kenya, Kyrgyzstan, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nepal, Nicaragua, Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, South Sudan, Sudan, Syrian Arab Republic, Tajikistan, Togo, Uganda, United Republic of Tanzania, Uzbekistan, Yemen and Zimbabwe.

Composition of geographic regions

AFRICA

Northern Africa: Algeria, Egypt, Libya, Morocco, Sudan, Tunisia and Western Sahara.

Sub-Saharan Africa

Eastern Africa: Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Rwanda, Seychelles, Somalia, South Sudan, Uganda, United Republic of Tanzania, Zambia and Zimbabwe.

Middle Africa: Angola, Cameroon, Central African Republic, Chad, Congo, Democratic Republic of the Congo, Equatorial Guinea, Gabon, and Sao Tome and Principe.

Southern Africa: Botswana, Eswatini, Lesotho, Namibia and South Africa.

Western Africa: Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo.

ASIA

Central Asia: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

Eastern Asia: China, Democratic People's Republic of Korea, Japan, Mongolia and Republic of Korea.

South-eastern Asia: Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste and Viet Nam.

Southern Asia: Afghanistan, Bangladesh, Bhutan, India, Iran (Islamic Republic of), Maldives, Nepal, Pakistan and Sri Lanka.

Western Asia: Armenia, Azerbaijan, Bahrain, Cyprus, Georgia, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syrian Arab Republic, Türkiye, United Arab Emirates and Yemen.

LATIN AMERICA AND THE CARIBBEAN

Caribbean: Antigua and Barbuda, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago.

Latin America

Central America: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama.

South America: Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela (Bolivarian Republic of).

OCEANIA

Australia and New Zealand: Australia and New Zealand.

Oceania excluding Australia and New Zealand

Melanesia: Fiji, New Caledonia, Papua New Guinea, Solomon Islands and Vanuatu.

Micronesia: Kiribati, Marshall Islands, Micronesia (Federated States of), Nauru and Palau.

Polynesia: American Samoa, Cook Islands, French Polynesia, Niue, Samoa, Tokelau, Tonga and Tuvalu.

NORTHERN AMERICA AND EUROPE

Northern America: Bermuda, Canada, Greenland and United States of America.

Europe

Eastern Europe: Belarus, Bulgaria, Czechia, Hungary, Poland, Republic of Moldova, Romania, Russian Federation, Slovakia and Ukraine.

Northern Europe: Denmark, Estonia, Finland, Iceland, Ireland, Latvia, Lithuania, Norway, Sweden, and United Kingdom of Great Britain and Northern Ireland.

Southern Europe: Albania, Andorra, Bosnia and Herzegovina, Croatia, Greece, Italy, Malta, Montenegro, North Macedonia, Portugal, Serbia, Slovenia and Spain.

Western Europe: Austria, Belgium, France, Germany, Luxembourg, Netherlands (Kingdom of the) and Switzerland.

2023

THE STATE OF FOOD SECURITY AND NUTRITION IN THE WORLD

URBANIZATION, AGRIFOOD SYSTEMS TRANSFORMATION AND HEALTHY DIETS ACROSS THE RURAL–URBAN CONTINUUM

This report provides an update on global progress towards the targets of ending hunger (SDG Target 2.1) and all forms of malnutrition (SDG Target 2.2). It shows that hunger at the global level remained relatively stable between 2021 and 2022, but is still far above pre-COVID-19-pandemic levels and is also rising in many places where people are still struggling to recover income losses in the wake of the pandemic or have been affected by increasing prices of food, agricultural inputs and energy, conflicts and/or extreme climate events. The report also provides updated estimates on the billions of people who are unable to access nutritious, safe and sufficient food all year round. Overall, the report shows that we are far off track to meet all nutrition targets. While progress on important indicators of child nutrition is revealed, rising overweight among children under five years of age in many countries portends growing burdens of non-communicable diseases.

Since its 2017 edition, this report has repeatedly highlighted that the intensification and interaction of conflict, climate extremes and economic slowdowns and downturns, combined with highly unaffordable nutritious foods and growing inequality, are pushing us off track to meet the SDG 2 targets. However, other important megatrends must also be factored into the analysis to fully understand the challenges to and opportunities for meeting the SDG 2 targets. One such megatrend, and the focus of this year's report, is urbanization.

Urbanization is increasing in many countries and this report shows it is changing agrifood systems in ways we can no longer understand using the simple rural–urban divide. The changing pattern of population agglomerations across a rural–urban continuum and its interface as a place of exchange and socioeconomic interactions, is reshaping and being reshaped by agrifood systems, with implications for the availability and affordability of healthy diets, and in turn, for food security and nutrition.
New evidence shows that food purchases in some countries are no longer high only among urban households but also among rural households. Consumption of highly processed foods is also increasing in peri-urban and rural areas of some countries. These changes are affecting people's food security and nutrition in ways that differ depending on where they live across the rural–urban continuum.

This timely and relevant theme is aligned with the United Nations General Assembly-endorsed New Urban Agenda, and the report provides recommendations on the policies, investments and actions needed to address the challenges of agrifood systems transformation under urbanization and to enable opportunities for ensuring access to affordable healthy diets for everyone.

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