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Social inclusion, poverty eradication and the 2030 agenda for sustainable development

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Social Inclusion, Poverty Eradication and the 2030 Agenda for Sustainable Development

Esuna Dugarova

prepared for the UNRISD project on
Post-2015 Development Agenda

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Contents

Acronyms	ii
Acknowledgements	ii
Summary.....	iii
The Concept of Social Inclusion	1
From the World Summit for Social Development to the 2030 Agenda for Sustainable Development	4
Review of Progress and Challenges: Country Experiences	5
Universal social protection	6
Meaningful participation	8
Social and solidarity economy.....	10
Concluding Remarks	12
References	13

Acronyms

GDP	Gross domestic product
ILO	International Labour Organization
MDG	Millennium Development Goal
NGO	Non-governmental organization
NREGA	Mahatma Gandhi National Rural Employment Guarantee Scheme Act
SDG	Sustainable Development Goal
SSE	Social and solidarity economy
UN	United Nations
UN DESA	United Nations Department of Economic and Social Development
USD	United States dollar
WSSD	World Summit for Social Development

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Summary

The concept of social inclusion, also referred to as social integration or social cohesion, represents a vision for “*a society for all*”, *in which every individual, each with rights and responsibilities, has an active role to play* (Report of the World Summit for Social Development, 1995). While various definitions have been developed to describe social inclusion, they all have been grounded in the promotion of a normative vision of society, in which individuals, groups or institutions are interconnected within a wider social system, and their relationships are maintained and enhanced in a harmonious way.

This paper refers to social inclusion as a goal, process and outcome. As a universal goal, it aims to achieve an inclusive society that entails respect for human rights, cultural diversity and democratic governance, and upholds principles of equality and equity. As a process, it enables citizens’ participation in decision-making activities that affect their lives, allowing all groups to take part in this process, especially marginalized groups. As an outcome, it ensures the reduction of inequalities, elimination of any forms of exclusion and discrimination, and achievement of social justice and cohesion.

Since the concept of social inclusion gained prominence following the World Summit for Social Development held in Copenhagen in 1995, there has been a tendency to (i) treat it as an expanded version of “economic” inclusion; (ii) identify exclusion with the marginalization of certain individuals or groups based on their race, ethnicity or gender; and (iii) focus on individual well-being in analysing and measuring social inclusion. Over time, however, it has become evident that, like other social ills such as poverty and inequality, exclusion has multiple causes and takes diverse forms related to age, disability and location, among others. It is therefore important to adopt a more comprehensive approach to inclusion.

Furthermore, there has been a renewed interest in social inclusion, with a number of policies and programmes having been implemented around the world, which highlighted the need for the simultaneous promotion of productivity, poverty reduction and greater inclusiveness. The recognized limits in the Millennium Development Goals have generated calls for more transformative and universal policies that are better integrated across social, economic and environmental domains within a more coherent development framework. The Second UN Decade for the Eradication of Poverty (2008–2017) has further reiterated the need to address social exclusion and called for more inclusive approaches to overcome poverty in its multiple dimensions.

In some countries, social programmes are now evolving towards a social inclusion framework, which incorporates (i) access to basic services, particularly health and education, requiring the active participation of beneficiaries in relevant programmes; and (ii) access to economic opportunities with the focus on inclusion in the labour market, with an overarching goal to reduce poverty and vulnerability, particularly among the most disadvantaged groups.

This paper argues that there are three key interrelated areas that are critical for poverty eradication and inclusive development, which include (i) universal social protection; (ii) meaningful participation; and (iii) social and solidarity economy. It discusses some of the main issues related to these areas and provides examples of best practices at the national level that have been implemented during the UN Decades for the Eradication of Poverty.

The paper concludes that it is unlikely that development will be sustainable unless it is inclusive. The 2030 Agenda for Sustainable Development thus needs to be an inclusive plan of action, pursuing the goal of leaving no one behind in a way that meets the needs of present generations without compromising the ability of future generations to participate in the processes that impact their lives. Social policies that promote practices based on universal rights-based entitlements, equal and meaningful participation, as well as norms of solidarity and reciprocity, while paying due respect to diversity and the environment, are more likely to enable social inclusion. It is therefore necessary to move away from the use of social inclusion schemes as remedial action towards making them an intrinsic part of broader and coherent development strategies. Government interventions in the form of enhancement of productive capacities, improved access to quality social services, adequate social protection and decent work are crucial to achieving socially inclusive, broad-based and sustainable development.

Under this approach, social policy should be concerned not only with the welfare and rights of an individual but also with supporting social relations, institutions and structures through which the welfare of individuals in their households, communities and nations could be sustained and improved, while recognizing the importance of societal levels of analysis and not simply economic or individual indicators.

The Concept of Social Inclusion

The concept of social inclusion, also referred to as social integration or social cohesion, represents a vision for “*a society for all*”, *in which every individual, each with rights and responsibilities, has an active role to play* (UN 1995). Social inclusion has been defined as a process in which those at risk of poverty and social exclusion gain the opportunities and resources that are needed to fully participate in societal activities (Frazer and Marlier 2013).¹ In this process, adequate income and employment have been treated as key means to tackle social exclusion, poverty and inequality. Social inclusion has also been seen as a foundation for shared prosperity that characterizes the process of improving abilities, opportunities and dignity of the disadvantaged through access to markets, services and spaces (World Bank 2013). The notion of space in relation to inclusion has been examined for the African continent, where regional disparities are seen as a major obstacle to structural transformation (AfDB 2013; AfDB et al. 2015). Spatial inclusion has been defined here as a goal of connecting people to assets and goods regardless of their location and is argued to be critical for poverty eradication and inclusive growth in the region (AfDB et al. 2015). Social inclusion has also been referred to as the endpoint of overcoming social exclusion, where social exclusion is characterized by the “involuntary exclusion of individuals and groups from society’s political, economic and societal processes, which prevents their full participation in the society in which they live” (UN DESA 2010a:1).²

While the terms “social inclusion”, “social integration” and “social cohesion” are related concepts that tend to be used interchangeably, they do not necessarily mean the same thing. Social integration has been treated both as a goal which aims for a more stable, safe and just society for all, and as a process which entails the participation of stakeholders in decision making that affects their lives (UN 1995). Some have also used the term “social capital” in discussions of social inclusion, to describe networks with shared norms, values and understandings that facilitate cooperation within or among groups (OECD 2007). In contrast to social integration, social capital is seen as a means to an end rather than an intrinsic goal. The notion “social ethics” is also sometimes used in relation to these concepts underline the importance of the community of values and solidarity (see, for example, UN ECLAC 2007).

The related concept of social cohesion, while traditionally encompassing shared values or a sense of belonging, has over time expanded towards integrating a wider variety of conditions, interests and identities that exist in societies (Rawls 2002). Some, for instance, have used this concept to promote a society that offers opportunities of upward

¹ Social exclusion is not coterminous with poverty (see, for example, Gore and Figueiredo 1997; Hickey and Du Toit 2007), as it is possible to be excluded without being poor, or to be poor without being socially excluded, as evidenced by the Indian caste system, or from discriminated minority groups such as the Chinese in Southeast Asia or the Jews in Europe for many centuries (Fischer 2011).

² One should also distinguish between voluntary and involuntary social exclusion (Barry 2002). Not everyone necessarily wishes to participate in key activities of society, and some individuals or groups may voluntarily choose to exclude themselves; for instance, a recluse might prefer solitude to human company; certain social or religious groups might emphasize their exclusivity; or the wealthy might lock themselves away in gated communities (Le Grand 2003). In this case, any move to include these groups in societal activities would be against their expressed will and would likely involve some measure of coercion. In this sense, voluntary social exclusion is not necessarily unjust or inequitable because it arises from a conscious choice. In fact, in some situations, people could prefer their “outsider status”, as it allows them to define their own values and priorities (Kabeer 2000). However, voluntary social exclusion may be problematic if an individual fails to make a relevant decision that could have negative implications for his/her long-term future, or if the decision damages other people’s welfare despite increasing that of the individual (Le Grand 2003). For instance, gated communities could deprive others of what might have been communal facilities and are therefore detrimental to social integration.

social mobility (OECD 2012). For others, it has ensured that all citizens have access to fundamental social and economic rights (Council of Europe 2001). In its regional approach to social cohesion, UN ECLAC (2007, 2010) has incorporated subjective information by emphasizing not only the relationships between the mechanisms of inclusion and exclusion that involve equity, political legitimacy, institutional factors and values, but also citizens' reactions and perception of how such mechanisms operate.

While all these concepts have been developed from somewhat different perspectives, they have nonetheless been grounded in the promotion of a normative vision of society, in which individuals, groups or institutions are interconnected within a wider social system, and their relationships are maintained and enhanced in a harmonious way.

In discussing social inclusion, one should also be aware of the multispectral nature of “inclusion”: inclusion of *whom* (for example, social groups or communities), inclusion of *what* (goods, services, resources), inclusion *into what* (labour market, welfare system or space, whether physical, political, social or cultural), *how* (equally, fairly, voluntarily or involuntarily), for *what purpose* and on *what terms*. Caution is needed regarding the terms on which social inclusion is carried out. Many impoverished and exploited people are in fact included, but on highly adverse terms. In this situation, social inclusion may not be automatically beneficial for the poor, nor is it necessarily wanted by them (Hospes and Clancy 2011). For example, the terms of contract farming arrangements may involve inclusion in value chains that could be detrimental to farmers and result in “adverse incorporation” (Hickey and Du Toit 2007; McCarthy 2010). Furthermore, certain patterns of social inclusion can promote inclusion in economic and political systems that are exploitative, repressive or ecologically unsustainable (Wolfe 1994), or can lead to an unwanted imposition of uniformity (Hewitt de Alcántara 1994) that may undermine a way of living of indigenous peoples, minorities and other social groups and suppress cultural diversity.

If the goal of social inclusion is to achieve a society for all, then it can be seen as an absolute phenomenon. At the same time, inclusion can also be relative in the sense that people, no matter how difficult their situation is, are involved into a broader network of social relations. Thus the problem arises not so much because they are unintegrated into wider social systems, but because present patterns of inclusion promote unjust or destructive outcomes in some situations (Ghai and Hewitt de Alcántara 1994). The challenge for policy is then to ensure that patterns of human relations in a society promote fair opportunities and guarantee equitable outcomes for all.

In this paper, I refer to social inclusion as a goal, process and outcome. As a universal goal, it aims to achieve an inclusive society that entails respect for human rights, cultural diversity and democratic governance, and upholds principles of equality and equity.³ As a process, it enables citizens' participation in decision-making activities that affect their lives, allowing all groups to take part in this process, especially marginalized groups. As an outcome, it ensures the reduction of inequalities, elimination of any forms of exclusion and discrimination, and achievement of social justice and cohesion.

³ The term “social inclusion” overlaps with the term “equality” but is not the same (Tilly 1999). There are many ways in which people can achieve fuller participation and inclusion, even if they lack an equal share of resources. At the same time, even people at the higher end of living standards may face social exclusion through political persecution or discrimination based on age, gender, sexual orientation or disability (Warschauer 2003).

Since the concept of social inclusion gained prominence following the World Summit for Social Development (WSSD) held in Copenhagen in 1995, there has been a tendency to (i) treat it as an expanded version of “economic” inclusion; (ii) identify exclusion with the marginalization of certain individuals or groups based on their race, ethnicity or gender; and (iii) focus on individual well-being in analysing and measuring social inclusion. Such an approach has taken place within a particular economic framework that has prioritized market-led efficiency as the outcome, where the primary purpose of including the poor in the development process was to serve the interests of economic efficiency. It has often been presumed that inclusion in terms of social rights would follow from economic participation in labour markets and adequate income. The opportunities, which the excluded often lacked, were defined principally in terms of paid work or income deficits. In line with this, poverty was narrowly seen from an income point of view, despite the WSSD endorsement of the multidimensional nature of poverty. In this situation, economic activity took precedence over political, social, environmental or cultural activity, and exclusion became to be treated as a consequence of poverty. Policies aimed at inclusion thus brought the excluded back towards economic efficiency that focused on improving individual well-being and reducing poverty in its narrow sense, rather than paying attention to social relations that underpin exclusion and the realization of rights related to security and social protection, adequate standards of living, and participation in various aspects of life. In this context, efforts to analyse and measure social inclusion were essentially limited to variables or indicators that reflected an individual’s access to services or resources and as such could provide little explanation regarding the nature of social relations or institutions. Furthermore, the design and implementation of programmes, which was done primarily through targeting and means testing, had a tendency to undermine social community relations instead of creating social inclusion.

Over time, it has become evident that, like other social ills such as poverty and inequality, exclusion is multifaceted; it has multiple causes and takes diverse forms related to age, disability and location, among others. It cannot therefore be addressed predominantly through economic means. Certainly, paid work and income are necessary conditions but not sufficient to achieve an inclusive society. Furthermore, poverty reduction does not automatically lead to social inclusion, as evidenced from the experiences of large emerging countries such as China and India, where poverty was drastically reduced in recent years but inequalities and exclusion of some groups increased (see, for example, Ghosh 2010). While society certainly consists of individuals, individual outcomes in education or health do not necessarily lead to a cohesive society, and policies that work well in one political and social context may not work well in another, nor do they help address unfair or unequal power relations. It is therefore important to adopt a more comprehensive approach to inclusion by implementing policies that are based on the norms of solidarity and reciprocity, promote equality of both opportunities and outcome, and ensure rights-based entitlements to social services. It should also involve the capacity of social groups to participate in society taking into account economic, social, cultural, religious or gender factors (Dugarova and Lavers 2014). Under this approach, social policy should be concerned not only with the welfare and rights of an individual but also with supporting social relations, institutions and structures through which the welfare of individuals in their households, communities and nations could be maintained and enhanced, while recognizing the importance of societal levels of analysis and not simply economic or individual indicators.⁴

⁴ See UNRISD 2006 and 2010 for this approach. From a gender perspective, for instance, social relations and power structures can contain deeply embedded gender divisions, in a similar way that

From the World Summit for Social Development to the 2030 Agenda for Sustainable Development

As part of the implementation of the WSSD Programme of Action, the United Nations General Assembly proclaimed the First United Nations Decade for the Eradication of Poverty (1997–2006), where the eradication of poverty was seen as an ethical, social, political and economic imperative of humankind. The scope of the Decade was broad and inclusive, and built upon the Summit’s comprehensive approach to poverty eradication in the context of achieving people-centred sustainable development (UN 1997). Together with poverty eradication and full employment, the promotion of social integration was set by the Summit as a key objective of development. The WSSD Programme of Action warned that the failure to achieve social inclusion would lead to social fragmentation and polarization, widen disparities and inequalities, and put strain on individuals, families, communities and institutions due to the rapid pace of social change, economic activity, and major population dislocations, particularly in areas of conflicts (UN 1995). It was stressed that policies to eradicate poverty, reduce disparities and combat social exclusion required the creation of employment opportunities, elimination of discrimination and promotion of participation as well as harmonious social relationships among groups and nations.

Despite the WSSD call for inclusive development strategies, the concerns of inclusivity were largely neglected in the Millennium Development Goals (MDGs) established following the Millennium Summit in 2000. While the contribution of the MDGs to creating a consensus in the global community around the urgency of addressing poverty has been widely acknowledged, none of the eight goals or accompanying 18 targets has had an explicit reference to inclusion, thus undermining its significance in achieving sustainable development. The focus of the goals has been on selected issues and vulnerable groups rather than on broader economic and social transformations, as well as political and social relations that underpin exclusion.

The recognized limits in the MDGs have generated calls for more transformative and universal policies that are better integrated across social, economic and environmental domains within a more coherent development framework (UN 2005; UNRISD 2010). The Second UN Decade for the Eradication of Poverty (2008–2017) has further reiterated the need to address social exclusion and called for more inclusive approaches to overcome poverty in its multiple dimensions (UN 2012a). The successful eradication of poverty requires a transformative social contract that promotes an inclusive society supported by institutions, systemic structures and processes that are necessary to enable people to participate in economic, social and political life (UN 2013a).

Further to the resolution adopted at Rio+20 Conference on Sustainable Development in 2012, the 2030 Agenda for Sustainable Development has shown a commitment to the creation of a comprehensive institutional framework for sustainable development that integrates the three dimensions in a balanced manner (UN 2012b). The outcome document of the agenda has explicitly called for the promotion of inclusive societies, institutions and decision making (Sustainable Development Goal/SDG 16), and encouraged social, economic and political inclusion of all as a target to reduce inequalities within and among countries (SDG 10). Furthermore, the new agenda has

they reflect class, ethnic or racial divisions. Inequalities are then the consequence of socially constructed power relations, norms and practices. Real social inclusion will therefore require the fundamental transformation of economic and social institutions, including the beliefs, norms and attitudes that shape them, at all levels of society, from households to labour markets and from communities to local, national and global governance institutions (UN Women 2015).

acknowledged the need for inclusive economic growth (SDG 8) and industrialization (SDG 9), while emphasizing an inclusive approach to quality education (SDG 4) and safe human settlements (SDG 11). It is clear that the 2030 Agenda for Sustainable Development presents a significant step forward compared to the MDGs, both in terms of the consultative process and the outcome document. In contrast to the MDGs, the 2030 Agenda has been developed through open and participatory global consultations involving a wide range of stakeholders, and the outcome document on the SDGs has recognized the need to build an inclusive society.⁵ Yet it remains to be seen how this ambition will be translated into action: how inclusive the actual process of implementation will be and whether it will lead to inclusive and sustainable outcomes that the new agenda aspires to.

Review of Progress and Challenges: Country Experiences

Over the past few decades, the economic growth performance of developing countries as a group has substantially improved, with real GDP growth increasing from 4.7 per cent in 1991–2002 to 7 per cent in 2003–2007 and 5.3 per cent in the post-crisis period 2008–2012 (UNCTAD 2014). Compared with the 1990s, recent growth has led to significant reductions in poverty in developing countries. The proportion of people living on less than USD1.25 a day fell from 47 per cent in 1990 to 27 per cent in 2005 and 22 per cent in 2010 (UN 2013b). There has been progress in the spread of democracy, wider recognition of the need to respect rights and diversity, increasing acknowledgment of the concerns of social groups including indigenous peoples, women and people with disabilities, and expanded economic and educational opportunities. Some countries have attained universal health coverage and expanded social protection programmes for the entire population.

Notwithstanding these instances of progress, today we find ourselves in a world that faces multiple crises, uncertainty and instability. Rising inequalities, unemployment and continued informalization of labour have intensified livelihood insecurities and exacerbated exclusion in many parts of the world, thus undermining the progress already made and threatening social cohesion. Furthermore, despite positive results in poverty reduction in many countries, the absolute number of poor people has grown.⁶ For example, in sub-Saharan Africa the number of poor people rose from 289.7 million in 1990 to 413.8 million in 2010 (UNCTAD 2014).

This state of affairs has led scholars and practitioners to argue that economic growth does not automatically translate into poverty eradication, nor does it lead to inclusive development outcomes.⁷ These developments, along with the transformations and

⁵ Another relevant shortcoming of the MDGs is that they have been viewed through the lens of a North-South divide, with poor citizens in developing countries being the primary target. If “leaving no-one behind” is the litmus test of commitment to social inclusion, justice and equity, it should be applied to developed countries as well (Watkins 2013).

⁶ Africa, particularly sub-Saharan Africa, continues to face major challenges in reducing poverty. The sustained growth in GDP that Africa experienced throughout the First UN Decade on Eradication of Poverty had little impact on poverty reduction or on achievement of the MDGs. Strong growth rates were driven by exports of primary commodities and were not accompanied by the significant creation of employment. Investments were made in capital-intensive industries such as mining and energy, to the detriment of the manufacturing sector, whose share of the African GDP and labour force fell during the 2000s (UNCTAD 2014).

⁷ The fact that recent growth in developing countries has not been inclusive can be attributed to the failure of the existing economic model to create sufficient good-quality jobs and the lack—or weakness—of comprehensive social protection mechanisms.

challenges caused by urbanization, technology advancements, demographic shifts and population ageing, increased migration flows, and rise of environmental disasters and conflicts, triggered a renewed interest in social inclusion, with a number of policies and programmes having been implemented around the world, which highlighted the need for the simultaneous promotion of productivity, poverty reduction and greater inclusiveness.

In some countries, social programmes are now evolving towards a social inclusion framework, which incorporates (i) access to basic services, particularly health and education, requiring the active participation of beneficiaries in relevant programmes; and (ii) access to economic opportunities with the focus on inclusion in the labour market, with an overarching goal to reduce poverty and vulnerability, particularly among the most marginalized groups (ILO 2014a). Relevant examples here include Bolsa Familia programme launched in Brazil in 2003, Girinka programme introduced in Rwanda in 2006, and Productive Safety Net programme developed in Ethiopia in 2005. Bolsa Familia, for instance, has contributed to the social inclusion of families that were constrained by extreme poverty, stimulated improvements in their education and health, while reducing inequality in income distribution and boosting the economy (Campello and Neri 2014). Rwanda's Girinka (One Cow per Family) programme has improved rural livelihoods by providing better nutrition and stable income to poor families through agricultural production (IFAD 2011), and also contributed to rebuilding social relationships within the community. The Ethiopian Productive Safety Net Programme has led to large-scale poverty reduction and food security through labour-intensive public works for households with able-bodied adults and the provision of direct support for disadvantaged individuals including orphans, persons with disabilities and the elderly (Subbarao et al. 2012). The challenge, however, remains how to make sure that these policies and programmes lead to real social inclusion and the poor are not caught in a vicious circle of poverty and social exclusion.

This paper argues that there are three key interrelated areas that are critical for poverty eradication and inclusive development, which include (i) universal social protection; (ii) meaningful participation; and (iii) social and solidarity economy. In the section below I will discuss some of the main issues related to these areas and provide examples of best practices at the national level that have been implemented during the UN Decades for the Eradication of Poverty.

Universal social protection

Social protection is concerned with preventing, managing and overcoming situations that adversely affect people's well-being (UNRISD 2010). It consists of policies and programmes that provide access to essential social services such as health and education, and ensure an adequate level of security under multiple contingencies of life related to unemployment, sickness, disability or old age. Social protection mechanisms are an important means of reducing poverty and can be a powerful tool to foster social inclusion, as they not only help prevent individuals and families from falling or remaining in poverty but also enable them to realize their rights and ensure their active involvement in societal processes.

While social protection has often been neglected within national and international development policy circles, it is now gaining wide recognition as an essential contributor to inclusive and sustainable development, as evidenced by various social protection initiatives around the world. In some of these interventions, there has been a shift from a narrow approach to social protection that targets specific vulnerable groups

through cash transfers to more comprehensive social policies—such as universal services and legal entitlements—to income transfers—such as social pensions or child allowances. For example, the Universal Coverage Scheme in Thailand introduced in 2001 achieved full health-care coverage in less than 15 years, thus contributing to better health outcomes, reduction of inequalities and substantial decline in poverty. The experience of Rwanda provides another interesting example of a universal and inclusive approach to social protection (box 1).⁸

Box 1: Inclusive health system in Rwanda

Following the genocide in 1994 that had a devastating effect on Rwanda's society and economy, the government launched a consultative process to create a national development plan called Vision 2020, grounded in the principles of people-centred development and social cohesion. Central to this vision was an inclusive health system for all citizens with equity-oriented national policies. In 2003, the government formalized the right to health in the constitution, recognizing that prosperity would not be possible without substantial investments in public health. As a result, premature mortality rates have fallen sharply and life expectancy has doubled since the mid-1990s. After piloting community-based health insurance and performance-based financing systems in several districts, health coverage was expanded in the mid-2000s to cover the whole nation. The experience of Rwanda provides a remarkable example of how a country rebuilt itself within 20 years of the end of a conflict and achieved substantial health gains from universal coverage. Investing in health has further contributed to shared economic growth as citizens live longer and with greater capacity to pursue their lives in a decent way.^a

Source: Binagwaho et al. 2014.

^a The regime of Rwanda is characterized by some as highly constrained in terms of providing adequate space for exercising basic civil and political rights, and in this sense, it is not completely inclusive. In situations where countries have a limited political space, one should recognize that the political system needs time to evolve, and the evolution has to be gradual and well managed (Golooba-Mutabi and Booth 2013).

In some countries, as part of their social protection arrangements, there has also been a focus on active labour market policies and a rights-based approach to social security and social protection. For example, India's National Rural Employment Guarantee Act 2005, regarded as one of the world's largest rights-based integrated employment and social protection initiatives, is a powerful tool for inclusive growth in rural India through its impact on social protection and democratic governance, thus contributing to the reduction of vulnerabilities and building resources that empower people, particularly women.⁹ In Mozambique, social protection has been seen as an important strategy for the promotion of inclusive development and social justice with significant advances occurring in equality and universality in citizens' access to health and education. Its Basic Social Security Regulation adopted in 2009, for instance, established the social protection rights of vulnerable groups and promotes social and economic inclusion of people living in poverty through labour intensive public works. The experience of Mexico provides a good example of an integrated approach to social protection and realization of citizens' rights (box 2).

⁸ "Inclusive" and "universal" could be seen as interrelated terms in the sense of "leaving no one behind" and treating all citizens equally. However, inclusive programmes do not necessarily mean universal. For instance, the Brazilian Bolsa Família or Ethiopian Productive Safety Net programmes are designed to include marginalized individuals and households but they are not universal as they target only the poor population. At the same time, while there exist varieties of universalism (Anttonen and Sipilä 2014), universal programmes are generally meant to include everyone; in this sense, they are inclusive of all people regardless of their socioeconomic background, physical abilities, gender and other characteristics. For development to be truly inclusive, policies and programmes should aim to be both inclusive and universal.

⁹ While India's achievement in democratization is widely acknowledged, some remain sceptical about its capacity to accommodate broader social interests to attain inclusive development outcomes (Nagaraj 2012).

Box 2: Integrated Vivir Mejor Strategy in Mexico

The Vivir Mejor (Live Better) Strategy was established as a response to the 2008 economic crisis to alleviate poverty and inequality, while promoting social cohesion and citizens' participation. It is an integrated social policy strategy that pursues a broader approach to social protection, taking into account the entire life cycle of individuals and their families. Key components of the Vivir Mejor strategy include (i) development of basic skills to guarantee equal opportunities in accessing basic social services for poorest families (programmes in this component include Oportunidades, Nutrition Support and Rural Supply); (ii) development of physical and social environment to promote social cohesion (programmes such as Habitat, Recovery of Public Spaces, Rural Housing, and 3X1 Programme for Migrants); and (iii) linking economic and social development to improve access to formal and well-remunerated work (for example, Child Day-care Centres for Working Mothers and Income-Generating Options programmes).^a The experience of Mexico has been recognized for its achievements in social and human development of people living in poverty. It has shown that in order to successfully address poverty and inequality and realize the social rights of people, programmes need to be embedded into a comprehensive national strategy for social policy within an institutional framework.

Source: ILO and UNDP 2011; ILO 2012.

^a For Mexico's childcare expansion see, for instance, Staab and Gerhard 2010.

These and other experiences indicate that comprehensive social protection programmes not only enhance productivity and raise human capital through the provision of income and social services; they also reduce poverty and inequality in its various dimensions and contribute to achieving more socially inclusive societies. Expanding and consolidating gains in these areas remain crucial for the 2030 Agenda for Sustainable Development. Despite this important role of social protection programmes, many people in developing countries continue to lack, or have low levels of access to, social schemes and services. It is estimated that nearly 73 per cent of the global population has no access to adequate social protection that would enable people to pursue decent livelihoods (ILO 2014b). Addressing this challenge should therefore be on the priority agenda of governments if they wish to build inclusive societies in the long run.¹⁰

Meaningful participation

Participation can be defined as “the organized efforts to increase control over resources and regulative institutions in given social situations, on the part of groups and movements of those hitherto excluded from such control” (Pearse and Stiefel 1979:7–8). It encompasses involvement in various aspects of life, whether social, cultural, economic or political, by all members of society based on equality of rights and opportunities. Meaningful participation is therefore not only about giving disadvantaged individuals or groups a voice at the table; it is about strengthening their capacity to influence decision-making processes and exercise their claims on external actors and institutions that affect their lives. In this sense, participation is a prerequisite for inclusive development.

¹⁰ There is growing evidence that social protection programmes in developing countries are affordable in countries with relatively limited fiscal space if they are well designed and implemented. For example, the budget for the Bolsa Família programme in Brazil was about 0.4 per cent of GDP in 2009 and covered about 13 million families (UNCTAD 2014). While the cost of social schemes can be substantial, and it is necessary to mobilize resources, policy makers should be aware that there is an opportunity cost to not implementing these programmes. For example, the cost of a well-designed and properly implemented social protection programme is low compared with the cost of not providing social protection in terms of poverty, social exclusion, and low achievements in education and productive capacities (European Communities 2010). Moreover, effective social protection can pay for itself over the long term by enhancing the productiveness of the labour force, the resilience of society and tax revenues (ILO 2011a). Policy makers should realize that the more they invest in social protection, the higher the returns for economy and society in general (Hujo and McClanahan 2009).

While the term of participation has been widely assimilated into mainstream development discourse over past three decades, it has often been reduced to consultations with selective stakeholders or other actors in positions of power (Dugarova and Utting 2013). As a consequence, such processes often sideline organized efforts, despite the fact that more collaborative and participatory processes can facilitate the mobilization of resources, the pooling of competencies, and ensuring synergies that otherwise might not exist. One of the key issues here therefore relates to the need to go beyond such a narrow perspective of participation and open up space to a diverse range of voices.

There are three forms of participation that are particularly relevant for inclusive development: (i) resource mobilization at the local or community level; (ii) access and influence in decision-making and governance processes; and (iii) advocacy by civil society networks to (re-)frame policy debates on development priorities and pathways (Dugarova and Lavers 2014). Such processes of empowered participation may challenge existing structures and relations of power, yet they are crucial for both fair decision making and equitable outcomes and are thus central to achieving an inclusive and sustainable development path (UNRISD 2014a).

Brazil and India provide examples of institutionalizing citizens' participation through the constitution, which opens up spaces for people to participate in the formulation, management and monitoring of policies so that they better reflect citizens' needs.¹¹ Many governments have also used affirmative action policies to promote greater access of disadvantaged or underrepresented groups to public institutions and ensure the equal right to participation and representation of all groups. Quota systems, for instance, are often seen as the most effective way of ensuring proportionate representation of disadvantaged groups in the political process. In Chile, persons with disabilities get 10 extra points when applying for public subsidies or housing programmes, while Brazil has quotas for entry into university for black and indigenous people, and several countries in Latin America guarantee political representation by offering a number of seats in the national legislature on the basis of gender, race or ethnicity (Dani and de Haan 2008).¹² Other good examples of enhancing capabilities of marginalized groups through participatory mechanisms at the local level come from the Indian state of Kerala (box 3) and the Mazowe District in Mashonaland Central Province in Zimbabwe (box 4).

¹¹ While the legal foundation is an important mechanism to ensure people's engagement in decisions that impact on their lives, it is insufficient to achieve inclusive outcomes for all participants (see, for example, Coelho et al. 2005). More effective approaches are therefore needed to recognize the diversity, identities and abilities of local actors to participate in these processes and improve institutional arrangements that help them to do so (Gaventa 2002). In the case of women, for instance, even when gender equality laws have been put in place, entrenched inequalities, discriminatory social norms and harmful customary practices can undermine their implementation and positive effects (UN Women 2015). In this situation, transformations in structures and institutions that constrain women's enjoyment of their rights could be triggered by coordinated public action with regard to redressing women's socioeconomic disadvantage; addressing stereotyping, stigma and violence; and strengthening women's voice, agency and participation.

¹² Caution is however needed as to how the affirmative action policies are implemented, as they can alienate other groups and thus run the risk of generating tensions or conflict (UN DESA 2010b).

Box 3: Providing space for participation in Kerala, India

The state of Kerala, India, introduced a poverty eradication programme called Kudumbashree in 1998 that organizes women into a structure consisting of neighbourhood groups comprising families, area development societies at the ward level and community development societies at the municipal level. Kudumbashree office-bearers are elected by local members, and the groups are linked to the state through the institutions of local self-government, which ensures that local development reflects the needs and aspirations of communities. With a network of four million poor women throughout Kerala, the programme has facilitated women's agency through strengthening social ties and created a variety of income and employment schemes. When in 2005, for instance, the state of Kerala sought to implement the Mahatma Gandhi National Rural Employment Guarantee Scheme Act (NREGA), local governments were able to implement the scheme by using the channels that Kudumbashree already established. Kudumbashree groups participated in the planning process and mobilized members to work in the programme. Kerala now ranks first in India in women's participation rates in NREGA. The Kudumbashree programme has thus provided a socio-political space where marginalized women can collectively pursue their needs, have their voices heard and participate in a meaningful way. This mobilization has created the synergy between democratic participation, social inclusion and poverty reduction.

Source: Mukherjee-Reed 2015.

Box 4: Building social capital through farmer organizations in Zimbabwe

In 2000, Zimbabwe experienced a major shift in its rural landscape when land occupation and government-initiated fast track land reform saw the emergence of new communities of black farmers on formerly white-owned farms. With minimalist government support, there has been a vibrant process of participation of small-scale farmer communities in the Mazowe district that ensured service provision through their own initiative. They have been organized in the form of institutions such as health, farm and irrigation committees that provide a range of social services as well as other labour related arrangements. Such institutions embody social capital associated with integration and collective action that strengthen links between people in a group. It is through interaction, reciprocity and communality that these communities have sustained their existence. The challenge for these organizations, however, is how to reconcile different agendas, interests and actors so as to allow the formulation of a common vision. Nonetheless, such farm-level institutions constitute an important source of social cohesion through maintaining order at the farm level and in many ways serve as a valuable asset in the livelihood strategies of farmers.

Source: Chiweshe 2014.

The above examples show how the participation of marginalized and often excluded groups can contribute to poverty eradication and lead to more equitable and inclusive outcomes. Public policy that purports to facilitate participation should thus be concerned as much with civil and political freedoms (such as the right to expression and collective bargaining) that enhance the capacity of disadvantaged groups to organize and mobilize, as with engaging non-governmental organizations (NGOs), civil society and local people in decision-making processes (UNRISD 2010).

Social and solidarity economy

The social and solidarity economy (SSE) refers to the production of goods and services by organizations and enterprises that put social, and often environmental, objectives before profit; involve cooperative and associative relations and forms of democratic management; and espouse values of solidarity, sharing and caring (UNRISD 2014bc). The crises related to finance, food, poverty and social exclusion have resulted in the emergence of various bottom-up initiatives that are based on the solidarity among different social groups in an attempt to solve their own problems (Favreau and Fréchette 2002). Different actors in development circles have subsequently started to recognize the need to shift from an approach that focuses on assisting the poor and empowering them through productive activities and social organization. This has fuelled the expansion of social and solidarity economy in recent years (ILO 2011b, 2014c).

Relevant to the SSE are also concepts such as Buen Vivir and even happiness that are gaining currency in international development discourse (see, for example, Gudynas 2011; Helliwell et al. 2015). Such perspectives uphold lifestyles associated with non-conspicuous consumption, living in harmony with human beings and the environment, and enhancing people's sense of purpose and belonging.¹³ These initiatives are rooted in the community and are intrinsically inclusive, generating active citizenship by the way in which its members interact. Women's emancipation, religious and racial equality, and respect for diversity are integral parts of these processes. This approach preserves and includes indigenous and traditional cultures in their practices, creates decent work, local ownership and reinvestments within the community (RIPESS 2014).

In recent years, a range of laws have been adopted concerning SSE on a national and sub-national level in France, Mexico, Spain and the Canadian province of Quebec, with some relevant developments taking place in Brazil, Cameroon and Italy. In Bolivia, Ecuador and Venezuela, SSE is seen as part of an institutional framework. This legislative activity and institutional recognition of SSE on a global level is characterized by efforts to construct public policies by incorporating economically dynamic and socially innovative aspects that aim to promote greater cohesion and inclusion (ILO 2014c). These elements are emphasized in Ecuador's national framework for development (box 5).

Box 5: Ecuador's National Plan for Good Living (2013-2017)

In consultation with local people and indigenous communities such as Andeans and Amazonians, the government of Ecuador adopted the concept of Good Living, or "Sumak Kawsa", which became the backbone of the new constitution adopted in 2008 and served as the basis for the National Plan for Good Living for 2009–2013 and for 2013–2017, thus guiding its public policy. While recognizing the importance of increasing productive capacity in the economic development process, it maintains a broader view in which the environment, cultural diversity and social inclusion play an important role. The concept of Good Living presents an alternative to a conventional growth-focused development model, at the core of which is strengthening social cohesion and community values, encouraging the active involvement of citizens in decision making, and the recognizing the rights of Nature. Good Living is seen as the style of life that enables happiness, encompasses respect for cultural and environmental diversity, and is grounded in principles of equality, equity and solidarity. The social and solidary economic system is one of the central pillars that constitutes the new Ecuadorian social contract and is seen as a major instrument to achieve inclusive and sustainable development outcomes. To support these practices, the Ecuadorian government has developed a wide range of initiatives, including the establishment of the National Institute for Popular and Solidarity Economy within the Ministry of Economic and Social Inclusion.^a

Source: National Secretariat of Planning and Development of Ecuador 2013.

^a While the efforts that Ecuador and some other Latin American governments are putting into social and environmental sustainability are laudable, there exist major challenges in translating these principles into practice. In addition to bureaucratic resistance and powerful forces that oppose such policies, these governments also have to oversee economies locked into models of economic growth, which are often based on the export of primary goods that have perverse social and environmental impacts (Coraggio 2015).

Supporting such forms of economic and social organization can offer significant opportunities for promoting social inclusion, environmental sustainability and economic productivity, which are key for sustainable development. While several governments are beginning to adopt policies and laws that aim to support social and solidarity economy, they often see it as a poverty reduction tool rather than an alternative approach to

¹³ There is an interrelationship between social integration and the environment. On the one hand, different patterns of social relations affected, among others, by demographic shifts, changes in national and international markets, as well as land tenure systems, could in turn affect the ways in which natural resources are utilized by society and the importance attached to environmental conservation. On the other hand, environmental degradation could act on social structures and institutions, inducing changes in productive activities, settlement patterns, social stratification or promotion of social solidarity and collective action (Vivian 1994).

development that can promote environmental justice and social cohesion (Utting 2015). This approach therefore needs to receive far more attention from governments and international organizations.

Concluding Remarks

It is unlikely that development will be sustainable unless it is inclusive. The 2030 Agenda for Sustainable Development thus needs to be an inclusive plan of action, pursuing the goal of leaving no one behind in a way that meets the needs of present generations without compromising the ability of future generations to participate in the processes that impact their lives. Social policies that promote practices based on universal rights-based entitlements, equal and meaningful participation, as well as norms of solidarity and reciprocity, while paying due respect to diversity and the environment, are more likely to enable social inclusion. It is therefore necessary to move away from the use of social inclusion schemes as remedial action towards making them an intrinsic part of broader and coherent development strategies. Government interventions in the form of enhancement of productive capacities, improved access to quality social services, adequate social protection and decent work are crucial to achieving socially inclusive, broad-based and sustainable development. At the same time, it is important to bear in mind that these interventions alone would not automatically ensure the desired outcomes. It is necessary to examine social relations within which economy and society are embedded.

The implementation of socially inclusive policies is the responsibility of all societal actors, including governments, civil society, private sector and society at large. It is vital to promote and encourage partnerships between different actors and sectors to implement these policies. Yet it is the role of the state to establish mechanisms that would facilitate the involvement of all these important actors at national and local levels. Comprehensive social policy is one of such mechanisms that promotes sustainable development in which all human beings have a right to a decent livelihood and are allowed to participate on equal terms in decisions-making processes.

At the same time, it is essential to recognize that processes of social inclusion are always locally specific and historically contingent. Each country needs to formulate policies and strategies based on its specific circumstances, resource base, and cultural and institutional set-up. The task is therefore not so much how to expand social inclusion per se, but how to promote a kind of inclusion that favours the creation of a more equitable society.

Finally, while it is necessary to understand the interlinkage between social inclusion and poverty eradication, it is equally important to attain policy coherence that recognizes the need for more integrated approaches to policy design and implementation, promotes complementarities and synergies among policies, while minimizing trade-offs that may undermine progress on core development objectives (Cook and Dugarova 2014). This should be central to achieving sustainable development outcomes in the 2030 Agenda for global action.

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Eliminating World Poverty: A Challenge for the 21st Century

White Paper on International Development

Presented to Parliament by the Secretary of State
for International Development
by Command of Her Majesty November 1997

“ *Together you and I will begin to build the new society, a society in which each of us has the chance to grow, to achieve, to contribute, to create dignity for ourselves, and not for ourselves alone, but for others also; a society in which each of us has a stake, a share; and we will give back to our children what they deserve - a heritage of hope.* **”**

Tony Blair

April 1997



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CONTENTS

	<i>Page</i>
<i>Foreword by the Secretary of State for International Development</i>	5
<i>Summary</i>	6
SECTION 1	
<i>The Challenge of Development</i>	8
SECTION 2	
<i>Building Partnerships</i>	22
<i>The Complexities of Development</i>	22
<i>Multilateral Development Assistance</i>	33
<i>The Bilateral Programme</i>	
– <i>Partnerships for Development</i>	37
– <i>Partnerships in Britain</i>	41
SECTION 3	
<i>Consistency of Policies</i>	50
<i>The Importance of Consistency</i>	50
<i>The Environment</i>	50
<i>Trade, Agriculture and Investment</i>	58
<i>Promoting Political Stability, Social Cohesion and Responding Effectively to Conflict</i>	67
<i>Promoting Economic and Financial Stability</i>	71
SECTION 4	
<i>Building Support for Development</i>	77
<i>List of Abbreviations</i>	82

FOREWORD BY THE SECRETARY OF STATE FOR INTERNATIONAL DEVELOPMENT

This White Paper sets out the Government's policies to achieve the sustainable development of this planet. It is first, and most importantly, about the single greatest challenge which the world faces – eliminating poverty. It is about ensuring that the poorest people in the world benefit as we move towards a new global society. It is about creating partnerships with developing countries and their peoples, on the basis of specific and achievable targets, to bring that about.

We can succeed. The overall successes of development in recent decades have been remarkable – people live longer; fewer mothers die in childbirth; fewer infants die from preventable diseases. But the numbers living in poverty are continuing to grow. Too many people – 1.3 billion too many – live in extreme poverty. The major UN Conferences of recent years have drawn together an agenda that could deliver sustained progress. There are good reasons

for optimism. But to succeed we need to mobilise greater political will across the international community.

It is our duty to care about other people, in particular those less well off than ourselves. We all have a moral duty to reach out to the poor and needy. But we also owe it to our children and our grandchildren to address these issues as a matter of urgency. If we do not do so there is a real danger that, by the middle of the next century, the world will simply not be sustainable. The combination of population growth, environmental degradation and the conflict and disease to which this will lead could impose catastrophic pressures upon the planet. This White Paper outlines the ways in which we can make progress. To succeed, we need the active support of the people of Britain. In this area we could give a lead which would make us all very proud of our country and also secure a safe and decent future for all of us.



Clare Short
Secretary of State for International Development

November 1997

SUMMARY

This Command Paper announces the Government's new approach to international development. It has 12 strands.

SECTION 1 THE CHALLENGE OF DEVELOPMENT

We shall:

1. Refocus our international development efforts on the elimination of poverty and encouragement of economic growth which benefits the poor. We will do this through support for international sustainable development targets and policies which create sustainable livelihoods for poor people, promote human development and conserve the environment.
-

SECTION 2 BUILDING PARTNERSHIPS

We shall:

2. Work closely with other donors and development agencies to build partnerships with developing countries to strengthen the commitment to the elimination of poverty, and use our influence to help mobilise the political will to achieve the international development targets.
 3. Pursue these targets in partnership with poorer countries who are also committed to them.
 4. Put in place new ways of working with the UK private and voluntary sectors, and the research community, towards the international development targets including transforming the Commonwealth Development Corporation into a dynamic public/private partnership.
 5. Measure the effectiveness of our efforts, alongside others, against the targets, including the aim of halving the proportion of the world's population living in extreme poverty by 2015.
-

SECTION 3

CONSISTENCY OF POLICIES

We shall:

6. Ensure that the full range of Government policies affecting developing countries, including environment, trade, investment and agricultural policies, takes account of our sustainable development objective.
 7. Give particular attention to human rights, transparent and accountable government and core labour standards, building on the Government's ethical approach to international relations.
 8. Use our resources proactively to promote political stability and social cohesion and to respond effectively to conflict.
 9. Encourage financial stability and the reduction of the external debt of developing countries to sustainable levels.
-

SECTION 4

BUILDING SUPPORT FOR DEVELOPMENT

We shall:

10. Increase public understanding of our mutual dependence and the need for international development.
 11. Ensure that resources made available for development are used only for the purposes intended, and consider the case for a new International Development Act.
 12. Provide the necessary resources for the development programme: the Government will start to reverse the decline in UK spending on development assistance, and reaffirms the UK's commitment to the 0.7 per cent UN target.
-

THE CHALLENGE OF DEVELOPMENT

We shall

- Refocus our international development efforts on the elimination of poverty and encouragement of economic growth which benefits the poor. We will do this through support for international sustainable development targets and policies which create sustainable livelihoods for poor people, promote human development and conserve the environment.

1.1 The quest for international development has been one of the great themes of the last 50 years. Efforts to create a framework to deal with political and economic relationships within the international community were launched in earnest at the end of the Second World War with the creation of the United Nations and the Bretton Woods Institutions. A key challenge was to manage the transition from colonial empires to a world characterised by independent states. In Britain the creation, by Harold Wilson and Barbara Castle, of the Ministry of Overseas Development in 1964 marked the establishment of a significant aid programme at a moment of great change, as many countries – particularly in Africa – gained their independence. Its work was described in a White Paper (Command Paper 2736) published in August 1965. Its starting point was that the majority of the human race still lived in poverty and that aid was in Britain's long-term self interest.

1.2 Ten years on another White Paper (Command Paper 6270), published in October 1975 when Judith Hart was Minister of Overseas Development, took

the same starting point – the extreme poverty of a very large proportion of the world's population – but put the emphasis on addressing more directly the basic needs of the poorest people in the poorest countries. It saw integrated rural development as the route to this objective.

1.3 The aspiration in the 1960s and early 1970s to achieve international development, and the assumption that this was a prize which could be seized over a period of a decade or two, were not borne out in practice. The 1970s and 1980s produced a number of major setbacks. Internally, economic policies were often inadequate and, where growth did occur, the benefits were often restricted to a small section of the population. External factors, such as the escalating price of oil, affected countries the world over, but particularly the developing countries. Concern over environmental degradation, forcefully articulated by the Club of Rome in 1974, grew in strength.

1.4 For many developing countries the 1980s represented a lost decade. Following a short-lived surge in bank lending, many

SECTION 1
THE CHALLENGE OF DEVELOPMENT

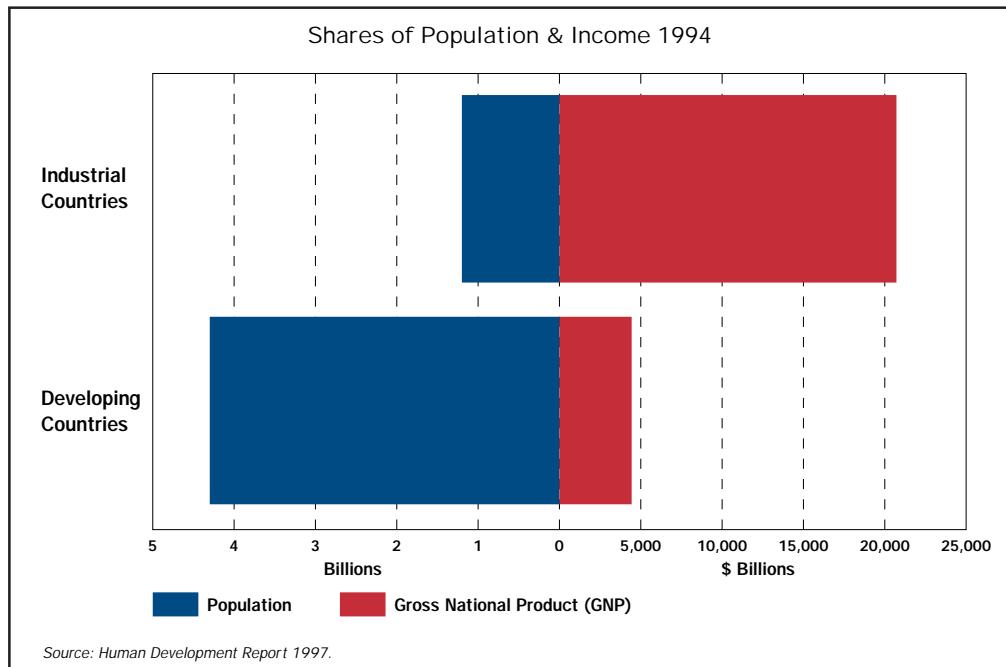
Latin American countries had to cope with huge debt burdens. In Africa, incomes per head fell in many countries as post-independence growth collapsed in a worldwide international climate that left little margin for policy errors. In contrast, in much of Asia growth was robust, reflecting long-standing investment in education and generally sound economic policies. But vast numbers of the rural poor remained untouched by progress, and many of those who migrated to the cities in search of a better future found life equally hard. The number of people in absolute poverty increased. Poor women, in particular, often failed to benefit.

Throughout the period pressure on the environment increased.

1.5 The end of the Cold War has transformed international politics. Until 1989, the ideological divide distorted development efforts. Both sides used aid to tie developing countries to their interests, leading to the diversion of effort from sustainable development. The new era provides a fresh opportunity to focus development efforts on poverty elimination.

1.6 The increasing globalisation of the world economy in terms of trade and

FIGURE 1



SECTION 1
THE CHALLENGE OF DEVELOPMENT

finance also brings new opportunities and challenges. Decisions taken in London, New York or Tokyo can have a profound effect on the lives of millions far away. We travel to distant places and trade with people of whom our grandparents knew little. We are mutually dependent. If our grandchildren are to have a safe future, we must improve opportunities for all the children of the world.

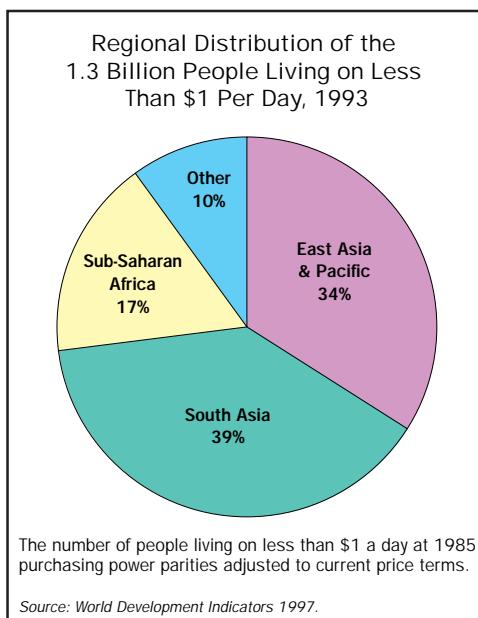
1.7 It is time to review our aspirations. All people have the same basic needs – fresh air to breathe, clean water to drink, uncontaminated food to eat, and livelihoods that allow them to earn their keep and raise healthy, educated children. We want to see a global society in which people everywhere are entitled to live in peace and security with their families and neighbours, and enjoy in full their civil and political rights. We want to see economic endeavour hand-in-hand with accountable government, the rule of law and a strong civil society.

1.8 The challenge of creating such a global society is formidable. Whilst globalisation presents great opportunities, it does not necessarily benefit everybody equally (*see Figure 1*). The poorest countries are also often the least able to take advantage of the opportunities, and globalisation can lead to an increase in inequality in these countries. Globalisation

needs therefore to be accompanied by policies to help the poor.

1.9 Some 1.3 billion people (almost 70 per cent of whom are women) – nearly a quarter of the world's population – continue to live in extreme poverty, on less than the equivalent of \$1 per day (*see Figure 2*). They lack access to opportunities and services (*see Figure 3*). They feel isolated and powerless and often feel excluded by ethnicity, caste, geography, gender or disability. They lack information and access to health and education facilities, to productive assets or to the market for their goods or labour. They believe nobody listens, and often have no way of being heard in places where the decisions which

FIGURE 2



SECTION 1
THE CHALLENGE OF DEVELOPMENT

affect their lives are made. Poor people, particularly women, are the most vulnerable to all forms of violence and abuse, including domestic violence, crime and civil conflict, because in very many cases systems of justice and government services do not fully extend to them.

1.10 Progress in addressing these issues has been uneven in some countries, too slow or too erratic to compensate for the additional burdens imposed by rapidly growing populations. In a few, especially war-torn societies, the quality of people's lives has declined sharply. For many, the prospects of a sustainable livelihood are worsening as population growth and

economic growth accelerate environmental degradation.

1.11 The fact that people survive at all under these conditions is a remarkable testament to the human spirit. Poor men and women apply enormous creativity, strength and dynamism on a daily basis to solve problems that those who live comfortably can hardly begin to understand. Poor people have assets – in their own skills, in their social institutions, in their values and cultures and in their detailed and sophisticated knowledge of their own environment. In rural communities there is a dense fabric of relationships, rights and obligations which

FIGURE 3
Human Poverty in Developing Countries

Region	Millions					
	Illiterate adults	People lacking access to health services	People lacking access to safe water	Malnourished children under 5	People not expected to survive to age 40	Maternal mortality rate (per 100,000 live births)
All Developing Countries of which:	842	766	1213	158	507	471
Arab States	59	29	54	5	26	380
East Asia	167	144	398	17	81	95
Latin America and the Caribbean	42	55	109	5	36	190
South Asia	407	264	230	82	184	554
South-East Asia and the Pacific	38	69	162	20	52	447
Sub-Saharan Africa	122	205	249	28	124	971

Source: Most recent estimates available from Human Development Report 1997

SECTION 1

THE CHALLENGE OF DEVELOPMENT

allows people to collaborate in sustaining livelihoods under the most difficult circumstances. Those who have worked with the urban poor can bear witness to the way that households piece together a living from any number of diverse sources.

1.12 Given the necessary support, the poor can be the means as well as the beneficiaries of sustainable development. Where poor people have rights and choices, they are able to make good use of them – including where the community collectively is involved in the management of “common pool” resources, such as village forests, grazing land or water sources.

1.13 Despite the setbacks, on average people live longer and in better health. Since 1960, child death rates in developing countries have been cut by more than half. *Per capita* food production and consumption have risen by 20 per cent. And malnutrition rates have declined by almost one third. The percentage of the population with access to clean water has doubled to 70 per cent. Adult literacy has risen from less than half to about two thirds (*see Figures 4 and 5*). In the last 50 years more people have escaped from poverty than in the previous 500 years of human existence. Great progress has been made and more is possible if we build on this experience.

1.14 Only governments can create the right political and economic framework

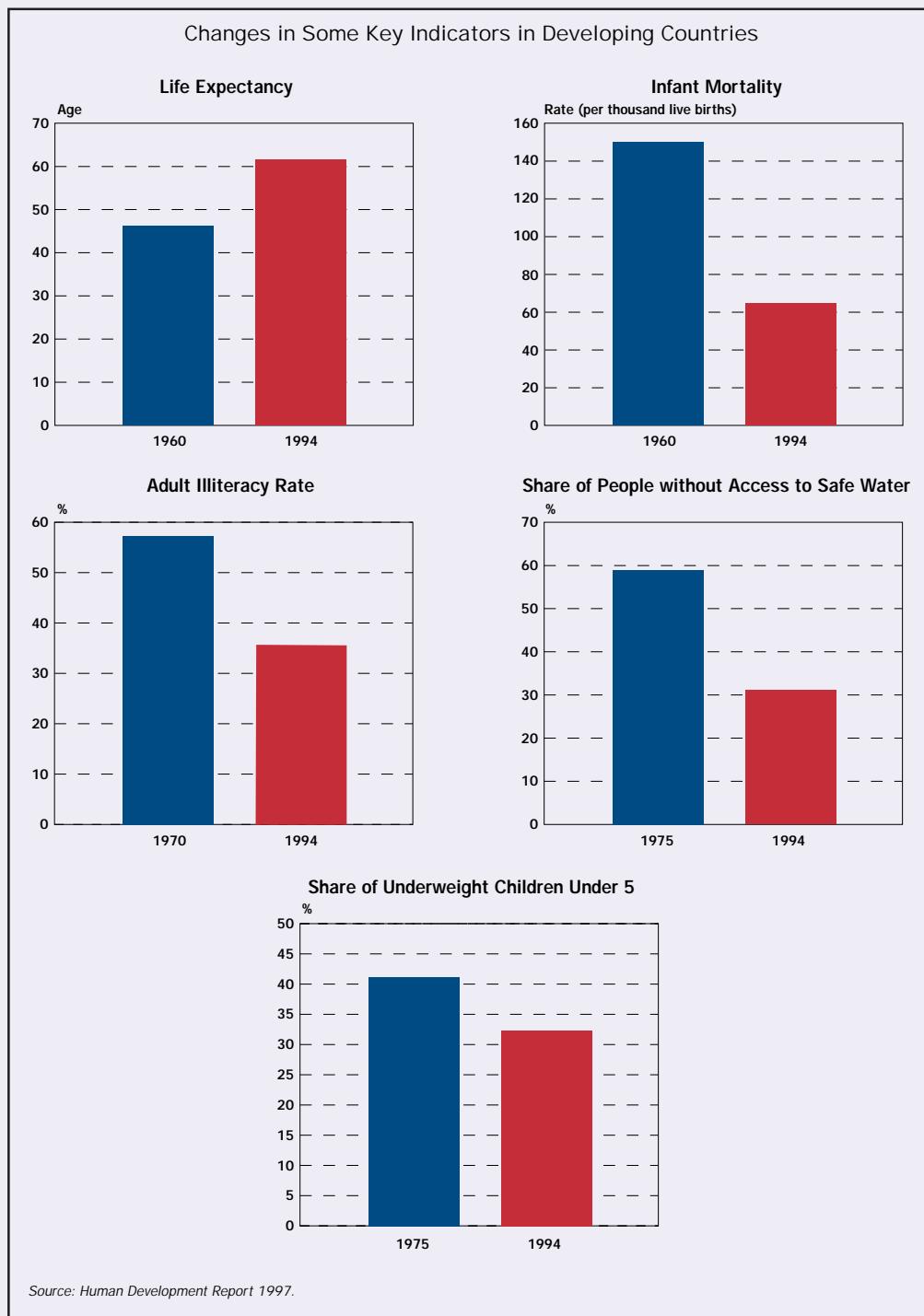
within which the march out of poverty can gather momentum. In recent years, major lessons have been learned about the best balance between the State and market forces in order to generate economic growth which benefits the poor and is sustainable.

1.15 There have been two flaws in models of development over the past half-century. The first was characterised by a belief that the State should extend its control over production and trading activities, and over the allocation of resources and prices, in a way which created distortions and led to inefficiency and corruption. The second was a belief in a minimalist State and unregulated market forces which failed to secure economic growth and led to increases in inequality across the world.

1.16 There is now an opportunity to create a new synthesis which builds on the role of the State in facilitating economic growth and benefiting the poor. Both States and markets make good servants and bad masters. We have learned that the virtuous State has a key role to play in supporting economic arrangements which encourage human development, stimulate enterprise and saving and create the environment necessary to mobilise domestic resources and to attract foreign investment.

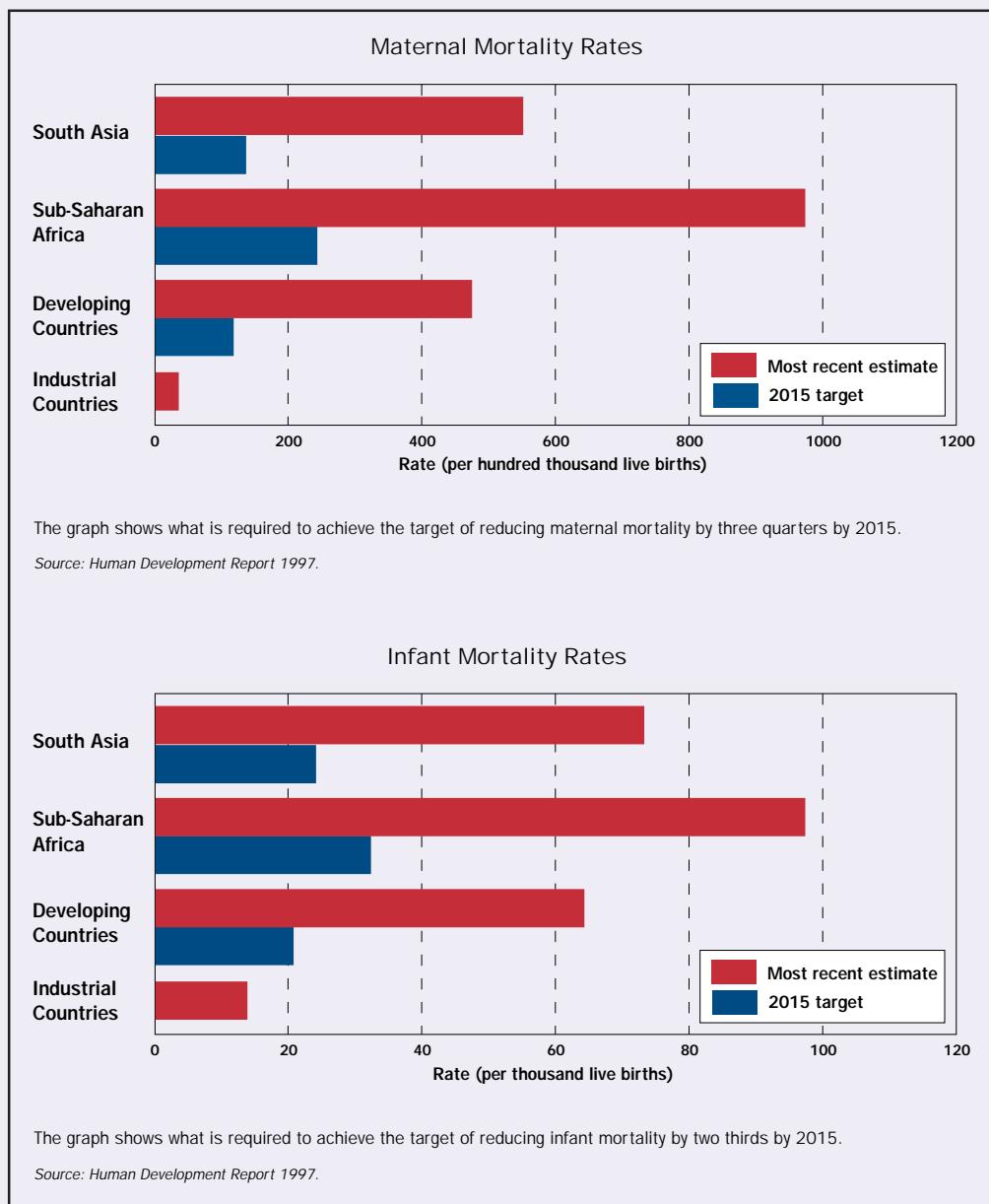
SECTION 1
THE CHALLENGE OF DEVELOPMENT

FIGURE 4



SECTION 1
THE CHALLENGE OF DEVELOPMENT

FIGURE 5



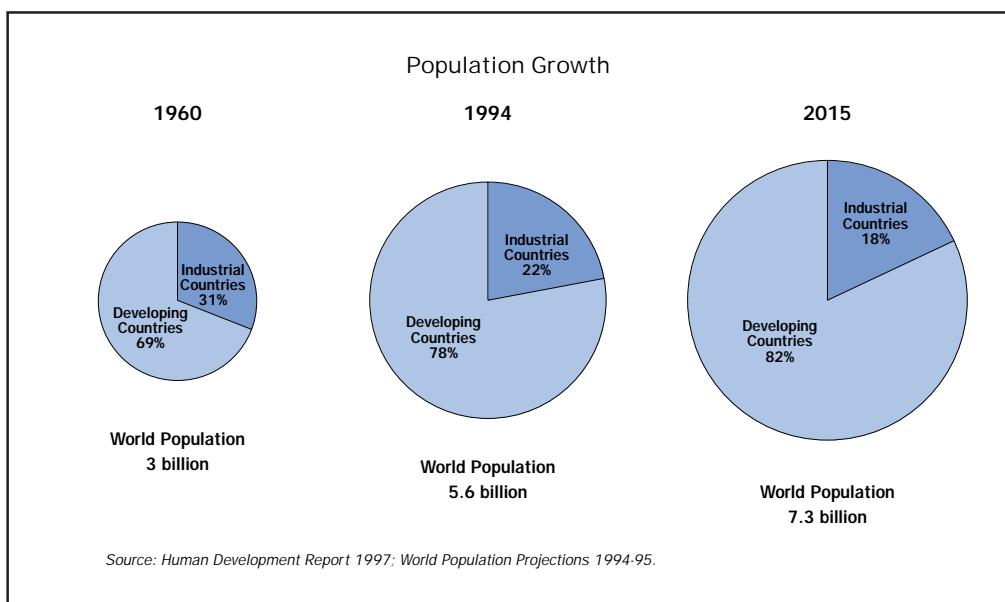
SECTION 1
THE CHALLENGE OF DEVELOPMENT

1.17 Sustainable development to eliminate poverty rests above all on the achievement of economic growth that is not only stable and vigorous, but which embraces poor people and allows them to share in the fruits of development. Such growth must outstrip population growth for a sustained period of time to have any real effect (*see Figure 6*), and recognise that environmental protection is an integral part of the development process. In order to benefit and promote the participation of the poor, economic growth must incorporate a sound and open macro-economic framework in which resources are used productively and which facilitates the development of income- and employment-generating activities that specifically include poor people,

particularly the women who comprise the bulk of the poor.

1.18 The experience of recent years in the most successful developing countries has clearly demonstrated the value of maintaining a sound fiscal balance and low inflation. Equally, it has shown the value of promoting more open and less regulated domestic and foreign trade. This increases the scope for higher savings which can help to finance investment. Such a framework will encourage the private sector, which provides the main impetus for economic growth. In some countries, foreign investors have also played an important role. The transformation of the economic environment in this manner has greatly invigorated a wide range of productive

FIGURE 6



SECTION 1
THE CHALLENGE OF DEVELOPMENT

activities, most importantly providing opportunities for poor people to establish sustainable livelihoods. Establishing the conditions that allow economic growth to accelerate in the poorer developing countries is, therefore, a critical prerequisite for sustainable poverty elimination.

1.19 The State must also provide a framework of law and regulation within which people can exercise their rights. It is the poor everywhere who pay the price where these conditions are not in place. Sustainable development, as the 1995 World Summit for Social Development in Copenhagen agreed, is not possible unless human rights are protected for all, including the poorest and the most disadvantaged. States have a responsibility to ensure that these rights are respected. They are summarised at *Panel 1*.

1.20 The present British Government was elected on 1 May 1997 on a renewed commitment to the principles of social justice – security for all, access to health and education services, strong social institutions, greater equality and the provision of opportunity. What we want for our children, we want for all children. These principles form the basis of our international as well as our national policies. The Government has already

made clear its commitment to human rights and a more ethical foreign policy.

1.21 There are two reasons, above all, why we should embrace the objectives of international development. First, because it is right to do so. Every generation has had a moral duty to reach out to the poor and needy and to try to create a more just world. Second, because we have a common interest in doing so. Global warming, land degradation, deforestation, loss of biodiversity, polluted and over-fished oceans, shortage of fresh water, population pressures and insufficient land on which to grow food will otherwise endanger the lives of everyone – rich and poor, developed and developing. As a country which depends more than most on international trade and investment, jobs and prosperity here in the UK depend on growth in the global economy to which developing countries could contribute so much in the future.

1.22 The purpose of this White Paper is to set out clear principles on which our common interest in sustainable development should be based. We also hope to develop a stronger public understanding of our mutual dependence. This is not just a White Paper about aid. It is a White Paper about sustainable development and a secure future for our

SECTION 1
THE CHALLENGE OF DEVELOPMENT

PANEL 1

HUMAN RIGHTS AND DEVELOPMENT

The term "human rights" is used in connection with those rights that have been recognised by the global community and protected by international legal instruments. Human rights include all those rights essential for human survival, physical security, liberty and development in dignity. They stem from the recognition of the inherent equality and dignity of all human beings. Every man, woman and child is entitled to enjoy their human rights, merely on the basis of their humanity and regardless of any distinguishing characteristics – such as race, gender, creed, opinion and class. All States have committed themselves to respect, protect and realise human rights, both in a number of international treaties, and through a series of recent UN Conferences.

Human rights necessary for survival and dignified living include:

- the rights to life and liberty
- the right to a standard of living adequate for health and well-being of the individual and his/her family, including food, water and housing, and the right to continuous improvements of living conditions
- the right to social protection in times of need
- the right to the highest attainable standard of physical and mental health
- the right to work and to just and favourable conditions of work
- the rights to privacy and family life

Human rights also cover those rights and freedoms necessary for human dignity, creativity and intellectual and spiritual development, eg:

- the right to education and to access to information
- freedoms of religion, opinion, speech and expression
- freedom of association
- the right to participate in the political process
- the right to participate in cultural life.

These also include those rights necessary for liberty and physical security, eg:

- freedom from slavery and servitude
- the rights to be free from arbitrary arrest or imprisonment, and to a fair trial
- freedom from torture and from cruel, inhuman or degrading treatment or punishment

Cross-cutting are the twin principles of equal rights of women and men, and the prohibition of discrimination of any kind on the grounds of race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status.

SECTION 1
THE CHALLENGE OF DEVELOPMENT

PANEL 2

SUSTAINABLE DEVELOPMENT
MEETING THE NEEDS OF TODAY AND FUTURE GENERATIONS

Most international institutions agree that sustainable development has interdependent economic, social and environmental dimensions.

Sustainable development was the central theme of the Rio Declaration, signed by 178 countries at the UN Conference on Environment and Development in 1992. The Declaration recognises a number of key points which include:

- *eradicating poverty [is] an indispensable requirement for sustainable development* (Principle 5)
- in order to achieve sustainable development, *environmental protection* shall constitute *an integral part of the development process* and cannot be considered in isolation from it (Principle 4)
- Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development (Principle 20)

Sustainable development requires the management and maintenance of different sorts of "capital" which support human well-being:

- *created capital*: including physical infrastructure, buildings, machinery and equipment
- *natural capital*: the environment and natural resources
- *human capital*: human skills and capacity
- *social capital*: strong social relationships and institutions

Development trends to date have tended to overlook how far the build-up of created capital has been at the expense of natural capital.

Sustainable development aims to achieve economic and social changes and underlying policies that can be sustained through the long term. Agenda 21, the Programme of Action from the UN Conference, therefore calls for countries to have national strategies for sustainable development.

SECTION 1
THE CHALLENGE OF DEVELOPMENT

PANEL 3

STATEMENT OF PURPOSE

DFID's aim is the elimination of poverty in poorer countries.

OBJECTIVES

We shall pursue this through the promotion of sustainable development and in particular by:

- building development partnerships with poorer countries
- working more closely with the private and voluntary sectors, and the research community
- working with and influencing multilateral development organisations
- working with other Government Departments to promote consistent policies affecting poorer countries
- using our knowledge and resources effectively and efficiently

Our specific objectives are:

1. Policies and actions which promote sustainable livelihoods

In particular we shall contribute to:

- sound policies and pro-poor economic growth
- the development of efficient and well-regulated markets
- access of poor people to land, resources and markets
- good governance and the realisation of human rights
- the prevention and resolution of conflicts
- the removal of gender discrimination

2. Better education, health and opportunities for poor people

In particular we shall contribute to:

- lower child and maternal mortality
- basic health care for all, including reproductive services
- effective universal primary education
- literacy, access to information and life skills
- safe drinking water and food security
- emergency and humanitarian needs

3. Protection and better management of the natural and physical environment

In particular we shall contribute to:

- sustainable management of physical and natural resources
- efficient use of productive capacity
- protection of the global environment

SECTION 1
THE CHALLENGE OF DEVELOPMENT

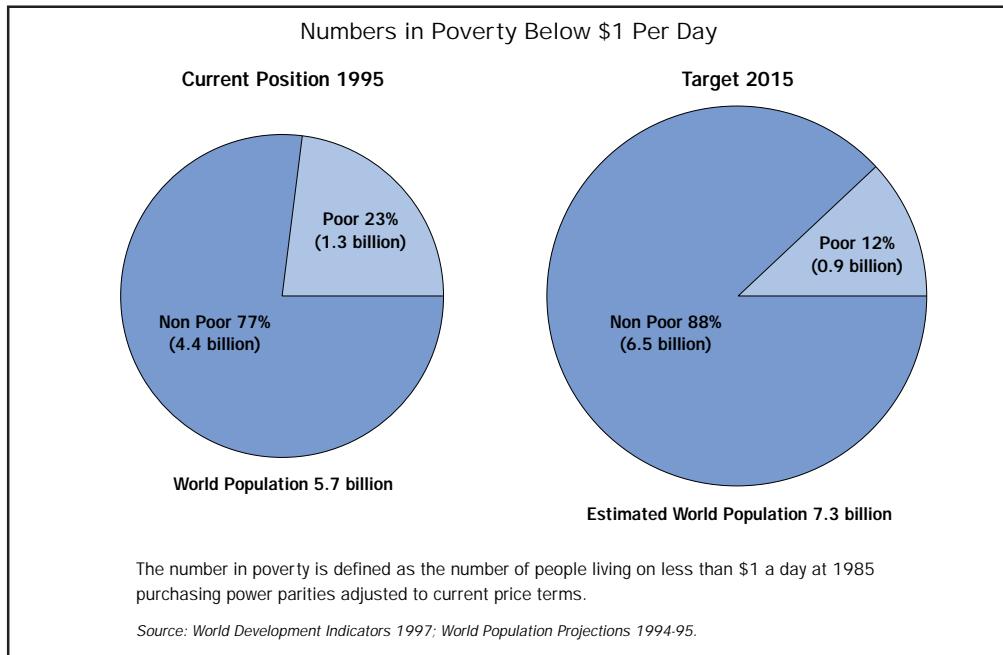
planet and its people (*see Panel 2*). The new Department for International Development (DFID) has the aim – reflecting the theme of this White Paper – of contributing to the elimination of poverty in poorer countries, not just through its bilateral and multilateral development programmes, but through working collaboratively with other government departments to promote consistency and coherence in policies affecting their development (*see Panel 3*).

1.23 This is a White Paper which reflects Britain's unique place in the world and our opportunity to adopt a new international role. No other country combines membership of the Group of

Seven industrialised countries, membership of the European Union, a permanent seat on the Security Council of the United Nations (UN) and membership of the Commonwealth. Our particular history places us on the fulcrum of global influence. We should not over-estimate what we can do by ourselves. We should not under-estimate what we can do with others. In no area is this more true than in development. Helping to lead the world in a commitment to poverty elimination and sustainable development is an international role in which all the people of Britain could take pride.

1.24 There are two key elements which need to be in place if the fight to eliminate

FIGURE 7



SECTION 1
THE CHALLENGE OF DEVELOPMENT

PANEL 4

INTERNATIONAL DEVELOPMENT TARGETS

The international development targets are designed to provide milestones against which progress towards the goal of poverty elimination can be measured.

Economic Well-being

- a reduction by one-half in the proportion of people living in extreme poverty by 2015.

Human Development

- universal primary education in all countries by 2015
- demonstrated progress towards gender equality and the empowerment of women by eliminating gender disparity in primary and secondary education by 2005
- a reduction by two-thirds in the mortality rates for infants and children under age 5 and a reduction by three-fourths in maternal mortality, all by 2015
- access through the primary health-care system to reproductive health services for all individuals of appropriate ages as soon as possible and no later than the year 2015

Environmental Sustainability and Regeneration

- the implementation of national strategies for sustainable development in all countries by 2005, so as to ensure that current trends in the loss of environmental resources are effectively reversed at both global and national levels by 2015

While not amenable to quantification, there is a range of qualitative elements of development that are essential to the attainment of the quantitative targets. These include democratic accountability, the protection of human rights and the rule of law.

poverty is to succeed. The first is a clear set of internationally agreed policies and principles which promote sustainable development and encourage environmental conservation. These exist, in the form of international targets for sustainable development based on UN Conventions and Resolutions. The key target is a reduction by half in the proportion of people living in extreme poverty by 2015 (*see Figure 7*). The targets are set out in full at *Panel 4*. We welcome and will promote them. They are achievable. In 2015, we will need to set further targets.

1.25 The second element is that the problems of international development can only be resolved if there is the political will to address them in both poorer and richer countries. This Government has that political will, and will seek to mobilise it elsewhere. We will translate it into action by refocusing our development efforts on poor people in a common endeavour to meet the internationally agreed targets so as to make our full contribution to the great task which lies ahead – the elimination of extreme poverty from the world in the lifetime of the present generation.

BUILDING PARTNERSHIPS

We shall

- Work closely with other donors and development agencies to build partnerships with developing countries to strengthen the commitment to the elimination of poverty, and use our influence to help mobilise the political will to achieve the international development targets.
- Pursue these targets in partnership with poorer countries who are also committed to them.
- Put in place new ways of working with the UK private and voluntary sectors, and the research community, towards the international development targets, including transforming the Commonwealth Development Corporation into a dynamic public/private partnership.
- Measure the effectiveness of our efforts, alongside others, against the targets, including the aim of halving the proportion of the world's population living in extreme poverty by 2015.

The Complexities of Development

2.1 Development is complex, and the challenge faced by the governments of the world's poorest countries is formidable. For poverty elimination to be achieved, and for development to be sustainable – that is, secured without sacrificing future resources – there must be a dynamic balance between policies and actions which promote sustainable livelihoods, human development and the better management of the natural and physical environment. That means establishing a pattern of economic growth that benefits all sections of society; targeting scarce resources so that poor people have the education, health care and opportunities they need and ensuring that women and men enjoy equal benefits. It also requires proper stewardship of natural resources so that the

needs of both present and future generations can be met.

2.2 This challenge is daunting for any society, but particularly for those with limited resources. Some countries will make more rapid progress towards the international development targets than others. Those most likely to succeed will have effective government, enlightened legislation, prudent budgeting and an efficient administration that responds to the needs of poor people. Governments of most poor countries seek help to carry through their development programmes. Effective support for their efforts will require action both through development programmes – the subject of this Section – and through wider policies – the subject of Section 3.

2.3 A wide range of interventions through development assistance programmes will often be needed to support economic growth which makes significant progress towards the elimination of poverty. These interventions include support for the provision of the basic necessities of life, water and food, investment in education, health and family planning services; investment in necessary infrastructure measures to create employment opportunities through the encouragement of small-scale enterprise; support for good governance and the rule of law and firm action against corruption; and action to promote greater equality for women and to end the exploitation of children. *Panels 5-13* illustrate some of the fundamental issues in these areas and practical ways in which we can support national development plans and programmes. We will encourage participatory approaches which take into account the views and needs of the poor, and which tackle disparities between women and men throughout society.

2.4 The Prime Minister made a specific commitment at the Denver Summit in mid-1997 to raise by 50 per cent our bilateral support for basic health care, basic education and clean water in Africa. In fulfilling this pledge, we shall look throughout at the wider picture so as to reflect the dynamic balance described

above. For example, death rates among children and pregnant women – both of which remain high in poorer countries – are unlikely to fall just as a result of the construction of a range of health centres. For women to enjoy better maternal health, they need access to good quality obstetric units, to be able to travel to them quickly, and to be in a position to choose to use them without the approval or authority of others to do so. If they cannot, poor women will continue to be at least a hundred times more likely to die in childbirth than women in the UK or US.

2.5 Equally, the building of schools is not enough: the education provided must ensure that those attending school acquire appropriate knowledge and skills to improve their lives and contribute to the well-being of their communities. The quality of education is a crucial factor in encouraging parents to enrol their children (particularly girls) and in ensuring they attend school throughout the year (see *Figure 8*). Meeting the agreed international targets will therefore require action to address teaching quality and learning attainment, as well as primary enrolment figures, in order to retain children in school throughout the primary level and beyond. It also requires policies and means to address gender inequalities in primary and secondary education.

SECTION 2

BUILDING PARTNERSHIPS

PANEL 5

WATER AND FOOD

The Challenge

Poverty elimination and the well-being and livelihoods of poor people, whether they live in towns or rural areas, are critically dependent on their access at all times to sufficient, safe food and water.

Fresh water is a finite and vulnerable resource essential to sustain life, development and the environment. Over 1.3 billion people do not have access to safe water. Eight hundred million people are hungry or malnourished.

Our Response

Water

We are supporting international efforts through the United Nations, other agencies and bilaterally to implement Key Principles for Sustainable Integrated Water Management as set out in Agenda 21 and reiterated at the Special Session of the UN General Assembly in June 1997.

We will:

- treat water as both a social and economic good
- increase our support for programmes that bring clean, safe water to poor people
- encourage all those who have an interest in its allocation and use – particularly women – to be involved in decision making and management of water resources
- adopt a comprehensive framework that takes account of impacts of water use on all aspects of social and economic development

Food

The World Food Summit in 1996 set the target of reducing the number of undernourished people in the world by half by 2015. The primary responsibility for achieving food security rests with individual governments but the international community must play an important role. We will continue to advocate coordinated action within the European Community and the United Nations system. We will carry out a review of food aid.

We will promote policies and programmes that:

- increase access by poor people to a fair share of productive assets such as land
- improve the services and access to knowledge that people need to make the best use of those assets
- promote management of the natural environment in ways that will produce more safe and nutritious food, generate employment and income, and improve living standards without degrading the environment
- recognise women's role in food production and their need for equal access to productive resources including land

SECTION 2

BUILDING PARTNERSHIPS

PANEL 6

EDUCATION

The Challenge

Education is an essential foundation for the process of enabling individuals and countries to realise their potential and make the most of their resources.

But an estimated 150 million primary age children do not go to school, many get an inadequate education, and over 900 million adults, two-thirds of whom are women, are illiterate. The overall proportion of illiterate adults has been falling but the uneducated children of today will be the illiterate adults of tomorrow. Our priority is to assist partner countries to achieve the full participation of all children and adults in quality education at all levels.

Our Response

The Government embraces the vision of the Jomtien World Conference on Education for All in 1990 – universal access and equity, a focus on learning, broadening basic education to include literacy for adults and strengthening partnerships. The international development targets to which we are committed include Universal Primary Education by 2015 and eliminating gender inequalities in primary and secondary education by 2005.

We will adopt a new approach, working together with governments and international donors to develop education sector policy and financial frameworks. The focus of our support will be on the fundamental elements of an effective education system: access, quality, retention and equity:

- Access – for girls as well as boys, rich or poor, rural or urban, and those in socially or ethnically disadvantaged communities
- Quality – to prepare children for the life ahead
- Retention – to enable pupils to benefit from the full cycle of education
- Equity – to remove all barriers to opportunity and achievement

We also intend to strengthen and extend partnerships to support a range of innovative strategies. These will include:

- development of policies and practices to improve schools, educational opportunities and achievement within education systems
- involvement of local communities in developing and managing schools to increase local participation and accountability
- creation of new opportunities for the poor to participate in education at all levels
- reconstruction of education systems in poor countries emerging from acute social upheaval
- promotion of scholarship and research to improve our knowledge and understanding of how education can contribute to the elimination of poverty

We shall elaborate these principles in an education policy document.

SECTION 2

BUILDING PARTNERSHIPS

PANEL 7

ESSENTIAL HEALTH CARE

The Challenge

The poorest billion people in the world are ten times more likely to die young (under 15 years of age) than the richest billion; they are nine times more likely to die of communicable diseases (diarrhoea, malaria, pneumonia and TB) and twice as likely to die from accidents and injury. Women, who are more at risk in all cases, are also at least ten times more likely to die of causes related to pregnancy and childbirth. This massive burden of ill-health affects poor people's chances of escaping from poverty and taking advantages of opportunities to do better.

Tackling high death and disability rates among poor people poses real challenges. For example, millions of people throughout the world cannot access sufficient water for personal use. As many as half the world's population lack access to effective means for disposing of excreta. Water, sanitation, shelter, food and education, as well as essential health care, are all vital requirements if efforts to improve poor people's health are to succeed.

Recent studies have indicated that a spend of just £9 per person per year on essential health care is sufficient to make a real difference to the suffering of poor people. This would allow a basic package of immunisation and nutritional supplements and public education of family planning, prevention of AIDS and sexually transmitted diseases and substance abuse, to be provided. Currently, many developing countries spend less than £3 per person per year for all health needs, and these funds are not distributed in a way that ensures equitable service provision.

Our Response

The UK has signed up to a series of relevant international targets to be achieved by 2015 – specifically halving proportions of people in poverty, halving child mortality rates, reducing maternal mortality by three quarters and ensuring accessible reproductive health services. These call for coherent action to improve the livelihoods and well-being of poor people in poor countries.

We are committed to:

- helping ensure that all the world's people – particularly those in the poorest countries of Africa and Asia – can access and benefit from essential health services
- establishing long-term partnerships for better health with countries, international organisations and UK-based groups
- supporting local (as well as global) initiatives on specific issues – for example, to help young people improve their sexual health and reduce HIV, enable all to lessen dangers for women associated with pregnancy, to reduce poor people's suffering due to communicable disease – especially malaria, tuberculosis, diarrhoea and the like, to access clean water and sanitation, and promote health environments
- working with governments to develop sector-wide approaches to better health
- increasing our support within the United Nations system to promote international standards for human health and health care
- the better application of scientific knowledge and techniques to the health and well-being of poor people

SECTION 2

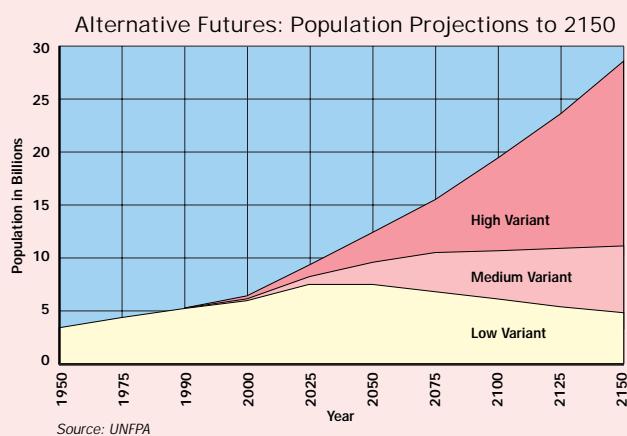
BUILDING PARTNERSHIPS

PANEL 8

POPULATION

The Challenge

The second half of the twentieth century has seen unprecedented changes in the size, structure and setting of the world's population. In 1945, the population of the world, at 2.3 billion, was about the size of just China and India today. Since then, it has more than doubled to 5.8 billion. It could easily reach 9 billion by 2045, representing a quadrupling within 100 years. Ninety-five per cent of the current growth is in developing countries, least well-equipped to cope with the consequences. This presents immense challenges for all concerned with reducing poverty.



It is clear that more and more people want to plan their families, have fewer children and give them a better start in life. At least 150 million couples worldwide are not able to access the contraceptives they want when they want them. When they are available, couples are often unaware how to use the contraceptives safely.

The services for millions more are inadequate. If countries could respond to their people's demands for smaller families, the world's population could stabilise at 10 billion – or less.

The world is also both younger and older than ever before. Today, half the population in developing countries is under 23 years old. By 2000, an estimated 800 million people – 15 per cent of the world's population – will be teenagers, the largest generation ever. Life expectancy in 1945 was 45 years; it is now 65, the highest ever, and by 2045, it is estimated it will be 76. By 2020, two thirds of the world's elderly people will be in developing countries. A further dimension has been the increasing urbanisation of the world's population. Eighty-four per cent of urban growth since 1970 has been in the developing countries, a proportion which continues to increase.

Our Response

Britain supports countries implementing the Programme of Action agreed at the International Conference on Population and Development in Cairo in 1994. Through multilateral and bilateral action Britain will do what it can to enable more people, particularly the poor, to have choices about the number and timing of their children. We will help women to go through pregnancy and childbirth more safely, and help women and men, whether adolescent or older, avoid sexually transmitted infections and sexual violence.

This means improving the quality and accessibility of reproductive health information, services and commodities. Our goal is to contribute to meeting by 2015 internationally agreed targets of reproductive health for all and a three-quarters reduction in maternal mortality.

SECTION 2

BUILDING PARTNERSHIPS

PANEL 9

BASIC INFRASTRUCTURE

The Challenge

Many women and children in developing countries spend hours every day fetching water or collecting fire wood for cooking. In rural areas, development is often limited by the lack of even basic access to enable children to attend school; for people to visit health centres; for farmers to be able to market their produce; or for the unemployed to seek work. Schools and health centres are often totally inadequate for needs.

In urban areas, many poor people live in temporary shelter on marginal land on unserviced plots. Safe water supplies are often not readily available and poor (or non-existent) sanitation and waste-disposal systems give rise to health problems. Inadequate power supplies restrict the development of small enterprises to offer employment nearer home and can force people to use alternative, more expensive forms of energy (e.g. paraffin for lighting).

Our Response

In order to improve the availability of, and access to, essential basic infrastructure for poorer people in our partner countries we will:

- Increase our support to integrated Water Supply and Sanitation Projects which involve communities in the planning and managing of new facilities and includes hygiene education to maximise health benefits
- Promote the use of alternatives (such as photovoltaic and mini hydro) systems to provide a cost effective means to supply electricity to a range of remote users including schools, hospitals, homes and water pumping for agriculture
- Seek ways to help reduce the burden placed on women and children to collect essential fuel for cooking
- Work with partners to develop rural feeder roads projects which train small local contractors and provides both employment for villagers and access to markets and other social services
- Seek appropriate ways to increase community participation in road maintenance and develop guidelines to improve the effectiveness of the involvement of communities in the maintenance and improvement of their local roads and tracks in order to protect community assets
- Build on current work aimed at forming partnerships with local artisans to help develop low-cost energy efficient designs for schools, health centres and houses that can be constructed from locally available materials
- Work with local community groups to assist low-income households to improve their own housing in a cost effective way, based on a self-help approach
- Work with urban slum dwellers to help meet basic infrastructure needs in partnership with city authorities
- Promote and encourage private sector investment in basic infrastructure and services in our partner countries to help meet the needs of the poor

SECTION 2

BUILDING PARTNERSHIPS

PANEL 10

INCOME AND EMPLOYMENT OPPORTUNITIES

The Challenge

Economic growth is the prime means of creating income and employment opportunities. Where markets for products are expanding, poor people are able to establish sustainable livelihoods for themselves either by increasing their existing production and finding new products to market, or by finding employment opportunities with new or growing enterprises. Without growth – with stagnant or even declining incomes – the poor will only be able to make insignificant improvements in their livelihoods at the expense of other poor people.

While economic growth is critical for sustainable development, it must be accompanied by policies and programmes to facilitate income and employment generation for poor people. Relying on the fruits of strong growth at a national level automatically trickling down to the more marginalised poor is not a solution. Systematic policies and programmes that not only distribute the fruits of economic development but more importantly integrate the poor themselves in the revitalisation of production are essential.

Individuals, households, enterprises and communities need the capacity to take advantage of opportunities to initiate and participate in new economic activity, to be provided with the appropriate incentives to stimulate their efforts to pursue and sustain income-generating activities, and to be encouraged through targeted instruments that promote economic activity.

Our Response

We will support policies and projects for which poor people are the immediate and direct beneficiaries, such as through:

- the promotion of finance for private business – through providing lines of credit and expertise to institutions, including co-operatives, that offer loans to poor farmers, poor people in towns and to small businesses
- investing in ways of freeing women's time for income earning activities, such as improvements in rural infrastructure
- providing training in technical, business and financial skills

We will support policies and projects that have a broader set of beneficiaries and which impact upon the poor in a less direct sense, but which are nonetheless critical to the environment in which they seek to establish their livelihoods, such as:

- the fundamental programmes that establish macro-economic stability
- the elimination of unproductive expenditures to free up scarce resources for poverty focused objectives
- the development of economic infrastructure that meets the water, transportation, communications and energy needs of those pursuing a wide range of activities – both formal and informal, large-scale and small-scale
- the mobilisation of private sector financing
- assisting with asset re-distribution, for example legislative reform which gives women farmers equal access to land

SECTION 2

BUILDING PARTNERSHIPS

PANEL 11

GOOD GOVERNANCE, CORRUPTION AND THE RULE OF LAW

The Challenge

The World Bank's 1997 World Development Report states unequivocally that "good government is not a luxury – it is a vital necessity for development". Raising standards of governance is central to the elimination of poverty. Making government more responsive to the needs and wishes of poor people can improve the quality of their lives. Accessible systems of justice help address family and personal insecurity. Poor people, and especially poor women, are likely to be the last to enjoy these rights unless they receive support.

Improving governance can thus improve the lives of poor people directly. It is also essential for creating the environment for faster economic growth. Both aspects can be compromised by corruption, which all governments must address. In developing countries it is the poor who bear proportionately the heaviest cost. The consequences include:

- the immediate impact on poor people of higher prices and fewer employment opportunities due to the distortions that corruption can cause, while corrupt officials may demand payment for public services which are supposed to be free
- the diversion of scarce budgetary resources away from poverty elimination into unproductive expenditure or into the repayment of debts accumulated because of corrupt activities, as well as the loss of tax and customs revenues
- the indirect economic impact that constrains economic growth by increasing the uncertainty and unpredictability of costs to prospective investors
- the indirect political impact that reduces poor people's representation as elites cling to power in order to exploit opportunities for corruption

Our Response

We will support measures to build sound and accountable government which is the foundation of economic growth and poverty elimination allowing poor and disadvantaged people to achieve their civil, political, economic, social and cultural rights. This will include:

- support for decentralisation, new approaches to criminal justice, better service delivery, women's political participation, and involving civil society
- support to make the machinery of government work smoothly and the Civil Service more efficient
- support to raise and allocate revenue equitably, to strengthen legal systems so that they can enforce laws of property and rights swiftly and justly
- encouraging democratic structures which can hold government accountable and give the poor a voice

As part of our commitment to combat corruption, we support OECD initiatives to criminalise the bribery of foreign public officials in international business transactions and to cease the tax deductibility of such bribes. We support the IMF and World Bank in their efforts to promote economic policies and institutional change to tackle corruption, within the scope of their mandates. In partner countries we will support direct instruments – such as anti-corruption commissions – and changes which reduce the motivation and opportunity for corruption – such as raising pay to a living wage and reducing administrative regulation where it is safe to do so.

SECTION 2

BUILDING PARTNERSHIPS

PANEL 12

ADDRESSING GENDER INEQUALITIES

The Challenge

The Government's policy on equality between women and men reflects UK commitments made at recent international meetings – at Vienna, at Cairo and importantly at Beijing. It builds on the OECD DAC Statement on Gender Equality and the EU's Gender Resolution and represents our contribution to taking forward the Beijing Platform for Action. The policy is an integral and essential part of our approach to development.

The goal of achieving equality between women and men is based on principles of human rights and social justice. Empowerment of women is moreover a prerequisite for achieving effective and people-centred development. We aim to tackle disparities between women and men throughout society.

The majority – perhaps 70 per cent – of the world's poorest people are women. Their poverty is associated with unequal access to productive resources and control of assets, together with poor health, lack of education, personal insecurity and limited participation in public life. The abolition of poverty cannot be achieved until men and women have equal access to the resources and services necessary to achieve their individual potential and fulfill their obligations to household, community and, more broadly, society.

Poor women are frequently doubly disadvantaged (because of their poverty and because of their gender) in access to services, in access to and control over economic resources and in participation in public life. This perpetuates gender inequality. Moreover, poor women are more likely than poor men to suffer from the non-material aspects of poverty: isolation, lack of information, inability to have their voices heard and vulnerability to personal and social forms of violence.

Effective poverty reduction requires policies which recognise women's multiple roles and we encourage and support macro-economic policies and development strategies that respond to the needs and efforts of women in poverty. We recognise the importance of women's informal and unpaid social as well as economic work, when improving their livelihoods.

Gender analysis can help effective poverty reduction strategies by contributing to the design of economic reform and sector investment programmes and the growth of a socially responsible private sector. It can help with the reform of trade and investment policies and the design of appropriate participatory monitoring and support mechanisms.

Our Response

We implement our policy using a twin-track approach:

- assessing and addressing inequalities between women and men, boys and girls, in relation to all strategic areas of concern and as an integral part of all our development activities;
- supporting specific and focused initiatives to enhance women's empowerment both in our own programmes and in our support to relevant national and multilateral organisations

SECTION 2

BUILDING PARTNERSHIPS

PANEL 13

RIGHTS OF THE CHILD

The Challenge

Very many millions of the world's children are suffering from violent civil or domestic conflict, or are exploited and abused in plantations and sweat shops. According to the ILO there are 250 million child workers. An estimated quarter of a million children under 18 – some as young as seven – are presently serving as soldiers, while the number of children displaced from their homes as a result of violent civil conflict is about 30 million. Some estimates suggest that about 1 million children every year fall victim to some form of sexual exploitation and some 8 million children are living on the streets. In those parts of Africa with high HIV/AIDS prevalence many children are orphans; these children are more likely to have their rights denied or violated and their property taken away from them.

Even where children are not suffering from these extreme forms of abuse, the specific needs of children within households and communities are often not understood or explicitly acknowledged; their needs and interests are often overlooked and subsumed by the needs of other household members, who have more power to express themselves. In many societies girl children tend to do the hardest work, have less to eat and are denied the opportunity of an education.

Our Response

We shall support international efforts to enhance children's well-being through implementation of the Convention of the Rights of the Child, promoting children's protection and participation, alongside the provision of effective and sustainable services.

Children have a right to basic standards in health care, education, food, shelter and welfare; governments have a duty to support, and if necessary assist, parents in meeting these rights. Provision of services will therefore continue to be an essential part of our contribution to promoting children's rights. At the same time, we shall place a stronger emphasis on combining provision with children's protection and participation. For example, we shall support the development of education systems where children are educated about their rights – and are shielded from violation of these rights.

We shall encourage and support stand-alone programmes which can enable development partner countries to protect children from a violation of their rights. We will also promote strategies and programmes which enhance children's and young people's participation in the decisions that affect their lives.

SECTION 2

BUILDING PARTNERSHIPS

2.6 Similarly, the provision of the physical means to bring clean water to rural villages is not enough by itself to ensure access to clean water for all. The question of who controls the pumps and pipes, and how access is determined, need also to be addressed. This can raise difficult social and cultural issues. The urban poor in developing countries can spend up to 40 per cent of their income on water, and pay water vendors up to 10 times the cost of water from a piped supply in the same city.

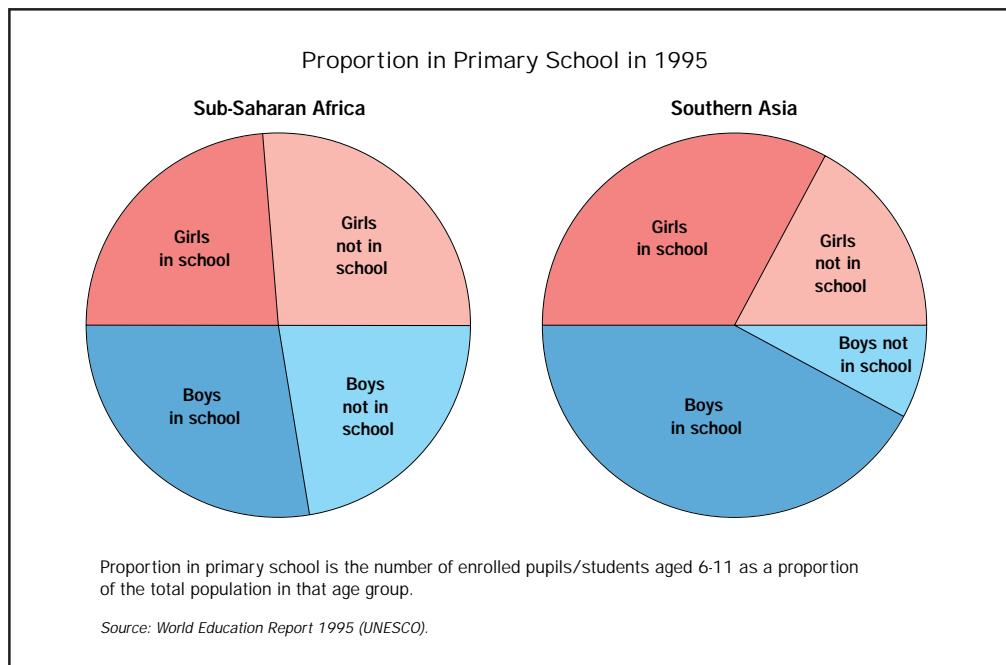
2.7 The international community as a whole has a major role to play in supporting developing countries in their efforts to eliminate poverty. Last year, the

development assistance provided by bilateral and multilateral donors totalled some \$55 billion. These resources, and the transfer of know-how and expertise that goes with them, can have far greater impact on levels of world poverty than has been evident to date. They will only be effective if there is also a consensus on priorities linked to the international development targets, and if the whole international community works together to meet them. We in the UK must rise to the challenge.

Multilateral Development Assistance

2.8 Of the net development assistance provided by the international community, some 30 per cent is made available through

FIGURE 8



the multilateral development institutions (the World Bank Group, the regional development banks and the UN), the European Union (EU) and the Commonwealth. Half (about £1.1 billion) of our programme is spent multilaterally (*see Figures 9 & 10*). This allows us to have influence over a much larger area. We cannot have bilateral programmes everywhere. We can, however, use our influence in the multilateral system to increase international commitment to poverty eradication, and work in such a way that our multilateral and bilateral efforts complement each other.

2.9 The multilateral development institutions make a unique contribution to development, not least through the scale of their resources and the influence they can exercise over the policies of partner governments. They can set standards, pioneer new techniques and address sensitive issues which would be extremely difficult for bilateral donors to pursue. Their political neutrality and technical expertise enable them to take a leadership and coordination role on major problems and global issues such as debt reduction, human rights and refugees, gender equality, the environment and the AIDS pandemic.

2.10 The World Bank and International Monetary Fund (IMF) have played a central role in the international development

agenda over recent decades. Both institutions will be at the centre of the efforts to pursue the international development targets. We will support a closely integrated approach in which the IMF contributes to the establishment of sound macro-economic and financial policies to encourage pro-poor growth, while the Bank complements these efforts by promoting policy, institutional reforms and projects that focus on the elimination of poverty.

2.11 We will continue our efforts to improve the effectiveness and efficiency of the multilateral development institutions and the European Union's development programmes. We want to see them adapt to the new priorities, decentralise aid management and enhance the quality of their programmes. We also want to see greater efforts made to ensure a coherent approach across agencies.

2.12 Our first priority is to encourage all the multilateral development institutions to strengthen their commitment to poverty elimination. The World Bank and UN development agencies have made the clearest commitment to the international development targets, which are based on agreements reached at a series of UN Summits. We welcome this commitment. But the targets must be entrenched in day-to-day decision-making. We will use our influence with the EC and

SECTION 2
BUILDING PARTNERSHIPS

FIGURE 9

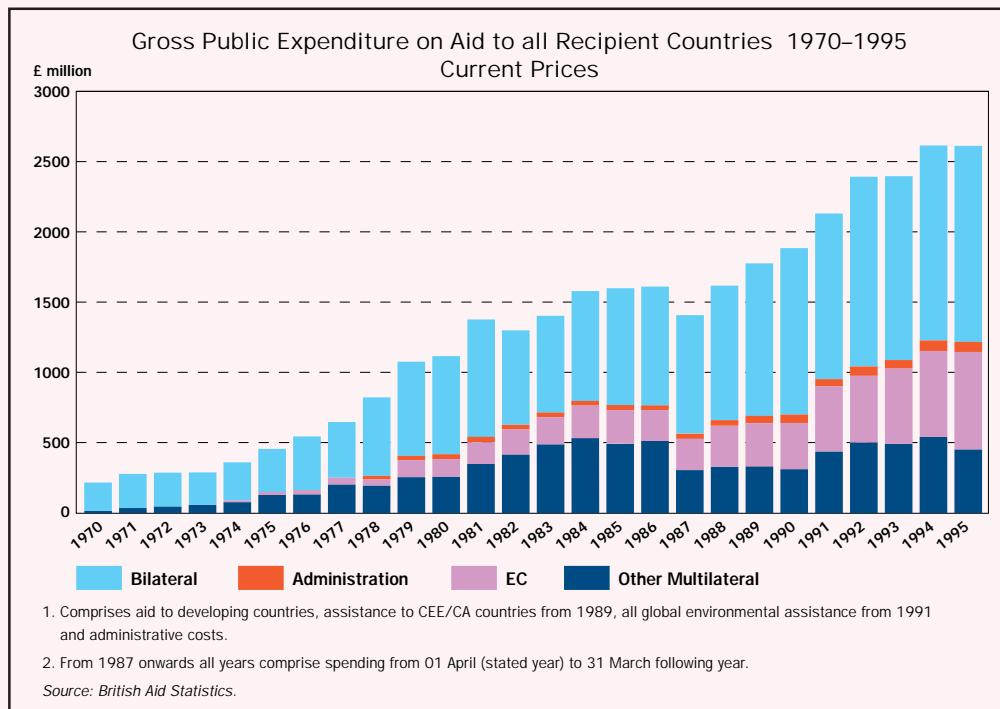
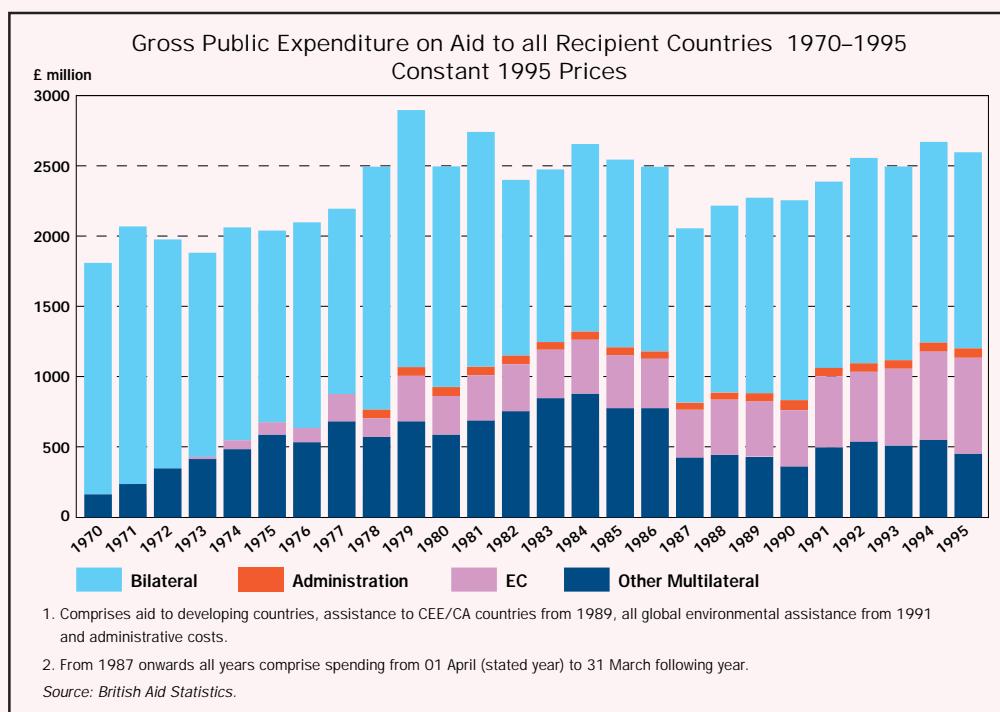


FIGURE 10



the regional development banks to strengthen the poverty focus of their operations and encourage them to set quantifiable targets for poverty reduction, and measure progress towards these.

2.13 We will encourage the multilateral development institutions to devote more attention to evaluating and monitoring the output of their activities, and to harmonise their impact assessment systems. We will also encourage them to integrate gender considerations and environmental and social sustainability into their projects, including – in the case of the World Bank and the regional development banks – enhanced support for activities which help the poorest, such as education, health and clean water.

2.14 In the development banks, we will also encourage better-off countries to graduate from low-interest loans to loans on near commercial terms. Eventually, they should graduate entirely from such borrowing so that development lending is concentrated where it is needed. This points to a shift in the use of the more concessional funds away from eastern Asia and Latin America towards the countries of sub-Saharan Africa and South Asia.

2.15 Over 30 per cent of our development programme is spent through the European Union. We will use our

influence in Europe, in particular during our Presidency in the first half of 1998, to help shape the way in which these funds are spent. Our aims will be to direct a larger share of resources to the poorest countries, to secure commitments from the Commission and other member states to measurable targets, especially on poverty elimination, and to help increase the effectiveness of these funds. We will play an active and constructive role in the Development Council, in other fora, and in bilateral contacts with the Commission. We will seek in particular to maintain and enhance the position of the poorest countries during the forthcoming renegotiation of the Lomé Convention which expires in 2000, and which covers 70 African, Caribbean and Pacific countries.

2.16 We will enhance our support for the role of the United Nations in development and especially for the UN Secretary-General's recently launched reform package, which we hope will provide the leaner and more effective organisation necessary to deliver the poverty elimination targets set out in the 1997 UN Human Development Report. The Government's decisions to rejoin the United Nations Educational, Scientific and Cultural Organization (UNESCO) and to reverse the previous Government's intention to leave the United Nations

SECTION 2

BUILDING PARTNERSHIPS

Industrial Development Organization (UNIDO) demonstrate our strong commitment to the United Nations and our desire to work from within in order to strengthen the system. In the UN, as in all multilateral institutions, we will seek to build new alliances for change and work more closely with our developing country partners to increase the effectiveness of these agencies in meeting the needs of poor countries.

2.17 The Commonwealth will have a full part to play in poverty elimination. Many of those countries in which we are most active and where we will be seeking a new partnership for development are members of the Commonwealth. It has an essential part to play in promoting understanding across a wide and diverse range of countries particularly through its support for education, including the prestigious Commonwealth Scholarships and Fellowships Scheme. Its strength lies in its informality and in its ability to mobilise the political will for poverty elimination.

2.18 At the 1997 Commonwealth Heads of Government Meeting (CHOGM) in Edinburgh, the Government asked for increased Commonwealth support for the poverty elimination targets. The Commonwealth's close historical relationships make it particularly well placed to mobilise political support for

poverty elimination across a large percentage of the world's population. We announced support for a number of new Commonwealth initiatives which contribute towards the development targets including a report on the role of sport in development, particularly for youth-at-risk.

The Bilateral Programme – Partnerships for Development

2.19 The Government believes that genuine *partnerships* between poorer countries – including developing countries and relevant middle income countries such as countries in transition and Dependent Territories – and the donor community are needed if poverty is to be addressed effectively and in a coherent way. The establishment of such partnerships moves beyond the old conditionalities of development assistance and will require political commitment to poverty elimination on both sides. We hope that developing countries will be ready to set out their strategies for moving towards the achievement of the targets, and share their plans internally as well as externally so that civil society is consulted about national priorities and can use its voice to strengthen commitment to the implementation of pro-poor policies.

2.20 We, together with the rest of the international community, must be ready to

SECTION 2

BUILDING PARTNERSHIPS

respond accordingly and to commit resources over extended periods in support of sound national development strategies designed to achieve sustainable development and the elimination of poverty. These strategies will depend on individual country circumstances, but be developed on the basis of common principles. Working in long-term partnerships will also make possible better coordination among donors, which is another objective of the international development strategy. Countries with limited administrative capacity should not have to negotiate separate country plans with each of the major bilateral donors and the multilateral agencies. We will encourage strengthened donor coordination, with the lead taken by the most appropriate agency in each particular country or sector.

2.21 Where low-income countries are committed to the elimination of poverty and pursuing sensible policies to bring that about, the Government will be ready to enter a deeper, long-term partnership and to provide:

- a longer term commitment
- an enhanced level of resources
- greater flexibility in the use of resources

The Government expects to have such partnerships with many of the very poor

countries of sub-Saharan Africa and South Asia. The basis for such partnerships is set out in *Panel 14*.

2.22 Within such partnerships, the different types of assistance may include capital aid (financial support for specific projects or activities); programme aid (balance of payments and budgetary support); technical co-operation (transfer of skills, whether from outside or within the country, including training and scholarships) and schemes managed through our diplomatic posts. What we do in any particular country will take into account what the countries themselves are doing, what they want us to do, what other donors are doing, and what particular contribution we are best able to provide. Where we have confidence in the policies and budgetary allocation process and in the capacity for effective implementation in the partner government, we will consider moving away from supporting specific projects to providing resources more strategically in support of sector-wide programmes or the economy as a whole. In this way the government concerned can develop the capacity to deliver services on a permanent basis.

2.23 In a number of countries, all of the criteria for such a government-to-government partnership will not be fulfilled. This may be the result of success – because countries have progressed

SECTION 2

BUILDING PARTNERSHIPS

beyond the stage of their economic development where we would be justified in making available substantial concessional financial resources. It may be the result of failure – because governments have failed to demonstrate their commitment to the elimination of poverty. And there are countries in which the UK is not well-placed to make an effective impact, where others must lead. We have limited financial and human resources and it is right to concentrate our bilateral programmes on priority areas where the needs are greatest and where we can achieve results. Elsewhere we will work primarily within the multilateral system to provide support.

Relationships will evolve over time. We will make strong efforts to help poor countries with whom we have traditionally worked to meet the criteria for a long-term partnership.

2.24 There will be some circumstances under which a government-to-government partnership is impossible, because the government concerned is not committed to the elimination of poverty, is not pursuing sound economic policies or is embroiled in conflict. Where poor countries are ruled by governments with no commitment to helping the poor realise their human rights, we will help – where

PANEL 14

DEVELOPMENT PARTNERSHIPS

Countries with which we are prepared in principle to embark on a deeper, long-term partnership, involving all forms of assistance, will be low-income, containing a large proportion of poor people.

They will also be countries where the UK is wanted as a partner, has the influence to play a positive role, and a comparative advantage in being able to make a strategic contribution to poverty reduction.

We would expect partner governments to:

- have a commitment to the principles of the agreed international development targets and be pursuing policies designed to achieve these and other UN targets which they have agreed
- be committed to pro-poor economic growth and conservation of the environment, and be pursuing appropriate policies
- wish to engage with us and with the donor community to this end
- pursue policies which promote responsive and accountable government, recognising that governments have obligations to all their people; promote the enjoyment of civil, cultural, economic, political and social rights; and which encourage transparency and bear down on corruption in the conduct of both the public service and the business sector

SECTION 2

BUILDING PARTNERSHIPS

we can do so – through alternative channels. These will include the institutions of civil society, voluntary agencies and local government. In such cases our assistance will be tightly focused on the victims of neglect and oppression.

2.25 There will thus be a range of relationships reflecting the circumstances of each country. What will remain consistent is the principle that the level of resources, length of commitment and flexibility in use of resources provided to governments will be related not only to their needs but also to the confidence that we have in their policies and actions.

2.26 Although the prime focus of our partnerships must be on the poorest countries, there are many poor people in middle income countries – 110 million in Latin America alone. We shall therefore seek appropriate ways to contribute to poverty elimination in middle income countries. Resource constraints mean that such countries must be carefully selected, after consideration of factors such as the numbers of poor people, their vulnerability to external forces and disasters, their potential impact on the global environment, and our comparative advantage in being able to contribute to poverty elimination. Middle income countries generally have sufficient financial

resources to address their own problems, and substantial resource transfer from the bilateral development programme is not appropriate. We can however offer a partnership based on a broader development co-operation particularly for institution building, sharing skills, experience and technology at a variety of levels within and outside government. Where the UK is not well placed to make an effective contribution, we will work within the multilateral system to provide support.

2.27 Countries in transition to full democratic societies and market economies face particular difficulties. Help for them is a finite commitment, reflecting our special interest in their stability and development as they integrate into the global economic system. The Know How Fund has achieved much but programmes now need to be reshaped to give greater emphasis to protecting the poorest and to enabling the widest number of people to share in the fruits of change. Our new strategy is summarised in *Panel 15*.

2.28 The Government reaffirms its responsibilities for Britain's 13 remaining Dependent Territories. Six of them continue to receive substantial UK development assistance, as summarised in *Panel 16*. The reasonable assistance needs of

SECTION 2

BUILDING PARTNERSHIPS

the Dependent Territories are a first call on the development programme.

2.29 The Government has three objectives in providing development assistance to the Dependent Territories:

- to maximise economic growth and self-sufficiency through sensible economic and financial management leading to graduation from such support, where this objective is feasible
- to ensure in the meantime that basic needs are met, including the provision of essential infrastructure
- to support the good governance of the territories, including the proper management of contingent liabilities and the fulfilment of the UK's international obligations – particularly human rights and the multilateral environment agreements

The Government has announced a fresh look at its relations with, and responsibilities towards, the remaining 13 dependencies over the coming months.

2.30 We will continue to be swift and effective in our response to emergencies and disasters, seeking not only to save lives but to rebuild livelihoods. This is described at *Panel 17*.

Partnerships in Britain

2.31 Just as we want to develop partnerships with developing countries, the Government will seek a new partnership with the UK private sector based on a shared understanding of the role that the public and private sectors – including the commercial private sector, the voluntary sector, academic and research institutions and local as well as central government – can play in development.

Working with British Business

2.32 Overall private capital flows have come to dwarf official flows as a source of funds for development even though they have so far focused on only a few countries, and concessional resource transfers will remain crucial for many developing countries for some time to come. From a business perspective the developing countries contain a majority of the population in the faster growing markets. There is therefore a shared interest in a constructive approach between Government and business to support sustainable development.

2.33 Such an approach needs to avoid the distortion of development funds in pursuit of short-term commercial objectives, such as the previous Government's support for the Pergau project or Westland helicopters. Above all it needs to reflect the fact that long-term

SECTION 2

BUILDING PARTNERSHIPS

PANEL 15

SUPPORT FOR THE COUNTRIES IN TRANSITION

Although many of the transition countries are not poor by measurements of income alone, many of their people suffer varying degrees of deprivation – of access to information, human and civil rights, democratic institutions and a decent environment. And social provision has in many cases not evolved to replace the unsustainable safety nets of the past. Radical shifts have taken place, but much remains to be done to achieve a stable redistribution of rights and responsibilities between the State and its citizens.

We will continue to support the process of transition in the region, seeking to ensure that its benefits are sustainable and spread through all levels of society. We shall work with a wide range of partners in the region and in the UK, and with multilateral institutions. We shall seek to involve governments, the private sector, academic and training bodies and NGOs. We will support:

- the development of the enabling framework necessary for a return to economic growth, including transparent and well-regulated markets, firm action against corruption, reform and restructuring of enterprises, and measures to encourage small and medium enterprise development
- an inclusive approach to economic management, directing social provision where it is most needed, preventing the capturing of the benefits of economic reform by a minority, and developing public and private mechanisms to increase financial security for households;
- empowerment of individuals and groups through establishing secure rights, spreading skills and information to enable people to participate in and help to shape transition, and developing accountable and accessible law enforcement systems
- the integration of environmental considerations into economic planning, mitigation of the effects of environmental degradation and prevention of future degradation, particularly in the interests of the poorest people
- integration of the transition countries into global economic and political frameworks, through accession to the European Union for eligible countries, strengthened relations with the Union for others, accession to the WTO with full adherence to WTO rules, and strengthened business and investment links with the UK and other countries

The Know How Fund will continue to be the channel for British bilateral technical assistance for Central and Eastern Europe and Central Asia, working within the new strategy and taking careful account of the differing needs in our various countries of operation. But bearing in mind that we spend many times more on the region through multilateral institutions, we will also seek to use our influence to ensure that they are working effectively towards an equitable and sustainable transition.

SECTION 2

BUILDING PARTNERSHIPS

PANEL 16

THE DEPENDENT TERRITORIES

Six of the UK's 13 remaining Dependent Territories still receive substantial UK development assistance: Anguilla, British Virgin Islands, Montserrat, and Turks and Caicos Islands in the Caribbean; St Helena and Pitcairn.

Most of our development assistance, which is based on an agreed Country Policy Plan (CPP) following a Strategic Review jointly conducted with the Dependent Territory, is channelled in three forms:

- in the poorer dependencies we continue to provide basic infrastructure – schools, hospitals, roads, water, power, etc
- we finance the costs of expatriate personnel engaged to fill key administrative or technical posts for which no suitably qualified local candidates are presently available, and to train potential successors
- for the two most economically dependent – St Helena and Montserrat – we are also providing budgetary support to meet the financing gap between government recurrent expenditure and locally generated resources

Our development assistance commitments to the latter two territories are considerable. Our present three-year £26 million commitment to St Helena amounts to some £1500 for every islander each year. Our current commitments to Montserrat in emergency and development assistance, in response to the volcano crisis, amount to £46 million, or over £10,000 per head.

trade and investment is essential to stimulate the growth which brings benefits to everyone, especially those most in need.

2.34 In the international arena, we will therefore strongly support, and seek to strengthen, the disciplines which limit the use of tied aid credits and the efforts to minimise support for unproductive expenditure. Concerted international effort is also needed if there is to be effective progress in untying development assistance. The Government has already fully untied Britain's contribution to the Special Programme of Assistance to Africa,

and we will pursue energetically the scope for multilateral untying of development assistance. We will also seek to develop further the use of local and regional skills and resources in assistance programmes, thus strengthening the local private sector, but will not otherwise unilaterally untie our bilateral aid.

2.35 With British business, we will move away from a narrow relationship based on individual contracts to a broader sharing of approaches to the eradication of poverty, drawing on the extensive skills of the British private sector – consultants and

SECTION 2

BUILDING PARTNERSHIPS

PANEL 17

DISASTERS AND EMERGENCIES

Disasters, both natural and man-made, and often recurrent, are a significant burden on poor societies. The root causes of poverty tend to leave poor people not only more exposed to hazards, but also less able to cope in the event of a disaster.

Our objectives in assisting countries to deal with disaster are not only to save lives through emergency relief, but also to protect and rebuild livelihoods and communities, and reduce vulnerability to future disasters.

In responding to disasters, we aim to provide swift, appropriate and cost-effective financial, material and technical assistance, based on analysis of actual need. We shall endeavour to do this in ways that encourages the participation of all stakeholders in decisions that affect their lives, builds local capacity and lays a solid foundation for rehabilitation and recovery. The UK's capacity to respond to disasters overseas will be strengthened through tapping the vast reservoir of available skills and building partnerships within the public and private sectors to ensure that all players are used to their best comparative advantage. In all disaster work, our responsibility must be first and foremost to those affected.

Disaster preparedness and prevention will be an integral part of our development co-operation programme. We shall work with disaster-prone partner countries to develop systems for the better management of man-made hazards and, where feasible, natural hazards, so as to reduce their human impact.

The multitude of actors involved in humanitarian work underlines the importance of international co-operation based on sound principles. Hence we shall encourage system-wide agreement on common performance standards and a code of ethical conduct for organisations involved in humanitarian work, and will seek to implement guidelines already agreed within the OECD. We shall work for, and co-operate with, a more effective and efficient multilateral humanitarian system, building on the capabilities of UN institutions, the Red Cross Movement, other international organisations and NGOs. Within the EU, we shall also work closely with other member states and the European Community Humanitarian Office (ECHO) to ensure more consistent joint policies and approaches.

SECTION 2

BUILDING PARTNERSHIPS

contractors, investors, exporters and importers, business organisations, large companies and small firms. The Aid and Trade Provision (ATP) lacks poverty elimination as its central focus; no more applications will be accepted for ATP assistance, and the scheme will be closed. This does not preclude deploying development assistance in association with private finance, including in the form of mixed credits. But in order to avoid the abuses of the past, any mixed credits will be managed within agreed country programmes and subject to:

- the agreed strategy and sectoral focus for each country, which would have the primary aim of helping to reduce poverty not of subsidising exports
- the same procedures for quality control as all other projects

2.36 Trade and investment are key to sustainable development. We will work with British business to strengthen support for investment and trade which contribute towards this objective. We will respond promptly to new ideas from all our development partners, both in British industry and in developing countries. We propose to build a new partnership between the relevant Government departments and British business. In

particular, following discussions with British business we will:

- make systematically available information about trade and investment opportunities in developing countries. The information will include both bilateral and multilateral aid-financed opportunities
- work to ensure that multilateral development projects make full use of the skills of UK business
- consult the private sector and non-governmental organisations (NGOs) when preparing country and other development strategies. These strategies will take full account of the contribution that can be made by all our development partners, including the UK private sector, and all forms of assistance provided by the UK Government
- work to reduce initial costs and perceived risks for investments which support the aim of poverty elimination. The Know How Fund will continue to encourage business to enter into joint ventures and invest in Central and Eastern Europe and Central Asia, and similar schemes will be developed as appropriate for other countries

SECTION 2

BUILDING PARTNERSHIPS

- continue to use the development programme to promote an enabling environment for private sector development which contributes to pro-poor economic growth
- develop with British business specific proposals in a number of partner countries for working together to help develop local business infrastructure

Together these represent an important new initiative. The Government is determined to ensure that it does all it can to make it succeed and to use in each case the most appropriate means to promote sustainable development.

2.37 Our main instrument for investing in the private sector in the poorest countries is the Commonwealth Development Corporation (CDC). Its particular strengths lie in its ability to help create and manage new business and to act as a catalyst for other investors. From its own resources it currently finances around £300 million of new activities a year in the poorer countries, of which over 30 per cent is for projects in sub-Saharan Africa. The Government believes the CDC to be an under-utilised asset. We will therefore seek to enlarge the resources at CDC's disposal by introducing private sector capital and creating a dynamic Government/private sector partnership with the Government retaining a

substantial minority holding; a partnership that will provide leadership as an ethical and socially responsible investor in poorer countries. As the Prime Minister has announced, the proceeds generated will be ploughed back into the development programme.

2.38 There is a growing understanding that ethical business is good business in every sense. The Government welcomes the development of ethical investment movements. These are growing instruments for change in development, as individuals and organisations look increasingly at how their savings, investments and purchasing decisions impact on the lives and rights of producers, suppliers and workers in the developing countries.

2.39 We propose to establish a new awards scheme to recognise private sector companies who have developed partnerships which make a particular contribution to sustainable development. This would enable us to recognise the many innovative actions taken by the private sector in contributing to development in ways which promote the ability of poor people to establish sustainable livelihoods and move out of poverty.

The Voluntary Sector

2.40 The Government wishes to strengthen its partnership with voluntary charitable and non-profit making

SECTION 2

BUILDING PARTNERSHIPS

organisations. We plan to work in alliance with them to win stronger public and international support for poverty elimination and sustainable development. We also plan to work in complementary ways in partnership countries and to support their efforts in non-partnership countries.

2.41 The Government intends to continue to support British voluntary agencies through the Joint Funding Scheme and the Volunteer Programme. We have agreed to discuss with them how to reorient these arrangements in the light of our new policies, in particular with the objective of strengthening capacity within developing country non-governmental organisations. In pursuit of these partnerships the Government intends to work closely with organisations within the UK which can reinforce these efforts, including the British Council which is a key partner in developing and implementing programmes in many countries.

The Research Community

2.42 We have reviewed our support for technology development and research to assess how they contribute to the objective of eliminating poverty, and whether they are resourced and managed in the most effective way. Knowledge, research and technology underpin all our work. The elimination of poverty and protection of the environment requires improved access to knowledge and technologies by poor people. This will be achieved through continued investment in research and research capacity in developing countries and through partnerships with the science community in the UK and internationally. The outcomes of this research will be disseminated widely so that the maximum benefit can be derived from it. *Panel 18* sets out the potential benefits of this new approach; *Panel 19* gives some examples of what has already been achieved.

SECTION 2

BUILDING PARTNERSHIPS

PANEL 18

RESEARCH: THE NEW APPROACH

- We will continue to generate knowledge and understanding of how best to tackle the problems of development. To effect change, knowledge is essential both for the UK itself and for our partners in development. At a time of great change in the globalising world, knowledge and ideas are particularly important to secure progress.
- The Government's aims for international development are ambitious and its work is urgent but resources are limited. These resources must be used in ways that produce the greatest benefits. We need to know what will work and what will not work. We remain aware that we do not have all the answers.
- Much knowledge is already available but often it needs to be adapted to the particular circumstances of developing countries. In other instances, existing knowledge is insufficient and investment in new knowledge, research and technology development is needed. Results need to be communicated effectively and the conditions created in which they can be implemented.
- One of the main constraints to effective development assistance is an imperfect understanding of social, economic, political and physical environments. We will find local solutions to local problems and involve local people and institutions in the process. The UK has earned international respect for the quality of its international development programmes. Getting it right means not only investing in effective relationships but in pushing back the boundaries of shared knowledge, understanding the problems which constrain sustainable development and working with national and international partners to develop appropriate, often innovative, solutions which will help to eliminate poverty.
- Research is an important weapon in the fight against poverty. Without research, many development interventions would fail or be much less successful; and research has significant multiplier effects – solutions to the causes of poverty in one part of the developing world may well be replicable in another. The principle of shared knowledge is an important component of the partnerships which are essential to development. The Government sees continued investment in knowledge generation as a key element in achieving its aims and objectives for international development.

SECTION 2

BUILDING PARTNERSHIPS

PANEL 19

EXAMPLES OF RESEARCH IMPACT

- Research on the effectiveness of development assistance and conditionality has been influential in changing the perception of donors and lending agencies about how best to promote development. This has contributed to the reorientation of our development policy set out in this White Paper, in particular thinking on partnerships and how other policies can affect development.
- Non-governmental organisations (NGOs) have significant potential as advocates of poor people's needs. DFID-funded research has identified findings which are now being used by NGOs to enhance their capacity to contribute to sustained poverty elimination.
- Recent British research on the conditions necessary for microcredit to be effective has been seminal and is often quoted and used by multilateral and other bilateral agencies in designing their own programmes for lending to small businesses and farmers.
- Research into reading levels in Zambia and Malawi influenced the national Malawi Community Schools programme, and led the Zambian Ministry of Education to reconsider its policy on introducing reading in English in Grade 1. Research showed that children learn the skills of literacy most effectively in their first language.
- In Tanzania, a randomised trial showed that treatment of STD (Sexually Transmitted Diseases) through the local clinics was associated with a 42 per cent reduction in new cases of HIV.
- Eclampsia – a disease characterised by convulsions – causes 50,000 maternal deaths a year. A randomised trial involving nine developing countries showed that magnesium sulphate (a low-cost drug) is at least twice as effective as other anti-convulsants in reducing the occurrence of further convulsions.
- Successful testing of a simple-to-operate multi-stage water filtration unit, first using a pilot plant in the UK followed by field testing in a Rwanda refugee camp, has led to the system being expanded by Oxfam to a full size plant to provide safe drinking water for 16,000 refugees.
- *Gliricidia sepium* is a tree which is widely planted in tropical countries by subsistence farmers. It provides fodder for livestock, poles for construction and wood for fuel. Its nitrogen-fixing qualities are valuable for soil improvement. A seed source identified by British scientists offers growth improvements of over 50 per cent.
- Research on the ecology of rice pests has helped to develop integrated management strategies which have empowered farmers to make better informed and environmentally sound pest management decisions resulting in lower levels of inputs (particularly pesticides), higher yields and increased income generation.
- A devastating and rapidly spreading fish disease has affected freshwater fisheries and aquaculture in Asian waters leading to widespread losses and threat to livelihoods. Collaborative research between British and regional scientists has identified the fungal agent, a new species, and ways of controlling the impact.
- Wood burning stoves costing as little as £2 have been developed which reduce by a half the amount of fuel wood needed for cooking. This reduces deforestation and air pollution. Where women make their living by cooking and have to buy fuel wood, the cost of the stove can be recovered in a few days. Many stoves are bought by the poorest.

CONSISTENCY OF POLICIES

We shall

- ensure that the full range of Government policies affecting developing countries, including environment, trade, investment and agricultural policies, takes account of our sustainable development objective
- give particular attention to human rights, transparent and accountable government and core labour standards, building on the Government's ethical approach to international relations
- use our resources proactively to promote political stability and social cohesion and to respond effectively to conflict
- encourage financial stability and the reduction of the external debt of developing countries to sustainable levels

The Importance of Consistency

3.1 Development assistance is an important part of the way in which we can help tackle poverty. But it is not by any means the only aspect of our relationship with developing countries. Both nationally and internationally, there is a complex web of environmental, trade, investment, agricultural, political, defence, security and financial issues which affect relations with developing countries. These are driven by a range of policy considerations, all of which affect the development relationship. To have a real impact on poverty we must ensure the maximum consistency between all these different policies as they affect the developing world. Otherwise, there is a risk that they will undermine development, and development assistance will only partly make up for the damage done.

3.2 In this section we set out how the Government is approaching four vital sets of issues where domestic, foreign and development policies need to be applied in a consistent way if the world's poor are to benefit. These are:

- the environment
- trade, agriculture and investment
- promoting political stability, social cohesion and responding effectively to conflict
- promoting economic and financial stability

We are ready to help developing countries to build the capacity to deal with these complex issues through the sharing of knowledge, information and technical capacity.

The Environment

3.3 Conservation and sustainable management of the environment is a

SECTION 3

CONSISTENCY OF POLICIES

cornerstone of our approach to international development. Perhaps nowhere is the need for consistency greater. Nor is there a clearer example of a mutual, global interest. It reminds us that development is not a rich country/poor country issue, and that it matters to all of us. We need to tackle environment problems at local, national and international levels.

3.4 At the national level, there is a strong link between poverty and environmental degradation. Poor people are often the main direct human casualties of environmental degradation and mismanagement. In rural areas, competition for access to resources, especially land, often squeezes poor people into marginal, low productivity lands, where they have no alternative but to over-exploit soils and forests. In towns and cities, poor people typically have to live and work where pollution is worst and the associated health hazards are highest.

3.5 Lasting eradication of poverty requires environmentally sustainable solutions. Consistent policies and better management are the key. Natural resources must be managed sustainably or else continued economic growth will not be possible. But some use must be accepted or development will not happen. We will help developing countries integrate environmental concerns into

their decision-making by supporting their efforts to prepare plans and policies for sound management of their natural resources and national strategies for sustainable development.

3.6 Rural communities are still the majority in most developing countries. We will work to promote sustainable agriculture which tackles hunger and poverty while protecting the environment. We will focus on small producers and on productive systems which maintain or improve the productivity of land and water resources. This should promote both poverty reduction and environmental sustainability. Agricultural trade policies have an impact too and we will be proposing reforms that support our international development aims. Our new approach to the problem of deforestation will support work to improve management of forest resources in ways that lead to a range of benefits to poor communities.

3.7 By the beginning of the next century, more than half of the world's population will for the first time in history be living in towns and cities. For most poor people, urban environment problems – such as air pollution, poor sanitation and contaminated water – will be a major concern. In many cases, the infrastructure to tackle these problems either does not exist or ignores their needs. We will

SECTION 3

CONSISTENCY OF POLICIES

promote urban development policies and programmes that focus on improving employment, shelter, education, health, water, sanitation and energy provisions for poor people.

3.8 At the international level, there is a self-evident common interest in addressing global environmental issues in a coherent and coordinated way. The poorest countries can and do suffer the consequences of the domestic environmental policies of the richer countries. The UK believes that the richer countries should lead on taking domestic action to combat those consequences, and is acting to meet its commitments. At the same time, the impact of developing country actions on the global environment is growing rapidly and their impact will be felt by developed as well as developing countries. An obvious example of the need for co-operation and coherence is climate change. Our approach in this area is set out in *Panel 20* (*see also Figure 11*).

3.9 There is a range of other issues where we will work to develop coherent policies. We will use our approach to forests to press for comprehensive and coherent international arrangements to achieve sustainable forest management. We shall take a leading role in a programme of

action to ensure optimal use and protection of freshwater resources. We shall support measures to combat land degradation and desertification. We will help developing countries meet their commitments to phase out ozone depleting substances. We shall also continue to help poor people in developing countries, often rich in species and habitats, but lacking resources, to manage and benefit from their biodiversity. Developing countries hold the bulk of the world's wild animals and plants. Helping them to conserve such resources and gain income from them offers benefits both for the alleviation of poverty and the safeguarding of biodiversity.

3.10 Given the connections between development, the elimination of poverty and the environment, we shall play a significant role in the Commission on Sustainable Development. This will include promoting capacity building in developing countries and exchanging experience to achieve the important target that all countries should develop national strategies for sustainable development (*see Panel 21*). We shall also seek to play a full and influential role in the UN Centre for Human Settlements (Habitat) in supporting urban development policies that contribute towards the reduction of poverty and sustainable development objectives.

SECTION 3

CONSISTENCY OF POLICIES

PANEL 20

CLIMATE CHANGE

Climate change is perhaps the most serious global environmental problem we face. The Intergovernmental Panel on Climate Change advises that, if greenhouse gas emissions continue to rise, by the year 2100 average global temperatures will have risen by between 1 and 3.5 degrees centigrade. This will cause sea levels to rise perhaps up to a metre over the same period, trebling the number of people at risk from flooding – from 46 million now to 118 million. Important decisions will be taken at the Climate Change Conference in Kyoto in December 1997 on targets for reductions in greenhouse emissions for the period after 2000.

Climate change is likely to have a significant adverse effect on areas of the natural world and human society, affecting eco-systems, human health, water resources, agriculture and forestry. The impacts will be felt by all of us, but developing countries and some of the poorest within them could be hit particularly hard. The very future of many small island states will be threatened and low-lying areas such as Bangladesh will be particularly vulnerable.

The Government recognises that climate change is a global problem and one which requires a global solution. Developed countries have been responsible for the majority of emissions to date and have a moral obligation to take the lead in reducing emissions. That is why the UK, which is one of the few OECD countries on course to meet the emission targets set so far, is in the forefront of those pressing for significant reductions in emissions to be agreed by developed countries at Kyoto.

But the threat of climate change will only be solved through global action. The total greenhouse gas emissions of the developing world are likely to overtake those of developed countries in the next 20 to 30 years. Therefore whilst the UK Government, in accordance with the Berlin Mandate, does not believe that developing countries should take on emission targets in this round of negotiations at Kyoto, it does believe that future stages of the process will require an increasingly global effort in setting emission reduction and limitation targets.

Obviously as developing countries increase their efforts to tackle climate change and limit emissions, they will require appropriate assistance to do so. As the Prime Minister said at the UN Special Session on Sustainable Development in June:

‘Industrialised countries must work with developing countries to help them combat climate change...and other global environmental challenges. We must live up to our side of the bargain and ensure that they have the resources to do this.’

Developing countries need energy. A major element of the UK’s approach will be to help key developing countries improve the efficient generation, distribution and management of energy, particularly by building national capacity. We will, where appropriate, promote and encourage the use of renewable energy resources. We will also help developing countries to build expertise in climate change research and observation.

SECTION 3

CONSISTENCY OF POLICIES

3.11 The UK also recognises that there is a need to provide additional assistance at a global level. Such assistance enables developing countries to take actions which benefit the global environment but which could not be justified solely on the basis of their national sustainable development needs.

The UK will therefore continue to provide substantial additional commitments in support of global environmental objectives through the Global Environment Facility and the Multilateral Fund for the Montreal Protocol (*see Panel 22*).

PANEL 21

NATIONAL STRATEGIES FOR SUSTAINABLE DEVELOPMENT

The Earth Summit (1992) called for countries to incorporate environmental considerations into their development plans and build national strategies for sustainable development. At the United Nations General Assembly's Special Session – Rio Plus Five (1997) – countries agreed to have them in place by 2002. We see these strategies as the main vehicle for integrating pro-poor economic growth with a social improvement and responsible approach to environmental management.

National strategies for sustainable development must respond to the specific needs of the country and its people.

Important principles in developing and implementing them include:

- securing strong political commitment and local ownership for the process and effective host country coordination of external development assistance
- strengthening national capacity to develop and implement the strategies, aiming for early implementation of promising initiatives which will bring tangible benefits quickly to poor people
- ensuring the full participation of the communities concerned, particularly those who are often ignored such as women, indigenous people and poor farming and slum communities
- making the most of win-win opportunities which reduce poverty, boost economic growth and conserve the environment, eg sustainable agriculture and urban health programmes
- focusing on the better management of key environmental and natural assets central to the livelihoods of poor people, eg water, soil and land
- using poverty assessments and strategic environmental assessments to develop pro-poor, pro-environment policies and programmes whether of an economy-wide or a sectoral nature
- framing policies and fiscal incentives which encourage socially and environmentally responsible behaviour by the private sector and communities at large

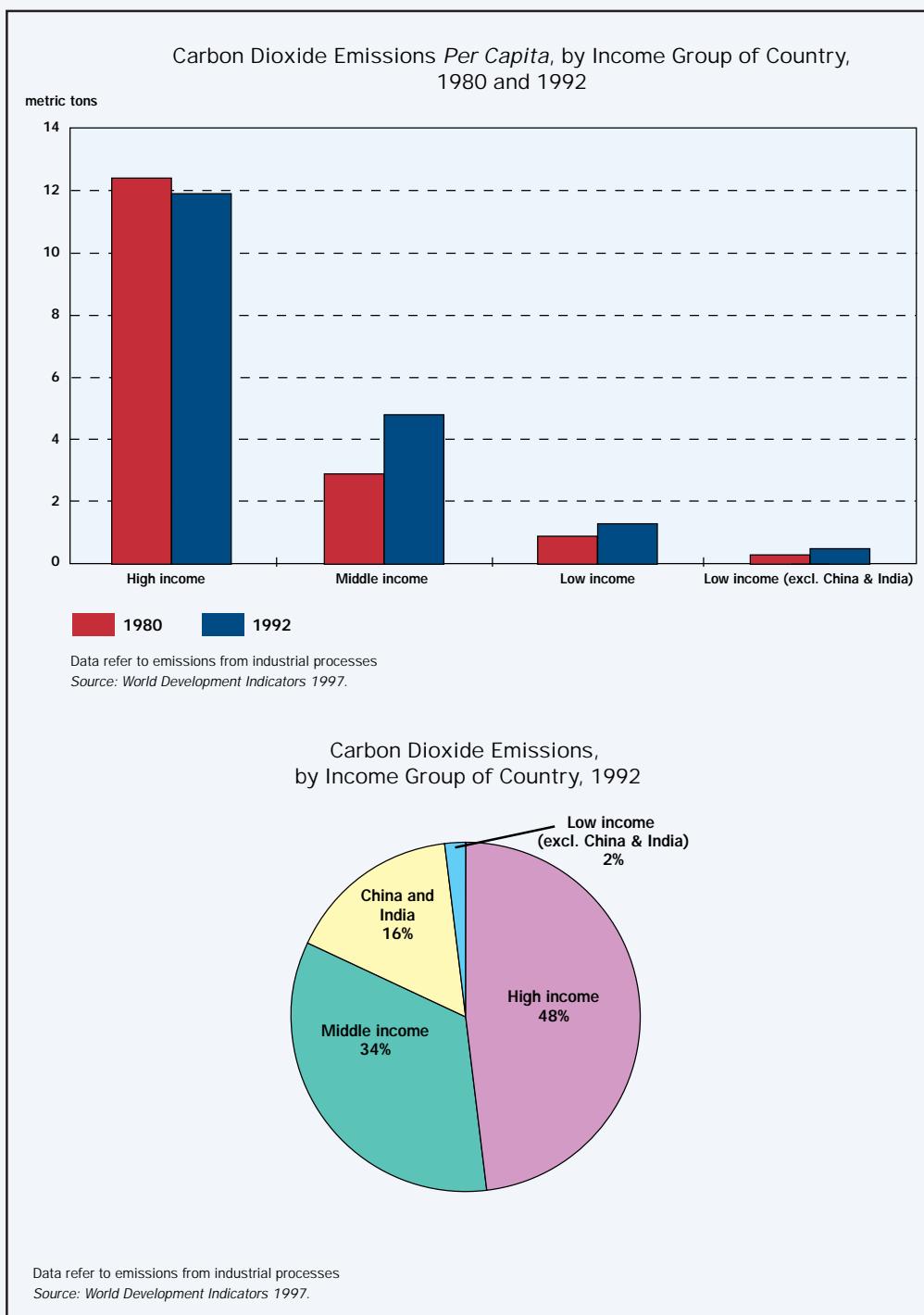
We will:

- work internationally to develop common approaches, and mobilise support for, the development and implementation of national strategies for sustainable development
- support partner countries in their efforts to develop and implement such strategies

SECTION 3

CONSISTENCY OF POLICIES

FIGURE 11



SECTION 3
CONSISTENCY OF POLICIES

PANEL 22

GLOBAL ENVIRONMENTAL ASSISTANCE

Neglecting the global environment would eventually jeopardise all sustainable development objectives. The poor would be particularly vulnerable. Action to address national and regional environmental needs are insufficient to protect the global environment. As the Rio Earth Summit recognised, additional coordinated global action is required.

Developing countries see the developed world as overwhelmingly responsible for current global environmental problems. They look to developed countries to take a lead in addressing concerns and in helping developing countries to do likewise. UK government departments work closely together to pursue these objectives domestically and internationally. Since 1990, the UK has made separate provision in its public expenditure framework to help developing countries tackle global environmental problems. These funds, managed by DFID, are separate from and additional to the development assistance budget. This separation is crucial as confirmation of the UK's commitment to help developing countries meet global needs without diverting resources from our traditional bilateral and multilateral aid channels.

The UK's Global Environmental Assistance provision makes contributions to:

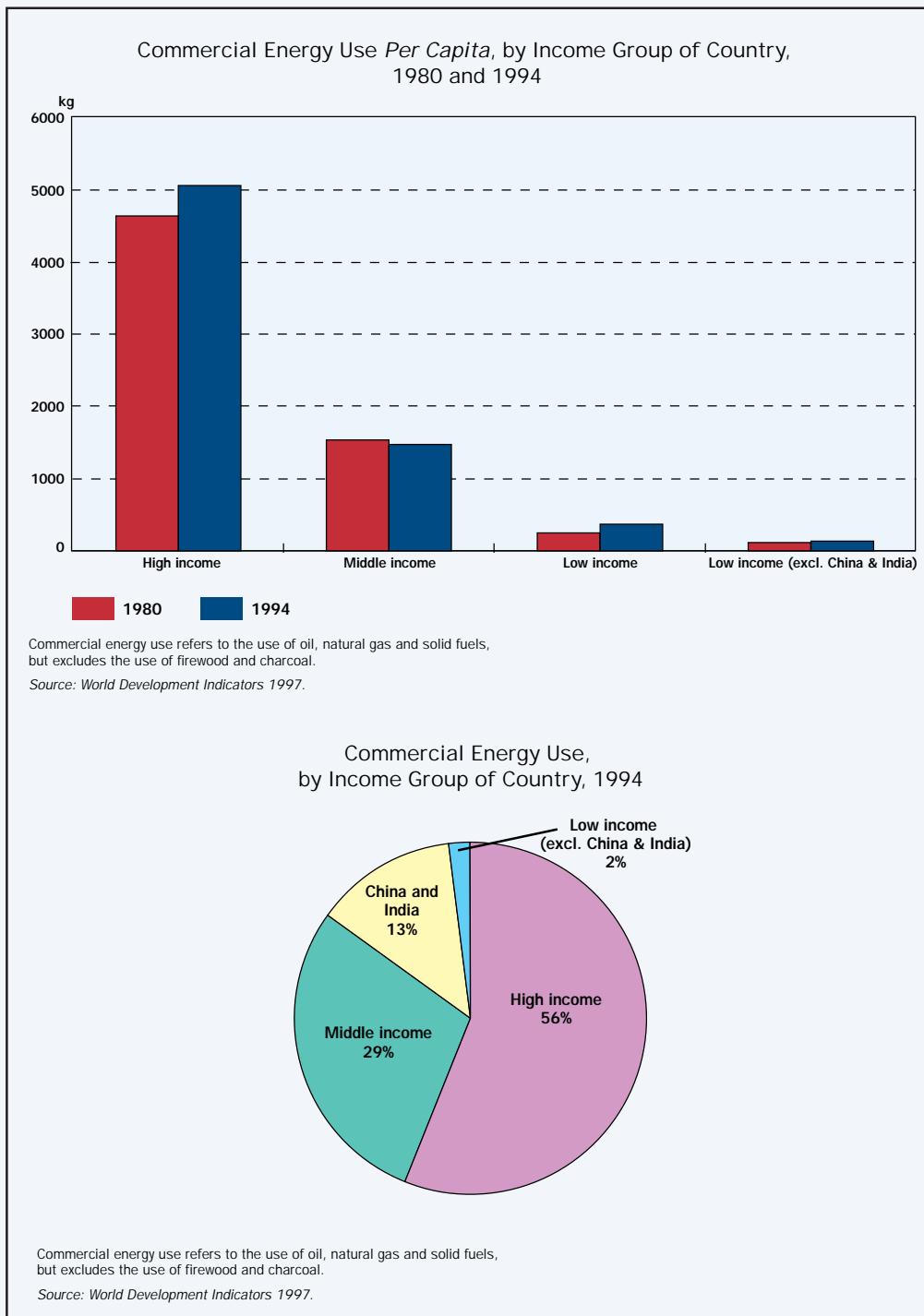
- the Global Environment Facility, which helps developing countries and countries in transition meet the additional costs of global environmental actions in four focal areas: climate change; biodiversity; pollution of international waters; and (for countries with economies in transition) ozone depletion
- the Multilateral Fund of the Montreal Protocol, which helps meet the costs to developing countries of their phase-out of ozone-depleting substances

The UK is a strong supporter of these funds and will continue to be so. And we will be prominent in ensuring that the resources are efficiently and effectively deployed. The impact of developing countries on the global environment is growing rapidly. For example, developing country greenhouse gas emissions will overtake those of developed countries in 25-30 years. DFID will work in partnership with developing countries on integrating environmental objectives in their sustainable development strategies and, where appropriate, provide support through our bilateral programme.

SECTION 3

CONSISTENCY OF POLICIES

FIGURE 12



3.12 At the Special Session of the UN General Assembly in New York in mid-1997, the Prime Minister committed the Government to enhancing the UK's partnership with key developing countries in energy efficiency (*see Figure 12*). We will, where appropriate, assist our developing country partners to improve the efficiency of their power generation and distribution systems, and to reduce atmospheric pollution from transport, particularly in major cities. We will also support the greater use of renewable sources of energy.

Trade, Agriculture and Investment

Introduction

3.13 Trade and investment are crucial to poverty elimination. They bring resources that can help generate the growth needed to establish sustainable livelihoods. We particularly need to work to ensure that the benefits which follow from the fall of barriers to international trade and investment reach the least developed countries, and the poorest people, and lead to sustainable development. This means paying increased attention to issues such as labour, environmental and health standards, and helping developing countries build their own capacity to take advantage of globalisation.

3.14 For these reasons, trade and investment policies form a key part of the Government's approach to development.

The time is right for progress, with important changes either in train or in prospect both within the EU and internationally. We plan to play a leading role in helping to shape these changes, working within the EU, within the multilateral institutions, with other governments both in developed and developing countries, and with the private sector.

Trade Policy

3.15 The Government supports an open, fair and sustainable multilateral trading system – from which all countries can benefit. The World Trade Organization (WTO) provides the rule-based framework which underpins the system. We will encourage and assist developing countries to become more fully integrated into the multilateral system and to participate in the WTO (*see Figure 13*). We want to support their efforts to reduce their trade barriers, taking account of the time needed for their economies to adjust.

Improving Market Access

3.16 We will work within the EU and the WTO for increased multilateral liberalisation of trade in goods and services, and the continued dismantling of tariff and non-tariff barriers worldwide. A particularly important sector for many developing countries is textiles, where we will press for adherence to the agreed timetable for the dismantling of quotas under the multi-fibre agreement. For

SECTION 3

CONSISTENCY OF POLICIES

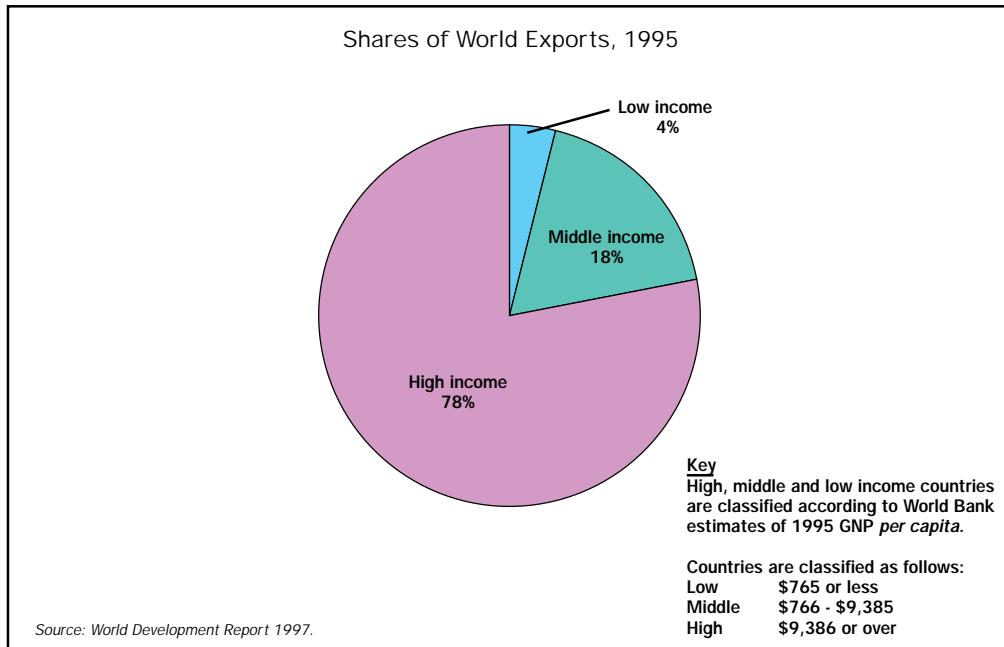
the future we are committed to negotiate further comprehensive trade liberalisation, in particular in the agriculture and services sectors.

3.17 Dismantling trade barriers takes time. In the interim we will continue to work for the best possible access to EU markets for developing countries, in particular for those countries that need this most to compete on world markets.

- We will press for the elimination of tariffs on imports from the least developed countries, and for eventual agreement to eliminate tariffs multilaterally within a WTO scheme.

- We believe that the current Lomé and Generalised System of Preference (GSP) terms should be brought into closer alignment by seeking ways to level up preferences and by extending product coverage within GSP to include all industrial goods and a wider range of agricultural goods. We will focus in particular on sectors likely to be of benefit to poor countries and poor producers.
- We believe that any bilateral and regional free trade agreements should be structured to promote economic development and be consistent with the multilateral trading system.

FIGURE 13



3.18 Eligibility for preferential access to the EU market (and other developed country markets) is governed by highly complex rules of origin. In practice, these make it difficult for developing countries to take full advantage of their preferential arrangements. We will work within the EU to make these rules simpler and less restrictive, and we will work multilaterally to bring different sets of rules more into line with each other, so that they are easier to use.

3.19 WTO rules provide for anti-dumping, anti-subsidy and safeguard measures. Such measures are for use in exceptional circumstances and not as a means of protecting business from legitimate competition. We will work to ensure that they are not used as a form of covert protectionism to deprive developing countries of their comparative advantage.

Improving Trade Procedures

3.20 Complex and diverse trade procedures (such as export documentation and customs systems) can represent a significant barrier, particularly for the poorest countries and the smallest firms. The United Nations Conference on Trade and Development (UNCTAD) has estimated that the cost of such procedures could amount to as much as 10 per cent in value of trade in goods and services. We

will make it a priority to work for a multilateral agreement to simplify such procedures.

The Reform of Agricultural Trade

3.21 Agriculture is a key sector for many developing countries. International trade in agricultural products has, however, been distorted by agriculture support policies throughout the world. A combination of domestic price support, import protection and export subsidies, in a variety of countries, has undermined the ability of many developing countries to compete successfully in a sector where they have natural comparative advantages.

3.22 Agricultural trade liberalisation will have major benefits for developing countries. The Government welcomes the important first steps that were taken in the Uruguay Round, but is acutely aware that there is a very long way to go, both in Europe and more widely.

CAP and Fisheries Reform in the EU

3.23 The Government is committed to fundamental reform of the Common Agricultural Policy (CAP). This will bring substantial benefits to EU consumers and taxpayers. The Government will make full use of the opportunities which this presents over the medium term to benefit developing countries.

3.24 The European Commission's proposed *Agenda 2000* reforms are a necessary step towards further and more extensive reform, including significant improvements in access to the EU market. This is where the major medium and long-term development benefits will be. In the short term, the current proposals have some potential negative effects for particular developing countries (which export agricultural products to the high price EU market under special arrangements). The Government is committed to working with the Commission and other Member States to consider how to address these effects.

3.25 The EU currently has 16 fisheries agreements with developing countries. The Government aims to ensure that fisheries agreements provide value for money, promote sustainable fishing and are coherent with UK and EU development policies.

Multilateral Liberalisation

3.26 Multilateral liberalisation of trade in agriculture, including increased access to markets in all developed countries, and the phasing out of export subsidies, has huge potential benefits for developing countries. The prospects are promising, and indeed pressure for trade liberalisation from within the WTO has been one of the key

factors which has made reform of the CAP increasingly possible. As part of the Uruguay Round, it was agreed that negotiations on further agriculture trade liberalisation would start at the turn of the century. The Government sees this as a major opportunity and is committed to achieving substantial further liberalisation in these negotiations.

Investment

3.27 Foreign direct investment can bring a range of benefits to developing countries, including employment, exports, new skills and technology. Portfolio flows can provide resources for local companies and deepen domestic capital markets. However, whilst private capital flows have increased substantially, they are heavily concentrated in a small number of the most advanced developing countries (see *Figure 14*). The least developed countries attract little foreign investment, and therefore continue to depend heavily on official development assistance.

3.28 We believe it is in the interests of developing and developed countries alike to create conditions which will help attract beneficial private investment to developing countries. This requires the right domestic policies and conditions in these countries, including political stability, transparent and accountable government and the prevention of corruption. These are crucial in order to attract and retain both foreign

SECTION 3
CONSISTENCY OF POLICIES

and domestic investment. We will encourage and assist developing countries to put in place such policies.

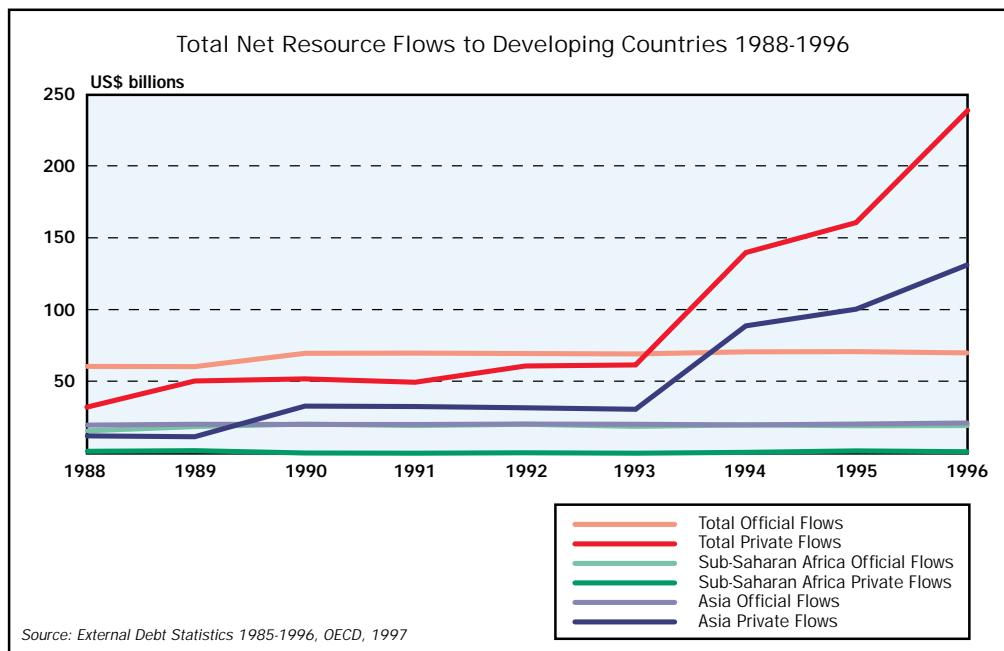
Multilateral Framework

3.29 In the Organisation for Economic Co-operation and Development (OECD) we are already in the process of negotiating an improved multilateral framework through the Multilateral Agreement on Investment (MAI), based on the principles of non-discrimination against foreign investors, open investment regimes and investor protection. The Government is working to ensure that the MAI fully reflects our commitment to core labour standards and that it prevents countries

from lowering environmental standards to attract investment.

3.30 The Government will continue to participate actively in dialogue with developing countries about the MAI. In particular we will encourage those – mainly the more advanced – who have a particular interest to consider becoming parties to the Agreement. But we recognise that the MAI is not designed for the economic and institutional constraints of poorer developing countries. We are exploring how their needs can be taken into account. In parallel, we are playing a full part in WTO discussions, supported by analytical work in UNCTAD, exploring the

FIGURE 14



SECTION 3

CONSISTENCY OF POLICIES

links between trade and investment and the implications for development and economic growth. We will work towards the eventual establishment of a WTO agreement on investment. We support moves to make capital account liberalisation a specific purpose of the IMF and to give the Fund appropriate jurisdiction over capital movements.

3.31 We will work to ensure that the OECD Guidelines on Multinational Enterprises are closely associated with the MAI and reviewed regularly to ensure they are up to date and effectively disseminated. In preparing for the review next year we shall draw on experience of voluntary codes already drawn up in specific sectors and between unions, consumer groups and NGOs.

Competition Issues

3.32 In order to fully benefit from increased foreign investment, developing countries – like developed countries – need to have in place the right domestic policy framework to deal with a range of competition law and policy issues, such as monopolies, mergers and restrictive business practices. We will continue work within UNCTAD to help develop a model framework for national policies in these areas. We will consider how best to assist developing countries who want to strengthen their domestic regulatory

framework before applying to join the MAI. And we will work with others to address these issues at the international level too, through the WTO Working Group on Trade and Competition.

Guarantees and Insurance

3.33 Guarantees and insurance are important mechanisms for encouraging private investment into developing countries. This is particularly important for infrastructure projects, where large sums of money need to be mobilised. The Overseas Investment Insurance Scheme of the British Export Credits Guarantee Department (ECGD) is increasingly utilised to help companies to invest overseas. We are considering whether this facility can be made more readily available to poor countries. We are also discussing with the World Bank Group how best to expand guarantee cover in developing countries – and particularly in poorer developing countries.

Intellectual Property

3.34 We are committed to rules on intellectual property rights which will facilitate the transfer of technology, and provide incentives for investment. We will pay particular attention to the impact of intellectual property rights on the interests of indigenous and local communities who depend on local biodiversity for their

livelihoods and welfare. We will also work to ensure intellectual property rights promote the conservation of biodiversity. We will work with multilateral institutions, such as the World Intellectual Property Organization (WIPO), WTO and UNCTAD, to help developing countries restructure their intellectual property rights systems, and implement the WTO Trade Related Aspects of Intellectual Property Rights (TRIPS) Agreement, in order to support domestic investment and attract foreign investment.

Standards

3.35 Dismantling the barriers to international trade and investment is essential. But we also need to ensure that the benefits contribute to poverty elimination and sustainable development. Increasing attention is therefore being paid in international fora, in the business community and in consumer and development groups to the issue of standards.

Core Labour Standards

3.36 We are working for the worldwide observance of core labour standards for all workers, including those in the informal sector where female workers are concentrated. These are human rights and must not be misused for protectionist purposes to deprive developing countries

of the opportunity to benefit from their comparative advantages.

- In the UK we are supporting collaboration between business and the voluntary sector in promoting ethical business, including the development of codes of conduct and ways of monitoring and verifying these codes.
- In developing countries, we shall look at ways of supporting local capacity to develop and monitor voluntary codes of conduct including assistance to Ministries of Labour, trades unions, NGOs and employers' associations.
- At international level, we shall support the efforts of the International Labour Organization (ILO) to promote internationally recognised core labour standards. We shall seek to strengthen the ILO's ability to make progress in eliminating exploitative and abusive practices throughout the world by increasing our support to its technical co-operation programmes, such as the International Programme on the Elimination of Child Labour, and by using its supervisory activities to encourage adherence to human rights in the workplace. We are active participants in the efforts of the international community to eradicate speedily all intolerable forms of child labour and

SECTION 3

CONSISTENCY OF POLICIES

shall do our best to ensure that the new ILO Convention designed to tackle this problem helps to stop the worst abuses. We shall also support the development of the ILO programme More and Better Jobs for Women.

- We shall promote a human rights based approach to labour issues in our support to multilateral organisations, including the European Community and the World Bank. We are supporting the use of positive incentives in the EU Generalised System of Preferences to link enhanced market access terms to adherence to these standards. We shall press for the EU to reaffirm at the WTO Ministerial conference in May 1998 its commitment to support the ILO's work in promoting labour standards and to have this reflected in any Declaration. We shall also press for systematic reporting by the ILO and WTO Secretariats on their collaboration in this area.

Environment Standards

3.37 Products which use natural resources sustainably can meet the growing wish of British and other consumers to minimise the damage that our consumption does to the environment and can offer sustainable livelihoods to some of the world's poorest people. The Government will work with producers and importers to

increase trade in sustainably produced products and services from developing countries, including by supporting voluntary certification and labelling.

3.38 Trade rules should not be used to impose unfair standards on developing countries or to discriminate unfairly against their exports. We will work to ensure that the interests of the environment are fairly reflected in the development of the global trading system. Most developing countries have signed the main Multilateral Environment Agreements. We will support their efforts to comply with those agreements and encourage others to join. In areas where clearer international standards are needed, we will support work to develop these.

3.39 The Government will work where appropriate with developing countries to support their efforts to raise their domestic environment standards. We will focus on this in order to help them meet the UN target of implementing national sustainable development strategies by 2005.

3.40 We shall strengthen the links between trade, environment and development as part of our review of our own Sustainable Development Strategy. We are also supporting work in the EU, WTO and UNCTAD on these issues.

Health Standards

3.41 We will do our best to ensure that the export and advertising of pharmaceutical products and other items such as tobacco and baby milk are conducted in a responsible way.

3.42 We are working with other governments towards a global ban on tobacco advertising. In the meantime we will support an international code of conduct for transnational companies advertising tobacco products, covering the content and exposure of children to advertising, and the use of health warnings.

3.43 We also support the World Health Organization's (WHO) International Code of Marketing of Breast Milk Substitutes, which sets minimum standards for labelling, advertising and promotion of infant formulas and other baby foods. We will support efforts to defend the Code.

Standards of Business Conduct

3.44 Bribery and corruption divert resources from poverty elimination and development (*see Panel 11*). We are working with developing countries and at the multilateral level to develop and implement policies designed to raise standards in this area. These efforts are reinforced by companies which refuse to pay bribes in order to win business contracts, and we

strongly support the OECD initiative to make the payment of bribes to foreign public officials in international commercial transactions a crime under national law. We will include anti-corruption clauses in all DFID contracts under our own development assistance programme, and we will work with partners in the Development Assistance Committee (DAC) of the OECD to include similar clauses in all contracts signed by DAC members. We will help partner governments to keep their own procurement procedures fair, transparent and up to date, and work to increase the professionalism of public sector purchasing.

Building Capacity

3.45 Dismantling barriers to international trade and investment will be of limited benefit if developing countries lack not just the supply but the human and institutional capacity to take advantage of new opportunities. We will support efforts to improve the multilateral coordination of technical assistance, and will also harness our own development assistance programme, in order to help developing countries build capacity:

- to manage the practical 'nuts and bolts' of the trade process, for instance customs procedures and trade regulations

- to improve their trade promotion efforts
- to participate fully in the WTO, and implement increasingly complex international obligations
- to meet international product standards

Knowledge and Information

3.46 As old barriers come down, countries seeking to enter the market face new problems. The amount of information required to trade successfully in today's global economy is daunting. Exporters need information about market opportunities, trade rules and procedures and product standards. Important work is being undertaken in this area by the International Trade Centre (ITC). We will support international efforts to find new ways of sharing knowledge and information, and assess whether there is a direct role we play ourselves in this area.

Institutions

3.47 Developing countries must be encouraged to participate fully in the WTO. Its provisions already recognise their interests and that they cannot always assume their obligations, for instance to open their own markets, as rapidly as developed countries. We support work in WTO and UNCTAD to enable member countries to adjust effectively to meet these

obligations and take advantage of their rights and to enhance the understanding of countries in the process of accession. We also support work to analyse the impact of trade agreements and issues on the international trade agenda from a development perspective.

Promoting Political Stability, Social Cohesion and Responding Effectively to Conflict

3.48 The promotion of a peaceful and stable world is a key element of British international policy. Political stability both within and between states is a necessary pre-condition for the elimination of poverty. Half of the world's low income countries are suffering, or have just emerged from, serious conflicts. Today there are some 28 major and more than 100 minor armed conflicts affecting some 70 countries. The nature of warfare has changed with a greater preponderance of intra-state conflict; civilians are now 10 times more likely than soldiers to be the victims of such conflicts.

3.49 Violent conflict generates social division, reverses economic progress, impedes sustainable development and frequently results in human rights violations. Large population movements triggered by conflict threaten the security and livelihood of whole regions. There are currently over 30 million refugees and

SECTION 3

CONSISTENCY OF POLICIES

persons displaced by violence who count amongst the poorest people in the world. The 10 poorest countries in the world are all hosting, or have generated, refugees. Some measures to address migration issues, which relate not only to refugees but also voluntary migrants, are set out at *Panel 23*.

3.50 Conflict prevention is therefore crucial to combat poverty and reduce suffering. Although tensions and disputes are inevitable in the process of development, problems arise when society cannot represent and manage its different interests in a constructive manner.

PANEL 23

INTERNATIONAL MIGRATION

Migration is a long-standing phenomenon. It can be driven by, for example, disasters, conflict and the persecution of minorities, and economic factors. The pressures of a growing population combined with the fragile environments of many poor countries has increased migration as people leave their homelands – no longer able to gain a secure livelihood because of drought, soil erosion, desertification and other environmental problems. In 1990, 120 million people – or around two per cent of the world's population – were living outside their country of origin.

Developmental impact. Migration can have both positive and negative effects on development. Migrants may meet critical labour needs in the receiving country. Many send home remittances which are a very important source of foreign exchange for a number of countries. However, a brain drain may slow development in the sending country and the social fabric is weakened by family break-up. In the short term sudden disorderly large-scale migration flows – frequently the case for refugee movements – can make social and economic integration difficult, and can impact adversely on receiving countries.

UK policy. Our objective is to help developing countries manage migration flows as beneficially as possible:

- We will work through the UN and other international organisations and within the EU to pursue our objective
- We will be active in the field of conflict prevention as well as providing humanitarian assistance
- We will support broad-based economic growth, which will help to reduce migratory pressures
- We will fund research into the impact of migration on development and the environment in order to refine our policy
- We will not, however, target scarce resources directly at reducing voluntary migration, not least because there is no evidence to suggest that this is effective
- We will seek to build on the skills and talents of migrants and other members of ethnic minorities within the UK to promote the development of their countries of origin

SECTION 3

CONSISTENCY OF POLICIES

Understanding the causes of conflict, and helping build the will and capacity of state and civil society to resolve disputes non-violently will be central to our international policy. To achieve this, we shall deploy our diplomatic, development assistance and military instruments in a coherent and consistent manner to:

- spread the values of civil liberties and democracy, rule of law and good governance, and foster the growth of a vibrant and secure civil society
- strengthen social cohesion, promote mediation efforts and encourage the regeneration of societies recovering from conflict
- protect and promote the full enjoyment of all human rights
- help solve political and other problems before they cause conflict
- advocate measures to control the means of waging war
- provide humanitarian assistance for victims of conflict and persecution
- contribute to international peacekeeping

3.51 To develop the capacity of the international community to tackle the root causes of violent conflict requires a

coherent system-wide response. We welcome the UN Secretary-General's reform efforts and will use our permanent seat on the Security Council to strengthen the UN's role in conflict prevention and peace building. We support the creation of a more proactive and coordinated conflict prevention capacity within the UN Secretariat. We also recognise the need to counter the culture of impunity that pervades today's conflicts; we support the creation of a permanent International Criminal Court and will continue to back and seek to strengthen the Tribunals in Rwanda and Former Yugoslavia.

3.52 Preventive diplomacy will continue to be pursued bilaterally, and through membership of other international bodies. Within the European Union, we shall seek better linkage of foreign, security and development co-operation policies, and implement existing Council Conclusions on conflict prevention. In addition, we intend to develop stronger peacebuilding and conflict management roles for the Commonwealth, the Organization for Security and Co-operation in Europe (OSCE) and other regional organisations, and will support practical measures to build up such capabilities in other regions, particularly Africa. In peace time we can deploy the extensive experience of our own armed forces to promote mutual understanding and confidence, and to help other countries

to develop democratically accountable armed forces. In times of crisis, early deployment of military forces can promote stability and thus stem or prevent conflict. We will continue to provide forces for operations in support of international order and humanitarian principles.

3.53 Our development co-operation effort in divided societies will be informed by the OECD Guidelines on Conflict, Peace and Development. We shall encourage the European Commission, UNDP and others to take a proactive approach to peace-building. In our bilateral programme, we shall seek to find alternative channels for mediation; we shall promote social cohesion and support *bridges for peace* which reach out to marginalised groups through access to political decision-making, social networks, economic resources and information. We shall seek to strengthen local capacities for peace-building in particular with women who are traditionally excluded from such efforts. Social exclusion, for whatever reason, creates an unstable environment in which the well-being of all may ultimately be threatened.

3.54 We shall continue generous provision for humanitarian assistance through UN and Red Cross agencies, NGOs and partner governments. Recognising the problems of diversion and manipulation of external assistance in

conflict situations, such help will be based on carefully assessed needs. We shall seek agreement on a code of ethical conduct for organisations working in conflict areas. The protection and promotion of human rights and the observance of international humanitarian law will be integral to all of our programmes of humanitarian assistance. We shall actively work with the International Committee of the Red Cross, the UN High Commissioner for Refugees, the UN High Commissioner for Human Rights and other agencies to find better means of safeguarding humanitarian workers. We shall work to ensure that humanitarian issues are properly taken into account when considering international political and peacekeeping interventions. Seeking durable solutions to long-standing crises, including for refugee and displaced populations, will be a priority.

3.55 In seeking to limit the means for waging wars, we shall continue to be active in arms control negotiations. We support the proposed EU programme on curbing illicit trafficking in conventional arms. We shall complement our own moratorium on the use and bans on the import, export, transfer and manufacture of anti-personnel landmines with vigorous efforts to secure the widest possible, permanent global ban, and continued support for mine clearance programmes. We shall seek to discourage excessive military expenditure in developing countries by helping further to

SECTION 3

CONSISTENCY OF POLICIES

develop the OECD Agenda for Action, and encouraging the international financial institutions to focus on this issue in their policy dialogue with developing countries.

Promoting Economic and Financial Stability

3.56 Economic and financial stability depends crucially on political stability; but the same is true in reverse, and badly regulated financial systems, volatile capital flows, upheavals created by money-laundering or drugs trafficking and corruption can lead in their turn to political instability. Developing countries are particularly vulnerable to such instability, and it is important that there should be a well-managed and regulated set of international mechanisms to support beneficial regulation and stability and bear down on corruption. The international community has an important role in contributing to financial stability, for example, through surveillance by the IMF and work on banking supervision.

Debt Sustainability

3.57 While developing countries finance much of their investments from their own savings, nearly all need to import some of the necessary capital from abroad. While some of this may be in grant form or private investment, loans are also important. But money these countries borrow accumulates as debts and needs to be repaid.

3.58 Often this goes well. The capital is invested wisely, and the country follows beneficial and transparent economic policies. But sometimes a country over-borrows – a problem often made worse by lenders who do not make responsible creditworthiness assessments. Money may be wasted or spent unproductively, for example on excessive military spending. Or sometimes countries may, through no fault of their own, suffer a severe external shock such as a collapse in the price of its exports.

3.59 Countries may then have an unsustainable debt burden (*see Figure 15*). They may not be able to export and earn enough foreign currency to pay the debt service due each year. Some of the poorest countries now have to pay out over half their export earnings in external debt service, and may have to allocate far more to paying old foreign debts than to health and education (*see Figure 16*). And the overhang of unpayable foreign debts may discourage new investment and therefore growth, thus creating a long-term barrier to development.

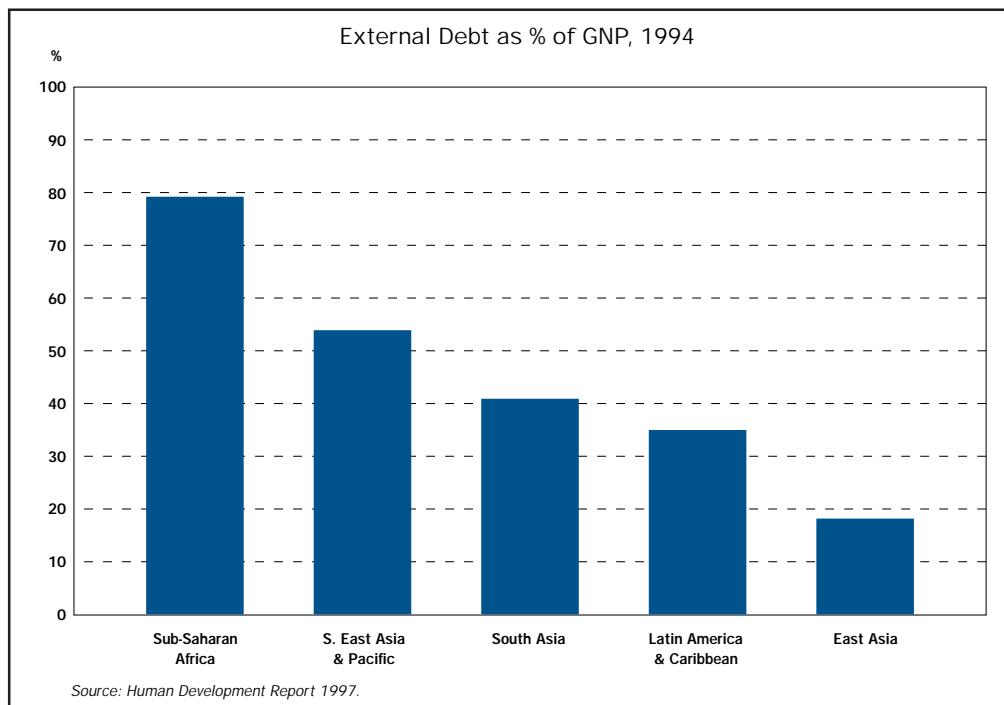
3.60 Britain has long recognised the burden of excessive debts carried by some developing countries. In 1978, the UK started a policy of converting aid loans into grants to the poorest countries, benefiting over 30 countries so far and providing relief of some £1.2 billion. As part of the

SECTION 3
CONSISTENCY OF POLICIES

Mauritius Mandate (*Panel 24*) we announced that the UK was willing in principle to cancel the remaining aid debt due to the UK from lower income Commonwealth countries at a cost of up to £132 million. Relief will be provided to those countries which are committed to the international development targets and are following sound economic policies which benefit the poor, and which promote responsive and accountable government, encourage transparency and bear down on corruption. We will encourage other donors to follow our lead, and are prepared to extend the initiative to non-Commonwealth countries, in concert with other donors.

3.61 Of course the UK alone cannot deal with the problem. We must work with our partners and fellow creditors. The international community provides debt relief, linked to IMF programmes designed with the debtor country to support approved economic policies. Relief provides balance of payments support during an adjustment programme. Over the last decade the Paris Club of creditors has written off a substantial part of the debts of some poor countries. As part of this process the UK, like others, provides relief on export credit-related debts. Money owed to commercial banks is discussed in the London Club, which generally follows similar principles.

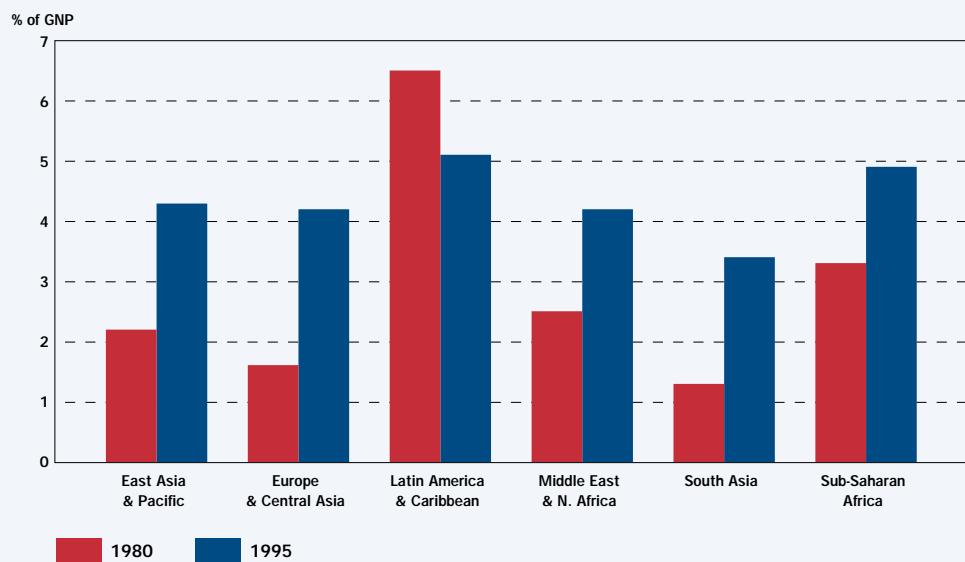
FIGURE 15



SECTION 3
CONSISTENCY OF POLICIES

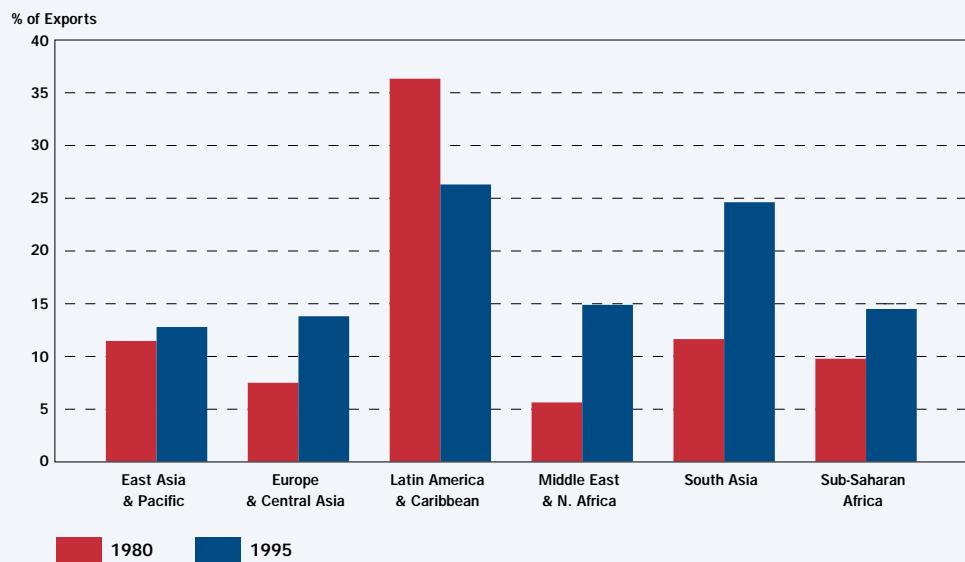
FIGURE 16

Total Debt Service as Percentage of GNP



Source: *World Development Indicators 1997*.

Total Debt Service as Percentage of Exports of Goods and Services



Source: *World Development Indicators 1997*.

3.62 Following a British initiative, a new programme of relief for Heavily Indebted Poor Countries (HIPCs) was agreed at the annual meeting of the IMF and the World Bank in September 1996. For the first time, these and other multilateral institutions will provide relief on debt owed to them. In parallel, the Paris Club will increase its maximum rate of debt reduction by up to 80 per cent. The key objective is that any poor country which follows sensible economic policies should be able to achieve debt sustainability, which means that their levels of debt must be affordable without the need for further rescheduling.

3.63 It has already been agreed that the first country to benefit under the HIPC Initiative will be Uganda, which is expected to receive debt relief from multilateral creditors as well as further relief from bilateral creditors in April 1998. A number of other countries will be considered before the end of 1997. As part of the Initiative, the UK will contribute to financing relief on Uganda's debts to the African Development Bank, which is the only one of the regional development banks unable to support all its own contributions.

3.64 At the Denver summit of eight leading industrialised democracies (the G8) in June 1997, the Government supported further implementation of the HIPC

Initiative and the expectation that additional countries would qualify in the months ahead. We also welcomed the news of a preliminary agreement between Russia and the Paris Club. It has since been confirmed that, prior to it joining the Paris Club as a creditor, Russia will write off a large proportion of its nominal claims on poor countries, greatly reducing the unsustainable debt overhang of some of them.

3.65 At the Commonwealth Finance Ministers' meeting in September 1997, the Government proposed a new Commonwealth debt initiative – the Mauritius Mandate (*see Panel 24*) – where the UK sought support for an international commitment to deal with the problem of unsustainable debt once and for all.

Money Laundering and Drugs

3.66 Money laundering – the movement of criminally derived funds for the purpose of concealing their true source – is an international problem. It damages and distorts countries' economies – producing unfair competition for legitimate businesses and handicapping governments' ability to make proper economic judgements. In extreme cases, money laundering can corrupt the entire political and financial systems of a country. It is the poor that bear the burden of this inefficiency and waste.

SECTION 3

CONSISTENCY OF POLICIES

3.67 There is a growing consensus about the need for effective anti-money laundering measures as a key element in any strategy to combat international crime. With our partners in the G7 and EU, we have given strong support to the work of the Financial Action Task Force (FATF), whose internationally accepted recommendations set out the legal and

regulatory measures that countries should take to combat money laundering. We have also played a leading role in encouraging the establishment of regional task forces, modelled on the FATF itself, which should help all countries round the globe to design and implement comprehensive anti-money laundering strategies. In addition we are pressing the International Financial

PANEL 24

A NEW APPROACH TO DEBT RELIEF

At the Commonwealth Finance Ministers' annual meeting in September 1997, the UK Government launched its Mauritius Mandate. This aims to ensure that, by the year 2000, all eligible poor countries have at least made a start on having their debts reduced to affordable levels. It also calls for faster implementation of the Heavily Indebted Poor Countries (HIPC) Debt Initiative. Specifically, the Government is seeking firm decisions by the Millennium on the amount and terms of relief for at least three quarters of the countries eligible under the Initiative. And those countries that have already established strong track records of economic reform should receive the maximum possible relief in a shorter time frame than the six years envisaged under the current rules of the Initiative.

The Mandate also emphasises the need to persuade other government creditors to be prepared to write off, where necessary, all categories of bilateral debt (including that most recently incurred), for the international community to analyse whether any gaps exist in current mechanisms and for debtors to have a strong voice in debt negotiations. The UK will provide a lead by:

- contributing around £6.5 million towards reducing Uganda's debts to the African Development Bank
- cancelling – at a cost of up to £132 million – aid debts still owed to the UK by those lower income Commonwealth countries which are committed to pro-poor and transparent policies
- offering technical assistance in debt management to poor countries, particularly those in the Commonwealth
- pledging, without condition, around £20 million to the IMF, to help it meet its share of the costs of implementing the HIPC Initiative
- confining official credits for heavily indebted, poor countries to productive expenditure, for a two-year period, whilst we seek to negotiate an international agreement covering all poor countries

In launching the Mandate, the Government called on creditors (ie other governments and international financial institutions) to follow the UK's lead, and urged debtor countries to adopt and keep to the sound policies needed to achieve sustainable development.

Institutions (IFIs) – the International Monetary Fund, the World Bank and regional development banks – to take account more explicitly of the need for all countries to have effective and efficient anti-money laundering controls in place. The IFIs also have a role in the provision of policy advice and technical assistance.

3.68 Measures to combat money laundering are an essential part of any global anti-drugs strategy. Coordinated action on drugs is a high priority for the Government nationally and internationally. The international illicit drugs trade – cultivation, trafficking and use – is detrimental to the sustainable economic and social development of many countries; and it is a threat to the social fabric of our own society, especially poor neighbourhoods.

3.69 The drugs problem and its contribution to poverty will only be successfully tackled through a wide-ranging strategy covering demand reduction, law enforcement, alternative development and crop eradication. The UK is one of the major donors to the United Nations Drug Control Programme through which we are able, with other donors, to fund a wide range of individual projects. The EU is also a major source of funds for drug-related assistance. We have used this to advantage in the Caribbean, where narco-corruption poses a particular threat to the stability and development of the smaller democracies.

3.70 Other sources of international co-operation and influence are the IFIs. In association with like-minded countries, and to the extent that their statutes permit, we are pressing these institutions to take into account borrowers' money laundering policies and legislation when considering country programmes, and to seek opportunities to support drugs-related projects in priority countries.

3.71 The Government's policy will be to focus more drugs assistance on key drug exporting countries or regions, taking account of the gravity of the situation, the extent of recipient country commitment to tackling the problems and the UK's capacity to help. This can include law enforcement training, equipment, support for alternative development and demand reduction. The UK's resources are limited and so must be tightly targeted and conditional on effective supporting policies on the part of recipient governments. In geographical terms, the bulk of UK drugs-related assistance (80 per cent) is directed at South East Asia and the heroin transit routes to Western Europe; and the cocaine route in Latin America and the Caribbean. Poverty is one of the root causes of the drugs problem in many developing countries. By tackling poverty and helping to develop legitimate livelihoods for poor people we can help to stem the international trade in drugs.

BUILDING SUPPORT FOR DEVELOPMENT

We shall

- increase public understanding of our mutual dependence and the need for international development
- ensure that resources made available for development are used only for the purposes intended, and consider the case for a new International Development Act
- provide the necessary resources for the development programme: the Government will start to reverse the decline in UK spending on development assistance, and reaffirms the UK's commitment to the 0.7 per cent UN target

4.1 International development cannot succeed without the necessary political will in the developing countries. Nor can it succeed without the full support of the international community. The British people have shown consistently through their support for the voluntary agencies who work overseas and their readiness to contribute generously to disasters and emergencies that they care about what happens in poorer countries. We propose to build on and respond to that support by increasing public awareness; by establishing a clear framework for the Government's development programme; and by providing enhanced development resources.

4.2 Giving people in Britain the facts about the forces that are shaping the world – and their lives – will help strengthen support for this effort. The British people should have accurate, unbiased, accessible

information about the causes of poverty and inequality in developing countries, and about what the international community can do. It is also right that they should understand the dangers for the future of their world of failing to address the problems of environmental degradation, overpopulation and the instability arising from extreme poverty and lack of access to basic resources. And it is right that we should be held publicly to account to show that their resources are being put to good use.

4.3 The Government therefore attaches great importance to increasing development awareness in Britain. Every child should be educated about development issues, so that they can understand the key global considerations which will shape their lives. And every adult should have the chance to influence the Government's policies. Getting these

policies right is essential if they are to fulfil their duty to hand on a better world to their grandchildren.

4.4 The Government will establish a working group of educationalists and others (including the business sector, trades unions, the churches, the voluntary organisations and the media) to consider and promote awareness and understanding. This group will be chaired by the Parliamentary Under Secretary of State for International Development. We will work to ensure that global issues are integrated into the national curriculum and that relevant teaching materials are available. We will examine ways of improving progress in other aspects of formal and informal education and youth work.

4.5 We will also establish an annual Development Policy Forum, chaired by the Secretary of State for International Development, to allow individuals and representatives of groups from all parts of society – academics, research institutes, the voluntary sector, the private sector and others – to share thinking and ideas for development and to draw on their wealth of knowledge and experience. Following the Forum, we will publish an *Annual Report*, which will explain how we are setting about the tasks described in this White Paper, and what progress has been made against the international

development targets. To inform this, we are playing a full part in work which is going on internationally to agree indicators against which progress can be measured, recognising the difficulties of attributing outcomes to specific investments or interventions. We envisage that publication of the *Annual Report* could be an occasion for a Parliamentary debate on international development.

4.6 It is important to public confidence that there should be a clear and unambiguous framework for the use of our development funds. The consultation mechanisms described above will help to ensure this. We will also decide after consultation whether there is a case for the introduction of a new International Development Act when the legislative timetable permits which would provide a clear statement of our commitment to eliminate poverty and promote sustainable development. All of the actions proposed in this White Paper can be put in place under the existing Overseas Development and Co-operation Act (1980).

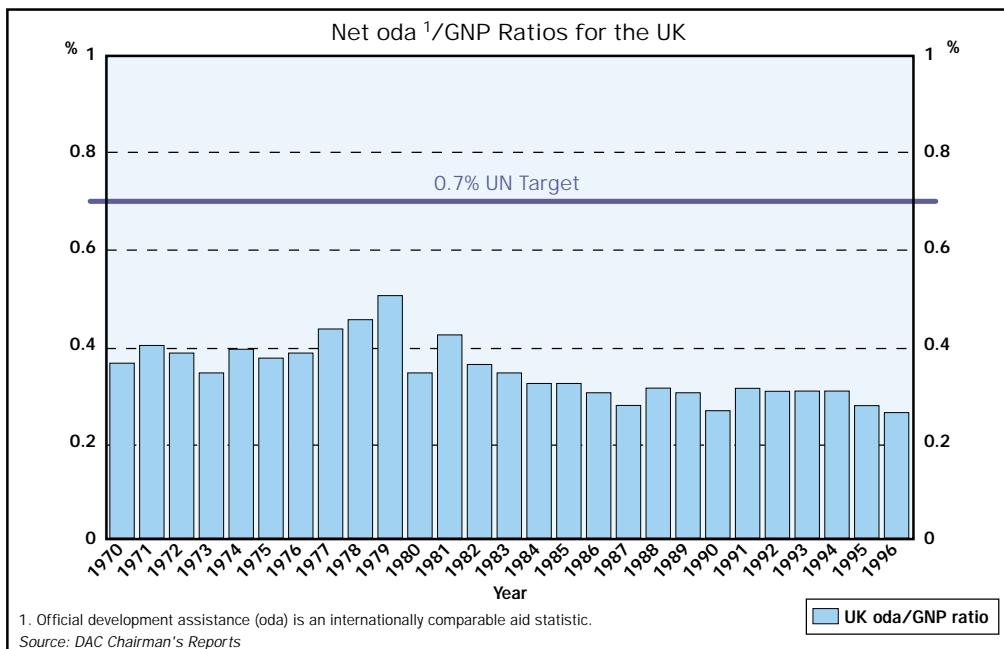
4.7 We can help development by use of our international influence, by developing partnerships and by working for greater consistency in areas such as trade and agriculture, as described in Sections 1-3 above. But the poorest developing countries will require substantial

SECTION 4
BUILDING SUPPORT FOR DEVELOPMENT

concessional resource transfers until at least the end of the first quarter of the next century if they are to develop the capacity to carry through an economic growth and poverty elimination agenda by themselves. Our objective should be to achieve in that time-scale a world in which concessional transfers on this scale are no longer necessary. The 1997 UN Human Development Report estimates that the additional cost of alleviating income poverty and achieving basic services for all in developing countries is likely to be in the order of \$80 billion a year. Total concessional resource transfers from the developed to the developing world are at present in the order of \$55 billion a year.

4.8 The resources which the international community has made available to support the development process have declined over recent years. If we are to make progress towards our goals we must do better. We must demonstrate that we are serious and reliable partners. The previous Administration almost halved Britain's development assistance as a proportion of GNP. In 1979, Britain's net official development assistance was 0.51 per cent of GNP and rising. It is now 0.27 per cent of GNP and has been falling steadily. Britain's development programme of £2.2 billion is the sixth largest in the world in terms of volume; but Britain ranks only 15th among the 21 donor member states of

FIGURE 17



the Development Assistance Committee of the OECD in the proportion of its GNP devoted to official development assistance (*see Figure 17*).

4.9 As this White Paper makes clear, the Government will improve the quality of our development programme by refocusing our efforts on eliminating poverty. We are committed also to reversing the decline in the British development assistance budget and to the UN target of 0.7 per cent of GNP. This year and next we have said that we will work within existing financial ceilings while conducting a comprehensive expenditure review to ensure that all our resources are used effectively and in accordance with our policy priorities. Having done so we can justify increasing our development assistance budget from 1999/2000. All our future assistance to developing countries will be on grant

terms. The development programme will remain a vital mechanism in achieving the key objective of poverty elimination.

4.10 Sustainable international development is central to the Government's position of building a new society. Not just a new society in Britain, but a new global society. If we do not succeed, the consequences for succeeding generations could be catastrophic. But we can succeed. In spite of setbacks, the lessons of development in recent decades give us real grounds for optimism. There is an encouraging consensus about what is needed to eliminate extreme poverty from the planet. This country is uniquely well placed to develop the partnerships with developing countries, within the UK and within the international community necessary to turn this aspiration into reality. The Government commits itself to this high endeavour.

LIST OF ABBREVIATIONS

ATP	Aid and Trade Provision	MDI	Multilateral Development
CAP	Common Agricultural Policy	Institution	
CDC	Commonwealth Development Corporation	NGO	Non-Governmental Organization
DAC	Development Assistance Committee	NSSD	National Strategies of Sustainable Development
DFID	Department for International Development	ODA	Official Development Assistance
EC	European Community – see also EU	OECD	Organization for Economic Co-operation and Development
ECGD	Export Credits Guarantee Department	OSCE	Organization for Security and Co-operation in Europe
ECHO	European Commission Humanitarian Office	STD	Sexually Transmitted Diseases
EU	European Union – see also EC	UN	United Nations
FATF	Financial Action Task Force	UNCHS	United Nations Centre for Human Settlements (Habitat)
GDP	Gross Domestic Product	UNCTAD	United Nations Conference on Trade and Development
GNP	Gross National Product	UNDP	United Nations Development Programme
GPEX	Gross Public Expenditure on Aid	UNESCO	United Nations Educational, Scientific and Cultural Organization
GSP	Generalised System of Preferences	UNIDO	United Nations Industrial Development Organization
HIPCS	Heavily Indebted Poor Countries	WHO	World Health Organization
IFIs	International Finance Institutions	WIPO	World Intellectual Property Organization
ILO	International Labour Organization	WTO	World Trade Organization
IMF	International Monetary Fund		
ITC	International Trade Centre		
MAI	Multilateral Agreement on Investment		

5

Sustainable Development, Poverty Eradication and Reducing Inequalities

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Table of Contents

Executive Summary.....	447
5.1 Scope and Delineations	450
5.1.1 Sustainable Development, SDGs, Poverty Eradication and Reducing Inequalities	450
5.1.2 Pathways to 1.5°C.....	450
5.1.3 Types of evidence.....	451
5.2 Poverty, Equality and Equity Implications of a 1.5°C Warmer World.....	451
5.2.1 Impacts and Risks of a 1.5°C Warmer World: Implications for Poverty and Livelihoods.....	452
5.2.2 Avoided Impacts of 1.5°C Versus 2°C Warming for Poverty and Inequality.....	452
5.2.3 Risks from 1.5°C Versus 2°C Global Warming and the Sustainable Development Goals.....	453
Cross-Chapter Box 12: Residual Risks, Limits to Adaptation and Loss and Damage	454
5.3 Climate Adaptation and Sustainable Development.....	456
5.3.1 Sustainable Development in Support of Climate Adaptation	456
5.3.2 Synergies and Trade-Offs between Adaptation Options and Sustainable Development	457
5.3.3 Adaptation Pathways towards a 1.5°C Warmer World and Implications for Inequalities.....	458
Box 5.1 : Ecosystem- and Community-Based Practices in Drylands.....	459
5.4 Mitigation and Sustainable Development.....	459
5.4.1 Synergies and Trade-Offs between Mitigation Options and Sustainable Development	459
Box 5.2: Challenges and Opportunities of Low-Carbon Pathways in Gulf Cooperative Council Countries	462
5.4.2 Sustainable Development Implications of 1.5°C and 2°C Mitigation Pathways.....	463
5.5 Sustainable Development Pathways to 1.5°C	466
5.5.1 Integration of Adaptation, Mitigation and Sustainable Development.....	467
5.5.2 Pathways for Adaptation, Mitigation and Sustainable Development.....	467
5.5.3 Climate-Resilient Development Pathways	468
Box 5.3: Republic of Vanuatu – National Planning for Development and Climate Resilience	471
Cross-Chapter Box 13: Cities and Urban Transformation ...	472
5.6 Conditions for Achieving Sustainable Development, Eradicating Poverty and Reducing Inequalities in 1.5°C Warmer Worlds.....	474
5.6.1 Finance and Technology Aligned with Local Needs....	474
5.6.2 Integration of Institutions.....	474
5.6.3 Inclusive Processes	475
5.6.4 Attention to Issues of Power and Inequality.....	475
5.6.5 Reconsidering Values.....	475
5.7 Synthesis and Research Gaps	475
Frequently Asked Questions	
FAQ 5.1 What are the Connections between Sustainable Development and Limiting Global Warming to 1.5°C above Pre-Industrial Levels?	477
FAQ 5.2 What are the Pathways to Achieving Poverty Reduction and Reducing Inequalities while Reaching a 1.5°C World?	479
References	510

Executive Summary

This chapter takes sustainable development as the starting point and focus for analysis. It considers the broad and multifaceted bi-directional interplay between sustainable development, including its focus on eradicating poverty and reducing inequality in their multidimensional aspects, and climate actions in a 1.5°C warmer world. These fundamental connections are embedded in the Sustainable Development Goals (SDGs). The chapter also examines synergies and trade-offs of adaptation and mitigation options with sustainable development and the SDGs and offers insights into possible pathways, especially climate-resilient development pathways towards a 1.5°C warmer world.

Sustainable Development, Poverty and Inequality in a 1.5°C Warmer World

Limiting global warming to 1.5°C rather than 2°C above pre-industrial levels would make it markedly easier to achieve many aspects of sustainable development, with greater potential to eradicate poverty and reduce inequalities (medium evidence, high agreement). Impacts avoided with the lower temperature limit could reduce the number of people exposed to climate risks and vulnerable to poverty by 62 to 457 million, and lessen the risks of poor people to experience food and water insecurity, adverse health impacts, and economic losses, particularly in regions that already face development challenges (medium evidence, medium agreement). {5.2.2, 5.2.3} Avoided impacts expected to occur between 1.5°C and 2°C warming would also make it easier to achieve certain SDGs, such as those that relate to poverty, hunger, health, water and sanitation, cities and ecosystems (SDGs 1, 2, 3, 6, 11, 14 and 15) (medium evidence, high agreement). {5.2.3, Table 5.2 available at the end of the chapter}

Compared to current conditions, 1.5°C of global warming would nonetheless pose heightened risks to eradicating poverty, reducing inequalities and ensuring human and ecosystem well-being (medium evidence, high agreement). Warming of 1.5°C is not considered 'safe' for most nations, communities, ecosystems and sectors and poses significant risks to natural and human systems as compared to the current warming of 1°C (high confidence). {Cross-Chapter Box 12 in Chapter 5} The impacts of 1.5°C of warming would disproportionately affect disadvantaged and vulnerable populations through food insecurity, higher food prices, income losses, lost livelihood opportunities, adverse health impacts and population displacements (medium evidence, high agreement). {5.2.1} Some of the worst impacts on sustainable development are expected to be felt among agricultural and coastal dependent livelihoods, indigenous people, children and the elderly, poor labourers, poor urban dwellers in African cities, and people and ecosystems in the Arctic and Small Island Developing States (SIDS) (medium evidence, high agreement). {5.2.1, Box 5.3, Chapter 3, Box 3.5, Cross-Chapter Box 9 in Chapter 4}

Climate Adaptation and Sustainable Development

Prioritization of sustainable development and meeting the SDGs is consistent with efforts to adapt to climate change (high

confidence). Many strategies for sustainable development enable transformational adaptation for a 1.5°C warmer world, provided attention is paid to reducing poverty in all its forms and to promoting equity and participation in decision-making (medium evidence, high agreement). As such, sustainable development has the potential to significantly reduce systemic vulnerability, enhance adaptive capacity, and promote livelihood security for poor and disadvantaged populations (high confidence). {5.3.1}

Synergies between adaptation strategies and the SDGs are expected to hold true in a 1.5°C warmer world, across sectors and contexts (medium evidence, medium agreement). Synergies between adaptation and sustainable development are significant for agriculture and health, advancing SDGs 1 (extreme poverty), 2 (hunger), 3 (healthy lives and well-being) and 6 (clean water) (robust evidence, medium agreement). {5.3.2} Ecosystem- and community-based adaptation, along with the incorporation of indigenous and local knowledge, advances synergies with SDGs 5 (gender equality), 10 (reducing inequalities) and 16 (inclusive societies), as exemplified in drylands and the Arctic (high evidence, medium agreement). {5.3.2, Box 5.1, Cross-Chapter Box 10 in Chapter 4}

Adaptation strategies can result in trade-offs with and among the SDGs (medium evidence, high agreement). Strategies that advance one SDG may create negative consequences for other SDGs, for instance SDGs 3 (health) versus 7 (energy consumption) and agricultural adaptation and SDG 2 (food security) versus SDGs 3 (health), 5 (gender equality), 6 (clean water), 10 (reducing inequalities), 14 (life below water) and 15 (life on the land) (medium evidence, medium agreement). {5.3.2}

Pursuing place-specific adaptation pathways towards a 1.5°C warmer world has the potential for significant positive outcomes for well-being in countries at all levels of development (medium evidence, high agreement). Positive outcomes emerge when adaptation pathways (i) ensure a diversity of adaptation options based on people's values and the trade-offs they consider acceptable, (ii) maximize synergies with sustainable development through inclusive, participatory and deliberative processes, and (iii) facilitate equitable transformation. Yet such pathways would be difficult to achieve without redistributive measures to overcome path dependencies, uneven power structures, and entrenched social inequalities (medium evidence, high agreement). {5.3.3}

Mitigation and Sustainable Development

The deployment of mitigation options consistent with 1.5°C pathways leads to multiple synergies across a range of sustainable development dimensions. At the same time, the rapid pace and magnitude of change that would be required to limit warming to 1.5°C, if not carefully managed, would lead to trade-offs with some sustainable development dimensions (high confidence). The number of synergies between mitigation response options and sustainable development exceeds the number of trade-offs in energy demand and supply sectors; agriculture, forestry and other land use (AFOLU); and for oceans (very high confidence). {Figure 5.2, Table 5.2 available at the end of the chapter} The 1.5°C

pathways indicate robust synergies, particularly for the SDGs 3 (health), 7 (energy), 12 (responsible consumption and production) and 14 (oceans) (*very high confidence*). {5.4.2, Figure 5.3} For SDGs 1 (poverty), 2 (hunger), 6 (water) and 7 (energy), there is a risk of trade-offs or negative side effects from stringent mitigation actions compatible with 1.5°C of warming (*medium evidence, high agreement*). {5.4.2}

Appropriately designed mitigation actions to reduce energy demand can advance multiple SDGs simultaneously. Pathways compatible with 1.5°C that feature low energy demand show the most pronounced synergies and the lowest number of trade-offs with respect to sustainable development and the SDGs (*very high confidence*). Accelerating energy efficiency in all sectors has synergies with SDGs 7 (energy), 9 (industry, innovation and infrastructure), 11 (sustainable cities and communities), 12 (responsible consumption and production), 16 (peace, justice and strong institutions), and 17 (partnerships for the goals) (*robust evidence, high agreement*). {5.4.1, Figure 5.2, Table 5.2} Low-demand pathways, which would reduce or completely avoid the reliance on bioenergy with carbon capture and storage (BECCS) in 1.5°C pathways, would result in significantly reduced pressure on food security, lower food prices and fewer people at risk of hunger (*medium evidence, high agreement*). {5.4.2, Figure 5.3}

The impacts of carbon dioxide removal options on SDGs depend on the type of options and the scale of deployment (*high confidence*). If poorly implemented, carbon dioxide removal (CDR) options such as bioenergy, BECCS and AFOLU would lead to trade-offs. Appropriate design and implementation requires considering local people's needs, biodiversity and other sustainable development dimensions (*very high confidence*). {5.4.1.3, Cross-Chapter Box 7 in Chapter 3}

The design of the mitigation portfolios and policy instruments to limit warming to 1.5°C will largely determine the overall synergies and trade-offs between mitigation and sustainable development (*very high confidence*). Redistributive policies that shield the poor and vulnerable can resolve trade-offs for a range of SDGs (*medium evidence, high agreement*). Individual mitigation options are associated with both positive and negative interactions with the SDGs (*very high confidence*). {5.4.1} However, appropriate choices across the mitigation portfolio can help to maximize positive side effects while minimizing negative side effects (*high confidence*). {5.4.2, 5.5.2} Investment needs for complementary policies resolving trade-offs with a range of SDGs are only a small fraction of the overall mitigation investments in 1.5°C pathways (*medium evidence, high agreement*). {5.4.2, Figure 5.4} Integration of mitigation with adaptation and sustainable development compatible with 1.5°C warming requires a systems perspective (*high confidence*). {5.4.2, 5.5.2}

Mitigation consistent with 1.5°C of warming create high risks for sustainable development in countries with high dependency on fossil fuels for revenue and employment generation (*high confidence*). These risks are caused by the reduction of global demand affecting mining activity and export revenues and challenges to rapidly decrease high carbon intensity of the domestic economy (*robust*

evidence, high agreement). {5.4.1.2, Box 5.2} Targeted policies that promote diversification of the economy and the energy sector could ease this transition (*medium evidence, high agreement*). {5.4.1.2, Box 5.2}

Sustainable Development Pathways to 1.5°C

Sustainable development broadly supports and often enables the fundamental societal and systems transformations that would be required for limiting warming to 1.5°C above pre-industrial levels (*high confidence*). Simulated pathways that feature the most sustainable worlds (e.g., Shared Socio-Economic Pathways (SSP) 1) are associated with relatively lower mitigation and adaptation challenges and limit warming to 1.5°C at comparatively lower mitigation costs. In contrast, development pathways with high fragmentation, inequality and poverty (e.g., SSP3) are associated with comparatively higher mitigation and adaptation challenges. In such pathways, it is not possible to limit warming to 1.5°C for the vast majority of the integrated assessment models (*medium evidence, high agreement*). {5.5.2} In all SSPs, mitigation costs substantially increase in 1.5°C pathways compared to 2°C pathways. No pathway in the literature integrates or achieves all 17 SDGs (*high confidence*). {5.5.2} Real-world experiences at the project level show that the actual integration between adaptation, mitigation and sustainable development is challenging as it requires reconciling trade-offs across sectors and spatial scales (*very high confidence*). {5.5.1}

Without societal transformation and rapid implementation of ambitious greenhouse gas reduction measures, pathways to limiting warming to 1.5°C and achieving sustainable development will be exceedingly difficult, if not impossible, to achieve (*high confidence*). The potential for pursuing such pathways differs between and within nations and regions, due to different development trajectories, opportunities and challenges (*very high confidence*). {5.5.3.2, Figure 5.1} Limiting warming to 1.5°C would require all countries and non-state actors to strengthen their contributions without delay. This could be achieved through sharing efforts based on bolder and more committed cooperation, with support for those with the least capacity to adapt, mitigate and transform (*medium evidence, high agreement*). {5.5.3.1, 5.5.3.2} Current efforts towards reconciling low-carbon trajectories and reducing inequalities, including those that avoid difficult trade-offs associated with transformation, are partially successful yet demonstrate notable obstacles (*medium evidence, medium agreement*). {5.5.3.3, Box 5.3, Cross-Chapter Box 13 in this chapter}

Social justice and equity are core aspects of climate-resilient development pathways for transformational social change. Addressing challenges and widening opportunities between and within countries and communities would be necessary to achieve sustainable development and limit warming to 1.5°C, without making the poor and disadvantaged worse off (*high confidence*). Identifying and navigating inclusive and socially acceptable pathways towards low-carbon, climate-resilient futures is a challenging yet important endeavour, fraught with moral, practical and political difficulties and inevitable trade-offs (*very high confidence*). {5.5.2, 5.5.3.3, Box 5.3} It entails deliberation and problem-solving

processes to negotiate societal values, well-being, risks and resilience and to determine what is desirable and fair, and to whom (*medium evidence, high agreement*). Pathways that encompass joint, iterative planning and transformative visions, for instance in Pacific SIDS like Vanuatu and in urban contexts, show potential for liveable and sustainable futures (*high confidence*). {5.5.3.1, 5.5.3.3, Figure 5.5, Box 5.3, Cross-Chapter Box 13 in this chapter}

The fundamental societal and systemic changes to achieve sustainable development, eradicate poverty and reduce inequalities while limiting warming to 1.5°C would require meeting a set of institutional, social, cultural, economic and technological conditions (*high confidence*). The coordination and monitoring of policy actions across sectors and spatial scales is essential to support sustainable development in 1.5°C warmer conditions (*very high confidence*). {5.6.2, Box 5.3} External funding and technology transfer better support these efforts when they consider recipients' context-specific needs (*medium evidence, high agreement*). {5.6.1} Inclusive processes can facilitate transformations by ensuring participation, transparency, capacity building and iterative social learning (*high confidence*). {5.5.3.3, Cross-Chapter Box 13, 5.6.3} Attention to power asymmetries and unequal opportunities for development, among and within countries, is key to adopting 1.5°C-compatible development pathways that benefit all populations (*high confidence*). {5.5.3, 5.6.4, Box 5.3} Re-examining individual and collective values could help spur urgent, ambitious and cooperative change (*medium evidence, high agreement*). {5.5.3, 5.6.5}

5.1 Scope and Delineations

This chapter takes sustainable development as the starting point and focus for analysis, considering the broader bi-directional interplay and multifaceted interactions between development patterns and climate actions in a 1.5°C warmer world and in the context of eradicating poverty and reducing inequality. It assesses the impacts of keeping temperatures at or below 1.5°C of global warming above pre-industrial levels on sustainable development and compares the impacts avoided at 1.5°C compared to 2°C (Section 5.2). It then examines the interactions, synergies and trade-offs of adaptation (Section 5.3) and mitigation (Section 5.4) measures with sustainable development and the Sustainable Development Goals (SDGs). The chapter offers insights into possible pathways towards a 1.5°C warmer world, especially through climate-resilient development pathways providing a comprehensive vision across different contexts (Section 5.5). The chapter also identifies the conditions that would be needed to simultaneously achieve sustainable development, poverty eradication, the reduction of inequalities, and the 1.5°C climate objective (Section 5.6).

5.1.1 Sustainable Development, SDGs, Poverty Eradication and Reducing Inequalities

Chapter 1 (see Cross-Chapter Box 4 in Chapter 1) defines sustainable development as ‘development that meets the needs of the present and future generations’ through balancing economic, social and environmental considerations, and then introduces the United Nations (UN) 2030 Agenda for Sustainable Development, which sets out 17 ambitious goals for sustainable development for all countries by 2030. These SDGs are: no poverty (SDG 1), zero hunger (SDG 2), good health and well-being (SDG 3), quality education (SDG 4), gender equality (SDG 5), clean water and sanitation (SDG 6), affordable and clean energy (SDG 7), decent work and economic growth (SDG 8), industry, innovation and infrastructure (SDG 9), reduced inequalities (SDG 10), sustainable cities and communities (SDG 11), responsible consumption and production (SDG 12), climate action (SDG 13), life below water (SDG 14), life on land (SDG 15), peace, justice and strong institutions (SDG 16) and partnerships for the goals (SDG 17).

5

The IPCC Fifth Assessment Report (AR5) included extensive discussion of links between climate and sustainable development, especially in Chapter 13 (Olsson et al., 2014) and Chapter 20 (Denton et al., 2014) in Working Group II and Chapter 4 (Fleurbaey et al., 2014) in Working Group III. However, the AR5 preceded the 2015 adoption of the SDGs and the literature that argues for their fundamental links to climate (Wright et al., 2015; Salleh, 2016; von Stechow et al., 2016; Hammill and Price-Kelly, 2017; ICSU, 2017; Maupin, 2017; Gomez-Echeverri, 2018).

The SDGs build on efforts under the UN Millennium Development Goals to reduce poverty, hunger, and other deprivations. According to the UN, the Millennium Development Goals were successful in reducing poverty and hunger and improving water security (UN, 2015a). However, critics argued that they failed to address within-country disparities, human rights and key environmental concerns, focused only on developing countries, and had numerous measurement and attribution problems

(Langford et al., 2013; Fukuda-Parr et al., 2014). While improvements in water security, slums and health may have reduced some aspects of climate vulnerability, increases in incomes were linked to rising greenhouse gas (GHG) emissions and thus to a trade-off between development and climate change (Janetos et al., 2012; UN, 2015a; Hubacek et al., 2017).

While the SDGs capture many important aspects of sustainable development, including the explicit goals of poverty eradication and reducing inequality, there are direct connections from climate to other measures of sustainable development including multidimensional poverty, equity, ethics, human security, well-being and climate-resilient development (Bebbington and Larrinaga, 2014; Robertson, 2014; Redclift and Springett, 2015; Barrington-Leigh, 2016; Helliwell et al., 2018; Kirby and O’Mahony, 2018) (see Glossary). The UN proposes sustainable development as ‘eradicating poverty in all its forms and dimensions, combating inequality within and among countries, preserving the planet, creating sustained, inclusive and sustainable economic growth and fostering social inclusion’ (UN, 2015b). There is *robust evidence* of the links between climate change and poverty (see Chapter 1, Cross-Chapter Box 4). The AR5 concluded with *high confidence* that disruptive levels of climate change would preclude reducing poverty (Denton et al., 2014; Fleurbaey et al., 2014). International organizations have since stated that climate changes ‘undermine the ability of all countries to achieve sustainable development’ (UN, 2015b) and can reverse or erase improvements in living conditions and decades of development (Hallegatte et al., 2016).

Climate warming has unequal impacts on different people and places as a result of differences in regional climate changes, vulnerabilities and impacts, and these differences then result in unequal impacts on sustainable development and poverty (Section 5.2). Responses to climate change also interact in complex ways with goals of poverty reduction. The benefits of adaptation and mitigation projects and funding may accrue to some and not others, responses may be costly and unaffordable to some people and countries, and projects may disadvantage some individuals, groups and development initiatives (Sections 5.3 and 5.4, Cross-Chapter Box 11 in Chapter 4).

5.1.2 Pathways to 1.5°C

Pathways to 1.5°C (see Chapter 1, Cross-Chapter Box 1 in Chapter 1, Glossary) include ambitious reductions in emissions and strategies for adaptation that are transformational, as well as complex interactions with sustainable development, poverty eradication and reducing inequalities. The AR5 WGII introduced the concept of climate-resilient development pathways (CRDPs) (see Glossary) which combine adaptation and mitigation to reduce climate change and its impacts, and emphasize the importance of addressing structural and intersecting inequalities, marginalization and multidimensional poverty to ‘transform [...] the development pathways themselves towards greater social and environmental sustainability, equity, resilience, and justice’ (Olsson et al., 2014). This chapter assesses literature on CRDPs relevant to 1.5°C global warming (Section 5.5.3), to understand better the possible societal and systems transformations (see Glossary) that reduce inequality and increase well-being

(Figure 5.1). It also summarizes the knowledge on conditions to achieve such transformations, including changes in technologies,

culture, values, financing and institutions that support low-carbon and resilient pathways and sustainable development (Section 5.6).

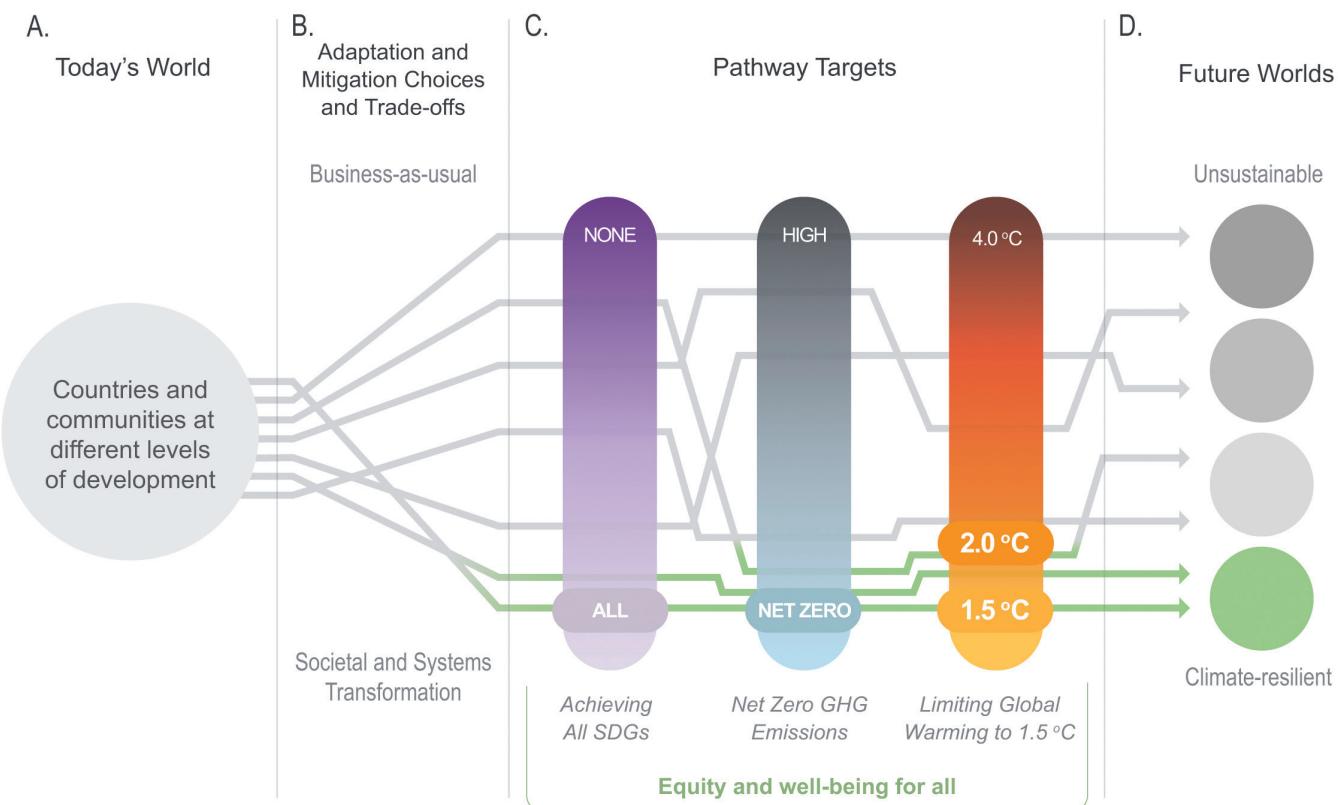


Figure 5.1 | Climate-resilient development pathways (CRDPs) (green arrows) between a current world in which countries and communities exist at different levels of development (A) and future worlds that range from climate-resilient (bottom) to unsustainable (top) (D). CRDPs involve societal transformation rather than business-as-usual approaches, and all pathways involve adaptation and mitigation choices and trade-offs (B). Pathways that achieve the Sustainable Development Goals by 2030 and beyond, strive for net zero emissions around mid-21st century, and stay within the global 1.5°C warming target by the end of the 21st century, while ensuring equity and well-being for all, are best positioned to achieve climate-resilient futures (C). Overshooting on the path to 1.5°C will make achieving CRDPs and other sustainable trajectories more difficult; yet, the limited literature does not allow meaningful estimates.

5.1.3 Types of Evidence

A variety of sources of evidence are used to assess the interactions of sustainable development and the SDGs with the causes, impacts and responses to climate change of 1.5°C warming. This chapter builds on Chapter 3 to assess the sustainable development implications of impacts at 1.5°C and 2°C, and on Chapter 4 to examine the implications of response measures. Scientific and grey literature, with a post-AR5 focus, and data that evaluate, measure and model sustainable development-climate links from various perspectives, quantitatively and qualitatively, across scales, and through well-documented case studies are assessed.

Literature that explicitly links 1.5°C global warming to sustainable development across scales remains scarce; yet we find relevant insights in many recent publications on climate and development that assess impacts across warming levels, the effects of adaptation and mitigation response measures, and interactions with the SDGs. Relevant evidence also stems from emerging literature on possible pathways, overshoot

and enabling conditions (see Glossary) for integrating sustainable development, poverty eradication and reducing inequalities in the context of 1.5°C.

5.2 Poverty, Equality and Equity Implications of a 1.5°C Warmer World

Climate change could lead to significant impacts on extreme poverty by 2030 (Hallegatte et al., 2016; Hallegatte and Rozenberg, 2017). The AR5 concluded, with *very high confidence*, that climate change and climate variability worsen existing poverty and exacerbate inequalities, especially for those disadvantaged by gender, age, race, class, caste, indigeneity and (dis)ability (Olsson et al., 2014). New literature on these links is substantial, showing that the poor will continue to experience climate change severely, and climate change will exacerbate poverty (*very high confidence*) (Fankhauser and Stern, 2016; Hallegatte et al., 2016; O'Neill et al., 2017a; Winsemius et al., 2018). The understanding of regional impacts and risks of 1.5°C global warming and interactions with patterns of societal

vulnerability and poverty remains limited. Yet identifying and addressing poverty and inequality is at the core of staying within a safe and just space for humanity (Raworth, 2017; Bathiany et al., 2018). Building on relevant findings from Chapter 3 (see Section 3.4), this section examines anticipated impacts and risks of 1.5°C and higher warming on sustainable development, poverty, inequality and equity (see Glossary).

5.2.1 Impacts and Risks of a 1.5°C Warmer World: Implications for Poverty and Livelihoods

Global warming of 1.5°C will have consequences for sustainable development, poverty and inequalities. This includes residual risks, limits to adaptation, and losses and damages (Cross-Chapter Box 12 in this chapter; see Glossary). Some regions have already experienced a 1.5°C warming, with impacts on food and water security, health and other components of sustainable development (*medium evidence, medium agreement*) (see Chapter 3, Section 3.4). Climate change is also already affecting poorer subsistence communities through decreases in crop production and quality, increases in crop pests and diseases, and disruption to culture (Savo et al., 2016). It disproportionately affects children and the elderly and can increase gender inequality (Kaijser and Kronsell, 2014; Vinyeta et al., 2015; Carter et al., 2016; Hanna and Oliva, 2016; Li et al., 2016).

At 1.5°C warming, compared to current conditions, further negative consequences are expected for poor people, and inequality and vulnerability (*medium evidence, high agreement*). Hallegatte and Rozenberg (2017) report that by 2030 (roughly approximating a 1.5°C warming), 122 million additional people could experience extreme poverty, based on a ‘poverty scenario’ of limited socio-economic progress, comparable to the Shared Socio-Economic Pathway (SSP) 4 (inequality), mainly due to higher food prices and declining health, with substantial income losses for the poorest 20% across 92 countries. Pretis et al. (2018) estimate negative impacts on economic growth in lower-income countries at 1.5°C warming, despite uncertainties. Impacts are likely to occur simultaneously across livelihood, food, human, water and ecosystem security (*limited evidence, high agreement*) (Byers et al., 2018), but the literature on interacting and cascading effects remains scarce (Hallegatte et al., 2014; O'Neill et al., 2017b; Reyer et al., 2017a, b).

Chapter 3 outlines future impacts and risks for ecosystems and human systems, many of which could also undermine sustainable development and efforts to eradicate poverty and hunger, and to protect health and ecosystems. Chapter 3 findings (see Section 3.5.2.1) suggest increasing Reasons for Concern from moderate to high at a warming of 1.1° to 1.6°C, including for indigenous people and their livelihoods, and ecosystems in the Arctic (O'Neill et al., 2017b). In 2050, based on the Hadley Centre Climate Prediction Model 3 (HadCM3) and the Special Report on Emission Scenarios A1b scenario (roughly comparable to 1.5°C warming), 450 million more flood-prone people would be exposed to doubling in flood frequency, and global flood risk would increase substantially (Arnell and Gosling, 2016). For droughts, poor people are expected to be more exposed (85% in population terms) in a warming scenario greater than 1.5°C for several countries in Asia and southern and western

Africa (Winsemius et al., 2018). In urban Africa, a 1.5°C warming could expose many households to water poverty and increased flooding (Pelling et al., 2018). At 1.5°C warming, fisheries-dependent and coastal livelihoods, of often disadvantaged populations, would suffer from the loss of coral reefs (see Chapter 3, Box 3.4).

Global heat stress is projected to increase in a 1.5°C warmer world, and by 2030, compared to 1961–1990, climate change could be responsible for additional annual deaths of 38,000 people from heat stress, particularly among the elderly, and 48,000 from diarrhoea, 60,000 from malaria, and 95,000 from childhood undernutrition (WHO, 2014). Each 1°C increase could reduce work productivity by 1 to 3% for people working outdoors or without air conditioning, typically the poorer segments of the workforce (Park et al., 2015).

The regional variation in the ‘warming experience at 1.5°C’ (see Chapter 1, Section 1.3.1) is large (see Chapter 3, Section 3.3.2). Declines in crop yields are widely reported for Africa (60% of observations), with serious consequences for subsistence and rain-fed agriculture and food security (Savo et al., 2016). In Bangladesh, by 2050, damages and losses are expected for poor households dependent on freshwater fish stocks due to lack of mobility, limited access to land and strong reliance on local ecosystems (Dasgupta et al., 2017). Small Island Developing States (SIDS) are expected to experience challenging conditions at 1.5°C warming due to increased risk of internal migration and displacement and limits to adaptation (see Chapter 3, Box 3.5, Cross-Chapter Box 12 in this chapter). An anticipated decline of marine fisheries of 3 million metric tonnes per degree warming would have serious regional impacts for the Indo-Pacific region and the Arctic (Cheung et al., 2016).

5.2.2 Avoided Impacts of 1.5°C versus 2°C Warming for Poverty and Inequality

Avoided impacts between 1.5°C and 2°C warming are expected to have significant positive implications for sustainable development, and reducing poverty and inequality. Using the SSPs (see Chapter 1, Cross-Chapter Box 1 in Chapter 1, Section 5.5.2), Byers et al. (2018) model the number of people exposed to multi-sector climate risks and vulnerable to poverty (income < \$10/day), comparing 2°C and 1.5°C; the respective declines are from 86 million to 24 million for SSP1 (sustainability), from 498 million to 286 million for SSP2 (middle of the road), and from 1220 million to 763 million for SSP3 (regional rivalry), which suggests overall 62–457 million fewer people exposed and vulnerable at 1.5°C warming. Across the SSPs, the largest populations exposed and vulnerable are in South Asia (Byers et al., 2018). The avoided impacts on poverty at 1.5°C relative to 2°C are projected to depend at least as much or more on development scenarios than on warming (Wiebe et al., 2015; Hallegatte and Rozenberg, 2017).

Limiting warming to 1.5°C is expected to reduce the number of people exposed to hunger, water stress and disease in Africa (Clements, 2009). It is also expected to limit the number of poor people exposed to floods and droughts at higher degrees of warming, especially in African and Asian countries (Winsemius et al., 2018). Challenges for poor populations – relating to food and water security, clean energy

access and environmental well-being – are projected to be less at 1.5°C, particularly for vulnerable people in Africa and Asia (Byers et al., 2018). The overall projected socio-economic losses compared to the present day are less at 1.5°C (8% loss of gross domestic product per capita) compared to 2°C (13%), with lower-income countries projected to experience greater losses, which may increase economic inequality between countries (Pretis et al., 2018).

5.2.3 Risks from 1.5°C versus 2°C Global Warming and the Sustainable Development Goals

The risks that can be avoided by limiting global warming to 1.5°C rather than 2°C have many complex implications for sustainable development (ICSU, 2017; Gomez-Echeverri, 2018). There is *high confidence* that constraining warming to 1.5°C rather than 2°C would reduce risks for unique and threatened ecosystems, safeguarding the services they provide for livelihoods and sustainable development and making adaptation much easier (O'Neill et al., 2017b), particularly in Central America, the Amazon, South Africa and Australia (Schleussner et al., 2016; O'Neill et al., 2017b; Reyer et al., 2017b; Bathiany et al., 2018).

In places that already bear disproportionate economic and social challenges to their sustainable development, people will face lower risks at 1.5°C compared to 2°C. These include North Africa and the Levant (less water scarcity), West Africa (less crop loss), South America and Southeast Asia (less intense heat), and many other coastal nations and island states (lower sea level rise, less coral reef loss) (Schleussner et al., 2016; Betts et al., 2018). The risks for food, water and ecosystems, particularly in subtropical regions such as Central America and countries such as South Africa and Australia, are expected to be lower at 1.5°C than at 2°C warming (Schleussner et al., 2016). Fewer people would be exposed to droughts and

heat waves and the associated health impacts in countries such as Australia and India (King et al., 2017; Mishra et al., 2017).

Limiting warming to 1.5°C would make it markedly easier to achieve the SDGs for poverty eradication, water access, safe cities, food security, healthy lives and inclusive economic growth, and would help to protect terrestrial ecosystems and biodiversity (*medium evidence, high agreement*) (Table 5.2 available at the end of the chapter). For example, limiting species loss and expanding climate refugia will make it easier to achieve SDG 15 (see Chapter 3, Section 3.4.3). One indication of how lower temperatures benefit the SDGs is to compare the impacts of Representative Concentration Pathway (RCP) 4.5 (lower emissions) and RCP8.5 (higher emissions) on the SDGs (Ansueati et al., 2015). A low emissions pathway allows for greater success in achieving SDGs for reducing poverty and hunger, providing access to clean energy, reducing inequality, ensuring education for all and making cities more sustainable. Even at lower emissions, a medium risk of failure exists to meet goals for water and sanitation, and marine and terrestrial ecosystems.

Action on climate change (SDG 13), including slowing the rate of warming, would help reach the goals for water, energy, food and land (SDGs 6, 7, 2 and 15) (Obersteiner et al., 2016; ICSU, 2017) and contribute to poverty eradication (SDG 1) (Byers et al., 2018). Although the literature that connects 1.5°C to the SDGs is limited, a pathway that stabilizes warming at 1.5°C by the end of the century is expected to increase the chances of achieving the SDGs by 2030, with greater potential to eradicate poverty, reduce inequality and foster equity (*limited evidence, medium agreement*). There are no studies on overshoot and dimensions of sustainable development, although literature on 4°C of warming suggests the impacts would be severe (Reyer et al., 2017b).

Table 5.1 | Sustainable development implications of avoided impacts between 1.5°C and 2°C global warming.

Impacts	Chapter 3 Section	1.5°C	2°C	Sustainable Development Goals (SDGs) More Easily Achieved when Limiting Warming to 1.5°C
Water scarcity	3.4.2.1	4% more people exposed to water stress	8% more people exposed to water stress, with 184–270 million people more exposed	SDG 6 water availability for all
	Table 3.4	496 (range 103–1159) million people exposed and vulnerable to water stress	586 (range 115–1347) million people exposed and vulnerable to water stress	
Ecosystems	3.4.3, Table 3.4	Around 7% of land area experiences biome shifts	Around 13% (range 8–20%) of land area experiences biome shifts	SDG 15 to protect terrestrial ecosystems and halt biodiversity loss
	Box 3.5	70–90% of coral reefs at risk from bleaching	99% of coral reefs at risk from bleaching	
Coastal cities	3.4.5.1	31–69 million people exposed to coastal flooding	32–79 million exposed to coastal flooding	SDG 11 to make cities and human settlements safe and resilient
	3.4.5.2	Fewer cities and coasts exposed to sea level rise and extreme events	More people and cities exposed to flooding	
Food systems	3.4.6, Box 3.1	Significant declines in crop yields avoided, some yields may increase	Average crop yields decline	SDG 2 to end hunger and achieve food security
	Table 3.4	32–36 million people exposed to lower yields	330–396 million people exposed to lower yields	
Health	3.4.5.1	Lower risk of temperature-related morbidity and smaller mosquito range	Higher risks of temperature-related morbidity and mortality and larger geographic range of mosquitoes	SDG 3 to ensure healthy lives for all
	3.4.5.2	3546–4508 million people exposed to heat waves	5417–6710 million people exposed to heat waves	

Cross-Chapter Box 12 | Residual Risks, Limits to Adaptation and Loss and Damage

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Introduction

Residual climate-related risks, limits to adaptation, and loss and damage (see Glossary) are increasingly assessed in the scientific literature (van der Geest and Warner, 2015; Boyd et al., 2017; Mechler et al., 2019). The AR5 (IPCC, 2013; Oppenheimer et al., 2014) documented impacts that have been detected and attributed to climate change, projected increasing climate-related risks with continued global warming, and recognized barriers and limits to adaptation. It recognized that adaptation is constrained by biophysical, institutional, financial, social and cultural factors, and that the interaction of these factors with climate change can lead to soft adaptation limits (adaptive actions currently not available) and hard adaptation limits (adaptive actions appear infeasible leading to unavoidable impacts) (Klein et al., 2014).

Loss and damage: concepts and perspectives

'Loss and Damage' (L&D) has been discussed in international climate negotiations for three decades (INC, 1991; Calliari, 2016; Vanhala and Hestbaek, 2016). A work programme on L&D was established as part of the Cancun Adaptation Framework in 2010 supporting developing countries particularly vulnerable to climate change impacts (UNFCCC, 2011a). In 2013, the Conference of the Parties (COP) 19 established the Warsaw International Mechanism for Loss and Damage (WIM) as a formal part of the United Nations Framework Convention on Climate Change (UNFCCC) architecture (UNFCCC, 2014). It acknowledges that L&D 'includes, and in some cases involves more than, that which can be reduced by adaptation' (UNFCCC, 2014). The Paris Agreement recognized 'the importance of averting, minimizing and addressing loss and damage associated with the adverse effects of climate change' through Article 8 (UNFCCC, 2015).

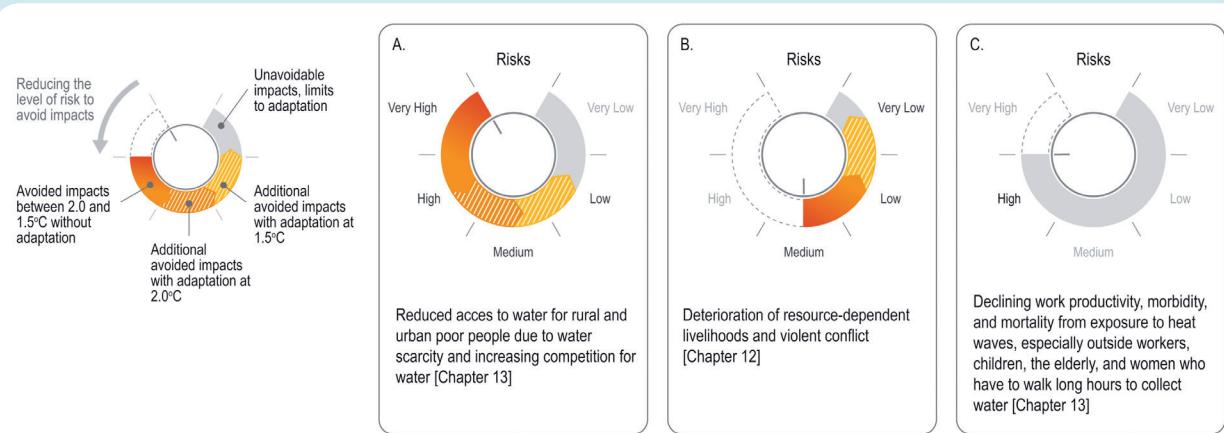
There is no one definition of L&D in climate policy, and analysis of policy documents and stakeholder views has demonstrated ambiguity (Vanhala and Hestbaek, 2016; Boyd et al., 2017). UNFCCC documents suggest that L&D is associated with adverse impacts of climate change on human and natural systems, including impacts from extreme events and slow-onset processes (UNFCCC, 2011b, 2014, 2015). Some documents focus on impacts in developing or particularly vulnerable countries (UNFCCC, 2011b, 2014). They refer to economic (loss of assets and crops) and non-economic (biodiversity, culture, health) impacts, the latter also being an action area under the WIM workplan, and irreversible and permanent loss and damage. Lack of clarity of what the term addresses (avoidance through adaptation and mitigation, unavoidable losses, climate risk management, existential risk) was expressed among stakeholders, with further disagreement ensuing about what constitutes anthropogenic climate change versus natural climate variability (Boyd et al., 2017).

5

Limits to adaptation and residual risks

The AR5 described adaptation limits as points beyond which actors' objectives are compromised by intolerable risks threatening key objectives such as good health or broad levels of well-being, thus requiring transformative adaptation for overcoming soft limits (see Chapter 4, Sections 4.2.2.3, 4.5.3 and Cross-Chapter Box 9, Section 5.3.1) (Dow et al., 2013; Klein et al., 2014). The AR5 WGII risk tables, based on expert judgment, depicted the potential for, and the limits of, additional adaptation to reduce risk. Near-term (2030–2040) risks can be used as a proxy for 1.5°C warming by the end of the century and compared to longer-term (2080–2100) risks associated with an approximate 2°C warming. Building on the AR5 risk approach, Cross-Chapter Box 12, Figure 1 provides a stylised application example to poverty and inequality.

Cross-Chapter Box 12 (continued)



Cross-Chapter Box 12, Figure 1 | Stylized reduced risk levels due to avoided impacts between 2°C and 1.5°C warming (in solid red-orange), additional avoided impacts with adaptation under 2°C (striped orange) and under 1.5°C (striped yellow), and unavoidable impacts (losses) with no or very limited potential for adaptation (grey), extracted from the AR5 WGI risk tables (Field et al., 2014), and underlying chapters by Adger et al. (2014) and Ollsson et al. (2014). For some systems and sectors (A), achieving 1.5°C could reduce risks to low (with adaptation) from very high (without adaptation) and high (with adaptation) under 2°C. For other areas (C), no or very limited adaptation potential is anticipated, suggesting limits, with the same risks for 1.5°C and 2°C. Other risks are projected to be medium under 2°C with further potential for reduction, especially with adaptation, to very low levels (B).

Limits to adaptation, residual risks, and losses in a 1.5°C warmer world

The literature on risks at 1.5°C (versus 2°C and more) and potentials for adaptation remains limited, particularly for specific regions, sectors, and vulnerable and disadvantaged populations. Adaptation potential at 1.5°C and 2°C is rarely assessed explicitly, making an assessment of residual risk challenging. Substantial progress has been made since the AR5 to assess which climate change impacts on natural and human systems can be attributed to anthropogenic emissions (Hansen and Stone, 2016) and to examine the influence of anthropogenic emissions on extreme weather events (NASEM, 2016), and on consequent impacts on human life (Mitchell et al., 2016), but less so on monetary losses and risks (Schaller et al., 2016). There has also been some limited research to examine local-level limits to adaptation (Warner and Geest, 2013; Filho and Nalau, 2018). What constitutes losses and damages is context-dependent and often requires place-based research into what people value and consider worth protecting (Barnett et al., 2016; Tschakert et al., 2017). Yet assessments of non-material and intangible losses are particularly challenging, such as loss of sense of place, belonging, identity, and damage to emotional and mental well-being (Serdeczny et al., 2017; Wewerinke-Singh, 2018a). Warming of 1.5°C is not considered ‘safe’ for most nations, communities, ecosystems and sectors, and poses significant risks to natural and human systems as compared to the current warming of 1°C (high confidence) (see Chapter 3, Section 3.4, Box 3.4, Box 3.5, Table 3.5, Cross-Chapter Box 6 in Chapter 3). Table 5.2, drawing on findings from Chapters 3, 4 and 5, presents examples of soft and hard limits in natural and human systems in the context of 1.5°C and 2°C of warming.

Cross-Chapter Box 12, Table 1 | Soft and hard adaptation limits in the context of 1.5°C and 2°C of global warming.

System/Region	Example	Soft Limit	Hard Limit
Coral reefs	Loss of 70–90% of tropical coral reefs by mid-century under 1.5°C scenario (total loss under 2°C scenario) (see Chapter 3, Sections 3.4.4 and 3.5.2.1, Box 3.4)		✓
Biodiversity	6% of insects, 8% of plants and 4% of vertebrates lose over 50% of the climatically determined geographic range at 1.5°C (18% of insects, 16% of plants and 8% of vertebrates at 2°C) (see Chapter 3, Section 3.4.3.3)		✓
Poverty	24–357 million people exposed to multi-sector climate risks and vulnerable to poverty at 1.5°C (86–1220 million at 2°C) (see Section 5.2.2)	✓	
Human health	Twice as many megacities exposed to heat stress at 1.5°C compared to present, potentially exposing 350 million additional people to deadly heat wave conditions by 2050 (see Chapter 3, Section 3.4.8)	✓	✓
Coastal livelihoods	Large-scale changes in oceanic systems (temperature and acidification) inflict damage and losses to livelihoods, income, cultural identity and health for coastal-dependent communities at 1.5°C (potential higher losses at 2°C) (see Chapter 3, Sections 3.4.4, 3.4.5, 3.4.6.3, Box 3.4, Box 3.5, Cross-Chapter Box 6, Chapter 4, Section 4.3.5; Section 5.2.3)	✓	✓
Small Island Developing States	Sea level rise and increased wave run up combined with increased aridity and decreased freshwater availability at 1.5°C warming potentially leaving several atoll islands uninhabitable (see Chapter 3, Sections 3.4.3, 3.4.5, Box 3.5, Chapter 4, Cross-Chapter Box 9)		✓

Cross-Chapter Box 12 (continued)

Approaches and policy options to address residual risk and loss and damage

Conceptual and applied work since the AR5 has highlighted the synergies and differences with adaptation and disaster risk reduction policies (van der Geest and Warner, 2015; Thomas and Benjamin, 2017), suggesting more integration of existing mechanisms, yet careful consideration is advised for slow-onset and potentially irreversible impacts and risk (Mechler and Schinko, 2016). Scholarship on justice and equity has provided insight on compensatory, distributive and procedural equity considerations for policy and practice to address loss and damage (Roser et al., 2015; Wallimann-Helmer, 2015; Huggel et al., 2016). A growing body of legal literature considers the role of litigation in preventing and addressing loss and damage and finds that litigation risks for governments and business are bound to increase with improved understanding of impacts and risks as climate science evolves (high confidence) (Mayer, 2016; Banda and Fulton, 2017; Marjanac and Patton, 2018; Wewerinke-Singh, 2018b). Policy proposals include international support for experienced losses and damages (Crosland et al., 2016; Page and Heyward, 2017), addressing climate displacement, donor-supported implementation of regional public insurance systems (Surminski et al., 2016) and new global governance systems under the UNFCCC (Biermann and Boas, 2017).

5.3 Climate Adaptation and Sustainable Development

Adaptation will be extremely important in a 1.5°C warmer world since substantial impacts will be felt in every region (*high confidence*) (Chapter 3, Section 3.3), even if adaptation needs will be lower than in a 2°C warmer world (see Chapter 4, Sections 4.3.1 to 4.3.5, 4.5.3, Cross-Chapter Box 10 in Chapter 4). Climate adaptation options comprise structural, physical, institutional and social responses, with their effectiveness depending largely on governance (see Glossary), political will, adaptive capacities and availability of finance (see Chapter 4, Sections 4.4.1 to 4.4.5) (Betzold and Weiler, 2017; Sonwa et al., 2017; Sovacool et al., 2017). Even though the literature is scarce on the expected impacts of future adaptation measures on sustainable development specific to warming experiences of 1.5°C, this section assesses available literature on how (i) prioritising sustainable development enhances or impedes climate adaptation efforts (Section 5.3.1); (ii) climate adaptation measures impact sustainable development and the SDGs in positive (synergies) or negative (trade-offs) ways (Section 5.3.2); and (iii) adaptation pathways towards a 1.5°C warmer world affect sustainable development, poverty and inequalities (Section 5.3.3). The section builds on Chapter 4 (see Section 4.3.5) regarding available adaptation options to reduce climate vulnerability and build resilience (see Glossary) in the context of 1.5°C-compatible trajectories, with emphasis on sustainable development implications.

5.3.1 Sustainable Development in Support of Climate Adaptation

Making sustainable development a priority, and meeting the SDGs, is consistent with efforts to adapt to climate change (*very high confidence*). Sustainable development is effective in building adaptive capacity if it addresses poverty and inequalities, social and economic exclusion, and inadequate institutional capacities (Noble et al., 2014; Abel et al., 2016; Colloff et al., 2017). Four ways in which sustainable development leads to effective adaptation are described below.

First, sustainable development enables transformational adaptation (see Chapter 4, Section 4.2.2.2) when an integrated approach is

adopted, with inclusive, transparent decision-making, rather than addressing current vulnerabilities as stand-alone climate problems (Mathur et al., 2014; Arthurson and Baum, 2015; Shackleton et al., 2015; Lemos et al., 2016; Antwi-Agyei et al., 2017b). Ending poverty in its multiple dimensions (SDG 1) is often a highly effective form of climate adaptation (Fankhauser and McDermott, 2014; Leichenko and Silva, 2014; Hallegatte and Rozenberg, 2017). However, ending poverty is not sufficient, and the positive outcome as an adaptation strategy depends on whether increased household wealth is actually directed towards risk reduction and management strategies (Nelson et al., 2016), as shown in urban municipalities (Colenbrander et al., 2017; Rasch, 2017) and agrarian communities (Hashemi et al., 2017), and whether finance for adaptation is made available (Section 5.6.1).

Second, local participation is effective when wider socio-economic barriers are addressed via multiscale planning (McCubbin et al., 2015; Nyantakyi-Frimpong and Bezner-Kerr, 2015; Toole et al., 2016). This is the case, for instance, when national education efforts (SDG 4) (Muttarak and Lutz, 2014; Striessnig and Loichinger, 2015) and indigenous knowledge (Nkomwa et al., 2014; Pandey and Kumar, 2018) enhance information sharing, which also builds resilience (Santos et al., 2016; Martinez-Baron et al., 2018) and reduces risks for maladaptation (Antwi-Agyei et al., 2018; Gajjar et al., 2018).

Third, development promotes transformational adaptation when addressing social inequalities (Section 5.5.3, 5.6.4), as in SDGs 4, 5, 16 and 17 (O'Brien, 2016; O'Brien, 2017). For example, SDG 5 supports measures that reduce women's vulnerabilities and allow women to benefit from adaptation (Antwi-Agyei et al., 2015; Van Aelst and Holvoet, 2016; Cohen, 2017). Mobilization of climate finance, carbon taxation and environmentally motivated subsidies can reduce inequalities (SDG 10), advance climate mitigation and adaptation (Chancel and Picketty, 2015), and be conducive to strengthening and enabling environments for resilience building (Nhamo, 2016; Halonen et al., 2017).

Fourth, when sustainable development promotes livelihood security, it enhances the adaptive capacities of vulnerable communities and households. Examples include SDG 11 supporting adaptation in cities

to reduce harm from disasters (Kelman, 2017; Parnell, 2017); access to water and sanitation (SDG 6) with strong institutions (SDG 16) (Rasul and Sharma, 2016); SDG 2 and its targets that promote adaptation in agricultural and food systems (Lipper et al., 2014); and targets for SDG 3 such as reducing infectious diseases and providing health cover are consistent with health-related adaptation (ICSU, 2017; Gomez-Echeverri, 2018).

Sustainable development has the potential to significantly reduce systemic vulnerability, enhance adaptive capacity and promote livelihood security for poor and disadvantaged populations (*high confidence*). Transformational adaptation (see Chapter 4, Sections 4.2.2.2 and 4.5.3) would require development that takes into consideration multidimensional poverty and entrenched inequalities, local cultural specificities and local knowledge in decision-making, thereby making it easier to achieve the SDGs in a 1.5°C warmer world (*medium evidence, high agreement*).

5.3.2 Synergies and Trade-Offs between Adaptation Options and Sustainable Development

There are short-, medium-, and long-term positive impacts (synergies) and negative impacts (trade-offs) between the dual goals of keeping temperatures below 1.5°C global warming and achieving sustainable development. The extent of synergies between development and adaptation goals will vary by the development process adopted for a particular SDG and underlying vulnerability contexts (*medium evidence, high agreement*). Overall, the impacts of adaptation on sustainable development, poverty eradication and reducing inequalities in general, and the SDGs specifically, are expected to be largely positive, given that the inherent purpose of adaptation is to lower risks. Building on Chapter 4 (see Section 4.3.5), this section examines synergies and trade-offs between adaptation and sustainable development for some key sectors and approaches.

Agricultural adaptation: The most direct synergy is between SDG 2 (zero hunger) and adaptation in cropping, livestock and food systems, designed to maintain or increase production (Lipper et al., 2014; Rockström et al., 2017). Farmers with effective adaptation strategies tend to enjoy higher food security and experience lower levels of poverty (FAO, 2015; Douxchamps et al., 2016; Ali and Erenstein, 2017). Vermeulen et al. (2016) report strong positive returns on investment across the world from agricultural adaptation with side benefits for environment and economic well-being. Well-adapted agricultural systems contribute to safe drinking water, health, biodiversity and equity goals (DeClerck et al., 2016; Myers et al., 2017). Climate-smart agriculture has synergies with food security, though it can be biased towards technological solutions, may not be gender sensitive, and can create specific challenges for institutional and distributional aspects (Lipper et al., 2014; Arakelyan et al., 2017; Taylor, 2017).

At the same time, adaptation options increase risks for human health, oceans and access to water if fertiliser and pesticides are used without regulation or when irrigation reduces water availability for other purposes (Shackleton et al., 2015; Campbell et al., 2016). When agricultural insurance and climate services overlook the poor, inequality may rise (Dinku et al., 2014; Carr and Owusu-Daaku, 2015; Georgeson

et al., 2017a; Carr and Onzere, 2018). Agricultural adaptation measures may increase workloads, especially for women, while changes in crop mix can result in loss of income or culturally inappropriate food (Carr and Thompson, 2014; Thompson-Hall et al., 2016; Bryan et al., 2017), and they may benefit farmers with more land to the detriment of land-poor farmers, as seen in the Mekong River Basin (see Chapter 3, Cross-Chapter Box 6 in Chapter 3).

Adaptation to protect human health: Adaptation options in the health sector are expected to reduce morbidity and mortality (Arbuthnott et al., 2016; Ebi and Otmani del Barrio, 2017). Heat-early-warning systems help lower injuries, illnesses and deaths (Hess and Ebi, 2016), with positive impacts for SDG 3. Institutions better equipped to share information, indicators for detecting climate-sensitive diseases, improved provision of basic health care services and coordination with other sectors also improve risk management, thus reducing adverse health outcomes (Dasgupta et al., 2016; Dovie et al., 2017). Effective adaptation creates synergies via basic public health measures (K.R. Smith et al., 2014; Dasgupta, 2016) and health infrastructure protected from extreme weather events (Watts et al., 2015). Yet trade-offs can occur when adaptation in one sector leads to negative impacts in another sector. Examples include the creation of urban wetlands through flood control measures which can breed mosquitoes, and migration eroding physical and mental well-being, hence adversely affecting SDG 3 (K.R. Smith et al., 2014; Watts et al., 2015). Similarly, increased use of air conditioning enhances resilience to heat stress (Petkova et al., 2017), yet it can result in higher energy consumption, undermining SDG 13.

Coastal adaptation: Adaptation to sea level rise remains essential in coastal areas even under a climate stabilization scenario of 1.5°C (Nicholls et al., 2018). Coastal adaptation to restore ecosystems (for instance by planting mangrove forests) supports SDGs for enhancing life and livelihoods on land and oceans (see Chapter 4, Sections 4.3.2.3). Synergistic outcomes between development and relocation of coastal communities are enhanced by participatory decision-making and settlement designs that promote equity and sustainability (van der Voorn et al., 2017). Limits to coastal adaptation may rise, for instance in low-lying islands in the Pacific, Caribbean and Indian Ocean, with attendant implications for loss and damage (see Chapter 3 Box 3.5, Chapter 4, Cross-Chapter Box 9 in Chapter 4, Cross-Chapter Box 12 in Chapter 5, Box 5.3).

Migration as adaptation: Migration has been used in various contexts to protect livelihoods from challenges related to climate change (Marsh, 2015; Jha et al., 2017), including through remittances (Betzold and Weiler, 2017). Synergies between migration and the achievement of sustainable development depend on adaptive measures and conditions in both sending and receiving regions (Fatima et al., 2014; McNamara, 2015; Entzinger and Scholten, 2016; Ober and Sakdapolrak, 2017; Schwan and Yu, 2017). Adverse developmental impacts arise when vulnerable women or the elderly are left behind or if migration is culturally disruptive (Wilkinson et al., 2016; Albert et al., 2017; Islam and Shamsuddoha, 2017).

Ecosystem-based adaptation: Ecosystem-based adaptation (EBA) can offer synergies with sustainable development (Morita and Matsumoto,

2015; Ojea, 2015; Szabo et al., 2015; Brink et al., 2016; Butt et al., 2016; Conservation International, 2016; Huq et al., 2017), although assessments remain difficult (see Chapter 4, Section 4.3.2.2) (Doswald et al., 2014). Examples include mangrove restoration reducing coastal vulnerability, protecting marine and terrestrial ecosystems, and increasing local food security, as well as watershed management reducing flood risks and improving water quality (Chong, 2014). In drylands, EBA practices, combined with community-based adaptation, have shown how to link adaptation with mitigation to improve livelihood conditions of poor farmers (Box 5.1). Synergistic developmental outcomes arise where EBA is cost effective, inclusive of indigenous and local knowledge and easily accessible by the poor (Ojea, 2015; Daigneault et al., 2016; Estrella et al., 2016). Payment for ecosystem services can provide incentives to land owners and natural resource managers to preserve environmental services with synergies with SDGs 1 and 13 (Arriagada et al., 2015), when implementation challenges are overcome (Calvet-Mir et al., 2015; Wegner, 2016; Chan et al., 2017). Trade-offs include loss of other economic land use types, tension between biodiversity and adaptation priorities, and conflicts over governance (Wamsler et al., 2014; Ojea, 2015).

Community-based adaptation: Community-based adaptation (CBA) (see Chapter 4, Sections 4.3.3.2) enhances resilience and sustainability of adaptation plans (Ford et al., 2016; Fernandes-Jesus et al., 2017; Grantham and Rudd, 2017; Gustafson et al., 2017). Yet negative impacts occur if it fails to fairly represent vulnerable populations and to foster long-term social resilience (Ensor, 2016; Taylor Aiken et al., 2017). Mainstreaming CBA into planning and decision-making enables the attainment of SDGs 5, 10 and 16 (Archer et al., 2014; Reid and Huq, 2014; Vardakoulias and Nicholles, 2014; Cutter, 2016; Kim et al., 2017). Incorporating multiple forms of indigenous and local knowledge is an important element of CBA, as shown for instance in the Arctic region (see Chapter 4, Section 4.3.5.5, Box 4.3, Cross-Chapter Box 9) (Apgar et al., 2015; Armitage, 2015; Pearce et al., 2015; Chief et al., 2016; Cobbinah and Anane, 2016; Ford et al., 2016). Indigenous and local knowledge can be synergistic with achieving SDGs 2, 6 and 10 (Ayers et al., 2014; Lasage et al., 2015; Regmi and Star, 2015; Berner et al., 2016; Chief et al., 2016; Murtinho, 2016; Reid, 2016).

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There are clear synergies between adaptation options and several SDGs, such as poverty eradication, elimination of hunger, clean water and health (*robust evidence, high agreement*), as well-integrated adaptation supports sustainable development (Eakin et al., 2014; Weisser et al., 2014; Adam, 2015; Smucker et al., 2015). Substantial synergies are observed in the agricultural and health sectors, and in ecosystem-based adaptations. However, particular adaptation strategies can lead to adverse consequences for developmental outcomes (*medium evidence, high agreement*). Adaptation strategies that advance one SDG can result in trade-offs with other SDGs; for instance, agricultural adaptation to enhance food security (SDG 2) causing negative impacts for health, equality and healthy ecosystems (SDGs 3, 5, 6, 10, 14 and 15), and resilience to heat stress increasing energy consumption (SDGs 3 and 7) and high-cost adaptation in resource-constrained contexts (*medium evidence, medium agreement*).

5.3.3 Adaptation Pathways towards a 1.5°C Warmer World and Implications for Inequalities

In a 1.5°C warmer world, adaptation measures and options would need to be intensified, accelerated and scaled up. This entails not only the right 'mix' of options (asking 'right for whom and for what?') but also a forward-looking understanding of dynamic trajectories, that is adaptation pathways (see Chapter 1, Cross-Chapter Box 1 in Chapter 1), best understood as decision-making processes over sets of potential action sequenced over time (Câmpeanu and Fazey, 2014; Wise et al., 2014). Given the scarcity of literature on adaptation pathways that navigate place-specific warming experiences at 1.5°C, this section presents insights into current local decision-making for adaptation futures. This grounded evidence shows that choices between possible pathways, at different scales and for different groups of people, are shaped by uneven power structures and historical legacies that create their own, often unforeseen change (Fazey et al., 2016; Bosomworth et al., 2017; Lin et al., 2017; Murphy et al., 2017; Pelling et al., 2018).

Pursuing a place-specific adaptation pathway approach towards a 1.5°C warmer world harbours the potential for significant positive outcomes, with synergies for well-being possibilities to 'leap-frog the SDGs' (J.R.A. Butler et al., 2016), in countries at all levels of development (*medium evidence, high agreement*). It allows for identifying local, socially salient tipping points before they are crossed, based on what people value and trade-offs that are acceptable to them (Barnett et al., 2014, 2016; Gorddard et al., 2016; Tschakert et al., 2017). Yet evidence also reveals adverse impacts that reinforce rather than reduce existing social inequalities and hence may lead to poverty traps (*medium evidence, high agreement*) (Nagoda, 2015; Warner et al., 2015; Barnett et al., 2016; J.R.A. Butler et al., 2016; Godfrey-Wood and Naess, 2016; Pelling et al., 2016; Albert et al., 2017; Murphy et al., 2017).

Past development trajectories as well as transformational adaptation plans can constrain adaptation futures by reinforcing dominant political-economic structures and processes, and narrowing option spaces; this leads to maladaptive pathways that preclude alternative, locally relevant and sustainable development initiatives and increase vulnerabilities (Warner and Kuzdas, 2017; Gajjar et al., 2018). Such dominant pathways tend to validate the practices, visions and values of existing governance regimes and powerful members of a community while devaluing those of less privileged stakeholders. Examples from Romania, the Solomon Islands and Australia illustrate such pathway dynamics in which individual economic gains and prosperity matter more than community cohesion and solidarity; this discourages innovation, exacerbates inequalities and further erodes adaptive capacities of the most vulnerable (Davies et al., 2014; Fazey et al., 2016; Bosomworth et al., 2017). In the city of London, United Kingdom, the dominant adaptation and disaster risk management pathway promotes resilience that emphasizes self-reliance; yet it intensifies the burden on low-income citizens, the elderly, migrants and others unable to afford flood insurance or protect themselves against heat waves (Pelling et al., 2016). Adaptation pathways in the Bolivian Altiplano have transformed subsistence farmers into world-leading quinoa producers, but loss of social cohesion and traditional values, dispossession and loss of ecosystem services now constitute undesirable trade-offs (Chelleri et al., 2016).

A narrow view of adaptation decision-making, for example focused on technical solutions, tends to crowd out more participatory processes (Lawrence and Haasnoot, 2017; Lin et al., 2017), obscures contested values and reinforces power asymmetries (Bosomworth et al., 2017; Singh, 2018). A situated and context-specific understanding of adaptation pathways that galvanizes diverse knowledge, values and joint initiatives helps to overcome dominant path dependencies, avoid trade-offs that intensify inequities and challenge policies detached

from place (Fincher et al., 2014; Wyborn et al., 2015; Murphy et al., 2017; Gajjar et al., 2018). These insights suggest that adaptation pathway approaches to prepare for 1.5°C warmer futures would be difficult to achieve without considerations for inclusiveness, place-specific trade-off deliberations, redistributive measures and procedural justice mechanisms to facilitate equitable transformation (*medium evidence, high agreement*).

Box 5.1 | Ecosystem- and Community-Based Practices in Drylands

Drylands face severe challenges in building climate resilience (Fuller and Lain, 2017), yet small-scale farmers can play a crucial role as agents of change through ecosystem- and community-based practices that combine adaptation, mitigation and sustainable development.

Farmer managed natural regeneration (FMNR) of trees in cropland is practised in 18 countries across sub-Saharan Africa, Southeast Asia, Timor-Leste, India and Haiti and has, for example, permitted the restoration of over five million hectares of land in the Sahel (Niang et al., 2014; Bado et al., 2016). In Ethiopia, the Managing Environmental Resources to Enable Transitions programme, which entails community-based watershed rehabilitation in rural landscapes, supported around 648,000 people, resulting in the rehabilitation of 25,400,000 hectares of land in 72 severely food-insecure districts across Ethiopia between 2012 and 2015 (Gebrehaweria et al., 2016). In India, local farmers have benefitted from watershed programmes across different agro-ecological regions (Singh et al., 2014; Datta, 2015).

These low-cost, flexible community-based practices represent low-regrets adaptation and mitigation strategies. These strategies often contribute to strengthened ecosystem resilience and biodiversity, increased agricultural productivity and food security, reduced household poverty and drudgery for women, and enhanced agency and social capital (Niang et al., 2014; Francis et al., 2015; Kassie et al., 2015; Mbow et al., 2015; Reij and Winterbottom, 2015; Weston et al., 2015; Bado et al., 2016; Dumont et al., 2017). Small check dams in dryland areas and conservation agriculture can significantly increase agricultural output (Kumar et al., 2014; Agoramoorthy and Hsu, 2016; Pradhan et al., 2018). Mitigation benefits have also been quantified (Weston et al., 2015); for example, FMNR of more than five million hectares in Niger has sequestered 25–30 Mtonnes of carbon over 30 years (Stevens et al., 2014).

However, several constraints hinder scaling-up efforts: inadequate attention to the socio-technical processes of innovation (Grist et al., 2017; Scoones et al., 2017), difficulties in measuring the benefits of an innovation (Coe et al., 2017), farmers' inability to deal with long-term climate risk (Singh et al., 2017), and difficulties for matching practices with agro-ecological conditions and complementary modern inputs (Kassie et al., 2015). Key conditions to overcome these challenges include: developing agroforestry value chains and markets (Reij and Winterbottom, 2015) and adaptive planning and management (Gray et al., 2016). Others include inclusive processes giving greater voice to women and marginalized groups (MRFCJ, 2015a; UN Women and MRFCJ, 2016; Dumont et al., 2017), strengthening community land and forest rights (Stevens et al., 2014; Vermeulen et al., 2016), and co-learning among communities of practice at different scales (Coe et al., 2014; Reij and Winterbottom, 2015; Sinclair, 2016; Binam et al., 2017; Dumont et al., 2017; Epule et al., 2017).

5.4 Mitigation and Sustainable Development

The AR5 WGIII examined the potential of various mitigation options for specific sectors (energy supply, industry, buildings, transport, and agriculture, forestry, and other land use; AFOLU); it provided a narrative of dimensions of sustainable development and equity as a framing for evaluating climate responses and policies, respectively, in Chapters 4, 7, 8, 9, 10 and 11 (IPCC, 2014a). This section builds on the analyses of Chapters 2 and 4 of this report to re-assess mitigation and sustainable development in the context of 1.5°C global warming as well as the SDGs.

5.4.1 Synergies and Trade-Offs between Mitigation Options and Sustainable Development

Adopting stringent climate mitigation options can generate multiple positive non-climate benefits that have the potential to reduce the costs of achieving sustainable development (IPCC, 2014b; Ürge-Vorsatz et al., 2014, 2016; Schaeffer et al., 2015; von Stechow et al., 2015). Understanding the positive impacts (synergies) but also the negative impacts (trade-offs) is key for selecting mitigation options and policy choices that maximize the synergies between mitigation and developmental actions (Hildingsson and Johansson, 2015; Nilsson

et al., 2016; Delponte et al., 2017; van Vuuren et al., 2017b; McCollum et al., 2018b). Aligning mitigation response options to sustainable development objectives can ensure public acceptance (IPCC, 2014a), encourage faster action (Lechtenboehmer and Knoop, 2017) and support the design of equitable mitigation (Holz et al., 2018; Winkler et al., 2018) that protect human rights (MRFCJ, 2015b) (Section 5.5.3).

This sub-section assesses available literature on the interactions of individual mitigation options (see Chapter 2, Section 2.3.1.2, Chapter 4, Sections 4.2 and 4.3) with sustainable development and the SDGs and underlying targets. Table 5.2 presents an assessment of these synergies and trade-offs and the strength of the interaction using an SDG-interaction score (see Glossary) (McCollum et al., 2018b), with evidence and agreements levels. Figure 5.2 presents the information of Table 5.2, showing gross (not net) interactions with the SDGs. This detailed assessment of synergies and trade-offs of individual mitigation options with the SDGs (Table 5.2 a–d and Figure 5.2) reveals that the number of synergies exceeds that of trade-offs. Mitigation response options in the energy demand sector, AFOLU and oceans have more positive interactions with a larger number of SDGs compared to those on the energy supply side (*robust evidence, high agreement*).

5.4.1.1 Energy Demand: Mitigation Options to Accelerate Reduction in Energy Use and Fuel Switch

For mitigation options in the energy demand sectors, the number of synergies with all sixteen SDGs exceeds the number of trade-offs (Figure 5.2 and Table 5.2) (*robust evidence, high agreement*). Most of the interactions are of a reinforcing nature, hence facilitating the achievement of the goals.

Accelerating energy efficiency in all sectors, which is a necessary condition for a 1.5°C warmer world (see Chapters 2 and 4), has synergies with a large number of SDGs (*robust evidence, high agreement*) (Figure 5.2 and Table 5.2). The diffusion of efficient equipment and appliances across end use sectors has synergies with international partnership (SDG 17) and participatory and transparent institutions (SDG 16) because innovations and deployment of new technologies require transnational capacity building and knowledge sharing. Resource and energy savings support sustainable production and consumption (SDG 12), energy access (SDG 7), innovation and infrastructure development (SDG 9) and sustainable city development (SDG 11). Energy efficiency supports the creation of decent jobs by new service companies providing services for energy efficiency, but the net employment effect of efficiency improvement remains uncertain due to macro-economic feedback (SDG 8) (McCollum et al., 2018b).

In the buildings sector, accelerating energy efficiency by way of, for example, enhancing the use of efficient appliances, refrigerant transition, insulation, retrofitting and low- or zero-energy buildings generates benefits across multiple SDG targets. For example, improved cook stoves make fuel endowments last longer and hence reduce deforestation (SDG 15), support equal opportunity by reducing school absences due to asthma among children (SDGs 3 and 4) and empower rural and indigenous women by reducing drudgery (SDG 5) (*robust evidence, high agreement*) (Derbez et al., 2014; Lucon et al., 2014; Maidment et al., 2014; Scott et al., 2014; Cameron et al.,

2015; Fay et al., 2015; Liddell and Guiney, 2015; Shah et al., 2015; Sharpe et al., 2015; Wells et al., 2015; Willand et al., 2015; Hallegatte et al., 2016; Kusumaningtyas and Aldrian, 2016; Berrueta et al., 2017; McCollum et al., 2018a).

In energy-intensive processing industries, 1.5°C-compatible trajectories require radical technology innovation through maximum electrification, shift to other low emissions energy carriers such as hydrogen or biomass, integration of carbon capture and storage (CCS) and innovations for carbon capture and utilization (CCU) (see Chapter 4, Section 4.3.4.5). These transformations have strong synergies with innovation and sustainable industrialization (SDG 9), supranational partnerships (SDGs 16 and 17) and sustainable production (SDG 12). However, possible trade-offs due to risks of CCS-based carbon leakage, increased electricity demands, and associated price impacts affecting energy access and poverty (SDGs 7 and 1) would need careful regulatory attention (Wesseling et al., 2017). In the mining industry, energy efficiency can be synergistic or face trade-offs with sustainable management (SDG 6), depending on the option retained for water management (Nguyen et al., 2014). Substitution and recycling are also an important driver of 1.5°C-compatible trajectories in industrial systems (see Chapter 4, Section 4.3.4.2). Structural changes and reorganization of economic activities in industrial park/clusters following the principles of industrial symbiosis (circular economy) improves the overall sustainability by reducing energy and waste (Fan et al., 2017; Preston and Lehne, 2017) and reinforces responsible production and consumption (SDG 12) through recycling, water use efficiency (SDG 6), energy access (SDG 7) and ecosystem protection and restoration (SDG 15) (Karner et al., 2015; Zeng et al., 2017).

In the transport sector, deep electrification may trigger increases of electricity prices and adversely affect poor populations (SDG 1), unless pro-poor redistributive policies are in place (Klausbrickner et al., 2016). In cities, governments can lay the foundations for compact, connected low-carbon cities, which are an important component of 1.5°C-compatible transformations (see Chapter 4, Section 4.3.3) and show synergies with sustainable cities (SDG 11) (Colenbrander et al., 2016).

Behavioural responses are important determinants of the ultimate outcome of energy efficiency on emission reductions and energy access (SDG 7) and their management requires a detailed understanding of the drivers of consumption and the potential for and barriers to absolute reductions (Fuchs et al., 2016). Notably, the rebound effect tends to offset the benefits of efficiency for emissions reductions through growing demand for energy services (Sorrell, 2015; Suffolk and Poortinga, 2016). However, high rebound can help in providing faster access to affordable energy (SDG 7.1) where the goal is to reduce energy poverty and unmet energy demand (see Chapter 2, Section 2.4.3) (Chakravarty et al., 2013). Comprehensive policy design – including rebound suppressing policies, such as carbon pricing and policies that encourage awareness building and promotional material design – is needed to tap the full potential of energy savings, as applicable to a 1.5°C warming context (Chakravarty and Tavoni, 2013; IPCC, 2014b; Karner et al., 2015; Zhang et al., 2015; Altieri et al., 2016; Santarius et al., 2016) and to address policy-related trade-offs and welfare-enhancing benefits (*robust evidence, high agreement*) (Chakravarty et al., 2013; Chakravarty and Roy, 2016; Gillingham et al., 2016).

Other behavioural responses will affect the interplay between energy efficiency and sustainable development. Building occupants reluctant to change their habits may miss out on welfare-enhancing energy efficiency opportunities (Zhao et al., 2017). Preferences for new products and premature obsolescence for appliances is expected to adversely affect sustainable consumption and production (SDG 12) with ramifications for resource use efficiency (Echegaray, 2016). Changes in user behaviour towards increased physical activity, less reliance on motorized travel over short distances and the use of public transport would help to decarbonize the transport sector in a synergetic manner with SDGs 3, 11 and 12 (Shaw et al., 2014; Ajanovic, 2015; Chakrabarti and Shin, 2017), while reducing inequality in access to basic facilities (SDG 10) (Lucas and Pangbourne, 2014; Kagawa et al., 2015). However, infrastructure design and regulations would need to ensure road safety and address risks of road accidents for pedestrians (Hwang et al., 2017; Kkreis et al., 2017) to ensure sustainable infrastructure growth in human settlements (SDGs 9 and 11) (Lin et al., 2015; SLoCaT, 2017).

5.4.1.2 Energy Supply: Accelerated Decarbonization

Decreasing the share of coal in energy supply in line with 1.5°C-compatible scenarios (see Chapter 2, Section 2.4.2) reduces adverse impacts of upstream supply-chain activities, in particular air and water pollution and coal mining accidents, and enhances health by reducing air pollution, notably in cities, showing synergies with SDGs 3, 11 and 12 (Yang et al., 2016; UNEP, 2017).

Fast deployment of renewables such as solar, wind, hydro and modern biomass, together with the decrease of fossil fuels in energy supply (see Chapter 2, Section 2.4.2.1), is aligned with the doubling of renewables in the global energy mix (SDG 7.2). Renewables could also support progress on SDGs 1, 10, 11 and 12 and supplement new technology (*robust evidence, high agreement*) (Chaturvedi and Shukla, 2014; Rose et al., 2014; Smith and Sagar, 2014; Riahi et al., 2015; IEA, 2016; van Vuuren et al., 2017a; McCollum et al., 2018a). However, some trade-offs with the SDGs can emerge from offshore installations, particularly SDG 14 in local contexts (McCollum et al., 2018a). Moreover, trade-offs between renewable energy production and affordability (SDG 7) (Labordena et al., 2017) and other environmental objectives would need to be scrutinised for potential negative social outcomes. Policy interventions through regional cooperation-building (SDG 17) and institutional capacity (SDG 16) can enhance affordability (SDG 7) (Labordena et al., 2017). The deployment of small-scale renewables, or off-grid solutions for people in remote areas (Sánchez and Izzo, 2017), has strong potential for synergies with access to energy (SDG 7), but the actualization of these potentials requires measures to overcome technology and reliability risks associated with large-scale deployment of renewables (Giwa et al., 2017; Heard et al., 2017). Bundling energy-efficient appliances and lighting with off-grid renewables can lead to substantial cost reduction while increasing reliability (IEA, 2017). Low-income populations in industrialized countries are often left out of renewable energy generation schemes, either because of high start-up costs or lack of home ownership (UNRISD, 2016).

Nuclear energy, the share of which increases in most of the 1.5°C-compatible pathways (see Chapter 2, Section 2.4.2.1), can increase the risks of proliferation (SDG 16), have negative environmental effects

(e.g., for water use; SDG 6) and have mixed effects for human health when replacing fossil fuels (SDGs 7 and 3) (see Table 5.2). The use of fossil CCS, which plays an important role in deep mitigation pathways (see Chapter 2, Section 2.4.2.3), implies continued adverse impacts of upstream supply-chain activities in the coal sector, and because of lower efficiency of CCS coal power plants (SDG 12), upstream impacts and local air pollution are likely to be exacerbated (SDG 3). Furthermore, there is a non-negligible risk of carbon dioxide leakage from geological storage and the carbon dioxide transport infrastructure (SDG 3) (Table 5.2).

Economies dependent upon fossil fuel-based energy generation and/or export revenue are expected to be disproportionately affected by future restrictions on the use of fossil fuels under stringent climate goals and higher carbon prices; this includes impacts on employment, stranded assets, resources left underground, lower capacity use and early phasing out of large infrastructure already under construction (*robust evidence, high agreement*) (Box 5.2) (Johnson et al., 2015; McGlade and Ekins, 2015; UNEP, 2017; Spencer et al., 2018). Investment in coal continues to be attractive in many countries as it is a mature technology and provides cheap energy supplies, large-scale employment and energy security (Jakob and Steckel, 2016; Vogt-Schilb and Hallegatte, 2017; Spencer et al., 2018). Hence, accompanying policies and measures would be required to ease job losses and correct for relatively higher prices of alternative energy (Oosterhuis and Ten Brink, 2014; Oei and Mendelevitch, 2016; Garg et al., 2017; HLCCP, 2017; Jordaan et al., 2017; OECD, 2017; UNEP, 2017; Blondeel and van de Graaf, 2018; Green, 2018). Research on historical transitions shows that managing the impacts on workers through retraining programmes is essential in order to align the phase-down of mining industries with meeting ambitious climate targets, and the objectives of a ‘just transition’ (Galgócz, 2014; Caldecott et al., 2017; Healy and Barry, 2017). This aspect is even more important in developing countries where the mining workforce is largely semi- or unskilled (Altieri et al., 2016; Tung, 2016). Ambitious emissions reduction targets can unlock very strong decoupling potentials in industrialized fossil exporting economies (Hatfield-Dodds et al., 2015).

Box 5.2 | Challenges and Opportunities of Low-Carbon Pathways in Gulf Cooperative Council Countries

The Gulf Cooperative Council (GCC) region (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates) is characterized by high dependency on hydrocarbon resources (natural oil and gas), with high risks of socio-economic impacts of policies and response measures to address climate change. The region is also vulnerable to the decrease of the global demand and price of hydrocarbons as a result of climate change response measures. The projected declining use of oil and gas under low emissions pathways creates risks of significant economic losses for the GCC region (e.g., Waisman et al., 2013; Van de Graaf and Verbruggen, 2015; Al-Maamary et al., 2016; Bauer et al., 2016), given that natural gas and oil revenues contributed to about 70% of government budgets and > 35% of the gross domestic product in 2010 (Callen et al., 2014).

The current high energy intensity of the domestic economies (Al-Maamary et al., 2017), triggered mainly by low domestic energy prices (Alshehry and Belloumi, 2015), suggests specific challenges for aligning mitigation towards 1.5°C-consistent trajectories, which would require strong energy efficiency and economic development for the region.

The region's economies are highly reliant on fossil fuel for their domestic activities. Yet the renewables deployment potentials are large, deployment is already happening (Cugurullo, 2013; IRENA, 2016) and positive economic benefits can be envisaged (Sgouridis et al., 2016). Nonetheless, the use of renewables is currently limited by economics and structural challenges (Lilliestam and Patt, 2015; Griffiths, 2017a). Carbon capture and storage (CCS) is also envisaged with concrete steps towards implementation (Alsheyab, 2017; Ustadi et al., 2017); yet the real potential of this technology in terms of scale and economic dimensions is still uncertain.

Beyond the above mitigation-related challenges, the region's human societies and fragile ecosystems are highly vulnerable to the impacts of climate change, such as water stress (Evans et al., 2004; Shaffrey et al., 2009), desertification (Bayram and Öztürk, 2014), sea level rise affecting vast low coastal lands, and high temperature and humidity with future levels potentially beyond adaptive capacities (Pal and Eltahir, 2016). A low-carbon pathway that manages climate-related risks within the context of sustainable development requires an approach that jointly addresses both types of vulnerabilities (Al Ansari, 2013; Lilliestam and Patt, 2015; Babiker, 2016; Griffiths, 2017b).

The Nationally Determined Contributions (NDCs) for GCC countries identified energy efficiency, deployment of renewables and technology transfer to enhance agriculture, food security, protection of marine resources, and management of water and costal zones (Babiker, 2016). Strategic vision documents, such as Saudi Arabia's 'Vision 2030', identify emergent opportunities for energy price reforms, energy efficiency, turning emissions into valuable products, and deployment of renewables and other clean technologies, if accompanied with appropriate policies to manage the transition and in the context of economic diversification (Luomi, 2014; Atalay et al., 2016; Griffiths, 2017b; Howarth et al., 2017).

5.4.1.3 Land-based agriculture, forestry and ocean: mitigation response options and carbon dioxide removal

5

In the AFOLU sector, dietary change towards global healthy diets, that is, a shift from over-consumption of animal-related to plant-related diets, and food waste reduction (see Chapter 4, Section 4.3.2.1) are in synergy with SDGs 2 and 6, and SDG 3 through lower consumption of animal products and reduced losses and waste throughout the food system, contributing to achieving SDGs 12 and 15 (Bajželj et al., 2014; Bustamante et al., 2014; Tilman and Clark, 2014; Hiç et al., 2016).

Power dynamics play an important role in achieving behavioural change and sustainable consumption (Fuchs et al., 2016). In forest management (see Chapter 4, Section 4.3.2.2), encouraging responsible sourcing of forest products and securing indigenous land tenure has the potential to increase economic benefits by creating decent jobs (SDG 8), maintaining biodiversity (SDG 15), facilitating innovation and upgrading technology (SDG 9), and encouraging responsible and just decision-making (SDG 16) (*medium evidence, high agreement*) (Ding et al., 2016; WWF, 2017).

Emerging evidence indicates that future mitigation efforts that would be required to reach stringent climate targets, particularly those associated with carbon dioxide removal (CDR) (e.g., afforestation and reforestation and bioenergy with carbon capture and storage; BECCS), may also impose significant constraints upon poor and vulnerable communities (SDG 1) via increased food prices and competition for arable land, land appropriation and dispossession (Cavanagh and Benjamin, 2014; Hunsberger et al., 2014; Work, 2015; Muratori et al., 2016; Smith et al., 2016; Burns and Nicholson, 2017; Corbera et al., 2017) with disproportionate negative impacts upon rural poor and indigenous populations (SDG 1) (*robust evidence, high agreement*) (Section 5.4.2.2, Table 5.2, Figure 5.2) (Grubert et al., 2014; Grill et al., 2015; Zhang and Chen, 2015; Fricko et al., 2016; Johansson et al., 2016; Aha and Ayitey, 2017; De Stefano et al., 2017; Shi et al., 2017). Crops for bioenergy may increase irrigation needs and exacerbate water stress with negative associated impacts on SDGs 6 and 10 (Boysen et al., 2017).

Ocean iron fertilization and enhanced weathering have two-way interactions with life under water and on land and food security (SDGs

2, 14 and 15) (Table 5.2). Development of blue carbon resources through coastal (mangrove) and marine (seaweed) vegetative ecosystems encourages: integrated water resource management (SDG 6) (Vierros, 2017); promotes life on land (SDG 15) (Potouoglou et al., 2017); poverty

reduction (SDG 1) (Schirmer and Bull, 2014; Lamb et al., 2016); and food security (SDG 2) (Ahmed et al., 2017a, b; Duarte et al., 2017; Sondak et al., 2017; Vierros, 2017; Zhang et al., 2017).

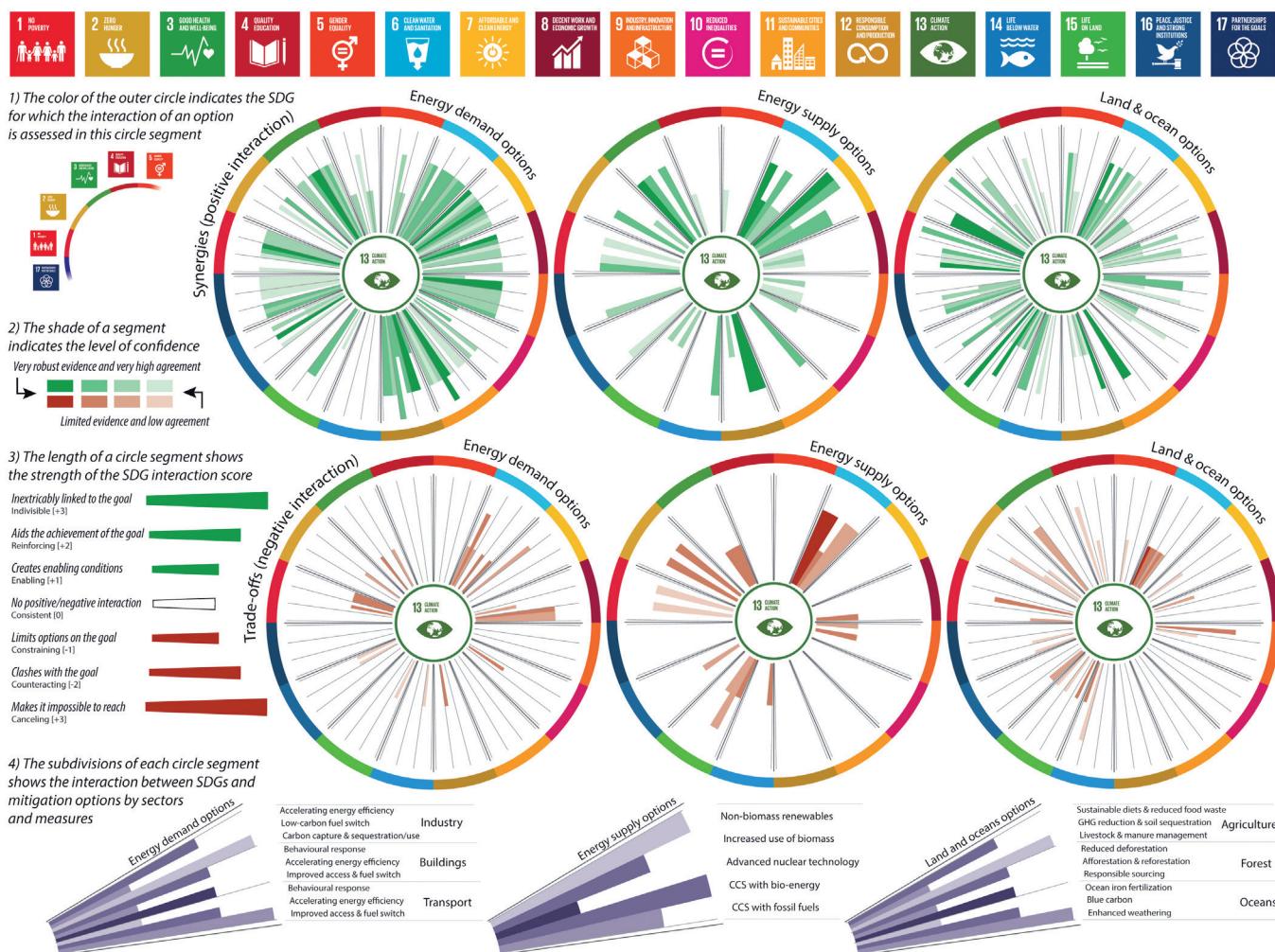


Figure 5.2 | Synergies and trade-offs and gross Sustainable Development Goal (SDG)-interaction with individual mitigation options. The top three wheels represent synergies and the bottom three wheels show trade-offs. The colours on the border of the wheels correspond to the SDGs listed above, starting at the 9 o'clock position, with reading guidance in the top-left corner with the quarter circle (Note 1). Mitigation (climate action, SDG 13) is at the centre of the circle. The coloured segments inside the circles can be counted to arrive at the number of synergies (green) and trade-offs (red). The length of the coloured segments shows the strength of the synergies or trade-offs (Note 3) and the shading indicates confidence (Note 2). Various mitigation options within the energy demand sector, energy supply sector, and land and ocean sector, and how to read them within a segment are shown in grey (Note 4). See also Table 5.2.

5.4.2 Sustainable Development Implications of 1.5°C and 2°C Mitigation Pathways

While previous sections have focused on individual mitigation options and their interaction with sustainable development and the SDGs, this section takes a systems perspective. Emphasis is on quantitative pathways depicting path-dependent evolutions of human and natural systems over time. Specifically, the focus is on fundamental transformations and thus stringent mitigation policies consistent with 1.5°C or 2°C, and the differential synergies and trade-offs with respect to the various sustainable development dimensions.

Both 1.5°C and 2°C pathways would require deep cuts in greenhouse gas (GHG) emissions and large-scale changes of energy supply and demand, as well as in agriculture and forestry systems (see Chapter 2, Section 2.4). For the assessment of the sustainable development implications of these pathways, this chapter draws upon studies that show the aggregated impact of mitigation for multiple sustainable development dimensions (Grubler et al., 2018; McCollum et al., 2018b; Rogelj et al., 2018) and across multiple integrated assessment modelling (IAM) frameworks. Often these tools are linked to disciplinary models covering specific SDGs in more detail (Cameron et al., 2016; Rao et al., 2017; Grubler et al., 2018; McCollum et al.,

2018b). Using multiple IAMs and disciplinary models is important for a robust assessment of the sustainable development implications of different pathways. Emphasis is on multi-regional studies, which can be aggregated to the global scale. The recent literature on 1.5°C mitigation pathways has begun to provide quantifications for a range of sustainable development dimensions, including air pollution and health, food security and hunger, energy access, water security, and multidimensional poverty and equity.

5.4.2.1 Air pollution and health

GHGs and air pollutants are typically emitted by the same sources. Hence, mitigation strategies that reduce GHGs or the use of fossil fuels typically also reduce emissions of pollutants, such as particulate matter (e.g., PM_{2.5} and PM₁₀), black carbon (BC), sulphur dioxide (SO₂), nitrogen oxides (NO_x) and other harmful species (Clarke et al., 2014) (Figure 5.3), causing adverse health and ecosystem effects at various scales (Kusumaningtyas and Aldrian, 2016).

Mitigation pathways typically show that there are significant synergies for air pollution, and that the synergies increase with the stringency of the mitigation policies (Amann et al., 2011; Rao et al., 2016; Klimont et al., 2017; Shindell et al., 2017; Markandya et al., 2018). Recent multimodel comparisons indicate that mitigation pathways consistent with 1.5°C would result in higher synergies with air pollution compared to pathways that are consistent with 2°C (Figures 5.4 and 5.5). Shindell et al. (2018) indicate that health benefits worldwide over the century of 1.5°C pathways could be in the range of 110 to 190 million fewer premature deaths compared to 2°C pathways. The synergies for air pollution are highest in the developing world, particularly in Asia. In addition to significant health benefits, there are also economic benefits from mitigation, reducing the investment needs in air pollution control technologies by about 35% globally (or about 100 billion USD2010 per year to 2030 in 1.5°C pathways; McCollum et al., 2018b) (Figure 5.4).

5.4.2.2 Food security and hunger

Stringent climate mitigation pathways in line with 'well below 2°C' or '1.5°C' goals often rely on the deployment of large-scale land-related measures, like afforestation and/or bioenergy supply (Popp et al., 2014; Rose et al., 2014; Creutzig et al., 2015). These land-related measures can compete with food production and hence raise food security concerns (Section 5.4.1.3) (P. Smith et al., 2014). Mitigation studies indicate that so-called 'single-minded' climate policy, aiming solely at limiting warming to 1.5°C or 2°C without concurrent measures in the food sector, can have negative impacts for global food security (Hasegawa et al., 2015; McCollum et al., 2018b). Impacts of 1.5°C mitigation pathways can be significantly higher than those of 2°C pathways (Figures 5.4 and 5.5). An important driver of the food security impacts in these scenarios is the increase of food prices and the effect of mitigation on disposable income and wealth due to GHG pricing. A recent study indicates that, on aggregate, the price and income effects on food may be bigger than the effect due to competition over land between food and bioenergy (Hasegawa et al., 2015).

In order to address the issue of trade-offs with food security, mitigation policies would need to be designed in a way that shields the population

at risk of hunger, including through the adoption of different complementary measures, such as food price support. The investment needs of complementary food price policies are found to be globally relatively much smaller than the associated mitigation investments of 1.5°C pathways (Figure 5.3) (McCollum et al., 2018b). Besides food support price, other measures include improving productivity and efficiency of agricultural production systems (FAO and NZAGRC, 2017a, b; Frank et al., 2017) and programmes focusing on forest land-use change (Havlík et al., 2014). All these lead to additional benefits of mitigation, improving resilience and livelihoods.

Van Vuuren et al. (2018) and Grubler et al. (2018) show that 1.5°C pathways without reliance on BECCS can be achieved through a fundamental transformation of the service sectors which would significantly reduce energy and food demand (see Chapter 2, Sections 2.1.1, 2.3.1 and 2.4.3). Such low energy demand (LED) pathways would result in significantly reduced pressure on food security, lower food prices and fewer people at risk of hunger. Importantly, the trade-offs with food security would be reduced by the avoided impacts in the agricultural sector due to the reduced warming associated with the 1.5°C pathways (see Chapter 3, Section 3.5). However, such feedbacks are not comprehensively captured in the studies on mitigation.

5.4.2.3 Lack of energy access/energy poverty

A lack of access to clean and affordable energy (especially for cooking) is a major policy concern in many countries, especially in those in South Asia and Africa where major parts of the population still rely primarily on solid fuels for cooking (IEA and World Bank, 2017). Scenario studies which quantify the interactions between climate mitigation and energy access indicate that stringent climate policy which would affect energy prices could significantly slow down the transition to clean cooking fuels, such as liquefied petroleum gas or electricity (Cameron et al., 2016).

Estimates across six different IAMs (McCollum et al., 2018b) indicate that, in the absence of compensatory measures, the number of people without access to clean cooking fuels may increase. Redistributive measures, such as subsidies on cleaner fuels and stoves, could compensate for the negative effects of mitigation on energy access. Investment costs of the redistributive measures in 1.5°C pathways (on average around 120 billion USD2010 per year to 2030; Figure 5.4) are much smaller than the mitigation investments of 1.5°C pathways (McCollum et al., 2018b). The recycling of revenues from climate policy might act as a means to help finance the costs of providing energy access to the poor (Cameron et al., 2016).

5.4.2.4 Water security

Transformations towards low emissions energy and agricultural systems can have major implications for freshwater demand as well as water pollution. The scaling up of renewables and energy efficiency as depicted by low emissions pathways would, in most instances, lower water demands for thermal energy supply facilities ('water-for-energy') compared to fossil energy technologies, and thus reinforce targets related to water access and scarcity (see Chapter 4, Section 4.2.1). However, some low-carbon options such as bioenergy, centralized solar

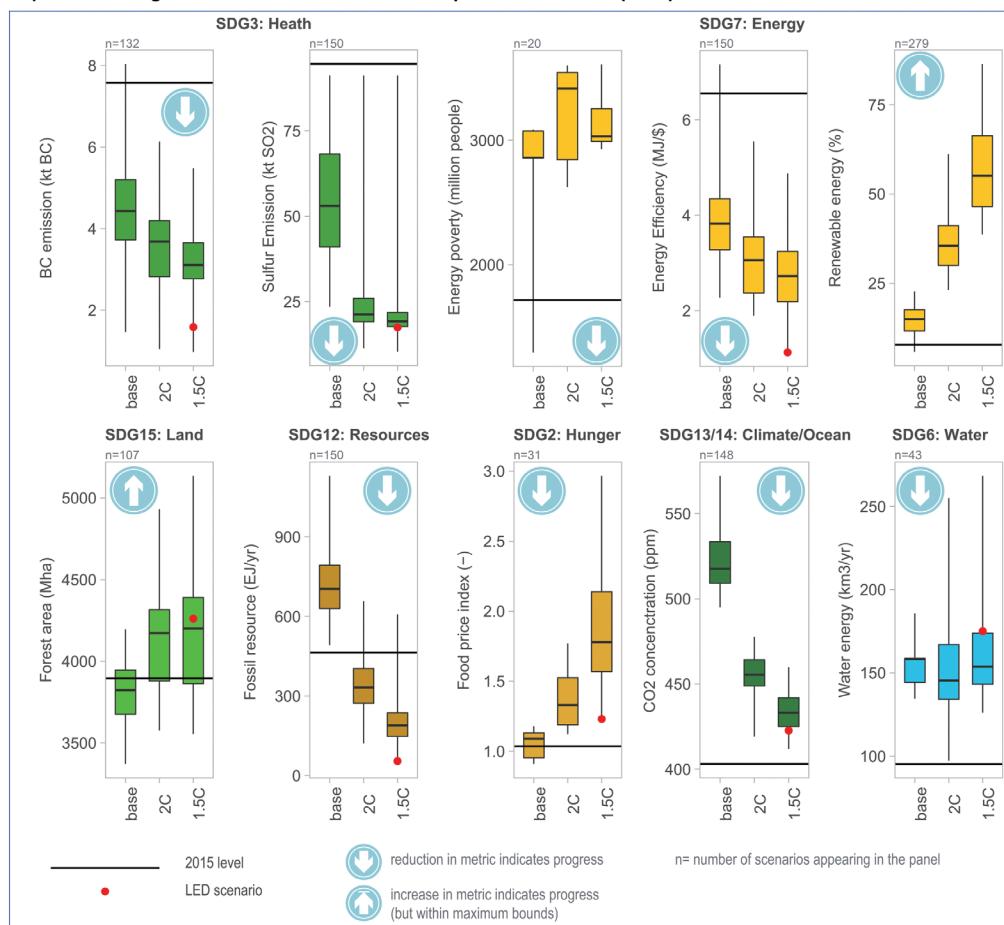
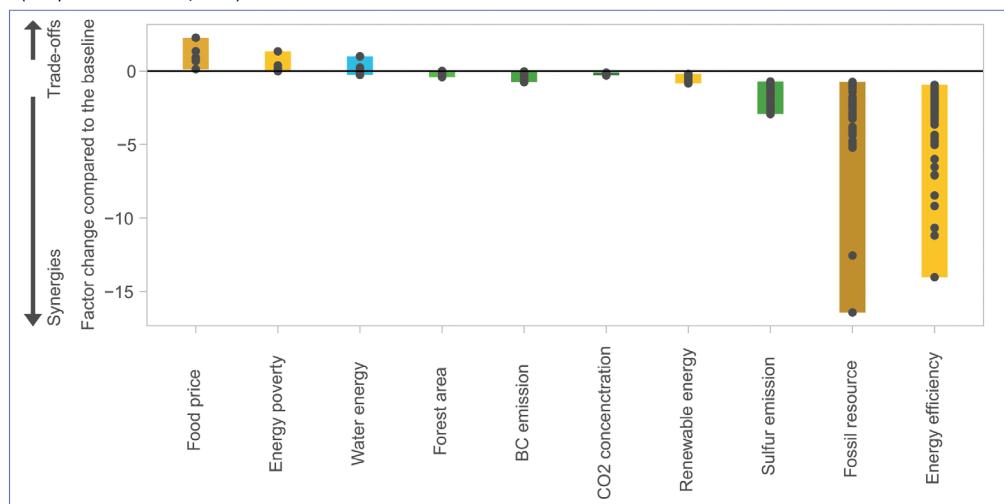
a) Scenario ranges for selected sustainable development dimensions (2050)**b) Synergies and trade-offs of 1.5°C pathways
(compared to baseline, 2050)**

Figure 5.3 | Sustainable development implications of mitigation actions in 1.5°C pathways. Panel (a) shows ranges for 1.5°C pathways compared to the ranges of 2°C pathways and baseline pathways. The panel (a) depicts interquartile and the full range across the scenarios for Sustainable Development Goal (SDG) 2 (hunger), SDG 3 (health), SDG 6 (water), SDG 7 (energy), SDG 12 (resources), SDG 13/14 (climate/ocean) and SDG 15 (land). Progress towards achieving the SDGs is denoted by arrow symbols (increase or decrease of indicator). Black horizontal lines show 2015 values for comparison. Note that sustainable development effects are estimated for the effect of mitigation and do not include benefits from avoided impacts (see Chapter 3, Section 3.5). Low energy demand (LED) denotes estimates from a pathway with extremely low energy demand reaching 1.5°C without bioenergy with carbon capture and storage (BECCS). Panel (b) presents the resulting full range for synergies and trade-offs of 1.5°C pathways compared to the corresponding baseline scenarios. The y-axis in panel (b) indicates the factor change in the 1.5°C pathway compared to the baseline. Note that the figure shows gross impacts of mitigation and does not include feedbacks due to avoided impacts. The realization of the side effects will critically depend on local circumstances and implementation practice. Trade-offs across many sustainable development dimensions can be reduced through complementary/re-distributional measures. The figure is not comprehensive and focuses on those sustainable development dimensions for which quantifications across models are available. Sources: 1.5°C pathways database from Chapter 2 (Grubler et al., 2018; McCollum et al., 2018b).

power, nuclear and hydropower technologies could, if not managed properly, have counteracting effects that compound existing water-related problems in a given locale (Byers et al., 2014; Fricko et al., 2016; IEA, 2016; Fujimori et al., 2017a; Wang, 2017; McCollum et al., 2018a).

Under stringent mitigation efforts, the demand for bioenergy can result in a substantial increase of water demand for irrigation, thereby potentially contributing to water scarcity in water-stressed regions (Berger et al., 2015; Bonsch et al., 2016; Jägermeyr et al., 2017). However, this risk can be reduced by prioritizing rain-fed production of bioenergy (Hayashi et al., 2015, 2018; Bonsch et al., 2016), but might have adverse effects for food security (Boysen et al., 2017).

Reducing food and energy demand without compromising the needs of the poor emerges as a robust strategy for both water conservation and GHG emissions reductions (von Stechow et al., 2015; IEA, 2016; Parkinson et al., 2016; Grubler et al., 2018). The results underscore the importance of an integrated approach when developing water, energy and climate policy (IEA, 2016).

Estimates across different models for the impacts of stringent mitigation pathways on energy-related water uses seem ambiguous. Some pathways show synergies (Mouratiadou et al., 2018) while others indicate trade-offs and thus increases of water use due to mitigation (Fricko et al., 2016). The synergies depend on the adopted policy implementation or mitigation strategies and technology portfolio. A number of adaptation options exist (e.g., dry cooling), which can effectively reduce electricity-related water trade-offs (Fricko et al., 2016; IEA, 2016). Similarly, irrigation water use will depend on the regions where crops are produced, the sources of bioenergy (e.g., agriculture vs. forestry) and dietary change induced by climate policy. Overall, and also considering other water-related SDGs, including access to safe drinking water and sanitation as well as waste-water treatment, investments into the water sector seem to be only modestly affected by stringent climate policy compatible with 1.5°C (Figure 5.4) (McCollum et al., 2018b).

In summary, the assessment of mitigation pathways shows that to meet the 1.5°C target, a wide range of mitigation options would need to be deployed (see Chapter 2, Sections 2.3 and 2.4). While pathways aiming at 1.5°C are associated with high synergies for some sustainable development dimensions (such as human health and air pollution, forest preservation), the rapid pace and magnitude of the required changes would also lead to increased risks for trade-offs for other sustainable development dimensions (particularly food security) (Figures 5.4 and 5.5). Synergies and trade-offs are expected to be unevenly distributed between regions and nations (Box 5.2), though little literature has formally examined such distributions under 1.5°C-consistent mitigation scenarios. Reducing these risks requires smart policy designs and mechanisms that shield the poor and redistribute the burden so that the most vulnerable are not disproportionately affected. Recent scenario analyses show that associated investments for reducing the trade-offs for, for example, food, water and energy access to be significantly lower than the required mitigation investments (McCollum et al., 2018b). Fundamental transformation of demand, including efficiency and behavioural changes, can help to significantly reduce the reliance on risky technologies, such as BECCS, and thus reduce the risk of potential

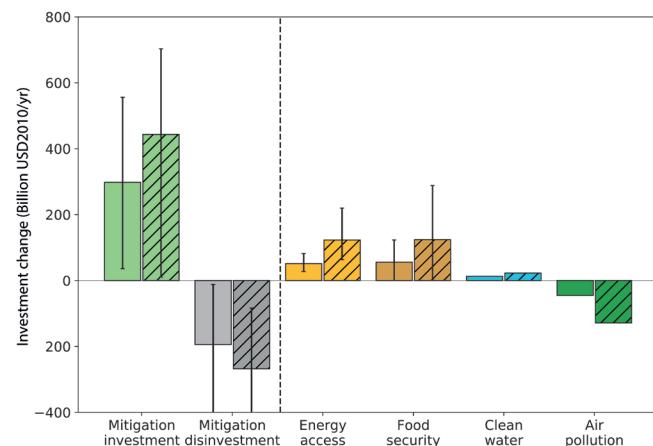


Figure 5.4 | Investment into mitigation up until 2030 and implications for investments for four sustainable development dimensions. Cross-hatched bars show the median investment in 1.5°C pathways across results from different models, and solid bars for 2°C pathways, respectively. Whiskers on bars represent minima and maxima across estimates from six models. Clean water and air pollution investments are available only from one model. Mitigation investments show the change in investments across mitigation options compared to the baseline. Negative mitigation investments (grey bars) denote disinvestment (reduced investment needs) into fossil fuel sectors compared to the baseline. Investments for different sustainable development dimensions denote the investment needs for complementary measures in order to avoid trade-offs (negative impacts) of mitigation. Negative sustainable development investments for air pollution indicate cost savings, and thus synergies of mitigation for air pollution control costs. The values compare to about 2 trillion USD2010 (range of 1.4 to 3 trillion) of total energy-related investments in the 1.5°C pathways. Source: Estimates from CD-LINKS scenarios summarised by McCollum et al., 2018b.

trade-offs between mitigation and other sustainable development dimensions (von Stechow et al., 2015; Grubler et al., 2018; van Vuuren et al., 2018). Reliance on demand-side measures only, however, would not be sufficient for meeting stringent targets, such as 1.5°C and 2°C (Clarke et al., 2014).

5.5 Sustainable Development Pathways to 1.5°C

This section assesses what is known in the literature on development pathways that are sustainable and climate-resilient and relevant to a 1.5°C warmer world. Pathways, transitions from today's world to achieving a set of future goals (see Chapter 1, Section 1.2.3, Cross-Chapter Box 1), follow broadly two main traditions: first, as integrated pathways describing the required societal and systems transformations, combining quantitative modelling and qualitative narratives at multiple spatial scales (global to sub-national); and second, as country- and community-level, solution-oriented trajectories and decision-making processes about context- and place-specific opportunities, challenges and trade-offs. These two notions of pathways offer different, though complementary, insights into the nature of 1.5°C-relevant trajectories and the short-term actions that enable long-term goals. Both highlight to varying degrees the urgency, ethics and equity dimensions of possible trajectories and society- and system-wide transformations, yet at different scales, building on Chapter 2 (see Section 2.4) and Chapter 4 (see Section 4.5).

5.5.1 Integration of Adaptation, Mitigation and Sustainable Development

Insights into climate-compatible development (see Glossary) illustrate how integration between adaptation, mitigation and sustainable development works in context-specific projects, how synergies are achieved and what challenges are encountered during implementation (Stringer et al., 2014; Suckall et al., 2014; Antwi-Agyei et al., 2017a; Bickersteth et al., 2017; Kalafatis, 2017; Nunan, 2017). The operationalization of climate-compatible development, including climate-smart agriculture and carbon-forestry projects (Lipper et al., 2014; Campbell et al., 2016; Quan et al., 2017), shows multilevel and multisector trade-offs involving ‘winners’ and ‘losers’ across governance levels (*high confidence*) (Kongsager and Corbera, 2015; Naess et al., 2015; Karlsson et al., 2017; Tanner et al., 2017; Taylor, 2017; Wood, 2017; Ficklin et al., 2018). Issues of power, participation, values, equity, inequality and justice transcend case study examples of attempted integrated approaches (Nunan, 2017; Phillips et al., 2017; Stringer et al., 2017; Wood, 2017), also reflected in policy frameworks for integrated outcomes (Stringer et al., 2014; Di Gregorio et al., 2017; Few et al., 2017; Tanner et al., 2017).

Ultimately, reconciling trade-offs between development needs and emissions reductions towards a 1.5°C warmer world requires a dynamic view of the interlinkages between adaptation, mitigation and sustainable development (Nunan, 2017). This entails recognition of the ways in which development contexts shape the choice and effectiveness of interventions, limit the range of responses afforded to communities and governments, and potentially impose injustices upon vulnerable groups (UNRISD, 2016; Thornton and Comberti, 2017). A variety of approaches, both quantitative and qualitative, exist to examine possible sustainable development pathways under which climate and sustainable development goals can be achieved, and synergies and trade-offs for transformation identified (Sections 5.3 and 5.4).

5.5.2 Pathways for Adaptation, Mitigation and Sustainable Development

This section focuses on the growing body of pathways literature describing the dynamic and systemic integration of mitigation and adaptation with sustainable development in the context of a 1.5°C warmer world. These studies are critically important for the identification of ‘enabling’ conditions under which climate and the SDGs can be achieved, and thus help the design of transformation strategies that maximize synergies and avoid potential trade-offs (Sections 5.3 and 5.4). Full integration of sustainable development dimensions is, however, challenging, given their diversity and the need for high temporal, spatial and social resolution to address local effects, including heterogeneity related to poverty and equity (von Stechow et al., 2015). Research on long-term climate change mitigation and adaptation pathways has covered individual SDGs to different degrees. Interactions between climate and other SDGs have been explored for SDGs 2, 3, 4, 6, 7, 8, 12, 14 and 15 (Clarke et al., 2014; Abel et al., 2016; von Stechow et al., 2016; Rao et al., 2017), while interactions with SDGs 1, 5, 11 and 16 remain largely underexplored in integrated long-term scenarios (Zimm et al., 2018).

Quantitative pathways studies now better represent ‘nexus’ approaches to assess sustainable development dimensions. In such approaches (see Chapter 4, Section 4.3.3.8), a subset of sustainable development dimensions are investigated together because of their close relationships (Welsch et al., 2014; Conway et al., 2015; Kearns et al., 2016; Parkinson et al., 2016; Rasul and Sharma, 2016; Howarth and Monasterolo, 2017). Compared to single-objective climate–SDG assessments (Section 5.4.2), nexus solutions attempt to integrate complex interdependencies across diverse sectors in a systems approach for consistent analysis. Recent pathways studies show how water, energy and climate (SDGs 6, 7 and 13) interact (Parkinson et al., 2016; McCollum et al., 2018b) and call for integrated water–energy investment decisions to manage systemic risks. For instance, the provision of bioenergy, important in many 1.5°C-consistent pathways, can help resolve ‘nexus challenges’ by alleviating energy security concerns, but can also have adverse ‘nexus impacts’ on food security, water use and biodiversity (Lotze-Campen et al., 2014; Bonsch et al., 2016). Policies that improve resource use efficiency across sectors can maximize synergies for sustainable development (Bartos and Chester, 2014; McCollum et al., 2018b; van Vuuren et al., 2018). Mitigation compatible with 1.5°C can significantly reduce impacts and adaptation needs in the nexus sectors compared to 2°C (Byers et al., 2018). In order to avoid trade-offs due to high carbon pricing of 1.5°C pathways, regulation in specific areas may complement price-based instruments. Such combined policies generally lead also to more early action maximizing synergies and avoiding some of the adverse climate effects for sustainable development (Bertram et al., 2018).

The comprehensive analysis of climate change in the context of sustainable development requires suitable reference scenarios that lend themselves to broader sustainable development analyses. The Shared Socio-Economic Pathways (SSPs) (Chapter 1, Cross-Chapter Box 1 in Chapter 1) (O’Neill et al., 2017a; Riahi et al., 2017) constitute an important first step in providing a framework for the integrated assessment of adaptation and mitigation and their climate–development linkages (Ebi et al., 2014). The five underlying SSP narratives (O’Neill et al., 2017a) map well into some of the key SDG dimensions, with one of the pathways (SSP1) explicitly depicting sustainability as the main theme (van Vuuren et al., 2017b).

To date, no pathway in the literature proves to achieve all 17 SDGs because several targets are not met or not sufficiently covered in the analysis, hence resulting in a sustainability gap (Zimm et al., 2018). The SSPs facilitate the systematic exploration of different sustainable dimensions under ambitious climate objectives. SSP1 proves to be in line with eight SDGs (3, 7, 8, 9, 10, 11, 13 and 15) and several of their targets in a 2°C warmer world (van Vuuren et al., 2017b; Zimm et al., 2018). However, important targets for SDGs 1, 2 and 4 (i.e., people living in extreme poverty, people living at the risk of hunger and gender gap in years of schooling) are not met in this scenario.

The SSPs show that sustainable socio-economic conditions will play a key role in reaching stringent climate targets (Riahi et al., 2017; Rogelj et al., 2018). Recent modelling work has examined 1.5°C-consistent, stringent mitigation scenarios for 2100 applied to the SSPs, using six different IAMs. Despite the limitations of these models, which are coarse approximations of reality, robust trends can be identified

(Rogelj et al., 2018). SSP1 – which depicts broader ‘sustainability’ as well as enhancing equity and poverty reductions – is the only pathway where all models could reach 1.5°C and is associated with the lowest mitigation costs across all SSPs. A decreasing number of models was successful for SSP2, SSP4 and SSP5, respectively, indicating distinctly higher risks of failure due to high growth and energy intensity as well as geographical and social inequalities and uneven regional development. And reaching 1.5°C has even been found infeasible in the less sustainable SSP3 – ‘regional rivalry’ (Fujimori et al., 2017b; Riahi et al., 2017). All these conclusions hold true if a 2°C objective is considered (Calvin et al., 2017; Fujimori et al., 2017b; Popp et al., 2017; Riahi et al., 2017). Rogelj et al. (2018) also show that fewer scenarios are, however, feasible across different SSPs in case of 1.5°C, and mitigation costs substantially increase in 1.5°C pathways compared to 2°C pathways.

There is a wide range of SSP-based studies focusing on the connections between adaptation/impacts and different sustainable development dimensions (Hasegawa et al., 2014; Ishida et al., 2014; Arnell et al., 2015; Bowyer et al., 2015; Burke et al., 2015; Lemoine and Kapnick, 2016; Rozenberg and Hallegatte, 2016; Blanco et al., 2017; Hallegatte and Rozenberg, 2017; O’Neill et al., 2017a; Rutledge et al., 2017; Byers et al., 2018). New methods for projecting inequality and poverty (downscaled to sub-national rural and urban levels as well as spatially explicit levels) have enabled advanced SSP-based assessments of locally sustainable development implications of avoided impacts and related adaptation needs. For instance, Byers et al. (2018) find that, in a 1.5°C warmer world, a focus on sustainable development can reduce the climate risk exposure of populations vulnerable to poverty by more than an order of magnitude (Section 5.2.2). Moreover, aggressive reductions in between-country inequality may decrease the emissions intensity of global economic growth (Rao and Min, 2018). This is due to the higher potential for decoupling of energy from income growth in lower-income countries, due to high potential for technological advancements that reduce the energy intensity of growth of poor countries – critical also for reaching 1.5°C in a socially and economically equitable way. Participatory downscaling of SSPs in several European Union countries and in Central Asia shows numerous possible pathways of solutions to the 2°C–1.5°C goal, depending on differential visions (Tàbara et al., 2018). Other participatory applications of the SSPs, for example in West Africa (Palazzo et al., 2017) and the southeastern United States (Absar and Preston, 2015), illustrate the potentially large differences in adaptive capacity within regions and between sectors.

Harnessing the full potential of the SSP framework to inform sustainable development requires: (i) further elaboration and extension of the current SSPs to cover sustainable development objectives explicitly; (ii) the development of new or variants of current narratives that would facilitate more SDG-focused analyses with climate as one objective (among other SDGs) (Riahi et al., 2017); (iii) scenarios with high regional resolution (Fujimori et al., 2017b); (iv) a more explicit representation of institutional and governance change associated with the SSPs (Zimm et al., 2018); and (v) a scale-up of localized and spatially explicit vulnerability, poverty and inequality estimates, which have emerged in recent publications based on the SSPs (Byers et al., 2018) and are essential to investigate equity dimensions (Klinsky and Winkler, 2018).

5.5.3 Climate-Resilient Development Pathways

This section assesses the literature on pathways as solution-oriented trajectories and decision-making processes for attaining transformative visions for a 1.5°C warmer world. It builds on climate-resilient development pathways (CRDPs) introduced in the AR5 (Section 5.1.2) (Olsson et al., 2014) as well as growing literature (e.g., Eriksen et al., 2017; Johnson, 2017; Orindi et al., 2017; Kirby and O’Mahony, 2018; Solecki et al., 2018) that uses CRDPs as a conceptual and aspirational idea for steering societies towards low-carbon, prosperous and ecologically safe futures. Such a notion of pathways foregrounds decision-making processes at local to national levels to situate transformation, resilience, equity and well-being in the complex reality of specific places, nations and communities (Harris et al., 2017; Ziervogel et al., 2017; Fazey et al., 2018; Gajjar et al., 2018; Klinsky and Winkler, 2018; Patterson et al., 2018; Tàbara et al., 2018).

Pathways compatible with 1.5°C warming are not merely scenarios to envision possible futures but processes of deliberation and implementation that address societal values, local priorities and inevitable trade-offs. This includes attention to politics and power that perpetuate business-as-usual trajectories (O’Brien, 2016; Harris et al., 2017), the politics that shape sustainability and capabilities of everyday life (Agyeman et al., 2016; Schlosberg et al., 2017), and ingredients for community resilience and transformative change (Fazey et al., 2018). Chartering CRDPs encourages locally situated and problem-solving processes to negotiate and operationalize resilience ‘on the ground’ (Beilin and Wilkinson, 2015; Harris et al., 2017; Ziervogel et al., 2017). This entails contestation, inclusive governance and iterative engagement of diverse populations with varied needs, aspirations, agency and rights claims, including those most affected, to deliberate trade-offs in a multiplicity of possible pathways (*high confidence*) (see Figure 5.5) (Stirling, 2014; Vale, 2014; Walsh-Dilley and Wolford, 2015; Biermann et al., 2016; J.R.A. Butler et al., 2016; O’Brien, 2016, 2018; Harris et al., 2017; Jones and Tanner, 2017; Mapfumo et al., 2017; Rosenbloom, 2017; Gajjar et al., 2018; Klinsky and Winkler, 2018; Lyon, 2018; Tàbara et al., 2018).

5.5.3.1 Transformations, equity and well-being

Most literature related to CRDPs invokes the concept of transformation, underscoring the need for urgent and far-reaching changes in practices, institutions and social relations in society. Transformations towards a 1.5°C warmer world would need to address considerations for equity and well-being, including in trade-off decisions (see Figure 5.1).

To attain the anticipated *transformations*, all countries as well as non-state actors would need to strengthen their contributions, through bolder and more committed cooperation and equitable effort-sharing (*medium evidence, high agreement*) (Rao, 2014; Frumhoff et al., 2015; Ekwurzel et al., 2017; Millar et al., 2017; Shue, 2017; Holz et al., 2018; Robinson and Shine, 2018). Sustaining decarbonization rates at a 1.5°C-compatible level would be unprecedented and not possible without rapid transformations to a net-zero-emissions global economy by mid-century or the later half of the century (see Chapters 2 and 4). Such efforts would entail overcoming technical, infrastructural, institutional and behavioural barriers across all sectors and levels

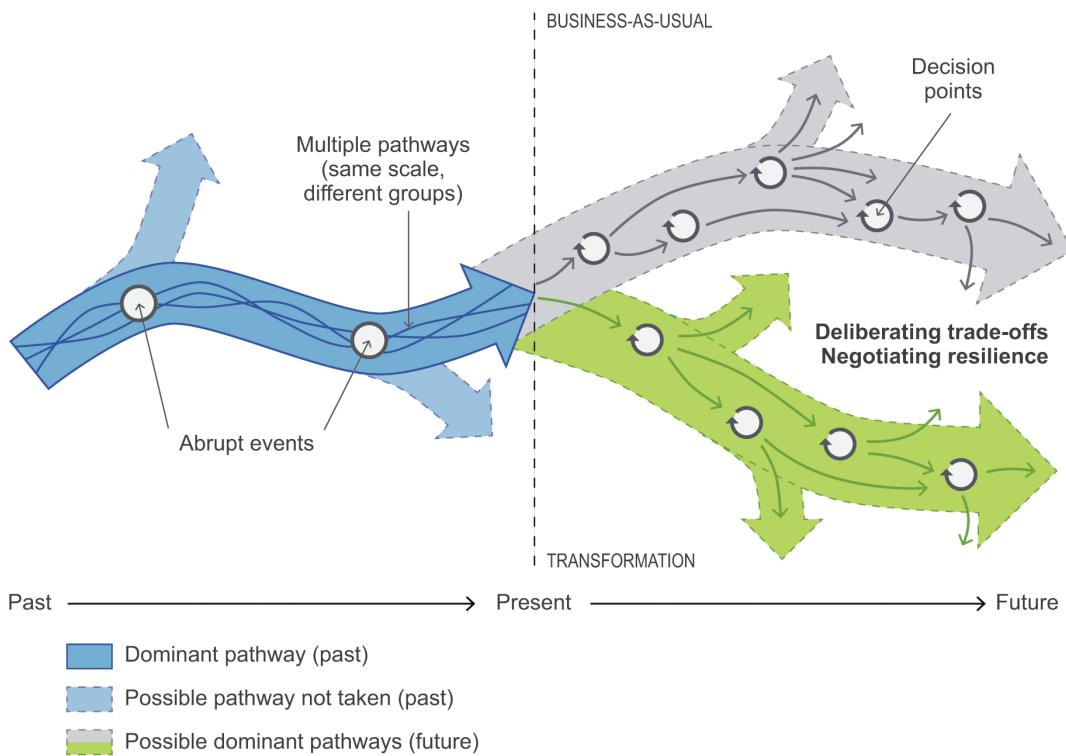


Figure 5.5 | Pathways into the future, with path dependencies and iterative problem-solving and decision-making (after Fazey et al., 2016).

of society (Pfeiffer et al., 2016; Seto et al., 2016) and defeating path dependencies, including poverty traps (Boonstra et al., 2016; Enqvist et al., 2016; Lade et al., 2017; Haider et al., 2018). Transformation also entails ensuring that 1.5°C-compatible pathways are inclusive and desirable, build solidarity and alliances, and protect vulnerable groups, including against disruptions of transformation (Patterson et al., 2018).

There is growing emphasis on the role of *equity, fairness and justice* (see Glossary) regarding context-specific transformations and pathways to a 1.5°C warmer world (*medium evidence, high agreement*) (Shue, 2014; Thorp, 2014; Dennig et al., 2015; Moellendorf, 2015; Klinsky et al., 2017b; Roser and Seidel, 2017; Sealey-Huggins, 2017; Klinsky and Winkler, 2018; Robinson and Shine, 2018). Consideration for what is equitable and fair suggests the need for stringent decarbonization and up-scaled adaptation that do not exacerbate social injustices, locally and at national levels (Okereke and Coventry, 2016), uphold human rights (Robinson and Shine, 2018), are socially desirable and acceptable (von Stechow et al., 2016; Rosenbloom, 2017), address values and beliefs (O'Brien, 2018), and overcome vested interests (Normann, 2015; Patterson et al., 2016). Attention is often drawn to huge disparities in the cost, benefits, opportunities and challenges involved in transformation within and between countries, and the fact that the suffering of already poor, vulnerable and disadvantaged populations may be worsened, if care to protect them is not taken (Holden et al., 2017; Klinsky and Winkler, 2018; Patterson et al., 2018).

Well-being for all (Dearing et al., 2014; Raworth, 2017) is at the core of an ecologically safe and socially just space for humanity, including health and housing, peace and justice, social equity, gender

equality and political voices (Raworth, 2017). It is in alignment with transformative social development (UNRISD, 2016) and the 2030 Agenda of 'leaving no one behind'. The social conditions to enable well-being for all are to reduce entrenched inequalities within and between countries (Klinsky and Winkler, 2018); rethink prevailing values, ethics and behaviours (Holden et al., 2017); allow people to live a life in dignity while avoiding actions that undermine capabilities (Klinsky and Golub, 2016); transform economies (Popescu and Ciurlau, 2016; Tåbara et al., 2018); overcome uneven consumption and production patterns (Dearing et al., 2014; Häyhä et al., 2016; Raworth, 2017) and conceptualize development as well-being rather than mere economic growth (*medium evidence, high agreement*) (Gupta and Pouw, 2017).

5.5.3.2 Development trajectories, sharing of efforts and cooperation

The potential for pursuing sustainable and climate-resilient development pathways towards a 1.5°C warmer world differs between and within nations, due to differential development achievements and trajectories, and opportunities and challenges (*very high confidence*) (Figure 5.1). There are clear differences between high-income countries where social achievements are high, albeit often with negative effects on the environment, and most developing nations where vulnerabilities to climate change are high and social support and life satisfaction are low, especially in the Least Developed Countries (LDCs) (Sachs et al., 2017; O'Neill et al., 2018). Differential starting points for CRDPs between and within countries, including path dependencies (Figure 5.5), call for sensitivity to context (Klinsky and Winkler, 2018). For the developing world, limiting warming to 1.5°C also means potentially

severely curtailed development prospects (Okereke and Coventry, 2016) and risks to human rights from both climate action and inaction to achieve this goal (Robinson and Shine, 2018) (Section 5.2). Within-country development differences remain, despite efforts to ensure inclusive societies (Gupta and Arts, 2017; Gupta and Pouw, 2017). Cole et al. (2017), for instance, show how differences between provinces in South Africa constitute barriers to sustainable development trajectories and for operationalising nation-level SDGs, across various dimensions of social deprivation and environmental stress, reflecting historic disadvantages.

Moreover, various equity and effort- or burden-sharing approaches to climate stabilization in the literature describe how to sketch national potentials for a 1.5°C warmer world (e.g., Anand, 2004; CSO Equity Review, 2015; Meinshausen et al., 2015; Okereke and Coventry, 2016; Bexell and Jönsson, 2017; Otto et al., 2017; Pan et al., 2017; Robiou du Pont et al., 2017; Holz et al., 2018; Kartha et al., 2018; Winkler et al., 2018;). Many approaches build on the AR5 ‘responsibility – capacity – need’ assessment (Clarke et al., 2014), complement other proposed national-level metrics for capabilities, equity and fairness (Heyward and Roser, 2016; Klinsky et al., 2017a), or fall under the wider umbrella of fair share debates on responsibility, capability and the right to development in climate policy (Fuglestvedt and Kallbekken, 2016). Importantly, different principles and methodologies generate different calculated contributions, responsibilities and capacities (Skeie et al., 2017).

The notion of nation-level fair shares is now also discussed in the context of limiting global warming to 1.5°C and the Nationally Determined Contributions (NDCs) (see Chapter 4, Cross-Chapter Box 11 in Chapter 4) (CSO Equity Review, 2015; Mace, 2016; Pan et al., 2017; Robiou du Pont et al., 2017; Holz et al., 2018; Kartha et al., 2018; Winkler et al., 2018). A study by Pan et al. (2017) concluded that all countries would need to contribute to ambitious emissions reductions and that current pledges for 2030 by seven out of eight high-emitting countries would be insufficient to meet 1.5°C. Emerging literature on justice-centred pathways to 1.5°C points towards ambitious emissions reductions domestically and committed cooperation internationally whereby wealthier countries support poorer ones, technologically, financially and otherwise to enhance capacities (Okereke and Coventry, 2016; Holz et al., 2018; Robinson and Shine, 2018; Shue, 2018). These findings suggest that equitable and 1.5°C-compatible pathways would require fast action across all countries at all levels of development rather than late accession of developing countries (as assumed under SSP3, see Chapter 2), with external support for prompt mitigation and resilience-building efforts in the latter (*medium evidence, medium agreement*).

Scientific advances since the AR5 now also make it possible to determine contributions to climate change for non-state actors (see Chapter 4, Section 4.4.1) and their potential to contribute to CRDPs (*medium evidence, medium agreement*). These non-state actors includes cities (Bulkeley et al., 2013, 2014; Byrne et al., 2016), businesses (Heede, 2014; Frumhoff et al., 2015; Shue, 2017), transnational initiatives (Castro, 2016; Andonova et al., 2017) and industries. Recent work demonstrates the contributions of 90 industrial carbon producers to global temperature and sea level rise, and their responsibilities to

contribute to investments in and support for mitigation and adaptation (Heede, 2014; Ekwurzel et al., 2017; Shue, 2017) (Sections 5.6.1 and 5.6.2).

At the level of groups and individuals, equity in pursuing climate resilience for a 1.5°C warmer world means addressing disadvantage, inequities and empowerment that shape transformative processes and pathways (Fazey et al., 2018), and deliberate efforts to strengthen the capabilities, capacities and well-being of poor, marginalized and vulnerable people (Byrnes, 2014; Tokar, 2014; Harris et al., 2017; Klinsky et al., 2017a; Klinsky and Winkler, 2018). Community-driven CRDPs can flag potential negative impacts of national trajectories on disadvantaged groups, such as low-income families and communities of colour (Rao, 2014). They emphasize social equity, participatory governance, social inclusion and human rights, as well as innovation, experimentation and social learning (see Glossary) (*medium evidence, high agreement*) (Sections 5.5.3.3 and 5.6).

5.5.3.3 Country and community strategies and experiences

There are many possible pathways towards climate-resilient futures (O’Brien, 2018; Tåbara et al., 2018). Literature depicting different sustainable development trajectories in line with CRDPs is growing, with some of it being specific to 1.5°C global warming. Most experiences to date are at local and sub-national levels (Cross-Chapter Box 13 in this chapter), while state-level efforts align largely with green economy trajectories or planning for climate resilience (Box 5.3). Due to the fact that these strategies are context-specific, the literature is scarce on comparisons, efforts to scale up and systematic monitoring.

States can play an enabling or hindering role in a transition to a 1.5°C warmer world (Patterson et al., 2018). The literature on strategies to reconcile low-carbon trajectories with sustainable development and ecological sustainability through green growth, inclusive growth, de-growth, post-growth and development as well-being shows *low agreement* (see Chapter 4, Section 4.5). Efforts that align best with CRDPs are described as ‘transformational’ and ‘strong’ (Ferguson, 2015). Some view ‘thick green’ perspectives as enabling equity, democracy and agency building (Lorek and Spangenberg, 2014; Stirling, 2014; Ehresman and Okereke, 2015; Buch-Hansen, 2018), others show how green economy and sustainable development pathways can align (Brown et al., 2014; Georges et al., 2017b), and how a green economy can help link the SDGs with NDCs, for instance in Mongolia, Kenya and Sweden (Shine, 2017). Others still critique the continuous reliance on market mechanisms (Wanner, 2014; Brockington and Ponte, 2015) and disregard for equity and distributional and procedural justice (Stirling, 2014; Bell, 2015).

Country-level pathways and achievements vary significantly (*robust evidence, medium agreement*). For instance, the Scandinavian countries rank at the top of the Global Green Economy Index (Dual Citizen LLC, 2016), although they also tend to show high spill-over effects (Holz et al., 2018) and transgress their biophysical boundaries (O’Neill et al., 2018). State-driven efforts in non-member countries of the Organisation for Economic Co-operation and Development include Ethiopia’s ‘Climate-resilient Green Economy Strategy’, Mozambique’s ‘Green Economy Action Plan’ and Costa Rica’s ecosystem- and conservation-driven

green transition paths. China and India have adopted technology and renewables pathways (Brown et al., 2014; Death, 2014, 2015, 2016; Khanna et al., 2014; Chen et al., 2015; Kim and Thurbon, 2015; Wang et al., 2015; Weng et al., 2015). Brazil promotes low per capita GHG emissions, clean energy sources, green jobs, renewables and sustainable transportation, while slowing rates of deforestation (see Chapter 4, Box 4.7) (Brown et al., 2014; La Rovere, 2017). Yet concerns remain regarding persistent inequalities, ecosystem monetization, lack of participation in green-style projects (Brown et al., 2014) and labour conditions and risk of displacement in the sugarcane ethanol sector (McKay et al., 2016). Experiences with low-carbon development pathways in LDCs highlight the crucial role of identifying synergies across scale, removing institutional barriers and ensuring equity and fairness in distributing benefits as part of the right to development (Rai and Fisher, 2017).

In small island states, for many of which climate change hazards and impacts at 1.5°C pose significant risks to sustainable development (see

Chapter 3 Box 3.5, Chapter 4 Box 4.3, Box 5.3), examples of CRDPs have emerged since the AR5. This includes the SAMOA Pathway: SIDS Accelerated Modalities of Action (see Chapter 4, Box 4.3) (UNGA, 2014; Government of Kiribati, 2016; Steering Committee on Partnerships for SIDS and UN DESA, 2016; Lefale et al., 2017) and the Framework for Resilient Development in the Pacific, a leading example of integrated regional climate change adaptation planning for mitigation and sustainable development, disaster risk management and low-carbon economies (SPC, 2016). Small islands of the Pacific vary significantly in their capacity and resources to support effective integrated planning (McCubbin et al., 2015; Barnett and Walters, 2016; Cvitanovic et al., 2016; Hemstock et al., 2017; Robinson and Dornan, 2017). Vanuatu (Box 5.3) has developed a significant coordinated national adaptation plan to advance the 2030 Agenda for Sustainable Development, respond to the Paris Agreement and reduce the risk of disasters in line with the Sendai targets (UNDP, 2016; Republic of Vanuatu, 2017).

Box 5.3 | Republic of Vanuatu – National Planning for Development and Climate Resilience

The Republic of Vanuatu is leading Pacific Small Island Developing States (SIDS) to develop a nationally coordinated plan for climate-resilient development in the context of high exposure to hazard risk (MoCC, 2016; UNU-EHS, 2016). The majority of the population depends on subsistence, rain-fed agriculture and coastal fisheries for food security (Sovacool et al., 2017). Sea level rise, increased prolonged drought, water shortages, intense storms, cyclone events and degraded coral reef environments threaten human security in a 1.5°C warmer world (see Chapter 3, Box 3.5) (SPC, 2015; Aipira et al., 2017). Given Vanuatu's long history of climate hazards and disasters, local adaptive capacity is relatively high, despite barriers to the use of local knowledge and technology, and low rates of literacy and women's participation (McNamara and Prasad, 2014; Aipira et al., 2017; Granderson, 2017). However, the adaptive capacity of Vanuatu and other SIDS is increasingly constrained due to more frequent severe weather events (see Chapter 3, Box 3.5, Chapter 4, Cross-Chapter Box 9 in Chapter 4) (Gero et al., 2013; Kuruppu and Willie, 2015; SPC, 2015; Sovacool et al., 2017).

Vanuatu has developed a national sustainable development plan for 2016–2030: the People's Plan (Republic of Vanuatu, 2016). This coordinated, inclusive plan of action on economy, environment and society aims to strengthen adaptive capacity and resilience to climate change and disasters. It emphasizes rights of all Ni-Vanuatu, including women, youth, the elderly and vulnerable groups (Nalau et al., 2016). Vanuatu has also developed a Coastal Adaptation Plan (Republic of Vanuatu, 2016), an integrated Climate Change and Disaster Risk Reduction Policy (2016–2030) (SPC, 2015) and the first South Pacific National Advisory Board on Climate Change & Disaster Risk Reduction (SPC, 2015; UNDP, 2016).

Vanuatu aims to integrate planning at multiple scales, and increase climate resilience by supporting local coping capacities and iterative processes of planning for sustainable development and integrated risk assessment (Aipira et al., 2017; Eriksson et al., 2017; Granderson, 2017). Climate-resilient development is also supported by non-state partnerships, for example, the 'Yumi stap redi long climate change'—the Vanuatu non-governmental organization Climate Change Adaptation Program (Maclellan, 2015). This programme focuses on equitable governance, with particular attention to supporting women's voices in decision-making through allied programmes addressing domestic violence, and rights-based education to reduce social marginalization; alongside institutional reforms for greater transparency, accountability and community participation in decision-making (Davies, 2015; Maclellan, 2015; Sterrett, 2015; Ensor, 2016; UN Women, 2016).

Power imbalances embedded in the political economy of development (Nunn et al., 2014), gender discrimination (Aipira et al., 2017) and the priorities of climate finance (Cabezon et al., 2016) may marginalize the priorities of local communities and influence how local risks are understood, prioritised and managed (Kuruppu and Willie, 2015; Baldacchino, 2017; Sovacool et al., 2017). However, the experience of the low death toll after Cyclone Pam suggests effective use of local knowledge in planning and early warning may support resilience at least in the absence of storm surge flooding (Handmer and Iveson, 2017; Nalau et al., 2017). Nevertheless, the very severe infrastructure damage of Cyclone Pam 2015 highlights the limits of individual Pacific SIDS efforts and the need for global and regional responses to a 1.5°C warmer world (see Chapter 3, Box 3.5, Chapter 4, Box 4.3) (Dilling et al., 2015; Ensor, 2016; Shultz et al., 2016; Rey et al., 2017).

Communities, towns and cities also contribute to low-carbon pathways, sustainable development and fair and equitable climate resilience, often focused on processes of power, learning and contestation as entry points to more localised CRDPs (*medium evidence, high agreement*) (Cross-Chapter Box 13 in this chapter, Box 5.2). In the Scottish Borders Climate Resilient Communities Project (United Kingdom), local flood management is linked with national policies to foster cross-scalar and inclusive governance, with attention to systemic disadvantages, shocks and stressors, capacity building, learning for change and climate narratives to inspire hope and action, all of which are essential for community resilience in a 1.5°C warmer world (Fazey et al., 2018). Narratives and storytelling are vital for realizing place-based 1.5°C futures as they create space for agency, deliberation, co-constructing meaning, imagination and desirable and dignified pathways (Velard et al., 2018). Engagement with possible futures, identity and self-reliance is also documented for Alaska, where warming has already exceeded 1.5°C and indigenous communities invest in renewable energy, greenhouses for food security and new fishing practices to overcome loss of sea ice, flooding and erosion (Chapin et al., 2016; Fazey et al., 2018). The Asian Cities Climate Change Resilience Network facilitates shared learning dialogues, risk-to-resilience workshops, and

iterative, consultative planning in flood-prone cities in India; vulnerable communities, municipal governmental agents, entrepreneurs and technical experts negotiate different visions, trade-offs and local politics to identify desirable pathways (Harris et al., 2017).

Transforming our societies and systems to limit global warming to 1.5°C and ensuring equity and well-being for human populations and ecosystems in a 1.5°C warmer world would require ambitious and well-integrated adaptation–mitigation–development pathways that deviate fundamentally from high-carbon, business-as-usual futures (Okereke and Coventry, 2016; Arts, 2017; Gupta and Arts, 2017; Sealey-Huggins, 2017). Identifying and negotiating socially acceptable, inclusive and equitable pathways towards climate-resilient futures is a challenging, yet important, endeavour, fraught with complex moral, practical and political difficulties and inevitable trade-offs (*very high confidence*). The ultimate questions are: what futures do we want (Bai et al., 2016; Tábara et al., 2017; Klinsky and Winkler, 2018; O’Brien, 2018; Velard et al., 2018), whose resilience matters, for what, where, when and why (Meerow and Newell, 2016), and ‘whose vision … is being pursued and along which pathways’ (Gillard et al., 2016).

Cross-Chapter Box 13 | Cities and Urban Transformation

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Global Urbanization in a 1.5°C Warmer World

The concentration of economic activity, dense social networks, human resource capacity, investment in infrastructure and buildings, relatively nimble local governments, close connection to surrounding rural and natural environments, and a tradition of innovation provide urban areas with transformational potential (see Chapter 4, Section 4.3.3) (Castán Broto, 2017). In this sense, the urbanization megatrend that will take place over the next three decades, and add approximately 2 billion people to the global urban population (UN, 2014), offers opportunities for efforts to limit warming to 1.5°C.

Cities can also, however, concentrate the risks of flooding, landslides, fire and infectious and parasitic disease that are expected to heighten in a 1.5°C warmer world (Chapter 3). In African and Asian countries where urbanization rates are highest, these risks could expose and amplify pre-existing stresses related to poverty, exclusion, and governance (Gore, 2015; Dodman et al., 2017; Jiang and O’Neill, 2017; Pelling et al., 2018; Solecki et al., 2018). Through its impact on economic development and investment, urbanization often leads to increased consumption and environmental degradation and enhanced vulnerability and risk (Rosenzweig et al., 2018). In the absence of innovation, the combination of urbanization and urban economic development could contribute 226 GtCO₂ in emissions by 2050 (Bai et al., 2018). At the same time, some new urban developments are demonstrating combined carbon and Sustainable Development Goals (SDG) benefits (Wiktorowicz et al., 2018), and it is in towns and cities that building renovation rates can be most easily accelerated to support the transition to 1.5°C pathways (Kuramochi et al., 2018), including through voluntary programmes (Van der Heijden, 2018).

Urban transformations and emerging climate-resilient development pathways

The 1.5°C pathways require action in all cities and urban contexts. Recent literature emphasizes the need to deliberate and negotiate how resilience and climate-resilient pathways can be fostered in the context of people’s daily lives, including the failings of everyday development such as unemployment, inadequate housing and a growing informal sector and settlements (informality), in order

Cross-Chapter Box 13 (continued)

to acknowledge local priorities and foster transformative learning (Vale, 2014; Shi et al., 2016; Harris et al., 2017; Ziervogel et al., 2017; Fazey et al., 2018; Macintyre et al., 2018). Enhancing deliberate transformative capacities in urban contexts also entails new and relational forms of envisioning agency, equity, resilience, social cohesion and well-being (Section 5.5.3) (Gillard et al., 2016; Ziervogel et al., 2016). Two examples of urban transformation are explored here.

The built environment, spatial planning, infrastructure, energy services, mobility and urban–rural linkages necessary in rapidly growing cities in South Asia and Africa in the next three decades present mitigation, adaptation and development opportunities that are crucial for a 1.5°C world (Newman et al., 2017; Lwasa et al., 2018; Teferi and Newman, 2018). Realizing these opportunities would require the structural challenges of poverty, weak and contested local governance, and low levels of local government investment to be addressed on an unprecedented scale (Wachsmuth et al., 2016; Chu et al., 2017; van Noorloos and Kloosterboer, 2017; Pelling et al., 2018).

Urban governance is critical to ensuring that the necessary urban transitions deliver economic growth and equity (Hughes et al., 2018). The proximity of local governments to citizens and their needs can make them powerful agents of climate action (Melica et al., 2018), but urban governance is enhanced when it involves multiple actors (Ziervogel et al., 2016; Pelling et al., 2018), supportive national governments (Tait and Euston-Brown, 2017), and sub-national climate networks (see Chapter 4, Section 4.4.1). Governance is complicated for the urban population currently living in informality. This population is expected to triple, to three billion, by 2050 (Satterthwaite et al., 2018), placing a significant portion of the world's population beyond the direct reach of formal climate mitigation and adaptation policies (Revi et al., 2014). How to address the co-evolved and structural conditions that lead to urban informality and associated vulnerability to 1.5°C of warming is a central question for this report. Brown and McGranahan (2016) cite evidence that the informal urban 'green economy' that has emerged out of necessity in the absence of formal service provisions is frequently low-carbon and resource-efficient.

Realising the potential for low carbon transitions in informal urban settlements would require an express recognition of the unpaid-for contributions of women in the informal economy, and new partnerships between the state and communities (Ziervogel et al., 2017; Pelling et al., 2018; Satterthwaite et al., 2018). There is no guarantee that these partnerships will evolve or cohere into the type of service delivery and climate governance system that could steer the change on a scale required to limit to warming to 1.5°C (Jaglin, 2014). However, work by transnational networks, such as Shack/Slum Dwellers International, C40, the Global Covenant of Mayors, and the International Council for Local Environmental Initiatives, as well as efforts to combine in-country planning for Nationally Determined Contributions (NDCs) (Andonova et al., 2017; Fuhr et al., 2018) with those taking place to support the New Urban Agenda and National Urban Policies, represent one step towards realizing the potential (Tait and Euston-Brown, 2017). So too do 'old urban agendas', such as slum upgrading and universal water and sanitation provision (McGranahan et al., 2016; Satterthwaite, 2016; Satterthwaite et al., 2018).

Transition Towns (TTs) are a type of urban transformation that have emerged mainly in high-income countries. The grassroots TT movement (origin in the United Kingdom) combines adaptation, mitigation and just transitions, mainly at the level of communities and small towns. It now has more than 1,300 registered local initiatives in more than 40 countries (Grossmann and Creamer, 2017), many of them in the United Kingdom, the United States, and other high-income countries. TTs are described as 'progressive localism' (Cretney et al., 2016), aiming to foster a 'communitarian ecological citizenship' that goes beyond changes in consumption and lifestyle (Kenis, 2016). They aspire to promote equitable communities resilient to the impacts of climate change, peak oil and unstable global markets; re-localization of production and consumption; and transition pathways to a post-carbon future (Feola and Nunes, 2014; Evans and Phelan, 2016; Grossmann and Creamer, 2017).

TT initiatives typically pursue lifestyle-related low-carbon living and economies, food self-sufficiency, energy efficiency through renewables, construction with locally sourced material and cottage industries (Barnes, 2015; Staggenborg and Ogrdnik, 2015; Taylor Aiken, 2016). Social and iterative learning through the collective involves dialogue, deliberation, capacity building, citizen science engagements, technical re-skilling to increase self-reliance, for example canning and preserving food and permaculture, future visioning and emotional training to share difficulties and loss (Feola and Nunes, 2014; Barnes, 2015; Boke, 2015; Taylor Aiken, 2015; Kenis, 2016; Mehmoond, 2016; Grossmann and Creamer, 2017).

Important conditions for successful transition groups include flexibility, participatory democracy, care ethics, inclusiveness and consensus-building, assuming bridging or brokering roles, and community alliances and partnerships (Feola and Nunes, 2014; Mehmoond, 2016; Taylor Aiken, 2016; Grossmann and Creamer, 2017). Smaller scale rural initiatives allow for more experimentation

Cross-Chapter Box 13 (continued)

(Cretney et al., 2016), while those in urban centres benefit from stronger networks and proximity to power structures (North and Longhurst, 2013; Nicolosi and Feola, 2016). Increasingly, TTs recognize the need to participate in policymaking (Kenis and Mathijs, 2014; Barnes, 2015).

Despite high self-ratings of success, some TT initiatives are too inwardly focused and geographically isolated (Feola and Nunes, 2014), while others have difficulties in engaging marginalized, non-white, non-middle-class community members (Evans and Phelan, 2016; Nicolosi and Feola, 2016; Grossmann and Creamer, 2017). In the United Kingdom, expectations of innovations growing in scale (Taylor Aiken, 2015) and carbon accounting methods required by funding bodies (Taylor Aiken, 2016) undermine local resilience building. Tension between explicit engagements with climate change action and efforts to appeal to more people have resulted in difficult trade-offs and strained member relations (Grossmann and Creamer, 2017) though the contribution to changing an urban culture that prioritizes climate change is sometimes underestimated (Wiktorowicz et al., 2018).

Urban actions that can highlight the 1.5°C agenda include individual actions within homes (Werfel, 2017; Buntaine and Prather, 2018); demonstration zero carbon developments (Wiktorowicz et al., 2018); new partnerships between communities, government and business to build mass transit and electrify transport (Glazebrook and Newman, 2018); city plans to include climate outcomes (Millard-Ball, 2013); and support for transformative change across political, professional and sectoral divides (Bai et al., 2018).

5.6 Conditions for Achieving Sustainable Development, Eradicating Poverty and Reducing Inequalities in 1.5°C Warmer Worlds

This chapter has described the fundamental, urgent and systemic transformations that would be needed to achieve sustainable development, eradicate poverty and reduce inequalities in a 1.5°C warmer world, in various contexts and across scales. In particular, it has highlighted the societal dimensions, putting at the centre people's needs and aspirations in their specific contexts. Here we synthesize some of the most pertinent enabling conditions (see Glossary) to support these profound transformations. These conditions are closely interlinked and connected by the overarching concept of governance, which broadly includes institutional, socio-economic, cultural and technological elements (see Chapter 1, Cross-Chapter Box 4 in Chapter 1).

5

5.6.1 Finance and Technology Aligned with Local Needs

Significant gaps in green investment constrain transitions to a low-carbon economy aligned with development objectives (Volz et al., 2015; Campiglio, 2016). Hence, unlocking new forms of public, private and public-private financing is essential to support environmental sustainability of the economic system (Croce et al., 2011; Blyth et al., 2015; Falcone et al., 2018) (see Chapter 4, Section 4.4.5). To avoid risks of undesirable trade-offs with the SDGs caused by national budget constraints, improved access to international climate finance is essential for supporting adaptation, mitigation and sustainable development, especially for LDCs and SIDS (*medium evidence, high agreement*) (Shine and Campillo, 2016; Wood, 2017). Care needs to be taken when international donors or partnership arrangements influence project financing structures (Kongsager and Corbera, 2015; Purdon, 2015; Phillips et al., 2017; Ficklin et al., 2018). Conventional climate funding schemes, especially the Clean Development Mechanism (CDM), have

shown positive effects on sustainable development but also adverse consequences, for example, on adaptive capacities of rural households and uneven distribution of costs and benefits, often exacerbating inequalities (*robust evidence, high agreement*) (Aggarwal, 2014; Brohé, 2014; He et al., 2014; Schade and Obergassel, 2014; Smits and Middleton, 2014; Wood et al., 2016a; Horstmann and Hein, 2017; Kreibich et al., 2017). Close consideration of recipients' context-specific needs when designing financial support helps to overcome these limitations as it better aligns community needs, national policy objectives and donors' priorities; puts the emphasis on the increase of transparency and predictability of support; and fosters local capacity building (*medium evidence, high agreement*) (Barrett, 2013; Boyle et al., 2013; Shine and Campillo, 2016; Ley, 2017; Sánchez and Izzo, 2017).

The development and transfer of technologies is another enabler for developing countries to contribute to the requirements of the 1.5°C objective while achieving climate resilience and their socio-economic development goals (see Chapter 4, Section 4.4.4). International-level governance would be needed to boost domestic innovation and the deployment of new technologies, such as negative emission technologies, towards the 1.5°C objective (see Chapter 4, Section 4.3.7), but the alignment with local needs depends on close consideration of the specificities of the domestic context in countries at all levels of development (de Coninck and Sagar, 2015; IEA, 2015; Parikh et al., 2018). Technology transfer supporting development in developing countries would require an understanding of local and national actors and institutions (de Coninck and Puig, 2015; de Coninck and Sagar, 2017; Michaelowa et al., 2018), careful attention to the capacities in the entire innovation chain (Khosla et al., 2017; Olawuyi, 2017) and transfer of not only equipment but also knowledge (*medium evidence, high agreement*) (Murphy et al., 2015).

5.6.2 Integration of Institutions

Multilevel governance in climate change has emerged as a key enabler for systemic transformation and effective governance (see Chapter 4,

Section 4.4.1). On the one hand, low-carbon and climate-resilient development actions are often well aligned at the lowest scale possible (Suckall et al., 2015; Sánchez and Izzo, 2017), and informal, local institutions are critical in enhancing the adaptive capacity of countries and marginalized communities (Yaro et al., 2015). On the other hand, international and national institutions can provide incentives for projects to harness synergies and avoid trade-offs (Kongsager et al., 2016).

Governance approaches that coordinate and monitor multiscale policy actions and trade-offs across sectoral, local, national, regional and international levels are therefore best suited to implement goals towards 1.5°C warmer conditions and sustainable development (Ayers et al., 2014; Stringer et al., 2014; von Stechow et al., 2016; Gwimbi, 2017; Hayward, 2017; Maor et al., 2017; Roger et al., 2017; Michaelowa et al., 2018). Vertical and horizontal policy integration and coordination is essential to take into account the interplay and trade-offs between sectors and spatial scales (Duguma et al., 2014; Naess et al., 2015; von Stechow et al., 2015; Antwi-Agyei et al., 2017a; Di Gregorio et al., 2017; Runhaar et al., 2018), enable the dialogue between local communities and institutional bodies (Colenbrander et al., 2016), and involve non-state actors such as business, local governments and civil society operating across different scales (*robust evidence, high agreement*) (Hajer et al., 2015; Labriet et al., 2015; Hale, 2016; Pelling et al., 2016; Kalafatis, 2017; Lyon, 2018).

5.6.3 Inclusive Processes

Inclusive governance processes are critical for preparing for a 1.5°C warmer world (Fazey et al., 2018; O'Brien, 2018; Patterson et al., 2018). These processes have been shown to serve the interests of diverse groups of people and enhance empowerment of often excluded stakeholders, notably women and youth (MRFCJ, 2015a; Dumont et al., 2017). They also enhance social- and co-learning which, in turn, facilitates accelerated and adaptive management and the scaling up of capacities for resilience building (Ensor and Harvey, 2015; Reij and Winterbottom, 2015; Tschakert et al., 2016; Binam et al., 2017; Dumont et al., 2017; Fazey et al., 2018; Lyon, 2018; O'Brien, 2018), and provides opportunities to blend indigenous, local and scientific knowledge (*robust evidence, high agreement*) (see Chapter 4, Section 4.3.5.5, Box 4.3, Section 5.3) (Antwi-Agyei et al., 2017a; Coe et al., 2017; Thornton and Comberti, 2017). Such co-learning has been effective in improving deliberative decision-making processes that incorporate different values and world views (Cundill et al., 2014; C. Butler et al., 2016; Ensor, 2016; Fazey et al., 2016; Gorddard et al., 2016; Aipira et al., 2017; Chung Tiam Fook, 2017; Maor et al., 2017), and create space for negotiating diverse interests and preferences (*robust evidence, high agreement*) (O'Brien et al., 2015; Gillard et al., 2016; DeCaro et al., 2017; Harris et al., 2017; Lahn, 2018).

5.6.4 Attention to Issues of Power and Inequality

Societal transformations to limit global warming to 1.5°C and strive for equity and well-being for all are not power neutral (Section 5.5.3). Development preferences are often shaped by powerful interests that determine the direction and pace of change, anticipated benefits and beneficiaries, and acceptable and unacceptable trade-offs (Newell et

al., 2014; Fazey et al., 2016; Tschakert et al., 2016; Winkler and Dubash, 2016; Wood et al., 2016b; Karlsson et al., 2017; Quan et al., 2017; Tanner et al., 2017). Each development pathway, including legacies and path dependencies, creates its own set of opportunities and challenges and winners and losers, both within and across countries (Figure 5.5) (*robust evidence, high agreement*) (Mathur et al., 2014; Phillips et al., 2017; Stringer et al., 2017; Wood, 2017; Ficklin et al., 2018; Gajjar et al., 2018).

Addressing the uneven distribution of power is critical to ensure that societal transformation towards a 1.5°C warmer world does not exacerbate poverty and vulnerability or create new injustices but rather encourages equitable transformational change (Patterson et al., 2018). Equitable outcomes are enhanced when they pay attention to just outcomes for those negatively affected by change (Newell et al., 2014; Dilling et al., 2015; Naess et al., 2015; Sovacool et al., 2015; Cervigni and Morris, 2016; Keohane and Victor, 2016) and promote human rights, increase equality and reduce power asymmetries within societies (*robust evidence, high agreement*) (UNRISD, 2016; Robinson and Shine, 2018).

5.6.5 Reconsidering Values

The profound transformations that would be needed to integrate sustainable development and 1.5°C-compatible pathways call for examining the values, ethics, attitudes and behaviours that underpin societies (Hartzell-Nichols, 2017; O'Brien, 2018; Patterson et al., 2018). Infusing values that promote sustainable development (Holden et al., 2017), overcome individual economic interests and go beyond economic growth (Hackmann, 2016), encourage desirable and transformative visions (Tàbara et al., 2018), and care for the less fortunate (Howell and Allen, 2017) is part and parcel of climate-resilient and sustainable development pathways. This entails helping societies and individuals to strive for sufficiency in resource consumption within planetary boundaries alongside sustainable and equitable well-being (O'Neill et al., 2018). Navigating 1.5°C societal transformations, characterized by action from local to global, stresses the core commitment to social justice, solidarity and cooperation, particularly regarding the distribution of responsibilities, rights and mutual obligations between nations (*medium evidence, high agreement*) (Patterson et al., 2018; Robinson and Shine, 2018).

5.7 Synthesis and Research Gaps

The assessment in Chapter 5 illustrates that limiting global warming to 1.5°C above pre-industrial levels is fundamentally connected with achieving sustainable development, poverty eradication and reducing inequalities. It shows that avoided impacts between 1.5°C and 2°C temperature stabilization would make it easier to achieve many aspects of sustainable development, although important risks would remain at 1.5°C (Section 5.2). Synergies between adaptation and mitigation response measures with sustainable development and the SDGs can often be enhanced when attention is paid to well-being and equity while, when unaddressed, poverty and inequalities may be exacerbated (Section 5.3 and 5.4). Climate-resilient development pathways (CRDPs)

open up routes towards socially desirable futures that are sustainable and liveable, but concrete evidence reveals complex trade-offs along a continuum of different pathways, highlighting the role of societal values, internal contestations and political dynamics (Section 5.5). The transformations towards sustainable development in a 1.5°C warmer world, in all contexts, involve fundamental societal and systemic changes over time and across scale, and a set of enabling conditions without which the dual goal is difficult if not impossible to achieve (Sections 5.5 and 5.6).

This assessment is supported by growing knowledge on the linkages between a 1.5°C warmer world and different dimensions of sustainable development. However, several gaps in the literature remain:

Limited evidence exists that explicitly examines the real-world implications of a 1.5°C warmer world (and overshoots) as well as avoided impacts between 1.5°C versus 2°C for the SDGs and sustainable development more broadly. Few projections are available for households, livelihoods and communities. And literature on differential localized impacts and their cross-sector interacting and cascading effects with multidimensional patterns of societal vulnerability, poverty and inequalities remains scarce. Hence, caution is needed when global-level conclusions about adaptation and mitigation measures in a 1.5°C warmer world are applied to sustainable development in local, national and regional settings.

Limited literature has systematically evaluated context-specific synergies and trade-offs between and across adaptation and mitigation response measures in 1.5°C-compatible pathways and the SDGs. This

hampers the ability to inform decision-making and fair and robust policy packages adapted to different local, regional or national circumstances. More research is required to understand how trade-offs and synergies will intensify or decrease, differentially across geographic regions and time, in a 1.5°C warmer world and as compared to higher temperatures.

Limited availability of interdisciplinary studies also poses a challenge for connecting the socio-economic transformations and the governance aspects of low emissions, climate-resilient transformations. For example, it remains unclear how governance structures enable or hinder different groups of people and countries to negotiate pathway options, values and priorities.

The literature does not demonstrate the existence of 1.5°C-compatible pathways achieving the ‘universal and indivisible’ agenda of the 17 SDGs, and hence does not show whether and how the nature and pace of changes that would be required to meet 1.5°C climate stabilization could be fully synergistic with all the SDGs.

The literature on low emissions and CRDPs in local, regional and national contexts is growing. Yet the lack of standard indicators to monitor such pathways makes it difficult to compare evidence grounded in specific contexts with differential circumstances, and therefore to derive generic lessons on the outcome of decisions on specific indicators. This knowledge gap poses a challenge for connecting local-level visions with global-level trajectories to better understand key conditions for societal and systems transformations that reconcile urgent climate action with well-being for all.

Frequently Asked Questions**FAQ 5.1 | What are the Connections between Sustainable Development and Limiting Global Warming to 1.5°C above Pre-Industrial Levels?**

Summary: Sustainable development seeks to meet the needs of people living today without compromising the needs of future generations, while balancing social, economic and environmental considerations. The 17 UN Sustainable Development Goals (SDGs) include targets for eradicating poverty; ensuring health, energy and food security; reducing inequality; protecting ecosystems; pursuing sustainable cities and economies; and a goal for climate action (SDG 13). Climate change affects the ability to achieve sustainable development goals, and limiting warming to 1.5°C will help meet some sustainable development targets. Pursuing sustainable development will influence emissions, impacts and vulnerabilities. Responses to climate change in the form of adaptation and mitigation will also interact with sustainable development with positive effects, known as synergies, or negative effects, known as trade-offs. Responses to climate change can be planned to maximize synergies and limit trade-offs with sustainable development.

For more than 25 years, the United Nations (UN) and other international organizations have embraced the concept of sustainable development to promote well-being and meet the needs of today's population without compromising the needs of future generations. This concept spans economic, social and environmental objectives including poverty and hunger alleviation, equitable economic growth, access to resources, and the protection of water, air and ecosystems. Between 1990 and 2015, the UN monitored a set of eight Millennium Development Goals (MDGs). They reported progress in reducing poverty, easing hunger and child mortality, and improving access to clean water and sanitation. But with millions remaining in poor health, living in poverty and facing serious problems associated with climate change, pollution and land-use change, the UN decided that more needed to be done. In 2015, the UN Sustainable Development Goals (SDGs) were endorsed as part of the 2030 Agenda for Sustainable Development. The 17 SDGs (Figure FAQ 5.1) apply to all countries and have a timeline for success by 2030. The SDGs seek to eliminate extreme poverty and hunger; ensure health, education, peace, safe water and clean energy for all; promote inclusive and sustainable consumption, cities, infrastructure and economic growth; reduce inequality including gender inequality; combat climate change and protect oceans and terrestrial ecosystems.

Climate change and sustainable development are fundamentally connected. Previous IPCC reports found that climate change can undermine sustainable development, and that well-designed mitigation and adaptation responses can support poverty alleviation, food security, healthy ecosystems, equality and other dimensions of sustainable development. Limiting global warming to 1.5°C would require mitigation actions and adaptation measures to be taken at all levels. These adaptation and mitigation actions would include reducing emissions and increasing resilience through technology and infrastructure choices, as well as changing behaviour and policy.

These actions can interact with sustainable development objectives in positive ways that strengthen sustainable development, known as synergies. Or they can interact in negative ways, where sustainable development is hindered or reversed, known as trade-offs.

An example of a synergy is sustainable forest management, which can prevent emissions from deforestation and take up carbon to reduce warming at reasonable cost. It can work synergistically with other dimensions of sustainable development by providing food (SDG 2) and clean water (SDG 6) and protecting ecosystems (SDG 15). Other examples of synergies are when climate adaptation measures, such as coastal or agricultural projects, empower women and benefit local incomes, health and ecosystems.

An example of a trade-off can occur if ambitious climate change mitigation compatible with 1.5°C changes land use in ways that have negative impacts on sustainable development. An example could be turning natural forests, agricultural areas, or land under indigenous or local ownership to plantations for bioenergy production. If not managed carefully, such changes could undermine dimensions of sustainable development by threatening food and water security, creating conflict over land rights and causing biodiversity loss. Another trade-off could occur for some countries, assets, workers and infrastructure already in place if a switch is made from fossil fuels to other energy sources without adequate planning for such a transition. Trade-offs can be minimized if effectively managed, as when care is taken to improve bioenergy crop yields to reduce harmful land-use change or where workers are retrained for employment in lower carbon sectors.

(continued on next page)

FAQ 5.1 (continued)

Limiting temperature increase to 1.5°C can make it much easier to achieve the SDGs, but it is also possible that pursuing the SDGs could result in trade-offs with efforts to limit climate change. There are trade-offs when people escaping from poverty and hunger consume more energy or land and thus increase emissions, or if goals for economic growth and industrialization increase fossil fuel consumption and greenhouse gas emissions. Conversely, efforts to reduce poverty and gender inequalities and to enhance food, health and water security can reduce vulnerability to climate change. Other synergies can occur when coastal and ocean ecosystem protection reduces the impacts of climate change on these systems. The sustainable development goal of affordable and clean energy (SDG 7) specifically targets access to renewable energy and energy efficiency, which are important to ambitious mitigation and limiting warming to 1.5°C.

The link between sustainable development and limiting global warming to 1.5°C is recognized by the SDG for climate action (SDG 13), which seeks to combat climate change and its impacts while acknowledging that the United Nations Framework Convention on Climate Change (UNFCCC) is the primary international, intergovernmental forum for negotiating the global response to climate change.

The challenge is to put in place sustainable development policies and actions that reduce deprivation, alleviate poverty and ease ecosystem degradation while also lowering emissions, reducing climate change impacts and facilitating adaptation. It is important to strengthen synergies and minimize trade-offs when planning climate change adaptation and mitigation actions. Unfortunately, not all trade-offs can be avoided or minimized, but careful planning and implementation can build the enabling conditions for long-term sustainable development.

FAQ5.1: The United Nations Sustainable Development Goals (SDGs)

The link between sustainable development and limiting global warming to 1.5°C is recognised by the Sustainable Development Goal for climate action (SDG 13)



FAQ 5.1, Figure 1 | Climate change action is one of the United Nations Sustainable Development Goals (SDGs) and is connected to sustainable development more broadly. Actions to reduce climate risk can interact with other sustainable development objectives in positive ways (synergies) and negative ways (trade-offs).

Frequently Asked Questions

FAQ 5.2 | What are the Pathways to Achieving Poverty Reduction and Reducing Inequalities while Reaching a 1.5°C World?

Summary: There are ways to limit global warming to 1.5°C above pre-industrial levels. Of the pathways that exist, some simultaneously achieve sustainable development. They entail a mix of measures that lower emissions and reduce the impacts of climate change, while contributing to poverty eradication and reducing inequalities. Which pathways are possible and desirable will differ between and within regions and nations. This is due to the fact that development progress to date has been uneven and climate-related risks are unevenly distributed. Flexible governance would be needed to ensure that such pathways are inclusive, fair and equitable to avoid poor and disadvantaged populations becoming worse off. Climate-resilient development pathways (CRDPs) offer possibilities to achieve both equitable and low-carbon futures.

Issues of equity and fairness have long been central to climate change and sustainable development. Equity, like equality, aims to promote justice and fairness for all. This is not necessarily the same as treating everyone equally, since not everyone comes from the same starting point. Often used interchangeably with fairness and justice, equity implies implementing different actions in different places, all with a view to creating an equal world that is fair for all and where no one is left behind.

The Paris Agreement states that it ‘will be implemented to reflect equity... in the light of different national circumstances’ and calls for ‘rapid reductions’ of greenhouse gases to be achieved ‘on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty’. Similarly, the UN SDGs include targets to reduce poverty and inequalities, and to ensure equitable and affordable access to health, water and energy for all.

Equity and fairness are important for considering pathways that limit warming to 1.5°C in a way that is liveable for every person and species. They recognize the uneven development status between richer and poorer nations, the uneven distribution of climate impacts (including on future generations) and the uneven capacity of different nations and people to respond to climate risks. This is particularly true for those who are highly vulnerable to climate change, such as indigenous communities in the Arctic, people whose livelihoods depend on agriculture or coastal and marine ecosystems, and inhabitants of small island developing states. The poorest people will continue to experience climate change through the loss of income and livelihood opportunities, hunger, adverse health effects and displacement.

Well-planned adaptation and mitigation measures are essential to avoid exacerbating inequalities or creating new injustices. Pathways that are compatible with limiting warming to 1.5°C and aligned with the SDGs consider mitigation and adaptation options that reduce inequalities in terms of who benefits, who pays the costs and who is affected by possible negative consequences. Attention to equity ensures that disadvantaged people can secure their livelihoods and live in dignity, and that those who experience mitigation or adaptation costs have financial and technical support to enable fair transitions.

CRDPs describe trajectories that pursue the dual goal of limiting warming to 1.5°C while strengthening sustainable development. This includes eradicating poverty as well as reducing vulnerabilities and inequalities for regions, countries, communities, businesses and cities. These trajectories entail a mix of adaptation and mitigation measures consistent with profound societal and systems transformations. The goals are to meet the short-term SDGs, achieve longer-term sustainable development, reduce emissions towards net zero around the middle of the century, build resilience and enhance human capacities to adapt, all while paying close attention to equity and well-being for all.

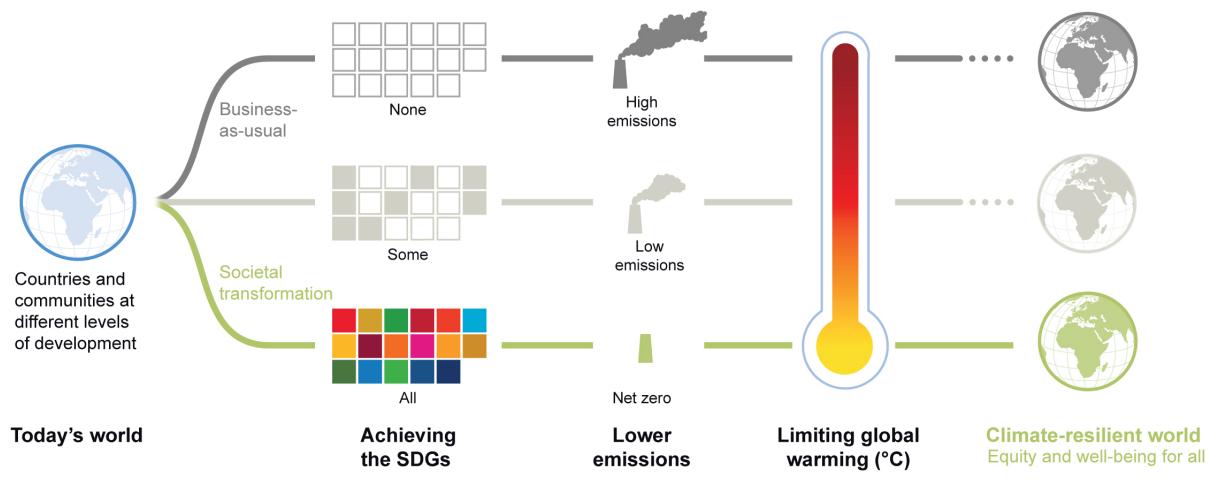
The characteristics of CRDPs will differ across communities and nations, and will be based on deliberations with a diverse range of people, including those most affected by climate change and by possible routes towards transformation. For this reason, there are no standard methods for designing CRDPs or for monitoring their progress towards climate-resilient futures. However, examples from around the world demonstrate that flexible and inclusive governance structures and broad participation often help support iterative decision-making, continuous learning and experimentation. Such inclusive processes can also help to overcome weak institutional arrangements and power structures that may further exacerbate inequalities.

(continued on next page)

FAQ 5.2 (continued)

FAQ5.2: Climate-resilient development pathways

Decision-making that achieves the United Nation Sustainable Development Goals (SDGs), lowers greenhouse gas emissions, limits global warming and enables adaptation could help lead to a climate-resilient world.



FAQ 5.2, Figure 1 | Climate-resilient development pathways (CRDPs) describe trajectories that pursue the dual goals of limiting warming to 1.5°C while strengthening sustainable development. Decision-making that achieves the SDGs, lowers greenhouse gas emissions and limits global warming could help lead to a climate-resilient world, within the context of enhancing adaptation.

Ambitious actions already underway around the world can offer insight into CRDPs for limiting warming to 1.5°C. For example, some countries have adopted clean energy and sustainable transport while creating environmentally friendly jobs and supporting social welfare programmes to reduce domestic poverty. Other examples teach us about different ways to promote development through practices inspired by community values. For instance, *Buen Vivir*, a Latin American concept based on indigenous ideas of communities living in harmony with nature, is aligned with peace; diversity; solidarity; rights to education, health, and safe food, water, and energy; and well-being and justice for all. The Transition Movement, with origins in Europe, promotes equitable and resilient communities through low-carbon living, food self-sufficiency and citizen science. Such examples indicate that pathways that reduce poverty and inequalities while limiting warming to 1.5°C are possible and that they can provide guidance on pathways towards socially desirable, equitable and low-carbon futures.

Table 5.2 | Mitigation – SDG table
Social-Demand

		Industry										Decarbonization/CCS/CCU																				
		Low-carbon Fuel Switch					Accelerating Energy Efficiency Improvement					Reduces Poverty					Air, Water Pollution Reduction and Better Health (3.9)					Water and Air Pollution Reduction and Better Health (3.9)					Disease and Mortality (3.17/23/33.4)					
		Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	
1	NO POVERTY	[0]	No direct interaction										[0]	No direct interaction				[0]	No direct interaction					[0]	No direct interaction				[0]	No direct interaction		
2	ZERO HUNGER	[+2]	% of people living below poverty line declines from 49% to 18% in South African context.	★									[+2]	No direct interaction				[+2]	No direct interaction					[+2]	No direct interaction				[+2]	No direct interaction		
3	GOOD HEALTH AND WELL-BEING																															
4	QUALITY EDUCATION																															



4 Quality Education

Poverty Reduction via Financial Savings (1.1)												Improved Warmth and Comforts														
Interaction			Score			Evidence			Agreement			Confidence			Interaction			Score			Evidence			Agreement		
Behavioural Response	[+2]	[+2]	◐	▣	◎	★	★	★	[0]			[+2]	◐	◑	◎	★★	★★	[0]								
Poverty and Development (1.1/1.2/1.3/1.4)	[+2,-1]	[+2,-1]	◐	◑	◑	◐	◑	◑	[+2]	◐	★	[+2]	◐	◑	◑	★★	★★	[+2]	◐	◑	◑	◑	◑	★		
Accelerating Energy Efficiency Improvement	[+2]	[+2]	◐	◑	◑	◐	◑	◑	[+2]	◐	★	[+2]	◐	◑	◑	★★	★★	[+2]	◐	◑	◑	◑	◑	★		
Buildings	carbon Energy	Improved Access and Fuel Switch to Modern Low-	Kirubi et al., 2009; Casillas and Kammen, 2010; Cook, 2011; Pachauri et al., 2012; Poole, 2013; Pueyo et al., 2013; Zulu and Richardson, 2013; Asaduzzaman et al., 2010; van Vuuren et al., 2009; Bonan et al., 2014; Rao et al., 2014; Burlig and Peonias, 2016; McCollum et al., 2018	Food Security and Agricultural Productivity (2/12/4)	Food Security (2.1)	Cabral et al., 2005; Thirun et al., 2009; van de Walle et al., 2013; McCollum et al., 2018	Access to modern energy forms (electricity, clean stoves, high-quality lighting) is fundamental to human development since the energy services made possible by them help alleviate chronic and persistent poverty. Strength of the impact varies in the literature. (Quote from McCollum et al., 2018)	- / →	[0,-1]	◐	◑	◑	◐	◑	◑	★★	★★	[+2]	◐	◑	◑	◑	◑	★★		
Disease and Mortality (3/13/23/3/3/4)	Food Security and Agricultural Productivity (2/12/4)	Food Security and Mortality (3/13/23/3/3/4)	Lam et al., 2012; Lim et al., 2012; Smith et al., 2013; Aranda et al., 2014; McCollum et al., 2018	Improved Access to Educational Institutions (4/14/24/3/4/5)	Healthy Lives and Well-being for All at All Ages (3/2/3/9)	Jamila et al., 2013; Huebner et al., 2013; Yue et al., 2014; Bhola et al., 2014; Derbez et al., 2014; Maidment et al., 2014; Scott et al., 2014; Cameron et al., 2015; Liddell and Gurney, 2015; Sharpe et al., 2015; Wells et al., 2015; Willand et al., 2015; Berrueta et al., 2017; Zhao et al., 2017	Efficient stoves improve health, especially for indigenous and poor rural communities. Household energy efficiency has positive health impacts on children's respiratory health, weight and susceptibility to illness, and the mental health of adults. Household energy efficiency improves winter warmth, lowers relative humidity with benefits for cardiovascular and respiratory health. Further improved indoor air quality by thermal regulation and occupant comfort are realised. However, in one instance, negative health impacts (asthma) of increased household energy efficiency were also noted when housing upgrades took place without changes in occupant behaviours. Home occupants reported warmth as the most important aspect of comfort which was largely temperature-related and low in energy costs. Residents living in the deprived areas expect improved warmth in their properties after energy efficiency measures are employed.	Household energy efficiency measures reduce school absences for children with asthma due to indoor pollution.	Equal Access to Educational Institutions (4/14/24/3/4/5)	Improved Warmth and Comforts	Huebner et al., 2013; Yue et al., 2014; Scott et al., 2014; Zhao et al., 2017	Home occupants reported warmth as the most important aspect of comfort which was largely temperature-related and low in energy costs. Residents living in deprived areas expect improved warmth in their properties after energy efficiency measures are employed.	Household energy efficiency measures reduce school absences for children with asthma due to indoor pollution.	Equal Access to Educational Institutions (4/14/24/3/4/5)	Healthy Lives and Well-being for All at All Ages (3/2/3/9)	Jamila et al., 2013; Huebner et al., 2013; Yue et al., 2014; Bhola et al., 2014; Derbez et al., 2014; Maidment et al., 2014; Scott et al., 2014; Cameron et al., 2015; Liddell and Gurney, 2015; Sharpe et al., 2015; Wells et al., 2015; Willand et al., 2015; Berrueta et al., 2017; Zhao et al., 2017	Efficient stoves improve health, especially for indigenous and poor rural communities. Household energy efficiency has positive health impacts on children's respiratory health, weight and susceptibility to illness, and the mental health of adults. Household energy efficiency improves winter warmth, lowers relative humidity with benefits for cardiovascular and respiratory health. Further improved indoor air quality by thermal regulation and occupant comfort are realised. However, in one instance, negative health impacts (asthma) of increased household energy efficiency were also noted when housing upgrades took place without changes in occupant behaviours. Home occupants reported warmth as the most important aspect of comfort which was largely temperature-related and low in energy costs. Residents living in the deprived areas expect improved warmth in their properties after energy efficiency measures are employed.	Household energy efficiency measures reduce school absences for children with asthma due to indoor pollution.								

Transport											
End Poverty in all its Forms Everywhere (1.1/1.4/1.a/1.b)											
Behavioral Response											
Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence		
Equal Right to Economic Resources Access Basic Services (1.1/1.4/1.a/1.b)	[+2,-1]	↑ / ↓	██████	★★★	↑ [+2]	████████	②	★★★	★★★	[+1]	
The costs of daily mobility can have important economic stress impacts, not only impacting carless families with low-mobility, but, in countries with high levels of car dependence, the costs of motoring can be burdensome, raising questions of affordability for households with limited economic resources. During economic crisis, public transport authorities may react by reducing levels of service and increasing fares, likely exacerbating the situation for low-income households.											
Dodson et al., 2004; Cascajo et al., 2017					Clifton, 2004; Hillier, 2011; Kruckowski et al., 2013; LeDoux and Vojnovic, 2013; Ghosh-Dastidar et al., 2014; Zenk et al., 2015; Lowry et al., 2016					Woodcock et al., 2009; Creutzig et al., 2012; Haines and Dora, 2012; Saunders et al., 2013; Shaw et al., 2014, 2017; Chakrabarti and Shin, 2017; Hwang et al., 2017; McCollum et al., 2018; Yu, 2015	
Ensure Access to Safe Nutritious Food (2.1/2.2)											
Ensure Access Basic Services											
Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence		
Equal Safe Access to Educational Institutions (4.1/4.2/4.3/4.5)	[+2,-1]	↑ / ↓	████████	★★★	Active travel modes, such as walking and cycling, represent strategies not only for boosting energy efficiency but also, potentially, for improving health and well-being (e.g., lowering rates of diabetes, obesity, heart disease, dementia and some cancers). However, a risk associated with these measures is that they could increase rates of road traffic accidents, if the existing infrastructure is unsatisfactory. Overall health effects will depend on the severity of the injuries sustained from these potential accidents relative to the health benefits accruing from increased exercise (McCollum et al., 2018).	[+2,-1]	████████	③	★★★	★★★	
Road Traffic Accidents (3.4/3.6)					Woodcock et al., 2009; Creutzig et al., 2012; Haines and Dora, 2012; Saunders et al., 2013; Shaw et al., 2014, 2017; Chakrabarti and Shin, 2017; Hwang et al., 2017; McCollum et al., 2018; Yu, 2015						
Reduce Illnesses from Hazardous Air, Water and Soil Pollution (3.9)											
Reduce Illnesses from Hazardous Air, Water and Soil Pollution											
Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence		
End Poverty in all its Forms Everywhere (1.1/1.4/1.a/1.b)	[+2,-1]	↑ / ↓	██████	★★★	Locally relevant policies targeting traffic reductions and ambitious diffusion of electric vehicles results in measured changes in non-climatic exposure for population, including ambient air pollution, physical activity and noise. The transition to low-carbon equitable and sustainable transport can be fostered by numerous short- and medium-term strategies that would benefit energy security, health, productivity and sustainability. An evidence-based approach that takes into account GHG emissions, ambient air pollutants, economic factors (affordability, cost optimization), social factors (poverty alleviations, public health benefits) and political acceptability is needed to tackle these challenges.	[+2]	████████	③	★★★	[0]	
Xylia and Silveira, 2017					Figueira et al., 2014; Schucht et al., 2015; Klausbrunner et al., 2016; Peng et al., 2017						
Reduce Illnesses from Hazardous Air Pollution (3.9)											
Reduce Illnesses from Hazardous Air Pollution											
Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence		
Ensure Access to Food Security (2.1/2.3/2.a/2.b/2.c)	[+2,-1]	↑ / ↓	██████	★★★	Projects aiming at resilient transport infrastructure development to improve access (e.g., C40 Cities Clean Bus Declaration, UTRP Declaration on Climate Leadership, Cycling Delivers on the Global Goals, Global Sidewalk Challenge) are targeted at reducing air pollution; electric vehicles using electricity from renewables or low carbon sources combined with e-mobility options such as trolley buses, metros, trams and electric buses, as well as promoting walking and biking, especially for short distances, need consideration.	[+2]	████	③	★★	[0]	
End Poverty in all its Forms Everywhere (1.1/1.4/1.a/1.b)					Ajanovic, 2015; SloCat, 2017						
Accelerating Energy Efficiency Improvement											
Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence		
Improved Access and Fuel Switch to Modern Low-carbon Energy	[+2,-1]	↑ / ↓	██████	★★★	Increasingly volatile global oil prices have raised concerns for the vulnerability of households to fuel price increases. Pricing measures are a key component of sustainable transport policy need to consider equity. Pro-poor mitigation policies are needed to reduce climate impact and reduce threat; for example, investing more and better in infrastructure by leveraging private resources and using designs that account for future climate change and the related uncertainty. Communities in poor areas cope with and adapt to multiple-stressors, including climate change. Coping strategies provide short-term relief but in the long-term may negatively affect development goals. And responses generate a trade-off between adaptation, mitigation and development. For African cities with slums, due to high commuting costs, many walk to work places which limit access. In Latin America triple informality leading to low productivity and living standards.	[+2]	████	③	★★	★★	[0]
Improved Access and Fuel Switch to Modern Low-carbon Energy					Dodson and Sipe, 2008; Sutcliffe et al., 2014; Halliegate et al., 2016; Klausbrunner et al., 2016; CAF, 2017; Lall et al., 2017						

Replicating Coal										
Non-biomass Renewables - solar, wind, hydro										
Poverty and Development (1.1/1.2/1.3/1.4)										
Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction
↑ / ↓	[+2]	➡➡➡	★★★	[0]	↑ / ↓	[+2]	➡➡➡	★★★★	[+1]	➡
Deployment of renewable energy and improvements in energy efficiency globally will aid climate change mitigation efforts, and this, in turn, can help to reduce the exposure of the world's poor to climate-related extreme events, negative health impacts and other environmental shocks (McCollum et al., 2018).										
Riahi et al., 2012; IPCC, 2014; Hallegratte et al., 2016b; McCollum et al., 2018										
Poverty and Development (1.1/1.2/1.3/1.4)										
Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction
↑	[+2]	➡➡➡	★★★	[0]	↑	[+2]	➡➡➡	★★★★	[+1]	➡
Promoting most types of renewables and boosting efficiency greatly aids the achievement of targets to reduce local air pollution and improve air quality; however, the order of magnitude of the effects, both in terms of avoided emissions and monetary valuation, varies significantly between different parts of the world. Benefits would especially accrue to those living in the dense urban centres of rapidly developing countries.										
Utilization of biomass and biofuels might not lead to any air pollution benefits, however, depending on the control measures applied. In addition, household air quality can be significantly improved through lowered particulate emissions from access to modern energy services (McCollum et al., 2018).										
No direct interaction										
Disease and Mortality (3.1/3.2/3.3/3.4), Air Pollution (3.9)										
Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction
↑	[+2]	➡➡➡	★★★★	[0]	↑	[+2]	➡➡➡	★★★★	[0]	↑
Replacing coal by biomass can reduce adverse impacts of upstream supply-chain activities, in particular local air and water pollution, and prevent coal mining accidents. Improvements to local air pollution in power generation compared to coal-fired power plants depend on the technology and fuel of biomass power plants, but could be significant when switching from outdated coal combustion technologies to state-of-the-art biomass power generation.										
IPCC, 2005, 2014; Miller et al., 2007; Hertwich et al., 2008; de Best-Walshoer et al., 2009; Shackley et al., 2009; Walquist et al., 2009; Wong-Parodi and Ray, 2009; Chan and Griffiths, 2010; Velman et al., 2010; Epstein et al., 2011; Koomeen et al., 2011; Reiner and Nutall, 2011; Singh et al., 2011; Ashworth et al., 2012; Burgher et al., 2012; Chen et al., 2012; Asfaw et al., 2013; Corsten et al., 2013; Einsiedel et al., 2013										
Balishter and Singh, 1991; Gohin, 2008; de Moraes et al., 2010; van der Horst and Vermeulen, 2011; Corbera and Pascual, 2012; Rud, 2012; Creutzig et al., 2013; Davis et al., 2013; Satio and Bachti, 2013; Mays et al., 2014; Ertan et al., 2017; McCollum et al., 2018										

Social-Supply (continued)

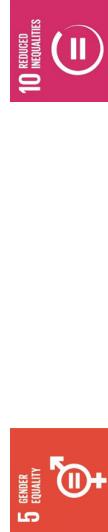
1 NO POVERTY		2 ZERO HUNGER		3 GOOD HEALTH AND WELL-BEING		4 QUALITY EDUCATION	
Nuclear/Advanced Nuclear	Replicating Coal	CCS: Bioenergy	Poverty and Development (1.1/1.2/1.3/1.4)	Farm Employment and incomes (2.3)	Disease and Mortality (3.1/3.2/3.3/3.4)	Disease and Mortality (3.1/3.2/3.3/3.4)	Disease and Mortality (3.1/3.2/3.3/3.4)
[0]	[0]	[+2,-2]	[+1,-2]	[+1,-2]	[+2,-1]	[+1,-1]	[0]
No direct interaction	No direct interaction	See effects of increased bioenergy use.	See increased use of biomass effects. In addition, the concern that more bioenergy (for BECCS) necessarily leads to unacceptably high food prices is not founded on large agreement in the literature. AR5, for example, finds a significantly lower effect of large-scale bioenergy deployment on food prices by mid-century than the effect of climate change on crop yields. Also, Muratori et al. (2016) show that BECCS reduces the upward pressure on food crop prices by lowering carbon prices and lowering the total biomass demand in climate change mitigation scenarios. On the other hand, competition for land use may increase food prices and thereby increase risk of hunger. Use of agricultural residue for bioenergy can reduce soil carbon, thereby threatening agricultural productivity.	See literature on increased biomass use: IPCC, 2014; Muratori et al., 2016; Dooley and Kartha, 2018	Wang and Jaffe, 2004; Hertwich et al., 2008; Apps et al., 2010; Veltman et al., 2010; Komnne et al., 2011; Singh et al., 2011; Siirila et al., 2012; Atchley et al., 2013; Costen et al., 2013; IPCC, 2014	No direct interaction	No direct interaction
Advanced Coal	CCS: Fossil	[0]	[0]	[0]	[0]	[0]	[0]
No direct interaction	No direct interaction	No direct interaction	No direct interaction	No direct interaction	No direct interaction	No direct interaction	No direct interaction

Agriculture and Livestock											
		Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence
1 NO POVERTY 	Poverty and Development (1.1/1.2/1.3/1.4)	[0-1]	➡️	➡️➡️	★★★	★	➡️	[+2]	➡️➡️➡️	★★★★★	★
Cutting livestock consumption can increase food security for some if land grows food not feed, but can also undermine livelihoods and culture where livestock has long been the best use of land, such as in parts of Sub-Saharan Africa.	Curbing consumer waste of major food crops (i.e., wheat, rice and vegetables and meats (i.e., beef, pork and poultry) in China, USA and India alone could feed ~413 million people per year (West et al., 2014). One billion extra people could be fed if food crop losses could be halved (Kummu et al., 2012). Reducing waste, especially from meat and dairy, could play a role in delivering food security and reduce the need for sustainable intensification Smith, 2013). Dietary change toward global healthy diets could improve nutritional health, food security and reduce emissions.	Garnett, 2011; Beddington et al., 2012; Kummu et al., 2012; Smith, 2013; Bojælli et al., 2014; Tilman and Clark, 2014; West et al., 2014; Lamb et al., 2016	Tobacco Control (3.a/3.a.1)	[+1]	➡️	□	➡️	[0]	➡️	□	★
2 ZERO HUNGER 	Food Security, Promoting Sustainable Agriculture (2.1/2.4/2a)	[0-1]	➡️	➡️➡️	★★★★	★	➡️	[+2]	➡️➡️➡️	★★★★★	★
Many CSA interventions aim to improve rural livelihoods, thereby contributing to poverty alleviation. Agroforestry or integrated crop-livestock-biogas systems can substitute costly, external inputs, saving on household expenditures – or even lead to the selling of some of the products, providing the farmer with extra income, leading to increased adaptive capacity (Bogdanski, 2012).	Safe application of biotechnology, both conventional and modern methods, can help to improve agricultural productivity, improving crop adaptability and thereby catering to food security. Reducing tillage, eliminating fallow and keeping the soil covered with residue, cover crops or perennial vegetation helps prevent soil erosion and has the potential to increase soil organic matter. Efficient land-management techniques can help in increasing crop yields, and so food security issues can be addressed. Yield projections are actually higher for developing countries than for developed countries, reflecting the fact that they have more catch-up potential (Evenson, 1999). Action is needed throughout the food system on moderating demand, reducing waste, improving governance and producing more food (Godfray and Garnett, 2014).	Evenson, 1999; West and Post, 2002; Johnson et al., 2007; Branca et al., 2011; McCarthy et al., 2011; Behnassi et al., 2014; Campbell et al., 2014; Godfray and Garnett, 2014; Harvey et al., 2014; Lipper et al., 2014	Ensure Healthy Lives (3.c)	[+2,-2]	➡️➡️	□	➡️➡️	[+2,-2]	➡️➡️	□	★
3 GOODHEALTH AND WELLBEING 	Food Security, Promoting Sustainable Agriculture (2.1/2.4/2a)	[0-1]	➡️	➡️➡️	★★★★	★	➡️	[+2,-2]	➡️➡️➡️	★★★★★	★
Behavioral Resilience: Sustainable Food Waste	Growing crops such as cassava, sorghum and millet, even in harsh conditions, is important to the diets of very poor people. Policy scenarios show that reduced research support, delayed industrialization, delayed biotechnology and climate change will delay progress in reducing childhood malnutrition. The global effects are small, but local effects for some countries, e.g., Bangladesh and Nigeria, are significant (Evenson, 1999).	Evenson, 1999; Godfray and Garnett, 2014	Ensure Inclusive and Quality Education (4.4/4.7)	[+2,-2]	➡️➡️	□	➡️➡️	[+2,-2]	➡️➡️	□	★
4 QUALITY EDUCATION 	Food Security, Promoting Sustainable Agriculture (2.1/2.4/2a)	[0-1]	➡️	➡️➡️	★★★★	★	➡️	[+2,-2]	➡️➡️➡️	★★★★★	★
With mixed-farming systems farmers can not only mitigate risks by producing a multitude of commodities, but they can also increase the productivity of both crops and animals in a more profitable and sustainable way.	Science-based action within CSA is required to integrate data sets and sound metrics for testing hypotheses about feedback regarding climate, weather data products and agricultural productivity, such as the nonlinearity of temperature effects on crop yield and the assessment of trade-offs and synergies that arise from different agricultural intensification strategies (Steenwerth et al., 2014). Low commodity prices have led to declining investment in research and development, farmer education, etc. (Lamb et al., 2016).	Steenwerth et al., 2014; Lamb et al., 2016	Ensure Healthy Lives (3.c)	[+2,-2]	➡️➡️	□	➡️➡️	[+2,-2]	➡️➡️	□	★
5	Poverty Reduction and Minimize Exposure to Risk (1.5)	[+2]	➡️	➡️➡️	★★	«	➡️	[+2,-2]	➡️➡️➡️	★★★★	«
Land-based GHG Reduction and Soil Carbon Sequestration	Fostering transitions towards more productive livestock production Systems targeting land-use change appears to be the most efficient lever to deliver food availability outcomes. Genomic selection should be able to at least double the rate of genetic gain in the dairy industry. Given the prevalence of mixed crop-livestock systems in many systems of the world, closer integration of crops and livestock in such systems can give rise to increased productivity and increased soil fertility (Thornton, 2010). Managing the indirect effects of livestock systems intensification is critical for the sustainability of the global food system; such as improving productivity and the close link to land sparing (Herrero and Thornton, 2013). In East Africa pastoralists have shifted from cows to camels, which are better adapted to survive periods of water scarcity and able to consistently provide more milk. Steenwerth et al., 2014. Scenarios where zero human-edible concentrate feeds is used for livestock, soil erosion potential reduces by 12%.	Steenwerth et al., 2014; Schader et al., 2015	Ensure Healthy Lives (3.c)	[+2,-2]	➡️➡️	□	➡️➡️	[+2,-2]	➡️➡️	□	«
6	Agroforestry and Livestock	[+2]	➡️	➡️➡️	★★	«	➡️	[+2,-2]	➡️➡️➡️	★★★★★	«
Greenhouse Gas Reduction from Improved Livestock Management Systems	Biodigestion, which has positive public health aspects, particularly where toilets are coupled with the biodigester, anaerobic conditions kill pathogenic organisms as well as digestive toxins. Separation processes can improve or worsen health risks related to food crops or to livestock.	Steenwerth et al., 2014; Burton, 2007	Ensure Healthy Lives (3.c)	[+2,-2]	➡️➡️	□	➡️➡️	[+2,-2]	➡️➡️	□	«

Social-Other (continued)

	Interaction	Score	Evidence	Awareness	Confidence	Interaction	Score	Evidence	Awareness	Confidence	Interaction	Score	Evidence	Awareness	Confidence	Interaction	Score	Evidence	Awareness	Confidence	Interaction	Score	Evidence	Awareness	Confidence	Interaction	Score	Evidence	Awareness	Confidence
4 QUALITY EDUCATION 																														
3 GOOD HEALTH AND WELL-BEING 																														
2 ERD NUMBER 																														
1 NO POVERTY 																														
Forest																														
Reduced Deforestation, REDD+	Partnerships between local forest managers, community enterprises and private sector companies can support local economies and livelihoods, and boost regional and national economic growth.	[+2]	□	②	★	↑ / ↘	[+1,-2]	□□	③	★	Food security may lead to the conversion of productive land under forest, including community forests, into agricultural production. In a similar fashion, the production of biomass for energy purposes (SDG 7) may reduce land available for food production and/or for community forest activities. Efforts by the Government of Zambia to reduce emissions by REDD+ have contributed erosion control, ecotourism and pollination valued at 1.5% of the country's GDP.	[0]	No direct interaction			↑ [+1]		□	③	*	Local forest users learn to understand laws, regulations and policies which facilitate their participation in society. Education and capacity building provide technical skill and knowledge (Katila et al., 2017).									
Katila et al., 2017																														
Poverty and Development (1.1/1.2/1.3/1.4)	Clean Development Mechanism (CDM) can have different implications on local community livelihoods. For example, willingness to adopt reforestation is influenced in particular by Australian landholder's perceptions of its potential to provide a diversified income stream, and its impacts on flexibility of land management; land sparing would have far-reaching implications for the UK countryside and would affect landowners and rural communities; and livelihoods could be threatened if subsistence agriculture is targeted.	[+2,-2]	□□	②③	★★★	↑ / ↘	[+1,-1]	□	③	★	CDM can have different implications on local regional food security and local community livelihoods.					↑ [+1]	□	③	*	Urban trees are increasingly seen as a way to reduce harmful air pollutants and therefore improve cardio-respiratory health.										
Zomer et al., 2008; Doolley and Kartha, 2018																														
Oceans																														
Ocean Iron Fertilization	No direct interaction	[0]	No direct interaction																											
Blue Carbon	Avoiding loss of mangroves and maintaining the 2000 stock could save a value of ecosystem services from mangroves in South East Asia of approximately 1.6 billion USD until 2050 (USD 2007 prices), with a 95% prediction interval of 1.58–2.76 billion USD (case study area South East Asia); seaweed aquaculture will enhance carbon uptake and provide employment; traditional management systems provide benefits for blue carbon and support livelihoods for local communities; greening of aquaculture can significantly enhance carbon storage; PES schemes could help capture the benefits derived from multiple ecosystem services beyond carbon sequestration.	[+3]	□□□	③④⑤	★★★	↑	[+3]	□□□	③④⑤	★★★	Avoiding loss of mangroves and maintaining the 2000 stock could save a value of ecosystem services from mangroves in South East Asia including fisheries; seaweed aquaculture will provide employment; traditional management systems provide livelihoods for local communities; greening of aquaculture can increase income and well-being; and mariculture is a promising approach for China.	[0]											Brander et al., 2012; Ahmed et al., 2017a; Brander et al., 2017b; Sondak et al., 2017; Vierros, 2017; Zhang et al., 2017							
Zomer et al., 2008; Schirmer and Bull, 2014; Lamb et al., 2016																														
Enhanced Weathering	No direct interaction	[0]	No direct interaction																											

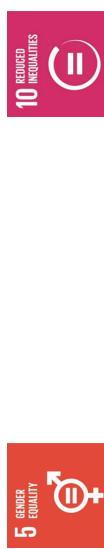
		Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence
5																
10		[0]					[0]									
16																
17																
Buildings																
Improved Access and Fuel Switch to Modern Low-carbon Energies	Accelerating Energy Efficiency Improvement	Women's Safety and Worth (5.1/2.5/3) Opportunities for Women (5./5.5)	[+1]				[+2]					[+2]				
Chowdhury, 2010; Dinkelman, 2010; Clancy et al., 2012; Hayes, 2012; Mattinga, 2012; Arendberg et al., 2011; Kohlin et al., 2011; Mattinga, 2012; Bunney et al., 2013; Pachauri and Rao, 2013; Bunney et al., 2017; McCollum et al., 2017	Women's Safety and Worth (5.1/2.5/3) Opportunities for Women (5./5.5)	Bhoylaid et al., 2014; Berueta et al., 2017	Dinkelman, 2011; Casillas and Kammen, 2012; Cayla and Osso, 2013; Hirth and Leckert, 2013; Piejo et al., 2013; Jakob and Stekel, 2014; Fay et al., 2015; Cameron et al., 2016; Hallegatte et al., 2016b; McCollum et al., 2018	[+1]			[+2]					[+2]				
Improved access to electric lighting can improve women's safety and girls' school enrolment. Cleaner cooking fuel and lighting access can reduce health risks and drudgery, which women disproportionately face. Access to modern energy services has the potential to empower women by improving their income-generating and entrepreneurial opportunities and reducing drudgery. Participating in energy supply chains can increase women's opportunities and agency and improve business outcomes.	Improved access to electric lighting can improve women's safety and girls' school enrolment. Cleaner cooking fuel and lighting access can reduce health risks and drudgery, which women disproportionately face. Access to modern energy services has the potential to empower women by improving their income-generating and entrepreneurial opportunities and reducing drudgery. Participating in energy supply chains can increase women's opportunities and agency and improve business outcomes.	Chowdhury, 2010; Dinkelman, 2010; Clancy et al., 2012; Hayes, 2012; Mattinga, 2012; Arendberg et al., 2011; Kohlin et al., 2011; Mattinga, 2012; Bunney et al., 2013; Pachauri and Rao, 2013; Bunney et al., 2017; McCollum et al., 2017														
Carbon		Women's Safety and Worth (5.1/2.5/3) Opportunities for Women (5./5.5)	[+1]				[+2]					[+2]				
Women's Safety and Worth (5.1/2.5/3) Opportunities for Women (5./5.5)	Women's Safety and Worth (5.1/2.5/3) Opportunities for Women (5./5.5)	Bhoylaid et al., 2014; Berueta et al., 2017	Dinkelman, 2011; Casillas and Kammen, 2012; Cayla and Osso, 2013; Hirth and Leckert, 2013; Piejo et al., 2013; Jakob and Stekel, 2014; Fay et al., 2015; Cameron et al., 2016; Hallegatte et al., 2016b; McCollum et al., 2018	[+1]			[+2]					[+2]				
Improved access to electric lighting can improve women's safety and girls' school enrolment. Cleaner cooking fuel and lighting access can reduce health risks and drudgery, which women disproportionately face. Access to modern energy services has the potential to empower women by improving their income-generating and entrepreneurial opportunities and reducing drudgery. Participating in energy supply chains can increase women's opportunities and agency and improve business outcomes.	Improved access to electric lighting can improve women's safety and girls' school enrolment. Cleaner cooking fuel and lighting access can reduce health risks and drudgery, which women disproportionately face. Access to modern energy services has the potential to empower women by improving their income-generating and entrepreneurial opportunities and reducing drudgery. Participating in energy supply chains can increase women's opportunities and agency and improve business outcomes.	Chowdhury, 2010; Dinkelman, 2010; Clancy et al., 2012; Hayes, 2012; Mattinga, 2012; Arendberg et al., 2011; Kohlin et al., 2011; Mattinga, 2012; Bunney et al., 2013; Pachauri and Rao, 2013; Bunney et al., 2017; McCollum et al., 2017														
Capacity and Accountability		Capacity and Accountability (16.1/16.3/16.5/16.6/16.7/16.8)	[+1]				[+2]					[+2]				
Capacity and Accountability (16.1/16.3/16.5/16.6/16.7/16.8)	Capacity and Accountability (16.1/16.3/16.5/16.6/16.7/16.8)	Acemoglu, 2009; Tabellini, 2010; Acemoglu et al., 2014; ICUS and ISSC, Shah et al., 2015; McCollum et al., 2018	Dinkelman, 2011; Casillas and Kammen, 2012; Cayla and Osso, 2013; Hirth and Leckert, 2013; Piejo et al., 2013; Jakob and Stekel, 2014; Fay et al., 2015; Cameron et al., 2016; Hallegatte et al., 2016b; McCollum et al., 2018	[+1]			[+2]					[+2]				
Institutions that are effective, accountable and transparent are needed at all levels of government (local to national to international) for providing energy access, promoting modern renewables and boosting efficiency. Strengthening the participation of developing countries in international institutions (e.g., international energy agencies, UN organizations, WTO, regional development banks and beyond) will be important for issues related to energy trade, foreign direct investment, labour migration and knowledge and technology transfer. Reducing corruption, where it exists, will help these bodies and related domestic institutions maximize their societal impacts. Limiting armed conflict and violence will aid most efforts related to sustainable development, including progress in the energy dimension.	Institutions that are effective, accountable and transparent are needed at all levels of government (local to national to international) for providing energy access, promoting modern renewables and boosting efficiency. Strengthening the participation of developing countries in international institutions (e.g., international energy agencies, UN organizations, WTO, regional development banks and beyond) will be important for issues related to energy trade, foreign direct investment, labour migration and knowledge and technology transfer. Reducing corruption, where it exists, will help these bodies and related domestic institutions maximize their societal impacts. Limiting armed conflict and violence will aid most efforts related to sustainable development, including progress in the energy dimension.	Acemoglu, 2009; Tabellini, 2010; Acemoglu et al., 2014; ICUS and ISSC, Shah et al., 2015; McCollum et al., 2018														
Enhance Policy Coherence for Sustainable Development		Enhance Policy Coherence for Sustainable Development (17.4)	[+1]				[+2]					[+2]				
Enhance Policy Coherence for Sustainable Development (17.4)	Enhance Policy Coherence for Sustainable Development (17.4)	Kim and Sun, 2017	Hult and Larsson, 2016	[+1]			[+2]					[+2]				
Implementing refrigerant transition and energy efficiency improvement policies in parallel for room ACs, roughly doubles the benefit of either policy implemented in isolation.	Implementing refrigerant transition and energy efficiency improvement policies in parallel for room ACs, roughly doubles the benefit of either policy implemented in isolation.															



10 REDUCED INEQUALITIES



Transport												
to Modern Low-Carbon Energy Improved Access and Fuel Switch Accelerating Energy Efficiency Behavioural Improvement Recognize Women's Unpaid Work (5.1/5.4) Opportunities for Women (5.1/5.5)												
Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	
Reduce Inequality (10.2)	[+1]	↑	★★	②③	Reduce Inequality (10.2)	[+2]	↑	★★	②③	Help Promote Global Partnership (17.1/17.3/17.5/17.6/17.7)	[+2]	
The woman's average trip to work differs markedly from the man's average trip. Working poor women rely on extensive social networks creating communities of spatial necessity, bartering for basic needs to overcome transportation constraints. Women earn lower wages and so are less likely to justify longer commutes. Many women need to manage dual roles as workers and mothers. Women tend to perform multi-purpose commuting, combining both work and household needs.					The equity impacts of climate change mitigation measures for transport, and indeed of transport policy intervention overall, are poorly understood by policymakers. This is in large part because standard assessment of these impacts is not a statutory requirement of current policymaking. Managing transport energy demand growth will have to be advanced alongside efforts in passenger travel towards reducing the deep inequalities in access to transport services that currently affect the poor worldwide. Free provision of roads and parking spaces converts vast amounts of public land and capital into under-priced space for cars, in extreme cases like Los Angeles, USA, roads and streets free for parking and driving are 20% of land areas as governments give drivers free land, people drive more than they would otherwise. High levels of car dependence and the costs of motoring can be burdensome, and lead to increasing debt, raising questions of affordability for households with limited resources, particularly low-income houses located in suburban areas			With behavioural change towards walking for short distances, pedestrian safety on the road might reduce, unless public policy is appropriately formulated. Prevalence of high levels of triple forms of informality in jobs, housing and transportation, are responsible for low productivity and low standards of living, and are a major challenge for policies targeting urban growth in Latin America.			Projects aiming at resilient transport infrastructure development (e.g., C40 Cities Clean Bus Declaration, UITP Declaration on Climate Leadership, Cycling Delivers on the Global Goals, Global Sidewalk Challenge) are happening through multi-stakeholder coalitions.	★
Crane, 2007; Rogalsky, 2010 Manville, 2017; Belton Chevallier et al., 2018					CAF, 2017; Slocat, 2017					Slocat, 2017		
Behavioural response	[0]				Responsive, Inclusive, Participatory Decision-making (16.7)	[+2]	↑	★★	②③	Help Promote Global Partnership (17.1/17.3/17.5/17.6/17.7)	[+2]	
No direct interaction					In transport mitigation it is necessary to conduct needs assessments and stakeholder consultation to determine plausible challenges, prior to introducing desired planning reforms. Further, the involved personnel should actively engage transport-based stakeholders during policy identification and its implementation to achieve the desired results. User behaviour and stakeholder integration are key for successful transport policy implementation.					Aggarwal, 2017; Alsabagh et al., 2017		
Improved Access and Fuel Switch Accelerating Energy Efficiency	[0]				Reduce Inequality (10.2)	[+2]	↑	★★	②③	Help Promote Global Partnership (17.1/17.3/17.5/17.6/17.7)	[+2]	
No direct interaction					The equity impacts of climate change mitigation measures for transport, and indeed of transport policy intervention overall, are poorly understood by policymakers. This is in large part because standard assessment of these impacts is not a statutory requirement of current policymaking. Managing transport energy demand growth will have to be advanced alongside efforts in passenger travel towards reducing the deep inequalities in access to transport services that currently affect the poor worldwide.			Formal transport infrastructure improvement in many cities in developing countries leads to eviction from informal settlements, need for appropriate redistributive policies and cooperation and partnerships with all stakeholders.		Figueroa et al., 2014; Lucas and Pangbourne, 2014		
Accelerating Energy Efficiency	[0]				Responsive, Inclusive, Participatory Decision-making (16.7)	[+2]	↑	★★	②③	Help Promote Global Partnership (17.1/17.3/17.5/17.6/17.7)	[+2]	
No direct interaction					Projects aiming at resilient transport infrastructure development and technology adoption (e.g., C40 Cities Clean Bus Declaration, UITP Declaration on Climate Leadership, Cycling Delivers on the Global Goals, Global Sidewalk Challenge) are happening through multi-stakeholder coalitions.					Colenbrander et al., 2016		



Advanced Coal	CCS: Fossil Bioenergy d Nuclear d Nuclear/Advanc	Increased Use of Biomass	Replicating Coal	Reducing Arms Trade (16.4)	Isiar et al., 2017	UN, 1989; Ramaker et al., 2003; Clarke et al., 2009; NCE, 2015; Riahi et al., 2015, 2017; Eis et al., 2016; O'Neill et al., 2017; McCollum et al., 2018	International Cooperation (All Goals)																	
				Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	
	Gender Equality and Women's Empowerment (5.1/5.4)	Empowerment and Inclusion (10.1/10.2/10.3/10.4)		Energy Justice	[+2]	↑	■	★	↑	[+2]	↑	■	★	↑	[+2.0]	↑ ↗	■	★	International cooperation (in policy) and collaboration (in science) is required for the protection of shared resources. Fragmented approaches have been shown to be more costly. Specific to SDG7, to achieve the targets for energy access, renewables and efficiency, it will be critical that all countries: (i) are able to mobilize the necessary financial resources (e.g., via taxes on fossil energy, sustainable financing, foreign direct investment, financial transfers from industrialized to developing countries); (ii) are willing to disseminate knowledge and share innovative technologies between each other; (iii) follow recognized international trade rules while at the same time ensuring that the least developed countries are able to take part in that trade; (iv) respect each other's policy space and decisions; (v) forge new partnerships between their public and private entities and within civil society; and (vi) support the collection of high-quality, timely and reliable data relevant to furthering their missions. There is some disagreement in the literature on the effect of some of the above strategies, such as free trade. Regarding international agreements, 'no-regrets options', where all sides gain through cooperation, are seen as particularly beneficial (e.g., nuclear test ban treaties) (McCollum et al., 2018).					
	Decentralized renewable energy systems (e.g., home- or village-scale solar power) can enable a more participatory, democratic process for managing energy-related decisions within communities.	Decentralized renewable energy systems (e.g., home- or village-scale solar power) can enable a more participatory, democratic process for managing energy-related decisions within communities.			[+1]	↑	■	★																
	Non-biomass Renewables - solar, wind, hydro	Non-biomass Renewables - solar, wind, hydro																						

	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence
5 GENDER EQUALITY	[0]	[0]																		
10 REDUCED INEQUALITIES						No direct interaction														
16 PEACE, JUSTICE AND STRONG INSTITUTIONS																				
17 PARTNERSHIPS FOR THE GOALS						No direct interaction														
Agriculture and Livestock																				
Land-based Greenhouse Gas Reduction and Soil Management Systems																				
Agroforestry and Livestock																				
Greenhouse Gas Reduction from Improved Livestock Production and Management																				
Carboon Sequestration and Soil Management																				
Dietets and Reduced Food Waste																				
Behavioral Responses: Sustainable Healthy Diets and Reduced Food Waste																				
Equal Access, Empowerment of Women (5.5)																				
Empower Economic and Political Inclusion of All, Irrespective of Sex (10.2)																				
Equal Access to Economic Resources, Promote Empowerment of Women (5.5/a/5.b)																				
Responsible Decision-making (16.7)																				
Improve Domestic Capacity for Tax Collection (17.1)																				
Resource Mobilization and Strengthen Partnership (17.1/i/17.3/17.5/17.17)																				
Build Effective, Accountable and Inclusive Institutions (16.6/16.7/16.8)																				
Resource Mobilization and Strengthen Multi-stakeholder Partnership (17.1/i/17.3/17.5/17.17)																				

Social 2-Other (continued)



	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence
Opportunities for Women (5.1/5.5)															
Reduced Deforestation, REDD+	[+1]	⌚	⌚	⌚	⌚	[+1]	⌚	⌚	⌚	⌚	[+1]	⌚	⌚	⌚	⌚
Brown, 2011; Larson et al., 2014; Katila et al., 2017	Bastos Lima et al., 2017; Katila et al., 2017	Bastos Lima et al., 2017; Katila et al., 2017	Bustamante et al., 2014; Bastos Lima et al., 2015; Bastos Lima et al., 2017; Katila et al., 2017												
Afforestation and Reforestation	[+1]	⌚	⌚	⌚	⌚	[+1]	⌚	⌚	⌚	⌚	[+1]	⌚	⌚	⌚	⌚
UN-Women et al., 2015	Epstein and Theuer, 2017	Epstein and Theuer, 2017													
Opportunities for Sex (10.2)															
Reduced Inequality Empowerment and Inclusion (10.1/10.3/10.4)	[+1]	⌚	⌚	⌚	⌚	[+1]	⌚	⌚	⌚	⌚	[+1]	⌚	⌚	⌚	⌚
Women have been less involved in REDD+ initiative (pilot project)	Urge developed countries to support, through multilateral and bilateral channels, the development of REDD+ national strategies or action plans and implementation. Girls and women have an important role in forestry activities, related to fuelwood, forest-food and medicine. Their empowerment contributes to sustainable forestry as well as reducing inequality.	Women's participation in the decision-making process of forest management, for example, has been shown to increase rates of reforestation while decreasing the illegal extraction of forest products.	Land-related mitigation, such as biofuel production, as well as conservation and reforestation action can increase competition for land and natural resources, so these measures should be accompanied by complementary policies. (Quoted from Epstein and Theuer, 2017)												
Behavioral Response (Responsible Sourcing)	[+1]	⌚	⌚	⌚	⌚	[+1]	⌚	⌚	⌚	⌚	[+1]	⌚	⌚	⌚	⌚
Huang et al., 2013; Sikkelma et al., 2014	No direct interaction	Indonesian factories may seek advantages through nonprice competition—perhaps by highlighting decent working conditions or the existence of a union—or to see trade associations or government agencies promoting the country as a responsible sourcing location (Bartley, 2010). In the absence of domestic legal instruments providing incentives to improve sustainability of sourcing, it appears that initiatives to engage the major importing enterprises in developing responsible sourcing practices and policies is a practical approach. Unless initiatives involve all the major importers, they are unlikely to be successful since the high costs associated with accreditation would increase production costs for these firms relative to their competitors (Huang et al., 2013).	Private certification initiatives for wood product and biomass sourcing may extend their schemes with criteria for 'leakage' (external GHG effects). Also recycling of waste wood in pellets is not yet practiced, due to unclear rules in the EU Waste Directive about overseas shipping sector stakeholders in supply-country sustainability initiatives may be the best way to support this gradual process of improvement. Although carrying out due diligence in timber sourcing can require considerable internal resources, it may be substantially less of a financial burden than the potential fines and reputational damage resulting from sourcing unknown or controversial timber (Huang et al., 2013).												

		Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence
5	GENDER EQUALITY	[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction			
10	REDUCED INEQUALITIES	[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction			
16	PEACE, JUSTICE AND STRONG INSTITUTIONS	[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction			
17	PARTNERSHIPS FOR THE GOALS	[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction			

Environment-Demand

Industry															
	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence
Water Efficiency and Pollution Prevention (6.3/6.4/6.5)	Sustainable and Efficient Resource (12.2/12.5/12.6/12.7/12.8)	[+1]	↑	★ ★	★★★	[0]									
Accelerating Energy Efficiency Improvement	Once started leads to chain of actions within the sector and policy space to sustain the effort. Helps in expansion of sustainable industrial production (Ghana).														
Vassolo and Döll, 2005; Nguyen et al., 2014; Holland et al., 2015; Frickó Apeaning and Thollander, 2013; Fernando et al., 2017 et al., 2016	No direct interaction	No direct interaction	No direct interaction	No direct interaction	No direct interaction	No direct interaction	No direct interaction	No direct interaction	No direct interaction	No direct interaction	No direct interaction	No direct interaction	No direct interaction	No direct interaction	No direct interaction
Water Efficiency and Pollution Prevention (6.3/6.4/6.5)	Sustainable Production (12.2/12.3/12.8.a)	[+2]	↑	★ ★	★★★★	[0]									
Low-carbon Fuel Switch	A switch to low-carbon fuels can lead to a reduction in water demand and waste water if the existing higher-carbon fuel is associated with a higher water intensity than the lower-carbon fuel. However, in some situations the switch to a low carbon fuel such as, for example, biobutanol could increase water use compared to existing conditions if the biofuel comes from a water-intensive feedstock.														
Heijazi et al., 2015; Frickó et al., 2016; Song et al., 2016	Liu and Bai, 2014; Ierler and Rashid, 2016; Stabel, 2016; Supino et al., 2016; Fan et al., 2017; Shi et al., 2017; Zeng et al., 2017	No direct interaction													
Water Efficiency and Pollution Prevention (6.3/6.4/6.5)	Sustainable Production and Consumption (12.1/12.6/12.8.a)	[+2]	↑	★ ★	★★★★	[0]									
Decarbonisation/CCS/CCU	CCUS requires access to water for cooling and processing which could contribute to localized water stress. CCS/CCU processes can potentially be configured for increased water efficiency compared to a system without carbon capture via process integration.														
Meldrum et al., 2013; Byers et al., 2016; Frickó et al., 2016; Brand et al., 2017	Wesseling et al., 2017	No direct interaction													
Conservate and Sustainably Use Ocean (14.1/14.5)	Conserve and Sustainable Production (15.1/15.5/15.9/15.10)	[+1]	↑	★ ★	★★★	[0]									
Industry	CCUS in the chemical industry faces challenges for transport costs and storage. In the UK cluster region have been identified for storage under sea.														
	Griffin et al., 2018	No direct interaction													



Buildings											
	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	
Water Efficiency and Pollution Prevention (6.3/6.4/6.6)	[+2]	↑ ↗ ↗	★★★	[+2]	↑ ↗ ↗ ↗	★★★	[0]				
Behavioural changes in the residential sector that lead to reduced energy demand can lead to reduced requirements on energy supply. As water is used to convert energy into useful forms, the reduction in residential demand is anticipated to reduce water consumption and waste water, resulting in more clean water for other sectors and the environment.	Sweeney et al., 2013; Webb et al., 2013; Allen et al., 2015; Echegaray (2015); He et al., 2016; Huit and Larsson, 2016; Isenhour and Feng, 2016; van Sluijs et al., 2016; Zhao et al., 2017; Liu et al., 2017; Sommerfield et al., 2017	Technological improvements alone are not sufficient to increase energy savings. Zhao et al. (2017) found that building technology and occupant behaviours interact with each other and finally affect energy consumption from home. They found that occupant habits could not take advantage of more than 50% of energy efficiency potential allowed by an efficient building. In the electronic segment, produce obsolescence represents a key challenge for sustainability. Echegaray (2016) discusses the dissonance between consumers' product durability experience, orientations to replace devices before terminal technical failure, and perceptions of industry responsibility and performance. The results from their urban sample survey indicate that technical failure is far surpassed by subjective obsolescence as a cause for fast product replacement. At the same time Liu et al. (2017) suggest that we need to go beyond individualist and structuralist perspectives to analyse sustainable consumption (i.e., combines both human agency paradigm and social structural perspective).	Bartos and Chester (2014); Frick et al. (2016); Holland et al. (2016)		No direct interaction	[0]					
Water Efficiency and Lifestyles (12.6/12.7/12.8)	[+1]	↑ ↗ ↗ ↗	★★★	[+1]	↑ ↗ ↗ ↗	★★★	[0]				
Sustainable practices adopted by public and private bodies in their operations (e.g., for goods procurement, supply chain management and accounting) create an enabling environment in which renewable energy and energy efficiency measures may gain greater traction (McCollum et al., 2018).											
Accelerating Energy Efficiency Improvement	[+2]	↑ ↗ ↗ ↗	★★★	Efficiency changes in the residential sector that lead to reduced energy demand can lead to reduced requirements on energy supply. As water is used to convert energy into useful forms, the reduction in residential demands is anticipated to reduce water consumption and waste water, resulting in more clean water for other sectors and the environment. A switch to low-carbon fuels in the residential sector can lead to a reduction in water demand and waste water if the existing higher-carbon fuel is associated with a higher water intensity than the lower-carbon fuel. However, in some situations the switch to a low-carbon fuel such as, for example, biofuel could increase water use compared to existing conditions if the biofuel comes from a water-intensive feedstock. As water is used to convert energy into useful forms, energy efficiency is anticipated to reduce water consumption and waste water, resulting in more clean water for other sectors and the environment. Subsidies for renewables are anticipated to lead to the benefits and trade-offs outlined when deploying renewables. Subsidies for renewables could lead to improved water access and treatment if subsidies support projects that provide both water and energy services (e.g., solar desalination).	Bilton et al., 2011; Scott, 2011; Kumar et al., 2012; Meldrum et al., 2013; Bartos and Chester, 2014; Hendrickson and Horvath, 2014; Kern et al., 2014; Holland et al., 2015; Frick et al., 2016; Kim et al., 2017	Reduced Deforestation (15.2)	[+2]	↑ ↗ ↗ ↗	★★★	Improved stoves has helped halt deforestation in rural India.	Bhojwaid et al., 2014

Environment-Demand (continued)



Sustainable Use and Management of Natural Resource (12.2)												Healthy Terrestrial Ecosystems (15.1/15.2/15.4/15.5/15.8)					
	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence		
Access to Improved Water and Sanitation (6.1/6.2), Water Efficiency and Pollution Prevention (6.3/6.4/6.6)		[+2]	↘	★★★	[+2,-1]	↗	[0]	↘	★★	[+2]	↗	[+2]	↗	★★★	★★★		
Improved Access and Fuel Switch to Moderate Low-carbon Energy			↘ / ↗			A switch to low-carbon fuels in the residential sector can lead to a reduction in water demand and waste water if the existing higher-carbon fuel is associated with a higher water intensity than the lower-carbon fuel. However, in some situations the switch to a low-carbon fuel such as, for example, biofuel could increase water use compared to existing conditions if the biofuel comes from a water-intensive feedstock. Improved access to energy can support clean water and sanitation technologies. If energy access is supported with water-intensive energy sources, there could be trade-offs with water efficiency targets.						Ensuring that the world's poor have access to modern energy services would reinforce the objective of halting deforestation, since firewood taken from forests is a commonly used energy resource among the poor (McCollum et al., 2018).					
Buildings														No direct interaction			
Water Efficiency and Pollution Prevention (6.3/6.4/6.6)		[+2]	↘	★★	[+2]	↗	[0]	↗	★★	[+2]	↗	[0]	[0]				
Behavioural Response						Behavioural changes in the transport sector lead to reduced transport demand and can lead to reduced transport energy supply. As water is used to produce a number of important transport fuels, the reduction in transport demand is anticipated to reduce water consumption and waste water, resulting in more clean water for other sectors and the environment.						Urban carbon mitigation must consider the supply chain management of imported goods, the production efficiency within the city, the consumption patterns of urban consumers, and the responsibility of the ultimate consumers outside the city. Important for climate policy of monitoring the CO ₂ clusters that dominate CO ₂ emissions in global supply chains, because they offer insights on where climate policy can be effectively directed.					
Transport														No direct interaction			
Water Efficiency and Pollution Prevention (6.3/6.4/6.6)		[+2]	↘	★★★	[+2]	↗	[0]	↗	★★★	[+2]	↗	[0]	[0]				
Accelerating Energy Efficiency Improvement						Similar to behavioural changes, efficiency measures in the transport sector that lead to reduced transport demand can lead to reduced transport energy supply. As water is used to produce a number of important transport fuels, the reduction in transport demand is anticipated to reduce water consumption and waste water, resulting in more clean water for other sectors and the environment.						Relational complex transport behaviour resulting in significant growth in energy-inefficient car choices, as well as differences in mobility patterns (distances driven, driving styles) and actual fuel consumption between different car segments all affect non-progress on transport decarbonization. Consumption choices and individual lifestyles are situated and tied to the form of the surrounding urbanization. Major behavioural changes and emissions reductions require understanding of this relational complexity, consideration of potential interactions with other policies, and the local context and implementation of both command-and-control as well as market-based measures.					
														Stanley et al., 2011; Gallego et al., 2013; Heimonen et al., 2013; Aamans and Peters, 2017; Azevedo and Teal, 2017; Gössling and Metzler, 2017			

Environment-Demand (continued)

	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence		
Water Efficiency and Pollution Prevention (6.3/6.4/6.5)						Ensure Sustainable Consumption and Production Patterns (12.3)											
6 GLEEN WATER AND SANITATION	[+2,-1]	■■	⊕⊕	★★★	⊕⊕⊕	[+2]	■■■■	⊕⊕⊕	★★★	⊕⊕⊕	[0]						
12 RESPONSIVE CONSUMPTION AND PRODUCTION						A switch to low-carbon fuels in the transport sector can lead to a reduction in water demand and waste water if the existing higher-carbon fuel is associated with a higher water intensity than the lower-carbon fuel. However, in some situations the switch to a low-carbon fuel such as, for example, biofuel could increase water use compared to existing conditions if the biofuel comes from a water-intensive feedstock. Transport electrification could lead to trade-offs with water use if the electricity is provided with water intensive power generation.	Due to persistent reliance on fossil fuels, it is posited that transport is more difficult to decarbonize than other sectors. This study partially confirms that transport is less reactive to given carbon tax than the non-transport sectors; in the first half of the century, transport mitigation is delayed by 10–30 years compared to non-transport mitigation. The extent to which earlier mitigation is possible strongly depends on implemented technologies and model structures.				No direct interaction		No direct interaction				
14 LIFE BELOW WATER						Hepazi et al., 2015; Fricko et al., 2016; Song et al., 2016	Figueira et al., 2014; IPCC, 2014; Pietzcker et al., 2014; Creutzig et al., 2015										
15 LIFE ON LAND																	



Replicating Coal										Reducing Coal											
	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	
Water Efficiency and Pollution Prevention (6.3 6.4 6.5) Access to Improved Water and Sanitation (6.1 6.2)		[+2]	↑	★★★	⊕⊕⊕	[+2]	↑	★★★	⊕⊕⊕	★★★	[+2]	↑ / ↓	★★	★★★	★★★	[+1]	↑ / ↓	★★	★★★	★★★	
Wind/solar renewable energy technologies are associated with very low water requirements compared to existing thermal power plant technologies. Widespread deployment is therefore anticipated to lead to improved water efficiency and avoided thermal pollution. However, managing wind and solar variability can increase water use at thermal power plants and can cause poor water quality downstream from hydropower plants. Access to distributed renewables can provide power to improve water access, but could also lead to increased groundwater pumping and stress if mismanaged. Developing dams to support reliable hydropower production can fragment rivers and alter natural flows reducing water and ecosystem quality. Developing dams to support reliable hydropower production can result in disputes for water in basins with up- and down-stream users. Storing water in reservoirs increases evaporation, which could offset water conservation targets and reduce availability of water downstream. However, hydropower plays an important role in energy access for water supply in developing regions, can support water security, and has the potential to reduce water demand if used without reservoir storage to displace other water intensive energy processes.		Banerjee et al., 2012; Riahi et al., 2012; Schwantz et al., 2014; Bhattacharyya et al., 2016; Cameron et al., 2016; McCollum et al., 2017; Bilton et al., 2011; Scott et al., 2011; Kumar et al., 2014; Grill et al., 2015; Fricko et al., 2016; Grubert, 2016; De Stefano et al., 2017	Banerjee et al., 2012; Riahi et al., 2012; Schwantz et al., 2014; Bhattacharyya et al., 2016; Cameron et al., 2016; McCollum et al., 2018; WBGU, 2013; Cooke et al., 2016; Mathews and McCuthey, 2018; McCollum et al., 2018	Alho, 2011; Garvin et al., 2011; Grodsky et al., 2011; Jain et al., 2011; Kumar et al., 2011; Kunz et al., 2011; Wiser et al., 2011; Dahl et al., 2012; de Lucas et al., 2012; Ziv et al., 2012; Lovrich and Emen, 2013; Smith et al., 2013; Mathews and McCuthey, 2018	Oceanbased energy from renewable sources (e.g., offshore wind farms, wave and tidal power) are potentially significant energy resource bases for island countries and countries situated along coastlines. Multi-use platforms combining renewable energy generation, aquaculture, transport services and leisure activities can lay the groundwork for more diversified marine economies. Depending on the local context and prevailing regulations, ocean-based energy installations could either induce spatial competition with other marine activities, such as tourism, shipping, resources exploitation, and marine and coastal habitats and protected areas, or provide further grounds for protecting those exact habitats, therefore enabling marine protection. (Quote from McCollum et al., 2018) Hydropower disrupts the integrity and connectivity of aquatic habitats and impacts the productivity of inland waters and their fisheries.																
Non-biomass Renewables - solar, wind hydro																					
Water Efficiency and Pollution Prevention (6.3 6.4 6.5)		[+1]	↑ / ↓	★★★	⊕⊕⊕	[+2]	↑	★★★	⊕⊕⊕	★★★	[+2]	↑ / ↓	★★	★★★	★★★	[+1]	↑ / ↓	★★	★★★	★★★	
Biomass expansion could lead to increased water stress when irrigated feedstocks and water-intensive processing steps are used. Bioenergy crops can alter flow over land and through soils as well as require fertilizer, and this can reduce water availability and quality. Planting bioenergy crops on marginal lands or in some situations to replace existing crops can lead to reductions in soil erosion and fertilizer inputs improving water quality.		Hegazi et al., 2015; Borsig et al., 2016; Choi et al., 2016; Song et al., 2016; Gao and Bryan, 2017; Griffiths et al., 2017; Ha and Wu, 2017; Tanwakar et al., 2017; Woodbury et al., 2018	Banerjee et al., 2012; Riahi et al., 2012; Schwantz et al., 2014; Bhattacharyya et al., 2016; Cameron et al., 2016; McCollum et al., 2018	Protecting terrestrial ecosystems, sustainably managing forests, halting deforestation, preventing biodiversity loss and controlling invasive alien species could potentially clash with renewable energy expansion, if that would mean constraining large-scale utilization of bioenergy or hydropower. Good governance, cross-jurisdictional coordination and sound implementation practices are critical for minimizing trade-offs (McCollum et al., 2018).																	
Increased Use of Biomass		[+1]	↑ / ↓	★★★	⊕⊕	[+2]	↑	★★★	⊕⊕⊕	★★★	[+1]	↑ / ↓	★★	★★★	★★★	[+1]	↑ / ↓	★★	★★★	★★★	
Switching to renewable energy reduces the depletion of finite natural resources.																					

Environment-Supply (continued)



		Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence		
Nuclear	Advanced Nuclear	Water Efficiency and Pollution Prevention (6/3 6/4 6.6)	[+,-,1]	↑ / ↓	★★&	JJJ	No direct interaction	[0]				[0]	No direct interaction				Healthy Terrestrial Ecosystems (15 1 15.2 15.4 15.5 15.8)	[+,-,1]	↑ / ↓	★★&	JJ	« «	Safety and waste concerns from uranium mining and milling.					
CCUS	Biogenic CCS	Water Efficiency and Pollution Prevention (6/3 6/4 6.6)	[+,-,1]	↑ / ↓	★★	★ ★	CCUS requires access to water for cooling and processing which could contribute to localized water stress. However, CCS/U processes can potentially be configured for increased water efficiency compared to a system without carbon capture via process integration. The biogenic component adds the additional trade-offs associated with bioenergy use. Large-scale bioenergy increases input demand, resulting in environmental degradation and water stress.	[+1]	↑	■■■	◎	◎	Switching to renewable energy reduces the depletion of finite natural resources. On the other hand, the availability of underground storage is limited and therefore reduces the benefits of switching from finite resources to bioenergy.	[0]			Healthy Terrestrial Ecosystems (15 1 15.2 15.4 15.5 15.8)	[+,-,1]	↑ / ↓	★★	★ ★	Protecting terrestrial ecosystems, sustainably managing forests, halting deforestation, preventing biodiversity loss, and controlling invasive alien species could potentially clash with renewable energy expansion, if that would mean constraining large-scale utilization of bioenergy or hydropower. Good governance, cross-jurisdictional coordination and sound implementation practices are critical for minimizing trade-offs resulting in environmental degradation and water stress.						
Meldrum et al., 2013; Byers et al., 2016; Fricke et al., 2016; Rapis et al., 2013; Holland et al., 2015; Fricke et al., 2016; Rapis et al., 2016	Banerjee et al., 2012; Riahi et al., 2012; Schwanitz et al., 2014; Bhattacharya et al., 2016; Cameron et al., 2016; McCollum et al., 2018	Water Efficiency and Pollution Prevention (6/3 6/4 6.6)	[+,-,1]	↑ / ↓	★★	★ ★											Water Efficiency and Pollution Prevention (6/3 6/4 6.6)	[+,-,1]	↑ / ↓	★★	★ ★	★ ★						
Meldrum et al., 2013; Byers et al., 2016; Fricke et al., 2016; Brändli et al., 2017; Dooley and Kartha, 2018	Banerjee et al., 2012; Riahi et al., 2012; Schwanitz et al., 2014; Bhattacharya et al., 2016; Cameron et al., 2016; McCollum et al., 2018	Water Efficiency and Pollution Prevention (6/3 6/4 6.6)	[+,-,1]	↑ / ↓	★★	★ ★	CCUS requires access to water for cooling and processing which could contribute to localized water stress. However, CCS/U processes can potentially be configured for increased water efficiency compared to a system without carbon capture via process integration. Coal mining to support clean coal CCS will negatively impact water resources due to the associated water demands, waste water and land-use requirements.	[0]									Water Efficiency and Pollution Prevention (6/3 6/4 6.6)	[+,-,1]	↑ / ↓	★★	★ ★	★ ★						
CCS: Fossil	Advanced Coal	Water Efficiency and Pollution Prevention (6/3 6/4 6.6)	[+,-,1]	↑ / ↓	★★	★ ★	CCUS requires access to water for cooling and processing which could contribute to localized water stress. However, CCS/U processes can potentially be configured for increased water efficiency compared to a system without carbon capture via process integration. Coal mining to support clean coal CCS will negatively impact water resources due to the associated water demands, waste water and land-use requirements.	[0]									Water Efficiency and Pollution Prevention (6/3 6/4 6.6)	[+,-,1]	↑ / ↓	★★	★ ★	★ ★						
Meldrum et al., 2013; Byers et al., 2016; Fricke et al., 2016; Brändli et al., 2017	Meldrum et al., 2013; Byers et al., 2016; Fricke et al., 2016; Brändli et al., 2017	Water Efficiency and Pollution Prevention (6/3 6/4 6.6)	[+,-,1]	↑ / ↓	★★	★ ★											Water Efficiency and Pollution Prevention (6/3 6/4 6.6)	[+,-,1]	↑ / ↓	★★	★ ★	★ ★						



Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence
Agriculture and Livestock																																							
Water Efficiency and Pollution Prevention (6.3/6.4/6.5)	[+2,-1]	➡ / ↘	★★★★	[+2]	_ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS	15.1/15.7	SUSTAINABLE PRACTICES AND LIFESTYLE (12.3/12.4/12.6/12.7/12.8)	★ ★ ★ ★	[0]	ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS	15.5/15.9	CONSERVATION OF BIODIVERSITY AND RESTORATION OF LAND (15.7)	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★				
Reduced food waste avoids direct water demand and waste water for crops and food processing, and avoids water used for energy supply by reducing agricultural food processing and waste management energy inputs. Healthy diets will support water efficiency targets if the shift towards healthy foods results in food supply chains that are less water intensive than the supply chains supporting the historical dietary pattern.	Reduce loss and waste in food systems, processing, distribution and by changing household habits. To reduce environmental impact of livestock both production and consumption trends in this sector should be traced. Livestock production needs to be intensified in a responsible way (i.e., be made more efficient in the way that it uses natural resources). Wasted food represents a waste of all the emissions generated during the course of producing and distributing that food. Mitigation measures include: eat no more than needed to maintain a healthy body weight; eat seasonal, robust, field-grown vegetables rather than processed, fragile foods prone to spoilage and requiring heating and lighting in their cultivation, refrigeration stage; consume fewer foods with low nutritional value e.g., alcohol, tea, coffee, chocolate and bottled water (these foods are not needed in our diet and need not be produced); shop on foot or over the internet (reduce energy use). Reduction in food waste will not only pave the path for sustainable production but will also help in achieving sustainable consumption (Garnett, 2011). Reduce meat consumption to encourage more sustainable eating practices.	Khan et al., 2009; Ingram et al., 2011; Kummu et al., 2012; Haileslassie et al., 2013; Bažejl et al., 2014; Tilman and Clark, 2014; Walker et al., 2014; Ran et al., 2016	Stehfest et al., 2009; Kummu et al., 2012																																				
Behavioral Response: Sustainable Healthy Diets and Reduced Food Waste	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘				
Land-based Greenhouse Gas Reduction and Soil Carbon Sequestration	[+1,-1]	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘		
Water Efficiency and Pollution Prevention (6.3/6.4/6.5)	[+1,-1]	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘		
Soil carbon sequestration can alter the capacity of soils to store water, which impacts the hydrological cycle and could be positive or negative from a water perspective, dependent on existing conditions. CSA linkages across sectors including management of water resources. Minimum tillage systems have been reported to reduce water erosion and thus sedimentation of water courses (Bustamante et al., 2014).	Lakshmi et al., 2014; Bustamante et al., 2014; P. Smith et al., 2016b	Behnassi et al., 2014; Lakshmi et al., 2015																																					
Ensure Sustainable Production Patterns (12.3)	[+1]	➡ / ↘	★★★★	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	
Millet or sorghum yield can double as compared with unimproved land by more than 1 tonne per hectare due to sustainable intensification. An integrated approach to safe applications of both conventional and modern agricultural biotechnologies will contribute to increased yield (Lakshmi et al., 2015).	Campbell et al., 2014; Lakshmi et al., 2015																																						
Conservation of Biodiversity and Restoration of Land (15.1/15.5/15.9)	[+1,-1]	➡ / ↘	★★★★	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	➡ / ↘	
Agricultural Intensification can promote conservation of biological diversity by reducing deforestation, and by rehabilitation and restoration of biodiverse communities on previously developed farm or pasture land. However, planting monocultures on biodiversity hot spots can have adverse side-effects, reducing biodiversity. Genetically modified crops reduce demand for cultivated land. Adaptation of integrated landscape approaches can provide various ecosystem services, CSA linkages across sectors, including management of land and bio-resources. Land sparing has the potential to be beneficial for biodiversity, including for many species of conservation concern, but benefits will depend strongly on the use of spared land. In addition, high yield farming involves trade-offs and is likely to be detrimental for wild species associated with farm land (Lamb et al., 2016).	Lybbert and Sumner, 2010; Behnassi et al., 2014; Harvey et al., 2014; IPCC, 2014; Lamb et al., 2016																																						



Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence
Agriculture and Livestock														
Water Efficiency and Pollution Prevention (6.3 6.4 6.6)	[+2,-1]	⬆ / ↴	▣▣▣	◎◎◎	★★★	[+1]	⬆	[0]						
Livestock efficiency measures are expected to reduce water required for livestock systems as well as associated livestock waste water flows. However, efficiency measures that include agricultural intensification could increase water demands locally, leading to increased water stress if the intensification is mismanaged. In scenarios where zero human-edible concentrate feed is used for livestock, freshwater use reduces by 21%.														
Hallezehasie et al., 2013; Schader et al., 2015; Kong et al., 2016; Ran et al., 2016														
Water Efficiency and Pollution Prevention (6.3 6.4 6.6)	[+2,-1]	⬆ / ↴	▣▣	◎◎	★★★	[+1]	⬆	[0]						
Forest management alters the hydrological cycle which could be positive or negative from a water perspective and is dependent on existing conditions. Conservation of ecosystem services indirectly could help countries maintain watershed integrity. Forests provide sustainable and regulated provision and help in water purification.														
Zomer et al., 2008; Kibria, 2015; Bonsch et al., 2016; Gao and Bryan, 2017; Griffiths et al., 2017; Katila et al., 2017														
Enhance Water Quality (6.3)	[+2,-1]	⬆ / ↴	▣▣▣	◎◎◎	★★★	[+1]	⬆	[0]						
Similar to REDD+, forest management alters the hydrological cycle which could be positive or negative from a water perspective and is dependent on existing conditions. Forest landscape restoration can have a large impact on water cycles. Strategic placement of tree belts in lands affected by dryland and salinity can remediate the affected lands by modifying landscape water balances. Watershed scale reforestation can result in the restoration of water quality. Fast-growing species can increase nutrient input and water inputs that can cause ecological damage and alter local hydrological patterns. Reforestation of mixed native species and in carefully chosen sites could increase biodiversity and restore waterways, reducing run-off and erosion (Dooley and Kartha, 2018).														
Zomer et al., 2008; Bustamante et al., 2014; Kibria, 2015; Lamb et al., 2016; Dooley and Kartha, 2018														
Reducing Greenhouse Gas Emissions from Livestock Systems														
Reduced Deforestation and Manure Management Systems														
Reduced Deforestation from Livestock REDD+														
Reduced Deforestation and Mangrove Afforestation														
Mangroves would help to enhance fisheries and tourism businesses.														
Forest	[+2,-1]	⬆ / ↴	▣▣▣	◎◎◎	★★★	[+2]	⬆	[0]						
Afforestation and Reforestation														
Afforestation and Reforestation														
Identified large amounts of land (749 Mha) globally as biophysically suitable and meeting the CDM eligibility criteria. Forest landscape restoration can conserve biodiversity and reduce land degradation. Mangroves reduce impacts of disasters (cyclones/storms/floods) acting as live seawalls and enhance forest resources/biodiversity. Forest goal can conserve/restore 3.9–8.8 m ³ /year average 77.2–176.9 m ³ in total and 7.7–17.7 m ³ /year in 2050 of forest area by 2030 (Volosin, 2014). Forest and biodiversity conservation, protected area formation and forestry-based afforestation are practices that enhance resilience of forest ecosystems to climate change (IPCC, 2014). Strategic placement of tree belts in lands affected by dryland and salinity can remediate the affected lands by modifying landscape water balances and protect livestock. It can restore biologically diverse communities on previously developed farmland. Large-scale restoration is likely to benefit ecosystem service provision, including recreation, biodiversity, conservation and flood mitigation. Reforestation of mixed native species and in carefully chosen sites could increase biodiversity and reduce run-off and erosion.														
Zomer et al., 2008; Bustamante et al., 2014; Kibria, 2015; Lamb et al., 2016; Dooley and Kartha, 2018														
Kibria, 2015														
Restoration of Land (15.1)														
Grasslands are valuable, but improved management is required as grass accounts for close to 30% of feed use in livestock systems. The scenario with 100% reduction of food-competing feedstuffs resulted in a 335 Mha decrease in arable land area, which corresponds to a decrease of 22% in arable and 7% in the total agricultural area.														
Herrero et al., 2013; Schader et al., 2015														
Conservation of Biodiversity, Sustainability of Terrestrial Ecosystems (15.2 15.3 15.4 15.5 15.9)														
Policies and programmes for reducing deforestation and forest degradation for rehabilitation and restoration of degraded lands can promote conservation of biological diversity. Reduce the human pressure on forests, including actions to address drivers of deforestation. Efforts by the government of Zambia to reduce emissions by REDD+ have contributed erosion control, ecotourism and pollution valued at 2.5% of the country's GDP.														
Miles and Kapos, 2008; IPCC, 2014; Bastos Lima et al., 2015; Turpie et al., 2015; Epstein and Theuer, 2017; Katila et al., 2017														
Conservation of Biodiversity and Restoration of Land (15.1 15.5 15.9)														
Large-scale restoration are practices that enhance resilience of forest ecosystems to climate change (IPCC, 2014). Strategic placement of tree belts in lands affected by dryland and salinity can remediate the affected lands by modifying landscape water balances and protect livestock. It can restore biologically diverse communities on previously developed farmland. Large-scale restoration is likely to benefit ecosystem service provision, including recreation, biodiversity, conservation and flood mitigation. Reforestation of mixed native species and in carefully chosen sites could increase biodiversity, reducing run-off and erosion.														
Zomer et al., 2008; Bustamante et al., 2014; Kibria, 2015; Lamb et al., 2016; Dooley and Kartha, 2018														

Environment-Other (continued)

	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence
Water Efficiency and Pollution Prevention (6.3/6/4/6.5)															
Forest	[+2,-1]	②③	▣	★★	④	+	[+1]	▣	②	★	④	[0]	+	[+1,-1]	★
		Responsible sourcing will have co-benefits for water efficiency and pollution prevention if the sourcing strategies incorporate water metrics. There is a risk that shifting supply sources could lead to increased water use in another part of the economy. At local levels, forest certification programmes and practicing sustainable forest management provide freshwater supplies.		At local levels, forest certification programmes and practicing sustainable forest management provide the provision of raw materials for a 'low ecological footprint' economy.											
		van Oel and Hoekstra, 2012; Launainen et al., 2014; Hontelez, 2016		Hontelez, 2016											
Ensure Sustainable Production Patterns (12.3)															
Oceans															
Sustainable and Conservation (15.1/15.2/15.3)															
Enhanced Weathering															
Protect Inland Freshwater Systems (14.1)															
Blue Carbon															
Protect Inland Freshwater Systems (14.1)															
Enhanced Weathering															





Industry																									
	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence
Accelerating Energy Efficiency Improvement	Energy Savings (7/17.3/7.a/7.b)	[+2]	⬆️	➡️➡️	★★★	[+1]	⬆️	➡️➡️	★★★	[+1]	⬇️	➡️➡️	★★	★★★	[+1]	⬇️	➡️➡️	★★	★★★	[+2]	⬆️	➡️➡️	★★	★★★	
	Reduces Unemployment (8.2/8.3/8.4/8.5/8.6)	[+2]	Energy efficiency leads to reduced energy demand and hence energy supply and energy security, reduces import. Positive rebound effect can raise demand but to a very less extent due to low rebound effect in industry sector in many countries and by appropriate mix of industries (China) can maintain energy savings gain. Supplying surplus energy to cities is also happening, proving maintenance culture, switching off equipment helps in saving energy (e.g. Ghana).	Unemployment rate reduction from 25% to 12% in South Africa.	Enhances firm productivity and technical and managerial capacity of employees. New jobs for managing energy efficiency opens up opportunities in energy service delivery sector.	Transitioning to a more renewables-based energy system that is highly energy efficient is well-aligned with the goal of upgrading energy infrastructure and making the energy industry more sustainable. At the same time, infrastructure upgrades in other parts of the economy, such as modernized telecommunications networks, can create the conditions for a successful expansion of renewable energy and energy efficiency measures (e.g., smart metering and demand-side management; McCollum et al., 2018).	Riahi et al., 2012; Apeaning and Thollander, 2013; Goldthau, 2014; Bhattacharyya et al., 2016; Metzler, 2016; McCollum et al., 2018	Kamer et al., 2015	Sustainable Cities (15.6/15.8/15.9)																
Low-Carbon Fuel Switch	Sustainable and Modern (7/2/7.a)	[+2]	⬆️	➡️	★	[+2]	⬆️	➡️➡️	★★★★	[+2]	⬇️	➡️➡️	★★★★	★★★★	[+2]	⬇️	➡️➡️	★★	★★★	[+2]	⬆️	➡️➡️	★★	★★★	
	Economic Growth with Decent Employment (8/18.2/8.3/8.4)	[+2]	Industries are becoming suppliers of energy, waste heat, water and roof tops used for solar energy generation, and therefore helping to reduce primary energy demand. CHP in chemical industries can help in providing surplus power in the grid.	The circular economy instead of linear global economy can achieve climate goals and can help in economic growth through industrialization, which saves on resources and their environment and supports small-, medium and even large industries, which can lead to employment generation. So new regulations, incentives and a revised tax regime can help in achieving the goal.	Stahel, 2013, 2017; Liu et al., 2014; Lederer et al., 2015; Supino et al., 2015; Zheng et al., 2016; Fan et al., 2017; Shi et al., 2017	Stahel, 2013, 2017; Liu et al., 2014; Lederer et al., 2015; Supino et al., 2015; Zheng et al., 2016; Fan et al., 2017; Shi et al., 2017	Innovation and New Infrastructure (9.2/9.3/9.4/9.5/9.a)																		
Affordable and Sustainable Energy Sources	Decouple Growth from Environmental Degradation (8/18.2/8.4)	[+2]	⬆️ / ↘️	➡️➡️	★★	[+2]	⬆️	➡️➡️	★★★★	[+2]	⬇️	➡️➡️	★★★★	★★★★	[+2]	⬇️	➡️➡️	★★	★★★	[+2]	⬆️	➡️➡️	★★	★★★	
	Decarbonization/CCS/CCU	[+2,-2]	CCS for EPIS can be incremental, but need additional space and can need additional energy, sometimes compensating for higher efficiency. For example, recirculating blast R furnace and CCS for iron steel means high energy demand; electric melting in glass can mean higher electricity prices; in the paper industry, new separation and drying technologies are key to reducing the energy intensity, allowing for carbon neutral operation in the future; bio-refineries can reduce petro-refineries; DR in iron and steel with H2 encourages innovation in hydrogen infrastructure, and the chemicals industry also encourage renewable electricity and hydrogen as bio-based polymers can increase biomass price.	EPIS are important players for economic growth. Deep decarbonization of EPIS through radical innovation is consistent with well-below 2°C scenarios.	Deep decarbonization through radical technological change in EPIS will lead to radical innovations, for example, in completely changing industries' innovation strategies, plants and equipment, skills, production techniques, design, etc. Radical CCS will need new infrastructure to transport CO ₂ .	Griffin et al., 2017; Wesseling et al., 2017	Denis-Ryan et al., 2016; Ahman et al., 2017; Wesseling et al., 2017; Griffin et al., 2018	Innovation and New Infrastructure (9.2/9.4/9.5)																	

Economic-Demand (continued)

Buildings												
Accelerating Energy Efficiency Improvement												
Increase in Energy Savings (7.3)												
Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	
Saving Energy, Improvement in Energy Efficiency (7.3/7.7.b)	Programmatically Improve Resource Efficiency (8.4)	Employment Opportunities (8.2/8.3/8.5/8.6)	Innovation and New Infrastructure (9.2/9.4/9.5)		Innovation and New Infrastructure (9.2/9.4/9.5)		Interaction		Score	Evidence	Agreement	
	[+2]					[+2]						
Lifestyle change measures and adoption behaviour affect residential energy use and implementation of efficient technologies as residential HVAC systems. Also, social influence can drive energy savings in users exposed to energy consumption feedback. Effect of autonomous motivation on energy savings behaviour is greater than that of other more established predictors, such as intentions, subjective norms, perceived behavioural control and past behaviour. Use of a hybrid engineering approach using social psychology and economic behaviour models are suggested for residential peak electricity demand response. However, some take-back in energy savings can happen due to rebound effects unless managed appropriately or accounted for welfare improvement. Adjusting thermostats helps in saving energy. Uptake of energy efficient appliances by households with an introduction to appliances standards, training, promotional material dissemination and the desire to save on energy bills are helping to change acquisition behaviour.	Behavioural change programmes help in sustaining energy savings through new infrastructure developments.	Adoption of smart meters and smart grids following community-based social marketing help with infrastructure expansion. People are adopting solar rooftops, white roof/vertical garden/green roofs at much faster rates due to new innovations and regulations.										
Chakravarty et al., 2013; Gianfici et al., 2013; Hori et al., 2013; Huebner et al., 2013; Jain et al., 2013; Sweeney et al., 2013; Webb et al., 2013; Yue et al., 2013; Anda and Temmen, 2014; Allen et al., 2015; Noaman et al., 2015; de Koning et al., 2016; Isenhour and Feng, 2016; Santaritis et al., 2016; Song et al., 2016; van Sluisveld et al., 2016; Sommerfeld et al., 2017; Zhao et al., 2017; Roy et al., 2018	Anda and Temmen, 2014; Roy et al., 2018	Anda and Temmen, 2014; Roy et al., 2018	Innovation and New Infrastructure (9.2/9.4/9.5)		Innovation and New Infrastructure (9.2/9.4/9.5)		Interaction		Score	Evidence	Agreement	
	[+2]					[+2]						
There is high agreement among researchers based on a great deal of evidence across various countries that energy efficiency improvement reduces energy consumption and therefore leads to energy savings (e.g., efficient stoves save biogas). Countries with higher hours of use due to higher ambient temperatures or more carbon intensive electricity grids benefit more from available improvements in energy efficiency and use of refrigerant transition.	Deploying renewables and energy efficient technologies, when combined with other targeted monetary and fiscal policies, can help spur innovation and reinforce local, regional and national industrial and employment objectives. Gross employment effects seem likely to be positive; however, uncertainty remains regarding the net employment effects due to several uncertainties surrounding macro-economic feedback loops playing out at the global level. Moreover, the distributional effects experienced by individual actors may vary significantly. Strategic measures may need to be taken to ensure that a large-scale switch to renewable energy minimizes any negative impacts on those currently engaged in the business of fossil fuels (e.g., government support could help businesses re-tool and workers re-train). To support clean energy and energy efficiency efforts, strengthened financial institutions in developing country communities are necessary for providing capital, credit and insurance to local entrepreneurs attempting to enact change (McCollum et al., 2018).	Adoption of smart meters and smart grids following community-based social marketing help in infrastructure expansion. Statutory norms to enhance energy and resource efficiency in buildings is encouraging green building projects.										
McLeod et al., 2013; Noris et al., 2013; Bhoyravl et al., 2014; Holopainen et al., 2014; Kwon et al., 2014; Yang et al., 2014; Cameron Frondel et al., 2011; Dinkelman, 2011; Guivarch et al., 2011; Jackson and Senker, 2011; Borenstein, 2012; Creutzig et al., 2013; Bluh et al., 2013; Liddell and Guiney, 2015; Shah et al., 2015; Bernieta et al., 2017; Kim et al., 2017; Salvalai et al., 2017	Babiker and Eckaus, 2007; Fankhauser and Tepic, 2007; Gohin, 2008; McLeod et al., 2010; Dinkelman, 2011; Guivarch et al., 2011; Jackson and Senker, 2011; Borenstein, 2012; Creutzig et al., 2013; Bluh et al., 2013; Liddell and Guiney, 2015; Shah et al., 2015; Bernieta et al., 2017; Kim et al., 2017; Salvalai et al., 2017	Anda and Temmen, 2014; Roy et al., 2018	Urban Environmental Sustainability (11.3/11.6/11.b/11.c)		Urban Environmental Sustainability (11.3/11.6/11.b/11.c)		Interaction		Score	Evidence	Agreement	
	[+2]					[+2]						
Accelerating Energy Efficiency Improvement	Buildings		Buildings		Buildings		Buildings		Buildings		Buildings	

Economic-Demand (continued)



	Interaction	Score	Evidence	Agreement	Confidence	Sustainable Economic Growth and Employment	Innovation and New Infrastructure (9.2/9.5)	Interaction	Score	Evidence	Agreement	Confidence	Housing (11.1)									
Buildings	↑	[+2]	██████	★②	★★★	Meeting Energy Demand	↑	[+2]	██████	②③	★★	★★	★★★★									
Improved Access and Fuel Switch to Modern Low-carbon Energy	Renewable energies could potentially serve as the main source to meet energy demand in rapidly growing developing country cities. Ali et al. (2015) estimated the potential of solar, wind and biomass renewable energy options to meet part of the electricity demand in Karachi, Pakistan.	Li et al., 2013; Peng and Lu, 2013; Pietzcker, 2013; Pode, 2013; Yanine and Sauma, 2013; Zulu and Richardson, 2013; Connolly et al., 2014; Creutzig et al., 2014; Pietzcker et al., 2014; Ali et al., 2015; O'Mahony and Dufour, 2015; Aburada et al., 2016; Mittlefehd, 2016; Bilgili et al., 2017; Byravan et al., 2017; Islar et al., 2017; Ozturk et al., 2017	Creutzig et al. (2014) assessed the potential for renewable energies in the European region. They found that a European energy transition with a high-level of renewable energy installations in the periphery could act as an economic stimulus, decrease trade deficits and possibly have positive employment effects. Provision of energy access can play a critical enabling role for new productive activities, livelihoods and employment. Reliable access to modern energy services can have an important influence on productivity and earnings (McCollum et al., 2018).	As renewable energies could potentially serve as the main source to meet energy demand in rapidly growing developing country cities, Ali et al. (2015) estimated the potential of solar, wind and biomass renewable energy options to meet part of the electricity demand in Karachi, Pakistan.	Roy et al., 2018; Andra and Temmer, 2014	Adoption of smart meters and smart grids following community-based social marketing help in infrastructure expansion. Statutory norms to enhance energy and resource efficiency in buildings is encouraging green building projects. Introduction of incentives and norms for solar rooftops/whitegreen roofs in cities are helping to accelerate innovation and the expansion of infrastructure.	Bhattacharya et al., 2016; Song et al., 2016; UN, 2016; McCollum et al., 2018; Roy et al., 2018	Ensuring access to basic housing services implies that households have access to modern energy forms. (Quoted from McCollum et al., 2018) Solar roof tops in Macau make cities sustainable. Introduction of incentives and norms for solar/whitegreen rooftops in cities are helping to accelerate the expansion of the infrastructure.	↑	[+2]	██████	②③	★★									
	Behavioral Response	Behavioral responses will reduce the volume of transport needs and by extension, energy demand.	Energy Savings (7.3/7.a/7.b)	↓	[+2]	██████	②③	★★★	As policy contradictions (e.g., standards, efficient technologies leading to increased electricity prices leading the poor to switch away from cleaner fuel(s) and unintended outcomes (e.g., redistribution of income generated by carbon taxes)) results in contradictions of the primary aims of (productive) job creation and poverty alleviation, and in trade-offs between mitigation, adaptation and development policies. Detailed assessments of mitigation policies' consequences requires developing methods and reliable evidence to enable policymakers to more systematically identify how different social groups may be affected by the different available policy options.	Lucas and Pangbourne, 2014; Suckall et al., 2014; Klausbruckner et al., 2016	Lucas and Pangbourne, 2014; Suckall et al., 2014; Klausbruckner et al., 2016	Policy contradictions (e.g., standards, efficient technologies leading to increased electricity prices leading the poor to switch away from cleaner fuel(s) and unintended outcomes (e.g., redistribution of income generated by carbon taxes)) results in contradictions of the primary aims of (productive) job creation and poverty alleviation, and in trade-offs between mitigation, adaptation and development policies. Detailed assessments of mitigation policies' consequences requires developing methods and reliable evidence to enable policymakers to more systematically identify how different social groups may be affected by the different available policy options.	Dulac, 2013; Amaaas and Peters, 2017; Martinez-Jaramillo et al., 2017; Xilia and Silveira, 2017	Combining promotion of mass transportation – train lines, tram lines, BRITS, gondola lift systems, bicycle-sharing systems and hybrid buses – and telecommuting reduces traffic and significantly contributes to meeting climate targets. A complementary package of complementary mitigation options is necessary for deep and sustained emissions reductions. In Sweden, a public bus fleet is aiming more towards decarbonization than efficiency.	Ahmad and Puppim de Oliveira, 2016; Hallegatte et al., 2016a	Build Resilient Infrastructure (9.1)	↑	[+2]	██████	②③	★★	
Transport	Accelerating Energy Efficiency	Improving Energy Efficiency	Energy Savings (7.3/7.a/7.b)	↑	[+2]	██████	②	★	Significant opportunities to slow travel growth and improve efficiency exist and, similarly, alternatives to petroleum exist but have different characteristics in terms of availability, cost, distribution, infrastructure, storage and public acceptability. Production of new technologies, fuels and infrastructure can favour economic growth; however, efficient financing of increased capital spending and infrastructure is critical.	Figuerola and Ribeiro, 2013; Ahmad and Puppim de Oliveira, 2016	Figuerola and Ribeiro, 2013; Ahmad and Puppim de Oliveira, 2016	Accelerating efficiency in tourism transport reduces energy demand (China).	Gouldson et al., 2015; Karkatsoulis et al., 2016	Combining promotion of mass transportation – train lines, tram lines, BRITS, gondola lift systems, bicycle-sharing systems and hybrid buses – and telecommuting reduces traffic and significantly contributes to meeting climate targets. A complementary package of complementary mitigation options is necessary for deep and sustained emissions reductions. In Sweden, a public bus fleet is aiming more towards decarbonization than efficiency.	Xilia and Silveira, 2017	Build Resilient Infrastructure (9.1)	↑	[+2]	██████	②③	★★	
Help Building Inclusive Infrastructure	Increasing Share of Renewable Energy	Biofuels	Increase Share of Renewable [7.2]	↑	[+2]	██████	②③	★★★	The decarbonization of the freight sector tends to occur in the second part of the century, and the sector decarbonizes by a lower extent than the rest of the economy. Decarbonizing road freight on a global scale remains a challenge even when notable progress in biofuels and electric vehicles has been accounted for.	Mjøen et al., 2016	Mjøen et al., 2016	The decarbonization of the freight sector tends to occur in the second part of the century, and the sector decarbonizes by a lower extent than the rest of the economy. Decarbonizing road freight on a global scale remains a challenge even when notable progress in biofuels and electric vehicles has been accounted for.	Figueroa et al., 2013; Gouldson et al., 2015; Carrara and Longden, 2017	Help Building Inclusive Infrastructure (9.1/a)	↑	[+2]	██████	②③	★★★			
Improved Access and Fuel Switch to Modern Low-carbon Energy	Buildings	Behavioral Improvement	Promote Sustained, Inclusive Economic Growth (8.3)	↓	[+2]	██████	②③	★★★	The strategies are not mutually exclusive and simultaneous implementation of some provides synergies for national energy security. Therefore, it is important to consider the results of material and contextual factors that co-evolve. Electric vehicles using electricity from renewables or low carbon sources combined with e-mobility options such as trolley buses, metros, trams and electric buses, as well as promote walking and biking, especially for short distances, need consideration.	Ajanovic, 2015; Måansson, 2016; Alahakoon, 2017; Wolfam et al., 2017	Ajanovic, 2015; Måansson, 2016; Alahakoon, 2017; Wolfam et al., 2017	Biofuels increases share of the renewables but can perform poorly if too many countries increase their use of biofuel, whereas electrification performs best when many other countries implement this technology. The strategies are not mutually exclusive and simultaneous implementation of some provides synergies for national energy security. Therefore, it is important to consider the results of material and contextual factors that co-evolve. Electric vehicles using electricity from renewables or low carbon sources combined with e-mobility options such as trolley buses, metros, trams and electric buses, as well as promote walking and biking, especially for short distances, need consideration.	Mendonça, 2016; Lall et al., 2017	Promote Sustained, Inclusive Economic Growth (8.3)	↑	[+2]	██████	②③	★★★			



	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence
Innovation and Growth (8.1/8.2/8.4)																				
Sustainable and Modern Energy (7.2/7.a)	[+3]	↑	██████	★★★	★★★	[0]	↔	██████	★★	★★	[+2]	██████	★★★★	★★★★	★★★★	↑	[+2]	██████	★★★★	★★★★
Non-biomass Renewables - solar, wind, hydropower																				
Rogelj et al., 2013; Cherian, 2015; Jingura and Kamusoko, 2016																				
Sustainable and Modern Energy (7.2/7.a)	[+3]	↑	██████	★★★	★★★	[+1]	↑	██████	★	★	[+1]	██████	★★★★	★★★★	★★★★	↑	[0]	██████	★★★★	★★★★
Nuclear	[1]	↑	██████	②	★★★	[1]	↑	██████	★★	★★	[+1]	██████	★★★★	★★★★	★★★★	↑	[0]	██████	★★★★	★★★★
IPCC, 2014																				
Sustainable and Modern Energy (7.2/7.a)	[+2]	↑	██████	★★★	★★★	[+1]	↑	██████	★	★	[+1]	██████	★★★★	★★★★	★★★★	↑	[0]	██████	★★★★	★★★★
IPCC, 2014																				
CCS: Bioenergy																				
IPCC, 2014																				
Replicating Coal																				
IPCC, 2014																				
Advanced Coal																				
IPCC, 2014																				
Ensure energy access and promote investment in new technologies (7.17.b)	[+2]	↑	██████	★★★	★★★	[+1]	↔	██████	★★★★	★★★★	[+1]	██████	★★★★	★★★★	★★★★	↑	[+1]	██████	★★★★	★★★★
IPCC, 2014																				
CCS: Fossil																				
IPCC, 2014																				
Inclusive and Sustainable Industrialization (9.2/9.4)																				
Tilly, 2006; Riahi et al., 2012; Daut et al., 2013; IPCC, 2014; Hallegatte et al., 2015; Johnson et al., 2015																				
Disaster Preparedness and Prevention (11.5)																				
McCollum et al., 2018.																				

Economic-Other

Economic-Other (continued)



Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence	Interaction	Score	Evidence	Agreement	Confidence
Sustainable Economic Growth (8.4)														
Energy Efficiency (7.3)	[+1]	⬆️	⭐	➡️	⬆️	[+1]	➡️	⭐	➡️	[+,-,1]	➡️ / ↘	➡️	➡️	★
Reduced Deforestation, REDD+	⬆️ / ↘	Consider the entire sinks and reservoirs of GHG while developing the nationally appropriate mitigation actions. For countries with a significant contribution of forest degradation and pollution valued at 2.5% of the country's GGP. Partnerships between local forest managers, community enterprises and private sector companies can often harvested in an unsustainable manner, but is a renewable energy source.	Bastos Lima et al., 2017; Katila et al., 2017	Efforts by the Government of Zambia to reduce emissions by REDD+, have contributed to erosion control, ecotourism and pollution valued at 2.5% of the country's GGP. Partnerships between local forest managers, community enterprises and private sector companies can support local economies and livelihoods, and boost regional and national economic growth.	Turpie et al., 2015; Epstein and Theuer, 2017; Katila et al., 2017	Expanding road networks are recognized as one of the main drivers of deforestation and forest degradation, diminishing forest benefits to communities. On the other hand, roads can enhance market access, thereby boosting local benefits (SDG 1) from the commercialization of forest products. (Quoted from Katila et al., 2017). Efforts by the Government of Zambia to reduce emissions by REDD+ have contributed to erosion control, ecotourism and pollution valued at 2.5% of the country's GGP.	Turpie et al., 2015; Epstein and Theuer, 2017; Katila et al., 2017	No direct interaction	No direct interaction	[0]	[0]	[0]	[0]	★
Decent Job Creation and Sustainable Economic Growth (8.3/8.4)	[+1]	⬇️	⭐	➡️	⬇️	[+2]	➡️	⭐ ⭐	➡️	[0]	➡️	➡️	➡️	★★★★
Afforestation and Reforestation	⬇️	The US Forest Service estimates that an average NYC street tree (urban afforestation) produces 209 USD in annual benefits, which is primarily driven by aesthetic (90 USD per tree) and energy savings (from shade benefits (47.63 USD per tree).	Jones and McDermott, 2018	Many tree plantations worldwide have higher growth rates which can provide higher rates of returns for investors. Agroforestry initiatives that offer significant opportunities for projects to provide benefits to smallholder farmers can also help address land degradation through community-based efforts in more marginal areas. Mangroves reduce impacts of disasters (cyclones/storms/floods) and enhance water quality, fisheries, tourism businesses and livelihoods.	Zomer et al., 2008; Kibria, 2015	Many urban tree plantations worldwide are created with a focus on multiple benefits, like air quality improvement, cultural preference for green nature, healthy community interaction as well as temperature control and biodiversity enhancement goals.	Chen and Qi, 2018; Fu et al., 2018; Kovarik, 2018; McKinney and Ingó, 2018; McPherson et al., 2018; Pei et al., 2018	No direct interaction	No direct interaction	[+2]	➡️	➡️	➡️	★★★★
Universal Access (7.3)	[+1]	⬇️	⭐	➡️	⬇️	[+2]	➡️	⭐	➡️	[+,-,2]	➡️	➡️	➡️	★★★★
Forest	⬇️	The trade of wood pellets from clean wood waste should be facilitated with less administrative import barriers by the EU, in order to have this new option seriously accounted for as a future resource for energy. (Quoted from Sikkema et al., 2014) Recommends further harmonization of legal harvesting, sustainable sourcing and cascaded use requirements for woody biomass or energy—with the current requirements of voluntary SFM certification schemes.	Sikkema et al., 2014	Some standards seek primarily to coordinate global trade, many purport to promote ecological sustainability and social justice or to institutionalize CSR, for example, labour standards developed in the wake of sweatshops and child labour scandals. Environmental standards for pollution control etc. Indonesian factories may seek advantages through non-price competition—perhaps by highlighting decent working conditions or the existence of a union—or to see trade associations or government promoting the country as a responsible sourcing location.	Bartley, 2010; Huang et al., 2013	Many urban tree plantations worldwide are created with a focus on multiple benefits, like air quality improvement, cultural preference for green nature, healthy community interaction as well as temperature control and biodiversity enhancement goals. People's preference for urban forest gardens are encouraging new urban green spaces, and tree selection helps in building resilience to disaster.	Chen and Qi, 2018; Fu et al., 2018; Kovarik, 2018; McKinney and Ingó, 2018; McPherson et al., 2018; Pei et al., 2018	No direct interaction	No direct interaction	[0]	➡️	➡️	➡️	★★★★
Oceans	[0]	No direct interaction	[0]	No direct interaction	[0]	No direct interaction	[0]	No direct interaction	[0]	No direct interaction	[0]	No direct interaction	[0]	No direct interaction
Blue Carbon	[0]	No direct interaction	[0]	No direct interaction	[0]	No direct interaction	[0]	No direct interaction	[0]	No direct interaction	[0]	No direct interaction	[0]	No direct interaction
Enhanced Weathering	[0]	No direct interaction	[0]	No direct interaction	[0]	No direct interaction	[0]	No direct interaction	[0]	No direct interaction	[0]	No direct interaction	[0]	No direct interaction

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Note that this reference list does not account for the references in Table 5.2, for which a separate reference list is provided.

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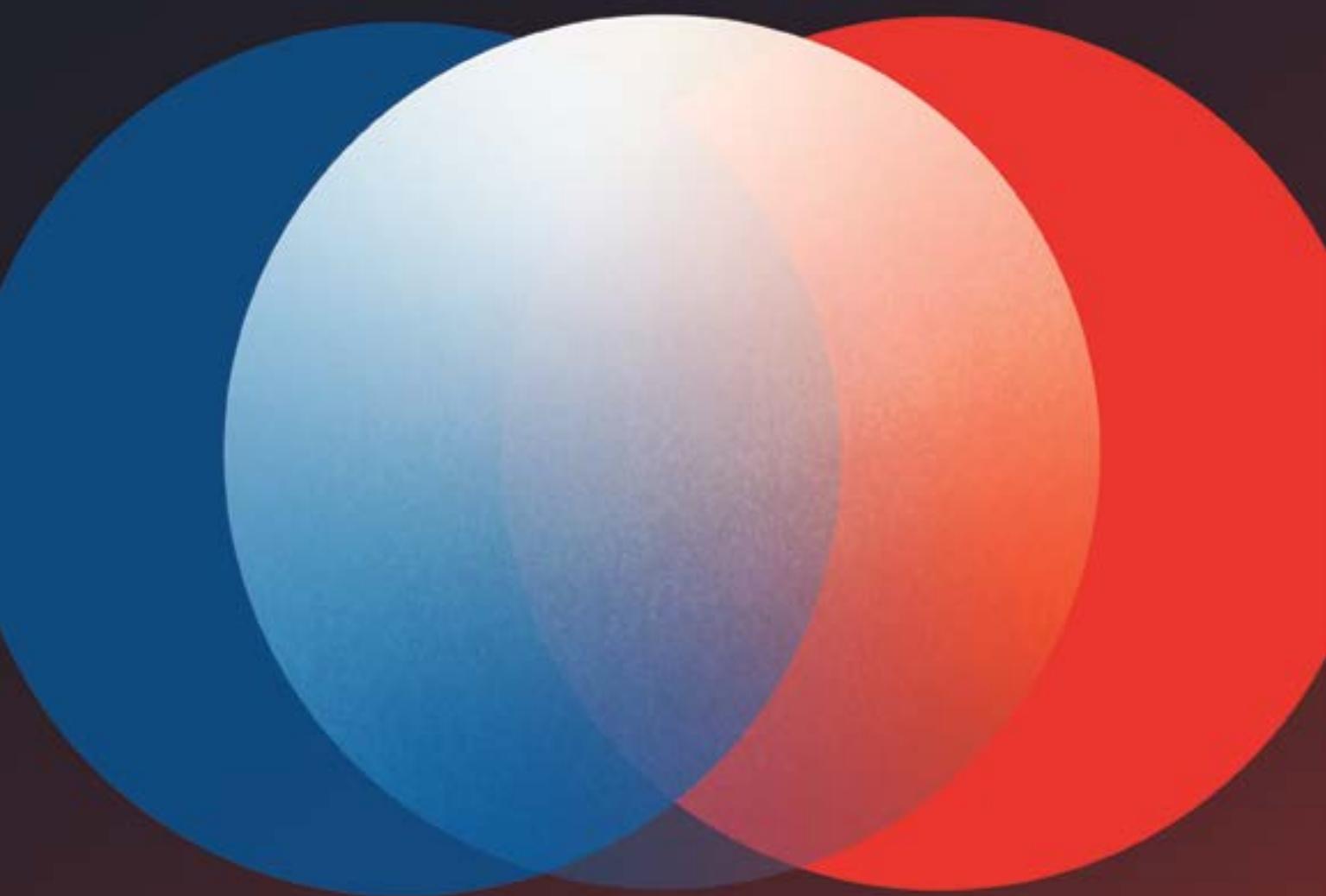
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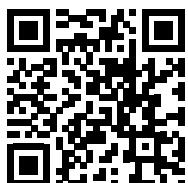
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Contents

<i>Foreword</i>	<i>xiii</i>
<i>Acknowledgments</i>	<i>xvii</i>
<i>About the Team</i>	<i>xix</i>
<i>Main Messages</i>	<i>xxiii</i>
<i>Abbreviations</i>	<i>xxxi</i>

Overview	1
Progress: Global poverty reduction and improvements in shared prosperity have stalled	1
Pathways: Eradicating poverty and boosting shared prosperity on a livable	
planet requires managing trade-offs	19
Priorities: Doing what matters, where it matters most	30
Notes	40
References	41
1 Global Poverty Update and Outlook	49
Summary	49
Ending poverty remains a major global challenge	50
Reigniting economic growth and making it more inclusive are key to	
eradicating poverty	67
Profile of the global poor: People living in poverty typically live in rural	
areas and are younger and less educated	74
Multidimensional poverty broadens the understanding of poverty to guide actions	82
Annex 1A. Methodology	86
Annex 1B. Survey-based estimates of the COVID-19 impact confirm	
previous nowcasts	88
Annex 1C. New data for India and international price levels have	
recently become available	90
Annex 1D. Regional and global poverty estimates, 1990–2024	94
Notes	98
References	100

2 Shared Prosperity	105
Summary	105
Introduction: A new take on shared prosperity	106
Progress in shared prosperity has stalled since the COVID-19 pandemic	109
Within-country inequality: The number of economies with high inequality	120
Effectively addressing inequality requires a comprehensive approach that tackles structural sources of inequality	131
Annex 2A. Comparing the growth in the mean of the bottom 40 percent versus the Global Prosperity Gap and the Gini index	136
Annex 2B. The Global Prosperity Gap	138
Annex 2C. Bottom coding welfare distributions	139
Annex 2D. Measuring the number of economies with high inequality	141
Annex 2E. Prosperity Gap estimates by region	145
Annex 2F. Further results on within-country inequality	146
Notes	152
References	156
3 Livable Planet	161
Summary	161
The concept of a livable planet	162
The importance of protecting people from extreme weather events	164
Priorities for advancing on the interlinked goals	183
Annex 3A. Progress on food and nutrition security	200
Annex 3B. Measuring climate risks: The percentage of people at high risk from climate-related hazards globally	202
Annex 3C. Enabling access to safe water and sanitation is crucial for well-being and helps reduce vulnerability	206
Annex 3D. Healthy ecosystems—zooming in on the importance of forests	208
Notes	210
References	212
4 Monitoring the Interlinked Goals.....	223
Summary	223
Advancing on these global challenges requires a solid foundation of evidence	223
A broadened World Bank vision calls for a more holistic and multifaceted approach to measuring well-being and risks	231
Data underpin the development process and should be prioritized	245
Annex 4A. Measuring food security	246
Annex 4B. Data used for climate hazards	249
Annex 4C. Tracking GHG emissions	250
Notes	253
References	256

CONTENTS

BOXES

O.1	How is the Prosperity Gap calculated?	8
O.2	Concepts of welfare and differences in measured inequality	13
O.3	How is the number of people at risk from extreme weather hazards calculated?	17
1.1	Revisiting the poverty line for a changing global population	52
1.2	Improvements in survey coverage	54
1.3	New data for India and international price levels	56
1.4	Progress in societal poverty has stagnated since 2020	68
1.5	Better labor markets for poverty reduction	71
2.1	Why the new shared prosperity measures?	106
2.2	How is the Prosperity Gap calculated?	110
2.3	Concepts of welfare and differences in measured inequality	121
3.1	Measuring climate risks: The percentage of people at high risk from climate-related hazards globally	166
3.2	Climate risks in IDA countries are high because of slow progress in growing incomes and limited improvements in other key dimensions of vulnerability	171
3.3	Small States face significant economic and climate-related challenges	173
3.4	How to best promote climate resilience	177
3.5	The increased fragmentation of aid	199

FIGURES

1	Global extreme poverty reduction has slowed to a near standstill, with 2020–30 set to be a lost decade	xxiv
2	Progress on boosting shared prosperity around the world has slowed down	xxiv
3	Risks from extreme weather events are high and may increase without action	xxv
4	Priorities to advance on the interlinked goals	xxvii
O.1	Progress has stagnated for the poor	3
O.2	Projections of poverty until 2050 under different scenarios	4
O.3	Poverty is still above prepandemic levels in the poorest countries	5
BO.1.1	The Prosperity Gap captures how far societies are from \$25 per person per day	8
O.4	Stalled progress in Global Prosperity Gap reduction	9
O.5	Limited gains in the Global Prosperity Gap due to a slowdown of global growth and an increase of global inequality during the COVID-19 pandemic	11
O.6	Poorer and conflict-affected economies tend to be more unequal	14
O.7	Income levels in the world have grown between 1990 and 2024, but many people remain vulnerable to falling back into poverty	16
BO.3.1	Measuring the vulnerability of people at high risk from climate-related hazards	18
O.8	A large share of the population in Sub-Saharan Africa does not have access to social protection or a financial account	22
O.9	Projections of emissions and temperatures to 2050	24

O.10	Additional emissions associated with poverty alleviation increase with the level of ambition	25
O.11	Lower emissions from poverty alleviation projected with energy efficiency and decarbonization	26
O.12	Priorities to advance on the interlinked goals	31
O.13	Increased concentration of extreme poverty in Sub-Saharan Africa and FCS	32
O.14	Rates of multidimensional poverty and increased risks from extreme weather in IDA countries compared with other countries	34
O.15	Positive relationship between income levels and GHG emissions	36
1.1	Poverty between 1990 and 2030 at \$2.15, \$3.65, and \$6.85 per person per day	51
B1.1.1	The composition of the global population has changed since 1990	53
B1.2.1	Share of population with survey data in 2020 or later for global poverty monitoring	55
1.2	Extreme poverty is still above prepandemic levels in low-income countries	57
1.3	Projections of poverty until 2050 under different scenarios	59
1.4	The regional distribution of poverty changes depending on the standard, but overall, most poor people are concentrated in Sub-Saharan Africa and South Asia	60
1.5	Poverty forecasts through 2030 by region	62
1.6	Increased concentration of extreme poverty in Sub-Saharan Africa and fragile and conflict-affected situations	63
1.7	Regional disparities in poverty reduction	66
1.8	Economic growth has been an important driver of extreme poverty reduction	67
B1.4.1	Societal poverty line	69
1.9	Income levels in the world have grown between 1990 and 2024, but many people remain vulnerable to falling back into poverty	73
1.10	Comparison of rural and urban poverty rates, 2022	75
1.11	Distribution of subnational extreme poverty rates by income group, 2021	78
1.12	Percent of population living in poverty by educational attainment, 2022	80
1.13	Age profile of the poor, 2022	81
1.14	The poorest countries lag behind in many dimensions of multidimensional poverty in 2021	84
1.15	Higher rates of multidimensional poverty than monetary poverty, especially in Sub-Saharan Africa	85
1B.1	Changes in poverty rates during the COVID-19 pandemic	89
1C.1	Concentration of extreme poverty in Sub-Saharan Africa and fragile and conflict-affected situations under various poverty rates for India in 2022	92
B2.2.1	The Prosperity Gap captures how far societies are from \$25 per person per day	111
2.1	Sub-Saharan Africa has the highest Prosperity Gap and contributes the most to the Global Prosperity Gap, followed by South Asia	112
2.2	There has been minimal progress in reducing the Prosperity Gap since the COVID-19 pandemic	113

CONTENTS

2.3	There has been considerable progress in reducing the Global Prosperity Gap since 1990	114
2.4	The East Asia and Pacific region has driven the reduction of the Global Prosperity Gap	115
2.5	The COVID-19 pandemic abruptly slowed the gains in the Global Prosperity Gap	116
2.6	Inequality increases the Prosperity Gap	118
2.7	Inequality delays prosperity	120
2.8	Poorer and conflict-affected economies tend to be more unequal	124
2.9	There is a steady decline in the number of economies with high inequality since 2000	125
2.10	The decline in the number of economies with high inequality is not driven by small changes around the threshold	126
2.11	More economies moved to a lower-inequality group than to a higher-inequality group, 2000–20	127
2.12	The reduction in inequality has been faster for economies with high levels of initial inequality	128
2.13	Average within-country inequality has been falling in the past 20 years	129
2.14	Most economies experienced a decline in inequality after COVID-19	130
2.15	Market versus disposable income	133
2.16	Effectively addressing inequality requires a comprehensive approach that tackles all phases of inequality	136
2A.1	Old and new measures of shared prosperity track each other well	137
2C.1	The rank-rank correlation of the Prosperity Gap between bottom coding at \$0.25/day and not bottom coding	141
2D.1	Relationship between income and consumption Ginis for countries with both	143
2F.1	Whereas the share of economies with high inequality has declined, the share of population living in economies with high inequality has barely changed in the past decade	146
3.1	Livable planet dimensions	162
3.2	Risks depend on hazard, exposure, and vulnerability	165
B3.1.1	Counting people at high risk from climate-related hazards	167
3.3	South Asia and lower-middle-income countries have the highest exposure rates to extreme weather hazards	168
3.4	For similar levels of exposure, risks vary	170
B3.2.1	Risks from extreme weather in IDA countries are high and reductions in vulnerability have been limited	172
3.5	Extreme weather events are occurring more frequently since 1970	175
3.6	Growth of total GHG emissions has continued but economic activity has become less emissions intensive over the past two decades	176
3.7	A large share of the population in Sub-Saharan Africa exposed to extreme weather events does not have access to social protection or a financial account	180

3.8	Projections of emissions and temperatures to 2050 show that with current policies, temperatures would increase close to 2°C	182
3.9	Energy production mix by income group remains largely based on coal and petroleum	182
3.10	Additional emissions associated with poverty alleviation increase with the level of ambition	184
3.11	Lower emissions from poverty alleviation projected with energy efficiency and decarbonization	185
3.12	Positive relationship between income levels and GHG emissions	191
3.13	Projected movement toward Net Zero 2050 by country income groups shows that high-income and upper-middle-income countries must lead the transition	193
3.14	Priorities to advance on the interlinked goals	194
3.15	Amounts of primary energy and generation of electricity from fossil sources need to decline massively to reach net zero by 2050	197
3A.1	The evolution of World Bank Vision and Scorecard indicators for food and nutrition security	202
3C.1	Regional and urban-rural differences in access to water	207
3D.1	Greenhouse gas emissions and capture from LULUCF, 2022	209
4.1	The number of household budget surveys has increased in all regions, 1998–2022	225
4.2	Less than one-half of the countries in the world have data available for global monitoring of poverty in 2020 or later	226
4.3	Data accessibility scores for countries by income categories	229
4.4	Using income and consumption does not change rankings and trends dramatically for countries where both measures exist	233
4.5	Comparison of inequality estimates derived from household surveys and other methods	235
4.6	Differences in trends of the Gini index between PIP and WID	237
4.7	Projections of GDP per capita vary significantly between Shared Socioeconomic Pathways	244

CONTENTS

MAPS

O.1	Income and consumption inequality among economies	14
O.2	Large populations are exposed to extreme weather events in South Asia and East Asia and Pacific, and vulnerability is high in Sub-Saharan Africa	17
2.1	The 49 economies with high inequality are concentrated in Sub-Saharan Africa and Latin America and the Caribbean	123
3.1	Large populations are exposed to extreme weather events in South Asia and East Asia and Pacific, and vulnerability is high in Sub-Saharan Africa	169

TABLES

1.1	Deprivations in educational attainment and access to basic infrastructure lift multidimensional poverty above the extreme poverty rate, 2021	83
1D.1	Percentage of population living in poverty by region	94
1D.2	Millions of people living in poverty by region	95
1D.3	Share of global poor (percent)	97
2.1	An inequality penalty is built into the Prosperity Gap index	117
2D.1	Statistics of Gini indexes in the Poverty and Inequality Platform, post-2000	142
2E.1	Prosperity Gap estimates, by region	145
2F.1	Gini index in latest available survey, by economy	147
3B.1	Hazard thresholds	203
3B.2	Extreme vulnerability definitions and sources	204
4.1	World Bank's Vision indicators	224

Foreword

For a quarter of a century, economies across the world whittled down poverty at an extraordinary clip. Beginning in 1990, rapid economic growth—especially in China and India—liberated more than 1 billion people from the scourge of extreme poverty. Over the next 25 years, as the incomes of the poorest nations began to converge with those of the wealthiest, the world came closer than ever to extinguishing extreme poverty altogether.

Then, after 2020, starting with the COVID-19 pandemic, a major reversal began. Poverty reduction slowed to a crawl. Poorer countries did worse than the wealthier economies in responding to the pandemic. Conflict in Europe and the Middle East then disrupted the supplies of foodgrains and fuel. Two years ago, the World Bank's *Poverty and Shared Prosperity* 2022 report took stock and came to a dismal conclusion: poverty had risen for the first time in decades. The global goal of cutting the extreme-poverty rate to 3 percent by 2030 had slipped out of reach. At the current pace, it will not be met for three decades.

The delay would be longer still for people living on less than \$6.85 a day—the poverty threshold for middle-income countries. It would take more than a century to eliminate poverty at this higher level, which now affects half of humanity. The 2020s, in short, are shaping up to be a lost decade—not just for a small set of countries but for the world as a whole.

That threatens reversals on two other fronts: the fight against climate change and the struggle to expand the middle class everywhere. Poverty, prosperity, and planet are the three corners of the iron triangle of economic development: to achieve durable progress on one, it is imperative to make substantial gains on the other two. In an era of economic populism, rising debt, and aging populations, that will not happen easily. In fact, without the right policy framework, it is far more likely that progress on one front will come at the expense of another.

This report aims to provide exactly that framework—one that can manage the trade-offs and deliver the best possible outcomes on all three fronts. For the first time, it gives governments a comprehensive way to monitor progress, identify new pathways to success, and choose the right policy priorities. The *Poverty, Prosperity, and Planet Report 2024* constitutes the World Bank Group's first integrated progress report on the three goals since the COVID-19 pandemic—and

it serves as a central tool in our institution’s efforts to realize its updated vision: to create a world free of poverty on a livable planet.

The analysis yields several sobering conclusions—as well as clear evidence that progress is possible even under daunting conditions. The good news is that progress on extreme poverty reduction has finally resumed at the global level: in 2024, the extreme poverty rate was 8.5 percent, marking the first time it has dipped below the 8.8 percent rate that prevailed on the eve of the COVID-19 pandemic. The bad news is that the recovery is bypassing the places that need it most: extreme poverty in the poorest economies is still 1 percentage point higher than it was in 2019.

Across the world, governments have also made notable progress in combating inequality within national borders. In 2024, the number of economies with high inequality stood at a 24-year low, reflecting a one-third reduction since the turn of the century. Yet 1.7 billion people—20 percent of the global population—still live in high-inequality economies, which are concentrated in Sub-Saharan Africa and Latin America and the Caribbean. Poverty and inequality are conjoined. Speeding up the reduction of within-country inequality accelerates progress on poverty reduction. It also builds a stronger foundation for peace and stability.

Another finding of this report is that well-off countries have been making considerable progress in adapting to climate change—but poor countries remain far behind. Since 2010, the number of people exposed to extreme-weather events has grown not only in the poorest economies eligible to borrow from the World Bank’s International Development Association (IDA) but also in non-IDA countries. These countries have managed to shield nearly all their populations from extreme-weather events—a function of their wealth and access to finance, which enables greater investment in climate adaptation. IDA countries, by contrast, have been able to protect barely one out of every two people from the risk of actual harm from an extreme-weather event.

That disparity underscores the need for a differentiated approach to managing the trade-offs in play at the intersection of poverty, prosperity, and planet. The poorest economies must be allowed to prioritize climate resilience. Sub-Saharan Africa, for example, has the largest share of people at high risk from extreme-weather events—more than a third. And half its people lack electricity or sanitation.

The policy priorities in the poorest economies *must* be different from those in wealthier parts of the world: to roll back extreme poverty, low-income economies must prioritize long-term growth and better health and education. They must be careful, however, to avoid getting locked into carbon-intensive technologies and growth strategies that will become progressively more costly and less efficient in the future. At higher levels of income, however, the policy predicament intensifies. Ending poverty for the 3 billion people who struggle on less than \$6.85 a day would come at a high cost to the environment. By the middle of this century, it would boost global emissions by nearly 50 percent over 2019 levels.

FOREWORD

The implications are clear: in the poorest economies, the focus should be on economic growth and investing in human, financial, and physical capital. For lower-middle-income countries, the focus should shift to growth and shared prosperity—and measures to increase the efficiency of policies that increase incomes, improve resilience to shocks, and lower emissions. Just by reducing air pollution, for example, they can reap large rewards on multiple fronts, including better health outcomes. For upper-middle- and high-income countries, which account for four-fifths of global carbon emissions, the emphasis must be on slashing emissions while finding ways to alleviate the job losses and other short-term pains that will result from these cuts.

None of this will be easy, but it can and must be done. The world today enjoys a historic opportunity to change course—to overcome the rising dangers of climate change, systemic inequality, social instability, and conflict. With closer international cooperation, it's possible to build the type of progress that ensures a broad and lasting rise in prosperity. It's an opportunity that must not be passed up.

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Main Messages

The World Bank has set a clear mission: ending extreme poverty and boosting shared prosperity on a livable planet. This report offers the first postpandemic assessment of global progress on this agenda. This report explores different potential pathways out of the polycrisis—an environment where multiple and interconnected challenges are affecting the world simultaneously—taking seriously the trade-offs and complementarities across objectives that are embedded in different policy approaches. The main messages are presented around **Progress** in terms of the goals, **Pathways** to move forward, and **Priorities** depending on where countries stand on the interlinked goals.

Progress: Global poverty reduction and improvements in shared prosperity have stalled

Global poverty reduction has slowed to a near standstill, with 2020–30 set to be a lost decade.

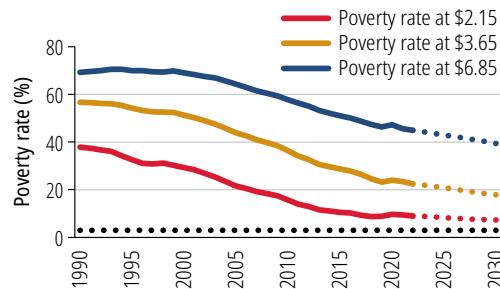
Today, 8.5 percent of the world lives in extreme poverty (those living on less than \$2.15 per person per day) (figure 1, panel a). At a poverty standard more relevant for upper-middle-income countries (\$6.85 per person per day), 44 percent of the world's population lives in poverty. The number of people living under this higher standard has barely changed since 1990 due to population growth (figure 1, panel b). At the current pace of progress, it would take decades to eradicate extreme poverty and more than a century to lift people above \$6.85 per day.

Progress has stalled amid multiple shocks and growth patterns that have not enabled the poorest to catch up. The COVID-19 pandemic had scarring impacts, and extreme poverty in the poorest countries today is still above prepandemic rates. Poverty continues to concentrate in settings with historically low economic growth and fragility. Gains in reducing the Global Prosperity Gap, the World Bank's new measure of shared prosperity, have also stopped since the pandemic due to a reduction in economic growth and a divergence in mean incomes across countries (figure 2, panel a). Today, incomes around the world, on average, would have to increase fivefold to reach a prosperity standard of \$25 per person per day, which in many places remains completely aspirational.

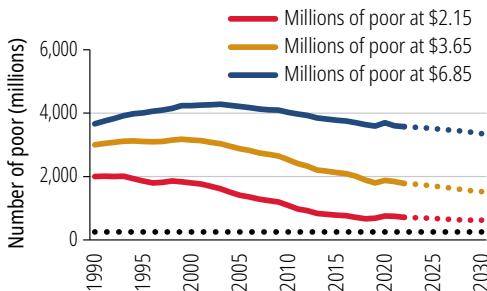
FIGURE 1

Global extreme poverty reduction has slowed to a near standstill, with 2020–30 set to be a lost decade

a. Progress in reducing extreme poverty has come to a halt



b. Number of people living on less than \$6.85 per day has remained unchanged since 1990



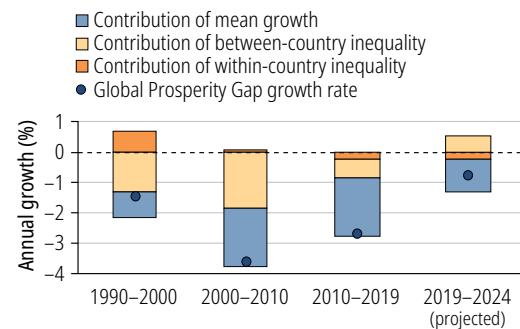
Sources: Original figures for this publication based on World Bank calculations.

Note: All \$ values are expressed in per person per day in 2017 purchasing power parity dollars. 2022–30 are projections and are shown in dots at the ends of lines. In panel a, the black horizontal dotted line is drawn at 3 percent and indicates the World Bank's target of ending extreme poverty by 2030. In panel b, it is drawn at 256 million, which represents 3 percent of the global population projected for 2030.

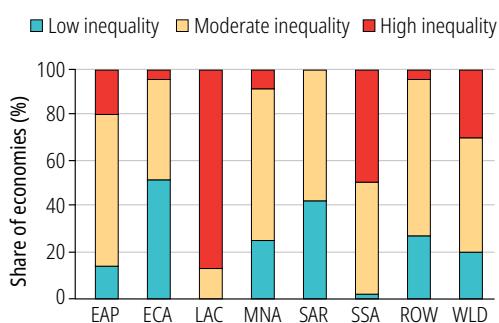
FIGURE 2

Progress on boosting shared prosperity around the world has slowed down

a. Recent progress on the Global Prosperity Gap was hindered by increasing inequality between countries due to divergent growth



b. Latin America and the Caribbean and Sub-Saharan Africa have a large share of high-inequality economies



Sources: Original figures for this publication based on World Bank calculations.

Note: EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa; ROW = rest of the world; WLD = world.

Panel a. Change in the Global Prosperity Gap decomposed into (negative of) the growth in mean incomes, between-country inequality, and within-country inequality. The Global Prosperity Gap for 2024 is projected.

Panel b. Share of economies in 2022 with Gini less than 30 (low), between 30 and 40 (moderate), and greater than 40 (high). Regional classifications follow the Poverty and Inequality Platform: <https://datanalytics.worldbank.org/PIP-Methodology/lionepestimates.html#regionscountries>.

MAIN MESSAGES

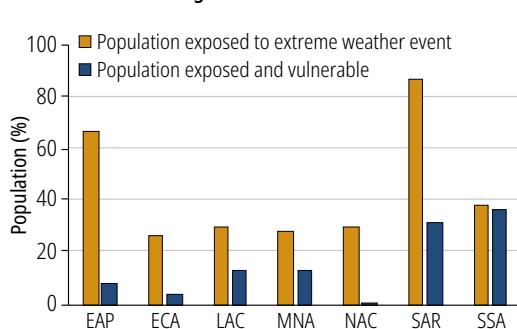
The number of economies with high inequality has fallen. The number of economies with high income or consumption inequality—defined as a Gini coefficient above 40—has fallen from 61 to 49 in a decade. High-inequality economies are concentrated in Latin America and the Caribbean and Sub-Saharan Africa (figure 2, panel b) and are home to 1.7 billion people in 2022, approximately one-fifth of the world's population, a share that has remained roughly the same over the past decade. Seventy percent of the global population lives in an economy with moderate inequality (Gini between 30 and 40), and only 7 percent live in economies with low inequality (Gini below 30).

Moreover, nearly one in five people are at risk of experiencing welfare losses due to an extreme weather event from which they will struggle to recover. The World Bank has developed a new vision indicator that counts the number of people at high risk from climate-related hazards globally. Being at high risk is defined as being exposed to hazards and also being vulnerable to their impacts (defined as the physical propensity to experience severe losses and the inability to cope with and recover from losses). Sub-Saharan Africa has the largest share of people at high risk from extreme weather events, with almost everyone who is exposed to an extreme weather event also being at high risk (figure 3, panel a). South Asia has the largest total population at high risk from extreme weather events (32 percent of the population).

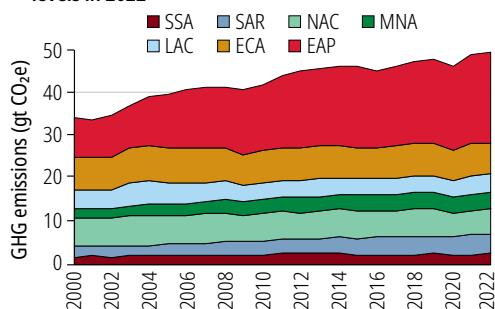
FIGURE 3

Risks from extreme weather events are high and may increase without action

a. Climate risks are high



b. Greenhouse gas emissions reached record levels in 2022



Sources: Original figures for this publication based on World Bank calculations.

Note: GHG = greenhouse gas; gt CO₂e = gigatons carbon dioxide equivalent; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; NAC = North America; SAR = South Asia; SSA = Sub-Saharan Africa. Regional classifications follow the World Bank region classifications: <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>.

Panel a. Population exposed to extreme weather events, and the population at high risk from extreme weather events (exposed and vulnerable).

Panel b. Total GHG emissions in gt CO₂e.

By contrast, the share of people at risk is the lowest in North America, where less than 1 percent of the population is at high risk. Although exposure in Sub-Saharan Africa is not as high as in other regions, high levels of vulnerability keep people at high risk. The likelihood of experiencing losses has declined with growing income levels globally, but less for the poorest and those in more fragile settings. For example, between 2010 and 2019, despite the number of people exposed increasing, non-International Development Association (IDA) countries were able to reduce the number of people at risk significantly over this period. This pattern is not the case for IDA countries, where the number of people at risk rose almost one to one with the population exposed. In non-IDA countries, the population at risk fell due to the large gains in income and financial access, developments from which people in IDA countries did not benefit as much.

In 2022, greenhouse gas (GHG) emissions reached record levels (figure 3, panel b), trapping nearly 50 percent more heat than in 1990. Climate change will likely lead to more frequent and more intense extreme weather events, which will negatively affect welfare.

Large gaps in human capital, basic infrastructure, and life essentials affect significant populations in the poorest regions. One-half or more of the people in Sub-Saharan Africa and in fragile and conflict-affected situations lack electricity and sanitation. Large education gaps also persist, but investments in education in low-income countries remain very low. Air pollution is a leading environmental risk to people's health, which must be prioritized: it carried a health cost representing 6.1 percent of global GDP in 2019. The prevalence of undernourishment is also on the rise globally and remains particularly high in Sub-Saharan Africa. These large multidimensional gaps have also contributed to the vulnerability to shocks in lower-income countries.

The global environment is facing multiple and interconnected crises or a “polycrisis.” The global environment that has become more challenging amid a polycrisis—from slow growth prospects and high levels of debt to increased uncertainty, fragility, and polarization. Economic growth in the poorest countries is projected to remain weaker than in the decade before the pandemic. In addition, debt interest payments in the poorest settings are reaching an all-time high, diverting spending away from critical needs.

Pathways: Eradicating poverty and boosting shared prosperity on a livable planet requires managing trade-offs

Progress on the interlinked goals requires faster and inclusive growth and protecting people from extreme weather events. Enabling the poor to benefit more from economic growth involves better-functioning labor markets, investments in the productive capacity of people, and structural conditions that enable socioeconomic mobility so that everyone can use their

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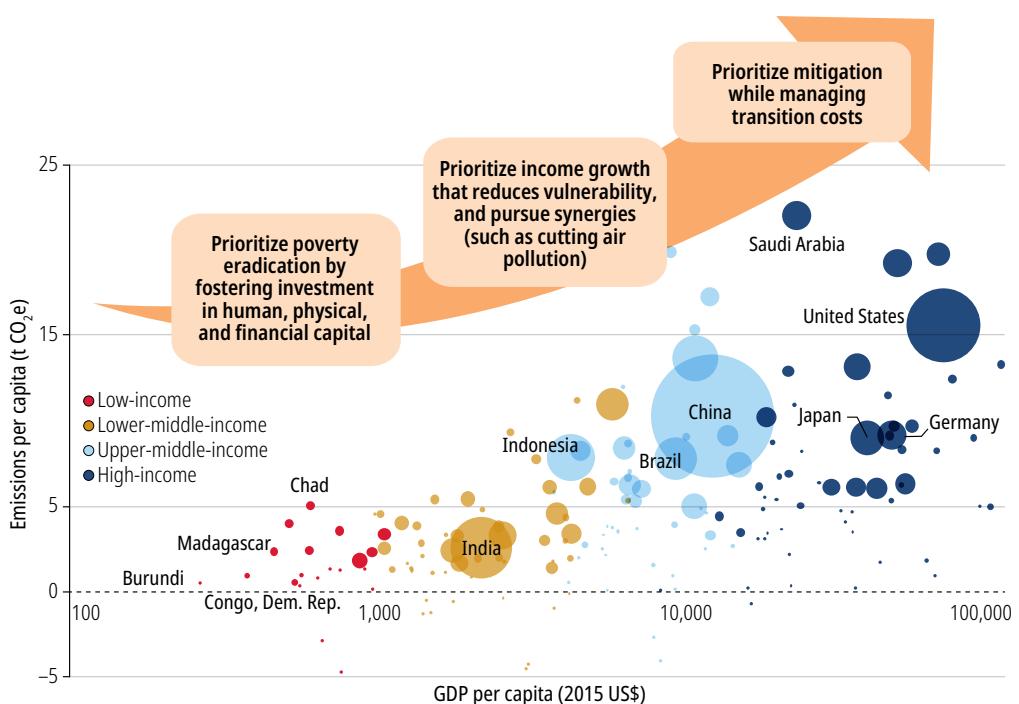
productive capacity to their full extent. Protecting people from extreme weather events requires acting on two fronts: (a) lowering vulnerability by enhancing risk management and (b) preventing the escalation of future climate hazards by accelerating transformations to reduce the emissions intensiveness of growth.

With limited budgets, high uncertainty, and conflicting interests, policy makers must prioritize and make difficult choices. To inform their decisions, policy makers must understand the trade-offs between growing incomes and lowering GHG emissions, find ways to scale up synergistic policies that can help advance on multiple fronts or reduce trade-offs (for example, tackling high air pollution), and manage transition costs to specific groups and communities affected by labor market or price shifts.

Actions need to recognize that emissions are primarily generated by richer countries and that poorer countries are the most at risk. Whereas upper-middle- and high-income countries currently account for four-fifths of global GHG emissions, low- and lower-middle-income

FIGURE 4

Priorities to advance on the interlinked goals



Source: Original figure for this publication based on World Bank calculations.

Note: GDP = gross domestic product; GHG = greenhouse gas; t CO₂e = tons, carbon dioxide equivalent. The size of the bubbles indicates total GHG emissions. Negative emissions occur when ecosystems absorb more carbon than the country emits. A few small countries with very high per capita emissions (Bahrain, Guyana, Iceland, Kuwait, Oman, Palau, Qatar, Trinidad and Tobago, United Arab Emirates) and countries with very low per capita emissions (Central African Republic, Vanuatu) are omitted for visual purposes. The horizontal axis uses a logarithmic scale.

countries contribute a relatively small share of emissions, although they are home to one-half of the world's population. For example, Sub-Saharan Africa accounts for only 5 percent of global emissions. On the other hand, the share of people at risk from weather hazards is significantly higher in poorer settings.

Advancing on the eradication of extreme poverty does not come at a big cost for the planet because the poorest countries contribute so little to emissions. Eradicating extreme poverty would increase emissions by less than 5 percent above 2019 levels. Achieving higher living standards than this bare minimum—that is, by moving more than 3 billion people above \$6.85 per day—would lead to a significant increase in emissions assuming historic emission intensities: the increase would be 46 percent above 2019 levels.

Priorities: Doing what matters where it matters

Figure 4 brings these considerations together and illustrates a simplified way to identify priorities. A key guiding element to set priorities is considering where the poor and vulnerable live and where the emissions are and will be generated. Each unique situation requires its own tailored solutions, and the results from this report do not aim to be prescriptive for a specific country. Country-specific studies are recommended to guide prioritization at that level. The following discussion aims to shed light on where attention should be placed from a broader global perspective.

Low-income and fragile countries need to prioritize poverty reduction by fostering investment in human, physical, and financial capital. Two-thirds of the world's extreme poor live in Sub-Saharan Africa, rising to three-quarters when including all fragile and conflict-affected countries. More broadly, IDA countries account for 7 in 10 of the global extreme poor today. In those settings, higher growth is an essential foundation. To have the maximum impact on poverty reduction, that growth must be inclusive by creating employment opportunities while ensuring that the poor can take advantage of opportunities (for example, through quality education). Promoting economic growth, basic investments, and insurance are fundamental to sustainably improve the lives of the poor. Those actions reduce multidimensional poverty and enhance resilience against extreme weather and other shocks.

Middle-income countries must prioritize income growth that reduces vulnerability and pursue synergistic actions. Middle-income countries have successfully exited low-income status and have been able to reduce extreme poverty substantially; however, they are struggling to maintain the momentum needed to reach high-income levels and lift people above the \$3.65 and \$6.85 poverty lines. As in low-income countries, accelerating economic growth, enhancing the productive capacity of poorer households, and risk management are key. At the same time, emissions of many middle-income countries cannot be neglected. Without action, their emissions will increase over the next decades and surpass those of upper-middle-income countries and higher-income countries in

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absolute terms. For this purpose, identifying synergistic policies that can contribute to all goals and scaling them up is key. Tackling local environmental hazards such as air pollution is an area with multiple gains.

High-income and upper-middle-income countries with high emissions must accelerate mitigation to advance on the interlinked goals globally while managing transition costs.

Upper-middle-income countries and, especially, high-income countries must step up the transition to low-carbon economies. Although emissions in those settings are projected to decline under current policies, the current progress is not nearly fast enough to limit global warming. Potential transition costs associated with climate mitigation, such as higher energy prices or job losses in carbon-intensive sectors, must be managed—particularly for the poor and more vulnerable. Wealthier nations hastening their climate mitigation actions could significantly alter the distribution of future environmental risks worldwide. Upper-middle-income countries also have a significant share of the population facing climate risks, and it is in their own population’s interest to accelerate this process to protect them from future hazards.

Advancing on these interlinked global challenges requires a solid foundation of evidence.

Across the board, more and better data are needed to address these complex policy issues and monitor impacts. Although data availability has improved in many countries, less than one-half of IDA countries had a household survey available for global poverty monitoring in 2020 or later. More investment is needed to produce reliable, granular, and timely information, and that requires foundational efforts to strengthen national statistical systems and innovative approaches to advance the frontier of data and modeling for welfare analysis. When collected, data should be made public to better monitor policy impact and facilitate further policy design. Because the lived experience of poverty goes well beyond monetary measures, it is important to ensure that data efforts also invest in understanding other dimensions of well-being, such as deprivations in access to services, health, or food security.

Urgent and coordinated global action is essential to meet these interlinked goals. The financing gap for sustainable development is growing, which hinders lower-income countries’ ability to invest across multiple objectives. This constrained environment creates an urgent need to focus and prioritize the actions that will have the highest return for development and that can allow the world to make significant progress. It calls for fundamental changes in how countries approach their national development strategies and their contribution to global public goods. The potential policy pathways in each context often differ drastically depending on a country’s historical development trajectory, access to technology and financing, and national priorities. However, countries must also consider their global responsibilities and that international actors have a critical coordination role to play. Ending poverty and boosting shared prosperity on a livable planet will require novel ways of organizing economic activity.

Abbreviations

AI	artificial intelligence
ALPM	active labor market program
CBAM	Carbon Border Adjustment Mechanism
CEMS	Continuous Emissions Monitoring Systems
CEQ	Commitment to Equity (Institute)
CO ₂	carbon dioxide
EDGAR	Emissions Database for Global Atmospheric Research
EFDVM	Emission Factors and Default Values Methods
EMDEs	emerging market and developing economies
ETS	emission trading systems
EU-SILC	European Union Statistics on Income and Living Conditions
FAM	fuel analysis method
FCS	fragile and conflict-affected situations
FIES	Food Insecurity Experience Scale
FNS	food and nutrition security
GDP	gross domestic product
GHG	greenhouse gas
GHSL	Global Human Settlement Layer with gridded population data (GHS-POP)
GMD	Global Monitoring Database
HCES	Household Consumption and Expenditure Survey
ICP	International Comparison Program
IDA	International Development Association

IIASA	International Institute of Applied Systems Analysis
IHME	Institute for Health Metrics and Evaluation
IPCC	Intergovernmental Panel on Climate Change
LULUCF	land use, land use change, and forestry
MDBs	multilateral development banks
MMRP	Modified Mixed Reference Period
MPI	Multidimensional Poverty Index
MPM	Multidimensional Poverty Measure
NDC	Nationally Determined Contribution
NGFS	Network for Greening the Financial System
NSS	National Sample Survey
ODIN	Open Data Inventory
OECD	Organisation for Economic Co-operation and Development
PIP	Poverty and Inequality Platform
PoU	Prevalence of Undernourishment
PPP	purchasing power parity
PSPR	Poverty and Shared Prosperity report
PV	photovoltaic
RTM	real-time modeling
SDGs	Sustainable Development Goals
SPL	societal poverty line
SSPs	Shared Socioeconomic Pathways
UNFCCC	United Nations Framework Convention on Climate Change
WASH	water, sanitation, and hygiene
WBGT	wet bulb globe temperature
WDI	World Development Indicators
WHO	World Health Organization
WID	World Inequality Database

The term *country*, used interchangeably with *economy*, does not imply political independence but refers to any territory for which authorities report separate social or economic statistics.

Overview

The World Bank has set a clear mission: ending extreme poverty and boosting shared prosperity on a livable planet. This new edition of the biennial series, previously titled *Poverty and Shared Prosperity*, assesses the three components of the mission and emphasizes that reducing poverty and increasing shared prosperity must be achieved without high costs to the environment. The current polycrisis—where the multiple crises of slow economic growth, increased fragility, climate risks, and heightened uncertainty have come together at the same time—makes national development strategies and international cooperation difficult.

This overview summarizes the **progress** toward achieving these goals, outlines promising **pathways** to speed up the progress on multiple fronts, and proposes **priorities** tailored to countries at various levels of poverty, income, and environmental vulnerability. Offering the first post-COVID-19 (Coronavirus) pandemic assessment of global progress on this interlinked agenda, the report finds that global poverty reduction has resumed but at a pace slower than before the COVID-19 crisis. It also provides evidence that the number of countries with high levels of income inequality has declined considerably during the past two decades, but the pace of improvements in shared prosperity has slowed and that inequality remains high in Latin America and the Caribbean and in Sub-Saharan Africa. The report also finds evidence of countries' increasing ability to manage natural hazards where there has been progress in poverty reduction and shared prosperity; but in the poorest settings, the report finds that climate risks are significantly higher.

Progress: Global poverty reduction and improvements in shared prosperity have stalled

Global poverty reduction slowed to a near standstill during the past five years, raising concerns that 2020–30 would be a lost decade

About 8.5 percent of the global population lives in extreme poverty in 2024. This means that 692 million people worldwide live on less than \$2.15 per person per day.¹ While the extreme

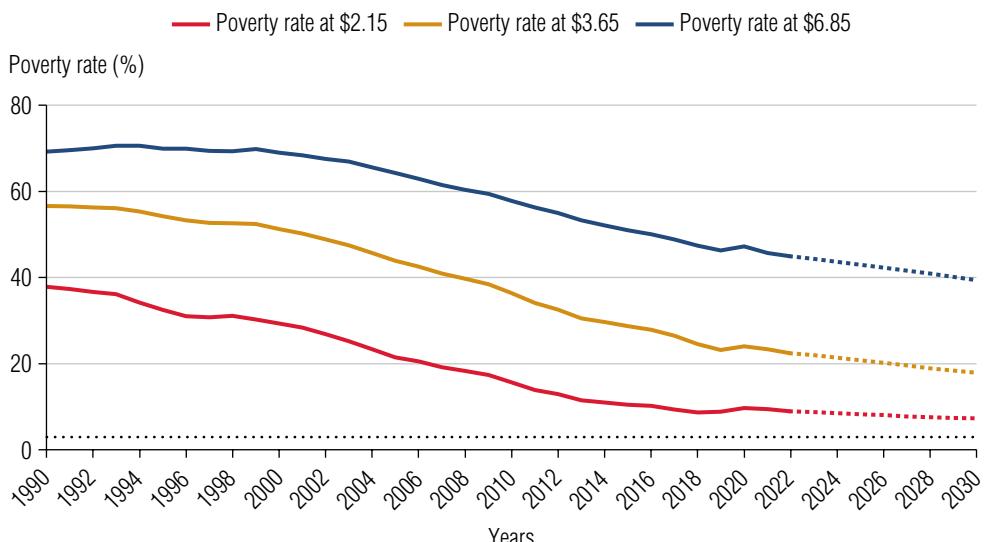
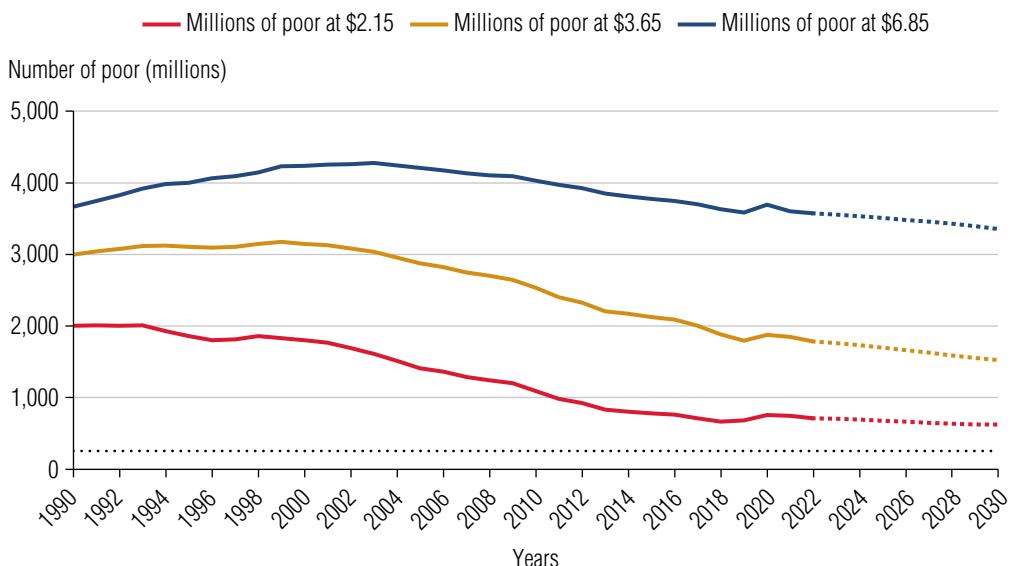
A reproducibility package is available for this book in the Reproducible Research Repository at <https://reproducibility@worldbank.org>.

poverty rate fell from 38 percent in 1990 to 8.5 percent in 2024, it has stalled more recently amid lower economic growth and multiple shocks such as the COVID-19 pandemic, high inflation, and increased conflict and fragility. Extreme poverty today is only slightly below the rate observed before the pandemic in 2019 and in many poor settings, poverty rates remain higher than they were five years ago. Using the slightly higher poverty line of \$3.65 a day per person (representative of the national poverty lines used in lower-middle-income countries), about 1.7 billion people are living in poverty in 2024 (21.4 percent, or about one-fifth, of the global population). At the still higher standard of \$6.85 per person per day that is more typical of upper-middle-income countries, almost one-half of the world's population (43.6 percent) is living in poverty. This means that the living standards of 3.5 billion people are below this higher poverty line in 2024 (figure O.1). While the share of people under \$6.85 declined from 70 percent to 43.6 percent since the 1990s, the actual number of people living on less than \$6.85 a day has barely changed since 1990 because of population growth.

Even more serious, by the end of this decade, a projected 7.3 percent of the world population will be living in extreme poverty—more than double the World Bank global goal of 3 percent and even further away from the Sustainable Development Goal of ending extreme poverty in all countries by 2030. In fact, between now and 2030, only 69 million people are projected to escape extreme poverty (figure O.1). At the higher poverty line of \$6.85, reductions in the poverty rate are projected to continue more noticeably with slightly less than 40 percent of the global population being projected to live on less than \$6.85 per person per day in 2030 (more than 3 billion people).

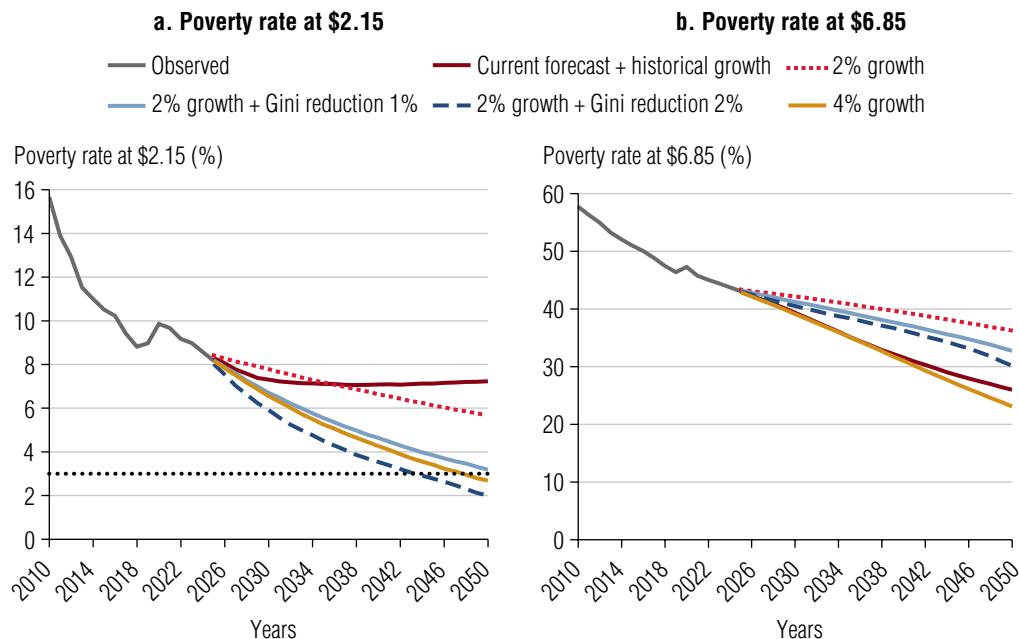
If economic growth continues to be slow and inequality remains unchanged, the 3 percent goal will remain out of reach for decades. If gross domestic product (GDP) per capita growth stays at the average rates observed during 2010–19, extreme poverty rates will remain above 7 percent until 2050 (figure O.2, panel a). If every country grew by 2 percent in per capita terms annually, extreme poverty would not reach 3 percent for another 60 years. Even with 4 percent per capita growth rates, which seem out of reach for many countries, it would take until 2048 to reach 3 percent. Reductions in inequality can help accelerate progress. For example, under the 2 percent per capita growth scenario, if the Gini index in every country were to also decrease by 2 percent annually, it would take 40 years less to eradicate poverty (20 versus 60 years).

Poverty rates at \$6.85 a day are projected to fall faster under the current growth forecast scenario than extreme poverty rates (figure O.2, panel b). Still, under the current growth forecast, it would take more than a century to reach a poverty rate of less than 3 percent at \$6.85 per person per day.

FIGURE 0.1**Progress has stagnated for the poor****a. Progress in reducing extreme poverty rate has resumed but at a slower pace than before 2020****b. The number of people living on less than \$6.85 has remained unchanged over the past 30 years**

Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org/>.

Note: Poverty rates are reported for the \$2.15, \$3.65, and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars). Between 2022 and 2029 poverty is projected based on per capita gross domestic product growth projections in *Global Economic Prospects, June 2024* (World Bank 2024c) complemented by the *Macro Poverty Outlook, Spring Meetings 2024* (World Bank 2024e) and the *World Economic Outlook* (IMF 2024); for 2030, average annual historic per capita growth rates (2010–19) are used. See annex 1A for more details on the projection methods. In panel a, the black horizontal dotted line is drawn at 3 percent and indicates the World Bank's target of ending extreme poverty by 2030. In panel b, it is drawn at 256 million, which represents 3 percent of the global population projected for 2030.

FIGURE 0.2**Projections of poverty until 2050 under different scenarios**

Sources: World Bank calculations using data from World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org/>; World Bank 2024c; IMF 2024; and World Bank 2024e.

Note: Poverty rates are reported for the \$2.15 and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars). Poverty rates are projected after 2022 based on country-level growth in gross domestic product per capita. “Current forecast + historical growth” is based on growth projections in the *Global Economic Prospects, June 2024* (World Bank 2024c) complemented by the *Macro Poverty Outlook* (World Bank 2024e) and the *World Economic Outlook* (IMF 2024) until 2029 and average annual per capita historical growth rates (2010–19) thereafter (see annex 1A for further details). Inequality reduction scenarios refer to a reduction in the country-level Gini index by 1 percent or 2 percent annually. The horizontal dotted line indicates a poverty rate of 3 percent.

Overlapping crises have slowed or stalled poverty reduction

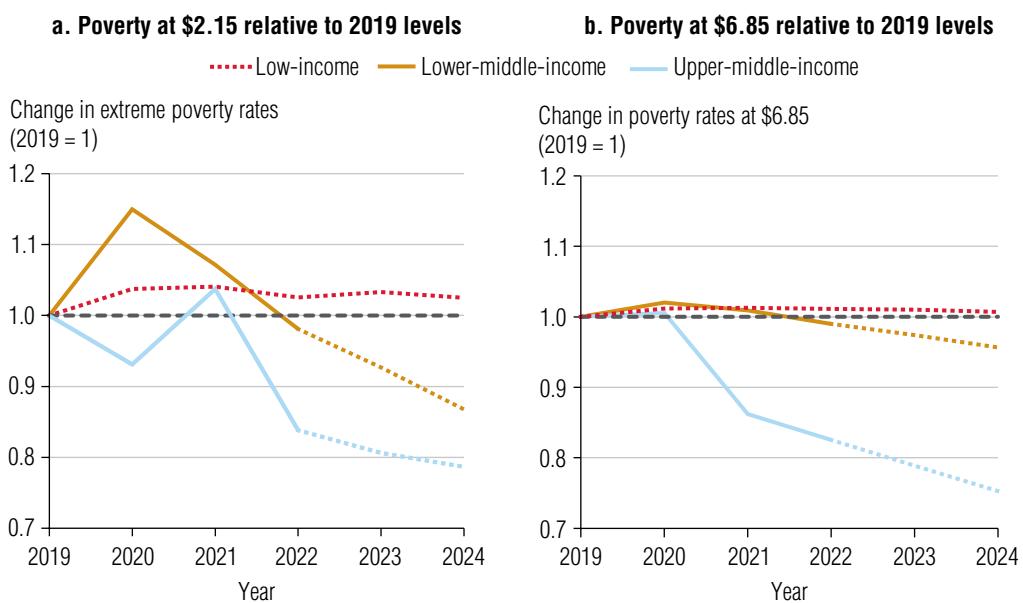
The slow progress on poverty reduction in the past years reflects global conditions characterized by multiple and overlapping crises or a “polycrisis.” *Polycrisis* refers to multiple and interconnected crises occurring simultaneously, where their interactions amplify the overall impact. The scarring effects of the pandemic, slow economic growth, increased conflict and fragility, and insufficient progress on shared prosperity, for instance, are connected and have been behind the slow progress in poverty reduction. The risk of a polycrisis is growing due to heightened uncertainty, fragility, climate change, and other vulnerabilities that tie together diverse sectors and regions.

The poorest countries have still not recovered from the poverty increase caused by the COVID-19 pandemic

The poorest countries still have higher poverty rates than before the pandemic. In low-income countries, the extreme poverty rate rose in 2020 and 2021 and has not fallen much since (figure O.3). In 2024, 43 percent of people in low-income countries are in extreme poverty. Lower-middle-income countries managed to recover from the COVID-19 shock only in 2022. In contrast, upper-middle-income countries continued to make progress in 2021 and 2022 against poverty (as measured against the \$6.85 line, which is more relevant in these settings). Low-income countries have shown less resilience, as the compounded effects of the pandemic and rising food and energy prices have led to poverty rates remaining higher than in 2019.²

FIGURE O.3

Poverty is still above prepandemic levels in the poorest countries



Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org/>.

Note: Poverty rates are shown relative to 2019 levels for the \$2.15 and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars). The line for low-income countries is dotted because the surveys covered less than 50 percent of the group's population between 2019 and 2022. Poverty rates for 2022–24 are projected based on per capita gross domestic product growth projections in *Global Economic Prospects, June 2024* (World Bank 2024c). High-income countries are omitted because poverty rates at both lines are small. Poverty rates at the \$6.85 poverty line did not increase in high-income countries between 2019 and 2024, and changes at the \$2.15 poverty line were less than 0.05 percentage points. Income group is kept fixed using the fiscal year 2024 classifications.

In addition to a slower recovery in terms of income, poor people experienced setbacks in human capital and employment, further compromising their resilience and capacity to generate higher incomes in the future. The pandemic had a devastating effect on global health, causing a significant number of excess deaths and reducing the global life expectancy at birth by over 1.5 years.³ Countries with higher inequalities in income and access to quality care had higher excess mortality during the pandemic (Sepulveda and Brooker 2021). The health and food systems disruptions caused by the pandemic also reversed progress on child nutrition, with an estimated additional 9.3 million children suffering from acute malnutrition and 2.6 million more children stunted by 2022 (Osendarp et al. 2020). In addition, school closures led to learning losses in language, literacy, and mathematics of around 30 percent in multiple countries. In 2021, in several countries a quarter of all young people were not in education, employment, or training (Schady et al. 2023). Poorer households were also less likely to use remote work and schooling (Narayan et al. 2022). Schooling disruptions affected poorer households more than richer ones. It is estimated that students in low-income and lower-middle-income countries could face future earning losses of up to 10 percent because of the pandemic, suggesting a permanent scarring effect (Schady et al. 2023). This generation of students now risks losing \$21 trillion in potential lifetime earnings in present value, or the equivalent of 17 percent of today's global GDP (World Bank et al. 2022). The loss in schooling is likely to have a larger effect on poverty in the future than the immediate effect of the pandemic has had (Decerf et al. 2024).

Extreme poverty has been increasingly concentrated in countries with slow economic growth

A large factor in the slowing of global poverty reduction over the last decade is the changing regional composition of poverty. In 1990, East Asia and Pacific had a higher poverty rate than Sub-Saharan Africa, and South Asia had rates similar to Sub-Saharan Africa. This picture changed markedly over the years. Fueled by rapid growth, East Asia and Pacific experienced unprecedented progress that also drove poverty reduction at the global level. Until 2013, global extreme poverty reduction was led by China's rapid economic growth, which lifted more than 800 million people out of extreme poverty over three decades. Between 1990 and 2024, the rest of East Asia and Pacific also made remarkable progress, with 210 million people exiting extreme poverty during this period. Extreme poverty also fell significantly in South Asia, despite recent stagnation (see chapter 1).

Since the early 2010s, progress in reducing global extreme poverty has depended on the reduction of poverty in Sub-Saharan Africa much more than it did before. Although the extreme poverty rate in Sub-Saharan Africa has fallen over the past three decades, it did so at much slower rates than in other regions, and the number of people living in extreme poverty in the region has come fairly close to doubling—rising from 282 million in 1990 to 464 million in 2024. Similarly, in the Middle East and North Africa, the number of people living in extreme poverty doubled from 15 million in 1990 to 30 million in 2024. Extreme poverty in that region has surged since 2014, driven by fragility, conflict, and inflation (Gatti et al. 2023).

OVERVIEW

In 2000, only one-quarter of the extreme poor were living in a country in Sub-Saharan Africa or in a country in fragile and conflict-affected situations (FCS). By 2014, every second person in extreme poverty lived in either Sub-Saharan Africa or in FCS. The share of extreme poor in FCS in Sub-Saharan Africa then grew starkly in the late 2010s, driven by countries with large poor populations becoming fragile (for example, Niger or Nigeria). By 2024, the share of the extreme poor in Sub-Saharan Africa or FCS had increased to three-quarters, and 42 percent of the global extreme poor were in FCS in Sub-Saharan Africa.⁴ More broadly, countries eligible for support through the International Development Association (IDA) account for 7 in 10 of the global extreme poor.⁵

IDA countries, particularly those in Sub-Saharan Africa, have not been able to achieve the high rates of income growth seen in East Asia and Pacific and South Asia. While IDA countries are different in many respects, they share common challenges, including low per capita incomes, widespread extreme poverty, and heightened fragility (World Bank 2024d). In Sub-Saharan Africa, which is home to about half of the IDA countries, economic growth has neither been large enough nor inclusive enough to reduce poverty significantly, especially since 2015 (Wu et al. 2024). Between 1990 and 2022, GDP per capita in Sub-Saharan Africa only grew by 0.7 percent annually (compared with 1.6 percent for the world). GDP growth in IDA countries is forecast to strengthen in 2024–25 but remain weaker than in the decade before the pandemic (World Bank 2024d).

Progress in improving shared prosperity has stalled since the pandemic

How growth benefits the least well-off is an important dimension to consider for improvements in societal well-being. Average income growth alone is not a good marker of development. Therefore, it is important to track a measure of the inclusiveness of growth or shared prosperity. The Global Prosperity Gap is the World Bank's new measure of shared prosperity (see box O.1). It is the average factor by which incomes need to be multiplied to bring everyone in the world to the prosperity standard of \$25 per person per day, which is roughly equal to the average income when countries reach high-income status. The measure gives greater weight to the incomes of the poor, and hence income growth among the poorest households matters significantly more for reducing the Global Prosperity Gap.

Progress in reducing the Prosperity Gap has stalled since the pandemic, highlighting a slowdown in inclusive income growth over this period (figure O.4, panel a). Today, incomes around the world would have to increase fivefold, on average, to reach the prosperity standard of \$25 per person per day. In many places, the convergence of incomes to the \$25 per person per day level remains purely aspirational. The Prosperity Gap ranges from 1.7 in Europe and Central Asia to over 12 in Sub-Saharan Africa, signaling large disparities in income levels across regions. In Sub-Saharan Africa, incomes on average would need to rise more than twelvefold to reach the \$25 standard. Sub-Saharan Africa accounts for 39 percent of the Global Prosperity Gap but 16 percent of the global population (figure O.4, panel b). This disparity highlights the large share of the region's population that is far away from the prosperity threshold.

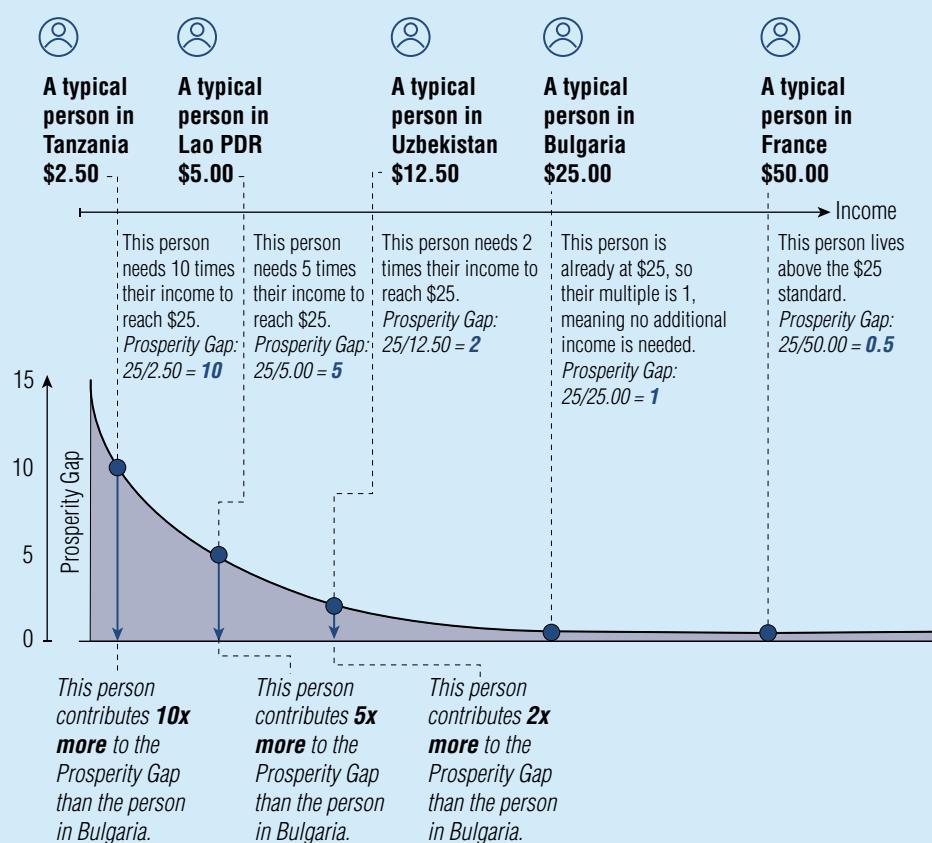
BOX 0.1**How is the Prosperity Gap calculated?**

The Prosperity Gap captures how far a society is from \$25 per person per day, which is close to the average per capita household income when countries reach high-income status. The society's shortfall is the average shortfall among all individuals living in that society but giving poorer people a greater weight. The Prosperity Gap is defined as the average income multiple needed to reach that \$25 standard for every member of that society (Kraay et al. 2023).

Note that the typical person in Tanzania, the Lao People's Democratic Republic, and Uzbekistan has less than \$25 per day so they contribute with a factor greater than 1, and the typical person in Bulgaria has \$25 per day so they contribute

FIGURE BO.1.1**The Prosperity Gap captures how far societies are from \$25 per person per day**

Let's say there are five people with the following levels of daily income:



(continued)

BOX 0.1**How is the Prosperity Gap calculated? (continued)**

with a factor of 1 (figure BO.1.1). The typical person in France lives above the \$25 standard and makes only a small contribution to the measure. While income growth experienced by any person in the world will help reduce the Prosperity Gap, the magnitude of that reduction grows exponentially the poorer the individual is. That means that the typical person in Tanzania—the poorest person in this example—will contribute more to the Prosperity Gap, and gains in their income will count more than the others.

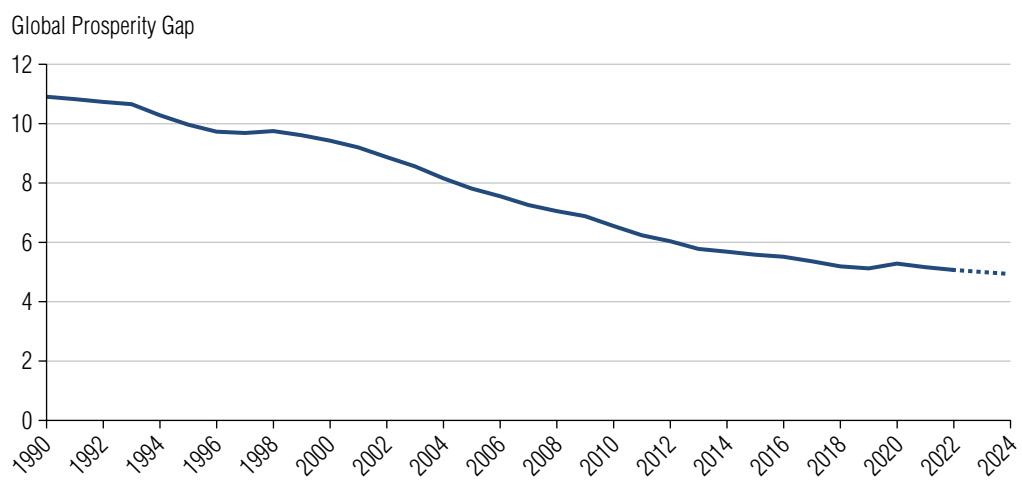
To find the Prosperity Gap in this example, these numbers are averaged:

$$\text{Prosperity Gap} = (10 + 5 + 2 + 1 + 0.5)/5 = 18.5/5 = 3.7$$

So, the society's Prosperity Gap is 3.7. This means that, on average, everyone's incomes need to be multiplied by 3.7 to reach the \$25 per day standard. If the five people in the example were the only people in the world, the Global Prosperity Gap would be 3.7.

Source: World Bank.

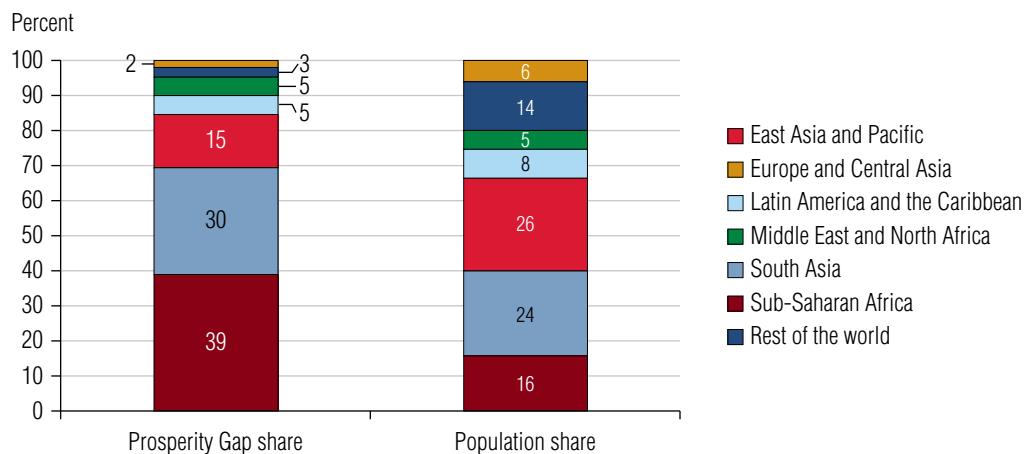
Note: All \$ values are in 2017 purchasing power parity dollars.

FIGURE 0.4**Stalled progress in Global Prosperity Gap reduction****a. Progress in reducing the Global Prosperity Gap**

(continued)

FIGURE 0.4**Stalled progress in Global Prosperity Gap reduction (*continued*)**

b. The poorest regions are furthest behind and contribute more to the Global Prosperity Gap relative to their population in 2024



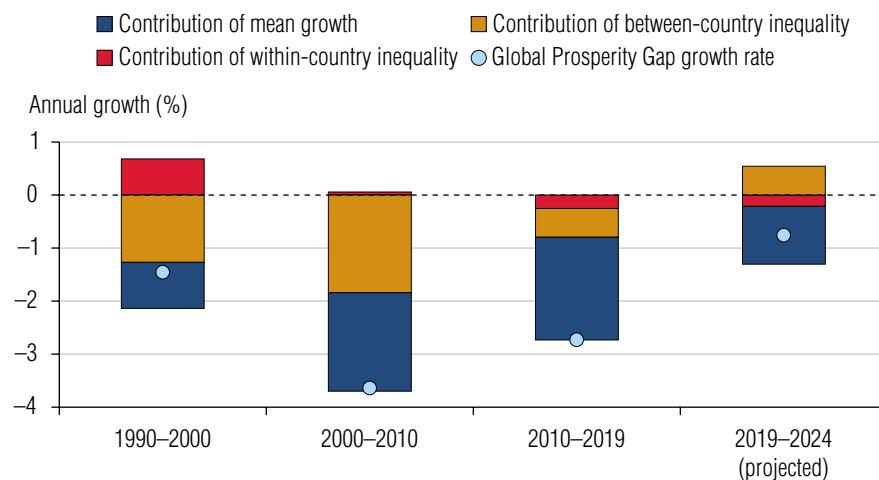
Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org/>.

Note: The estimates after 2022 are nowcasts (see annex 1A for further details on nowcasts and forecasts). See box 0.1 for a calculation of the Global Prosperity Gap. Regional contribution (percent) of the Global Prosperity Gap in 2024 is shown in panel b, compared with the regional population shares (see chapter 2 for further details). The label values may not add to 100 percent due to rounding.

Historically, gains in global prosperity have been driven by both overall economic growth and a decline in inequality between countries. Between 1990 and 2024, the Global Prosperity Gap improved at an annual rate of 2.34 percent, with global mean income increasing at an annual rate of 1.48 percent and global inequality declining by 0.86 percent. The decline in global inequality has been driven by a decline in the inequality between countries, which is measured by the disparities in average living standards across countries (Kraay et al. 2023; Lakner and Milanovic 2016). However, from 2019 to 2024, the gains in prosperity were limited by a slowdown of global growth during the COVID-19 pandemic as well as an increase in global inequality driven by a divergence in average incomes between countries (figure O.5).

FIGURE 0.5

Limited gains in the Global Prosperity Gap due to a slowdown of global growth and an increase of global inequality during the COVID-19 pandemic



Source: World Bank calculations using data from the Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org/>.

Note: A decrease in the Prosperity Gap is an improvement in welfare. Growth is calculated as the log difference. Change in the Prosperity Gap is the sum of the (negative) growth in the mean income and the decline in total inequality. Positive growth in the mean decreases (improves) the Prosperity Gap; thus, in the figure, the contribution of the mean growth is shown as the negative of mean growth. That is, for all the periods in the graph, there was positive growth in the global mean, which is displayed as a negative contribution. Inequality is measured using the inequality measure related to the Prosperity Gap. Change in total inequality is the sum of changes in between-country and within-country inequality. See annex 2B for further details.

The number of economies with high inequality has fallen, and high-inequality economies are now concentrated in Latin America and the Caribbean and in Sub-Saharan Africa

High inequality reflects a lack of opportunities for socioeconomic mobility, which can further hinder prospects for poverty reduction and shared prosperity over time. In countries where levels of income or consumption inequality are higher, an increase in growth results in a smaller reduction in poverty (Bourguignon 2003). Simulations have shown that declines in inequality can have a significant effect on reducing poverty (Bergstrom 2022; Lakner et al. 2022). However, this double dividend has been missed in some cases. Poverty reduction in Sub-Saharan Africa has been slow, largely because of slow growth. But a lack of improvement in equality has also been a missed opportunity for poverty reduction (Sinha, Inchauste, and Narayan 2024) in a region where many countries have abnormally high levels of inequality.

There is a broad consensus that when inequality in a country is high it is harmful. High levels of inequality within a country can be symptomatic of the inability of some population groups to rise along the economic and social ladder for reasons that are outside of their control, such as their gender, race, parental background, or place of birth. This is not only unjust but also inefficient, because it means that some population groups cannot participate in economic activity using their full potential. Furthermore, the inequality of outcomes and opportunities in the present directly affects the opportunities for the next generation (Atkinson 2015; van der Weide et al. 2024; World Bank 2017). For instance, unequal societies tend to exhibit greater inequalities among schools or neighborhoods, so inequalities today have a strong effect on children's opportunities (Alesina et al. 2021; Asher, Novosad, and Rafkin 2024; Chetty, Hendren, and Katz 2016). This is also important as societal frictions have been linked to actual or perceived high inequality levels—for example, the social discontent seen during the Arab Spring (World Bank 2016). Concurrently, lower inequality is correlated with higher levels of political and social stability as well as social cohesion (World Bank 2016). Evidence suggests that high inequality has been disproportionately reducing political participation among low-income voters relative to high-income voters (Erikson 2015) and at the same time increasing the share of political contributions of high-income households (Cagé 2023).

Inequality is a broad concept, and it should be studied with a broad range of measures to capture its multiple dimensions (see box O.2). This report focuses on a specific measure of inequality—the Gini index—and a specific threshold to differentiate high-inequality economies—a Gini index above 40. The Gini index is based on income (or consumption) using household surveys, which are the only ones available to monitor inequality globally. Chapters 2 and 4 in the report discuss the indicator in more detail as well as implications for measurement and interpretation.

Using the latest survey available for each economy, 49 out of 166 economies had a Gini index above 40 (map O.1).⁶ About 1.7 billion people lived in high-inequality economies in 2022. The number of economies with high inequality has fallen, from 66 a decade earlier to 49 in the most recent year. At the same time, the percentage of people living in economies with high inequality has remained roughly the same in the past decade (about 22 percent of the world population).

At present, high-inequality economies are concentrated in Sub-Saharan Africa and Latin America and the Caribbean. Over 80 percent of the economies in Latin America and the Caribbean had a Gini index above 40 in their most recent household survey. Within Sub-Saharan Africa, inequality is highest in Southern and Central Africa.⁷ High income or consumption inequality is more prevalent in low- and middle-income economies as well as economies affected by FCS (figure O.6, panel b). Around one-third of low-income economies and two-fifths of middle-income economies exhibit high levels of inequality.⁸ For FCS economies with data, two-fifths of them have high levels of inequality. Of the 68 IDA countries with data on inequality, less than 15 percent were in the low-inequality group and 37 percent were in the high-inequality group.

BOX 0.2**Concepts of welfare and differences in measured inequality**

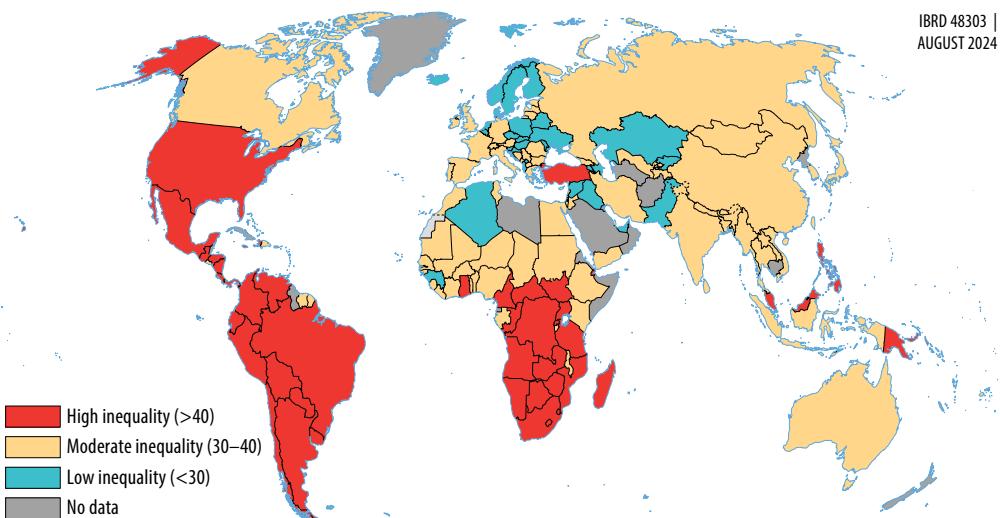
The level of inequality depends on the underlying concept of welfare that is captured. Economic inequality is generally captured in three different welfare spaces—income, consumption, or wealth—each reflecting different aspects of welfare and different observed levels of inequality. Whereas *income* signals an individual's or family's potential buying power, *consumption* expenditure is the realization of that buying power. Households generally do not consume all their income. What is left over, that is, savings, tends to be greater for the richer households compared with poorer households. This implies that the distribution of consumption tends to be more equal than the distribution of income (see annex 2D and chapter 4 for further detail). Whereas income and consumption both represent the flow of resources—that is, how much one earns or spends in a given time frame, typically a year—*wealth* represents a stock of resource such as accumulated assets, including property, corporate stock holdings, or savings, as well as other investments that can be inherited or acquired. For example, a house (or stock) is wealth, and the rent (or dividends) is the income generated from this asset. The distribution of wealth tends to be much more unequal than either income or consumption.^a

These concepts are interlinked. For instance, recent increases in income inequality have been attributed to the higher rate of return of wealth among the richest (Piketty 2014). Nevertheless, these concepts of welfare are distinct in several crucial ways. Unlike income, which can fluctuate annually, wealth tends to accumulate over time and is more resistant to short-term economic changes. This likely makes wealth a better indicator of long-term resilience and a better signal for economic opportunity or mobility. However, among the three concepts outlined here, wealth remains the most difficult to capture. This is in part due to measurement challenges that also plague income measurement in developing countries, as well as the potential to “hide” wealth offshore, which is a concern even for the countries with the most comprehensive data (Zucman 2015). Given these challenges, this report uses income or consumption depending on the type of survey available.

a. For example, see the studies by Saez and Zucman (2020) for the United States and by Alvaredo, Atkinson, and Morelli (2018) for the United Kingdom.

This report also notes that more analytical work is needed to better capture top incomes in household surveys and adjust for methodological differences between countries—such as differences between income and consumption—to improve inequality monitoring (see chapter 4).

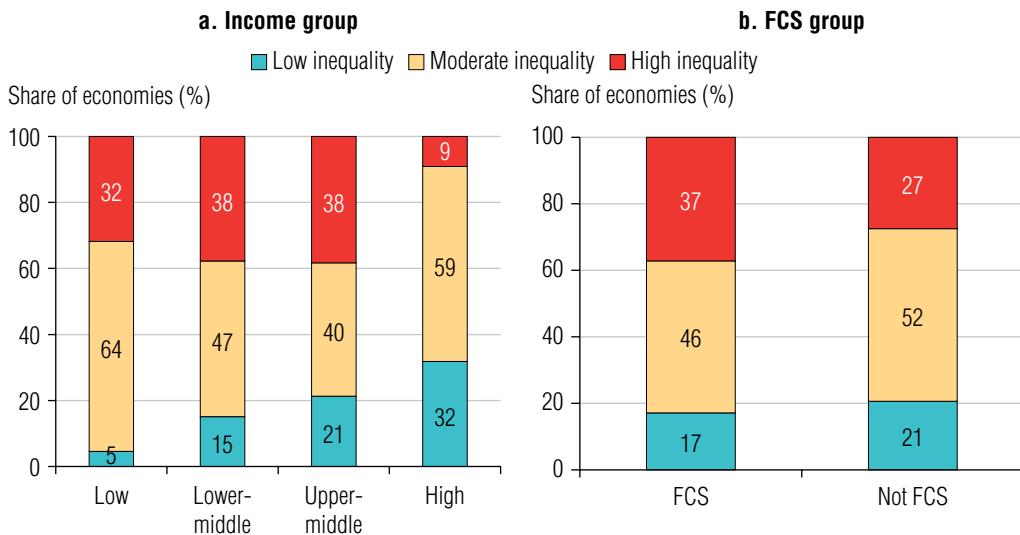
MAP 0.1
Income and consumption inequality among economies

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AUGUST 2024

Sources: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org/>; Haddad et al. 2024.

Note: The map presents Gini indexes for the latest available survey (after 2000), which measures the inequality of income or consumption, depending on the economy. High-inequality economies have a Gini index above 40, moderate-inequality economies are those with a Gini index between 30 and 40, and low-inequality economies are those with a Gini index below 30. See annex table 2F.1 for the economy classifications, Gini indexes, year of survey, and the type of welfare—income, or consumption—used.

FIGURE 0.6
Poorer and conflict-affected economies tend to be more unequal



Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org/>.

Note: FCS = fragile and conflict-affected situations. High-inequality economies have a Gini index above 40, moderate-inequality economies are those with a Gini index between 30 and 40, and low-inequality economies are those with a Gini index below 30. The data cover 166 economies with at least one household survey in the Poverty and Inequality Platform between 2000 and 2022. Gini is calculated from the latest survey year. Income group and FCS status are based on World Bank fiscal year 2024 lists. The label values may not add to 100 percent due to rounding.

Risks of gain reversals remain high for the poorest countries

Although the global distribution of income has improved since 1990, a sizable portion of the population continues to live close to the poverty lines discussed in this report (figure O.7). This means that even moderate shocks can rapidly push people back into extreme poverty. Recent shocks highlight this risk. For example, in the Middle East and North Africa, the extreme poverty rate was below 3 percent between 2000 and 2014. Today, almost 7 percent of people in the region live in extreme poverty due to increased fragility and conflict. Another example is the COVID-19 pandemic, which pushed about 73 million people worldwide into extreme poverty in a single year, predominantly in lower-income countries. The pandemic has shown how shocks can have a long-lasting effect on welfare. Shocks are expected to increase with more frequent and severe extreme weather events.

Nearly one in five people is likely to experience a severe weather shock that they are going to struggle to recover from

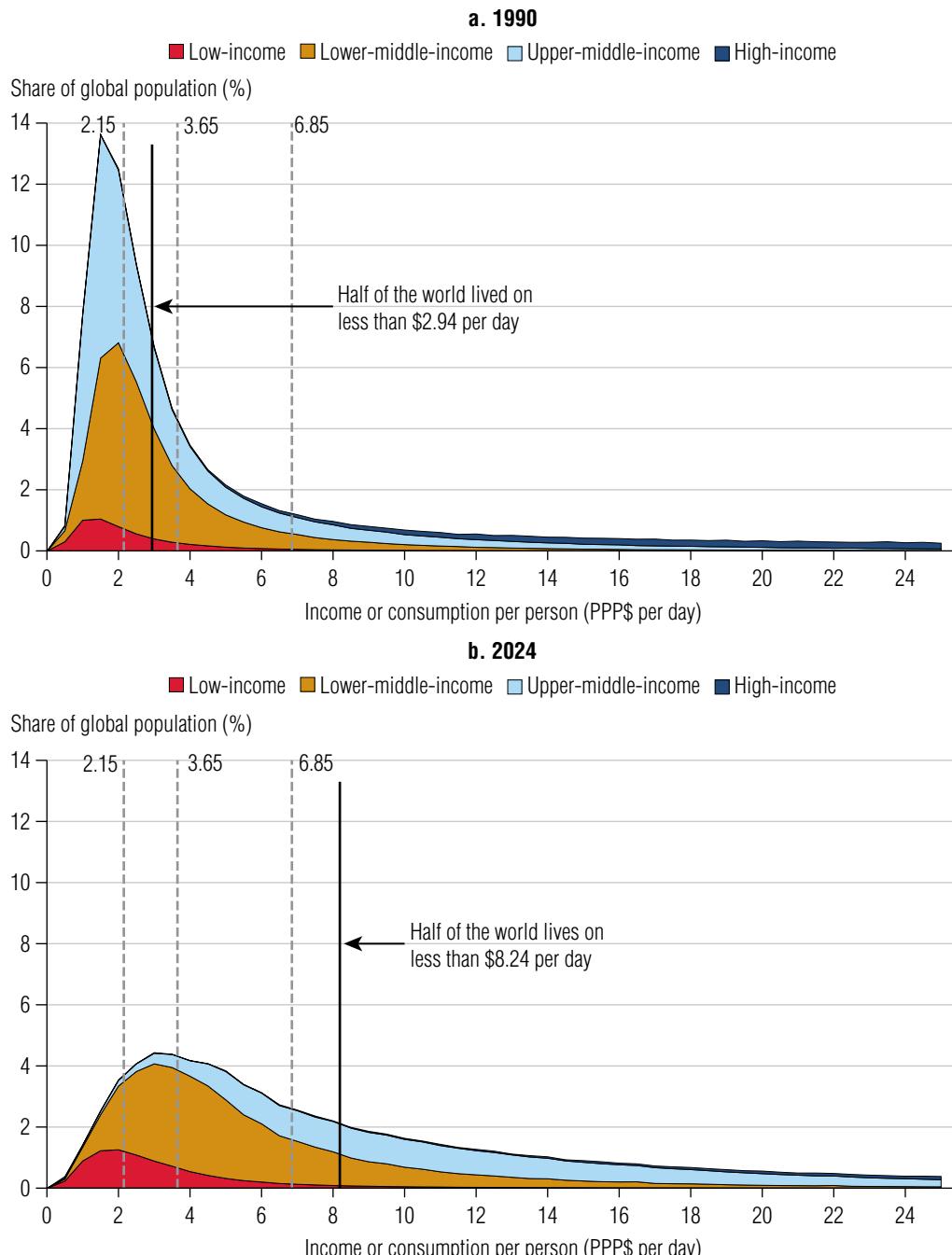
Climate change will likely lead to an increasing occurrence and severity of extreme weather events (IPCC 2023). Since the 1970s, floods, storms, droughts, and heatwaves are occurring more often. Every year, millions of households are pushed into or trapped in poverty by natural disasters (Baque and Fuje 2020; Hallegatte and Walsh 2021; Hill and Porter 2017; Kochhar and Knippenberg 2023; Pape and Wollburg 2019). In addition, droughts and heatwaves have been occurring at a higher frequency in countries where poverty rates are already high.

The World Bank has developed an indicator that tracks the number of people at high risk from climate-related hazards across the world (World Bank, n.d.). Nearly one in five people (17.9 percent) is at high risk from climate-related hazards globally, meaning they are likely to experience a severe climate shock in their lifetime that they will struggle to recover from. People are considered at risk from climate-related hazards if they are exposed to a hazard (specifically floods, heat, drought, cyclones) *and* are vulnerable to experiencing severe welfare effects from these events when they occur. Vulnerability, which is a person's propensity or predisposition to be adversely affected, is what moves people from being exposed to being at risk. Box O.3 summarizes how the indicator was constructed.

Countries can have similar shares of their population exposed, but different shares of their population at risk (map O.2). South Asia is the region with the largest share of its population exposed to shocks (88.1 percent), followed by East Asia and Pacific (67.9 percent). But Sub-Saharan Africa has the largest share of people who are at high risk from extreme weather events, even though the share of people exposed is smaller than Asia. In Sub-Saharan Africa, nearly the same proportion of people exposed to an extreme weather event is also at high risk (39.2 percent and 37.3 percent, respectively, of the total population). In comparison, even though two-thirds of the population in East Asia and Pacific is exposed, less than one-tenth is at risk. Vulnerability is lowest in North America, with less than 1 percent of the population at high risk, despite 31 percent of the population being exposed to a weather shock. In absolute terms, South Asia has the largest number of people at high risk from extreme weather events (594 million people, or 32 percent of its population).

FIGURE 0.7

Income levels in the world have grown between 1990 and 2024, but many people remain vulnerable to falling back into poverty

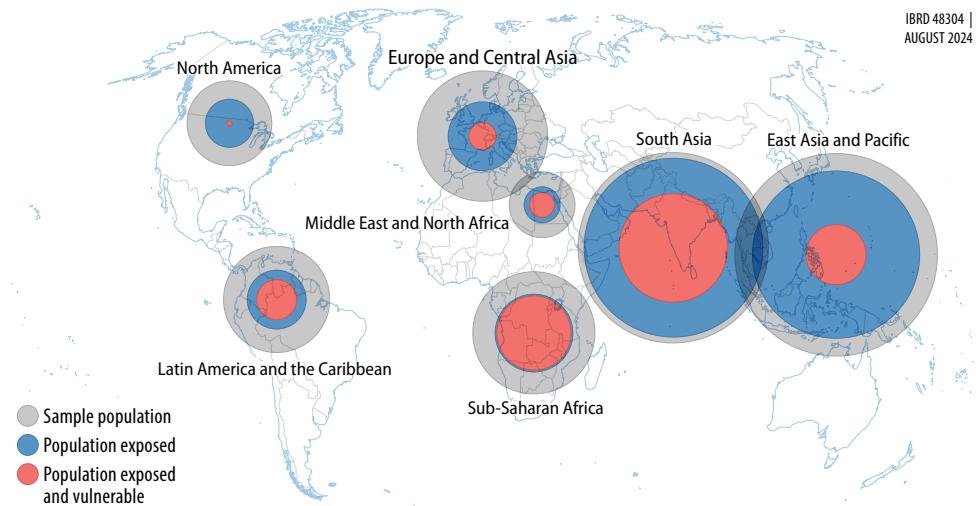


Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org/>.

Note: PPP\$ = purchasing power parity dollars. This figure shows the distribution of the population over income and consumption levels in 1990 and in 2024, cut off at \$25 per person per day and expressed in 2017 purchasing power parity dollars (PPP\$). More than 86 percent of the global population lived below the \$25 per person per day threshold in 1990 and about 80 percent live under the threshold in 2024.

MAP 0.2

Large populations are exposed to extreme weather events in South Asia and East Asia and Pacific, and vulnerability is high in Sub-Saharan Africa



Source: World Bank calculations using data from the World Bank Group Scorecard indicator: the percentage of people at high risk of climate-related hazards globally, <https://scorecard.worldbank.org/en/scorecard/home>.

Note: Gray circles depict the overall population in the region, blue circles depict the population exposed to any type of hazard, and red circles depict the population exposed to any type of climate-related hazard and vulnerable along at least one dimension. There is a blue circle in Sub-Saharan Africa, but it is barely visible in the figure because almost everyone in Sub-Saharan Africa who is exposed is also vulnerable. The circles represent regions; their placement on the map does not have any meaning. See annex 3B for more details.

BOX 0.3

How is the number of people at risk from extreme weather hazards calculated?

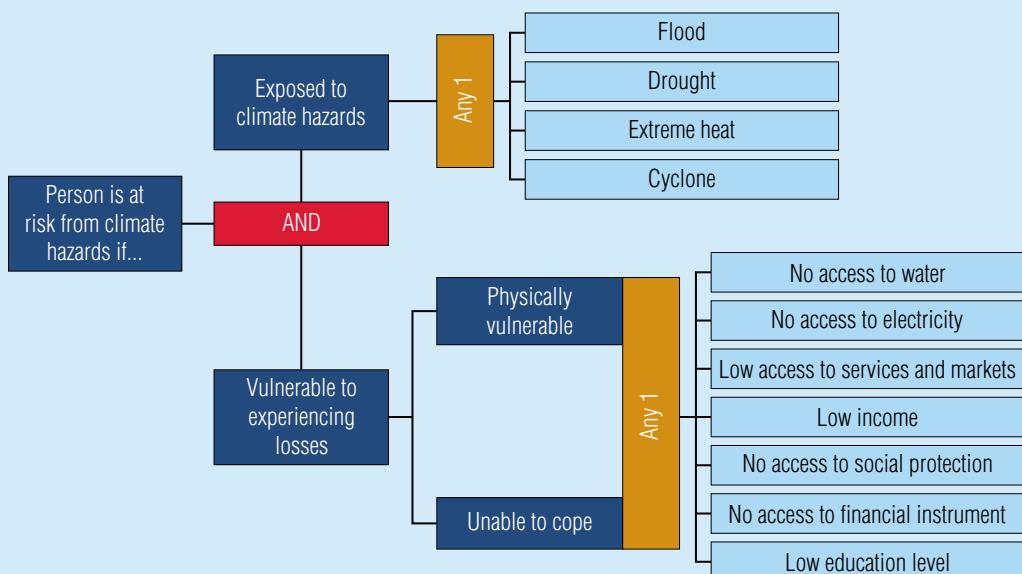
The percentage of people at high risk from climate-related hazards globally is defined as the number of people globally who are both exposed to a set of key climate-related hazards (floods, droughts, cyclones, and heatwaves) and are also highly vulnerable (that is, have a propensity to be adversely affected or unable to cope with the effects), as a share of global population. People are counted as being at high risk from climate-related hazards if they are exposed to at least one hazard and are identified as highly vulnerable on at least one dimension of vulnerability.

(continued)

BOX 0.3**How is the number of people at risk from extreme weather hazards calculated? (continued)**

This indicator follows the traditional risk framework in which risk is the combination of hazard, exposure, and vulnerability. The hazard is the potential occurrence of an extreme event, exposure indicates the people affected in the hazard's location, and vulnerability is the propensity or predisposition of these people to be adversely affected. Here, vulnerability is proxied by a set of indicators measuring (a) the physical propensity to experience severe losses (proxied by the lack of mobility and access to basic infrastructure services, such as water and electricity) and (b) the inability to cope with and recover from losses (proxied by low income, not having education, not having access to financial services, and not having access to social protection). Figure BO.3.1 summarizes the measure.

The indicator is based on a sample of 103 countries with data on all vulnerability dimensions and covers 86 percent of the world population. The latest available data within three years, before or after 2021, are used. The indicator currently considers a subset of climate hazards using historical data, a subset of vulnerability dimensions, and an aggregation methodology similar to approaches used for multidimensional poverty measures. Chapter 3 provides more details on how the indicator is constructed, and chapter 4 discusses measurement challenges with respect to the indicator in more detail, as well as some areas in which the indicator will be updated in future rounds.

FIGURE BO.3.1**Measuring the vulnerability of people at high risk from climate-related hazards**

Source: World Bank Group Scorecard indicator: the percentage of people at high risk of climate-related hazards globally, <https://scorecard.worldbank.org/en/scorecard/home>.

OVERVIEW

Without more rapid action, climate-related hazards will likely intensify. In 2022, the three main anthropogenic greenhouse gases—carbon dioxide (CO₂), methane, and nitrous oxide—reached record levels, trapping nearly 50 percent more heat than in 1990.^{9,10} Greenhouse gas emissions, which lead to global warming, are linked to the occurrence and severity of extreme weather events (IPCC 2023). If GHG emissions are not reduced, climate risks will worsen. While economic growth has become less carbon intensive, progress in reducing GHG emissions per unit of growth has slowed down recently (chapter 3 discusses in more detail the trends and patterns in GHG emissions). That progress needs to be speeded up.

To summarize, comparisons between exposure and risk show that risks can be mitigated by reducing vulnerability. While exposure in Sub-Saharan Africa is not as high as in other regions, high levels of vulnerability keep people at high risk. The availability in the region of factors that are important for resilience, such as access to basic infrastructure services (for example, water and electricity), income, education, and financial services, is limited. For instance, only 50 percent of the population in Sub-Saharan Africa has access to electricity, and 65 percent has access to basic drinking water.¹¹ These deprivations make people more vulnerable to adverse shocks.

Pathways: Eradicating poverty and boosting shared prosperity on a livable planet requires managing trade-offs

Ending extreme poverty and boosting shared prosperity on a livable planet requires actions in two areas: delivering faster and inclusive growth (that is, growing labor incomes by delivering more and better jobs and investing in the productive capacity of the poor) and protecting people from climate shocks (that is, enhancing risk management and accelerating climate change mitigation).

Progress requires more economic growth and climate actions

Delivering faster and more inclusive growth

The 1990 World Development Report highlighted that the most effective way to improve the lives of the poor is through (a) promoting economic growth that uses labor, the poor's most abundant asset; (b) investing in human capital, particularly primary education, and health care; and (c) promoting well-targeted social safety nets. These priorities are still appropriate more than 30 years later and are even more urgent given the losses in human capital due to COVID-19 and increasing environmental shocks.

Enabling the poor to benefit more from economic growth will require better-functioning labor markets, as labor is the main source of income for the poor (World Bank 2013a). It is therefore crucial to ensure that the conditions are in place for strong private sector-led growth—the main creator of jobs. Governments can support job creation by ensuring that the fundamental elements of macroeconomic stability, a business-friendly environment, and the rule of law are in place. Developing effective job strategies leading to sustained labor productivity enhancements (which are essential for fostering economic growth), reducing poverty, and ensuring inclusive

outcomes in the long term depend heavily on essential job transformations across sectors, occupations, and space (see box 1.5 in chapter 1). For example, the transition from agriculture to nonagricultural sectors is vital for economic growth, and it is marked by substantial productivity gains. The move from rural to urban areas is associated with higher wages and productivity if urban labor markets work well. Completing these job transitions is essential to closing massive income gaps and combatting poverty. Evidence suggests that progress in these transitions can significantly reduce poverty rates by shifting people into more productive activities.¹²

Growth that is most effective in poverty reduction creates opportunities for those at the bottom of the income distribution. If poorer households possess lower productive capacity, the potential for income growth and overall economic growth is more limited (López-Calva and Rodríguez-Castelán 2016).¹³ Moreover, growth that reduces poverty requires structural conditions that enable socioeconomic mobility, thereby ensuring that everyone can use their full productive capacity.

Enabling the poor to benefit more from economic growth will require substantive investments in human capital, basic infrastructure, improved opportunities and access to markets, and progressive fiscal policies that reduce inequality and raise domestic revenue (Lakner et al. 2022; World Bank 2022e; Wu et al. 2024).

Protecting people from climate shocks by enhancing risk management

A large body of evidence highlights the importance of risk management for increasing resilience to negative shocks (World Bank 2013b). Risk management must integrate the ability to prepare for risks with the capacity to respond effectively afterward. Building on the foundational work of Ehrlich and Becker (1972), preparation should encompass three proactive measures: self-insurance, market insurance, and self-protection. In addition to these three measures, a comprehensive risk management strategy includes support for sensible coping measures. Better knowledge can lead to more informed decisions about allocating resources between insurance and protection (World Bank 2013b). Similarly, improved insurance and protection can make coping with risks less challenging and less costly. Effective ways to promote resilience to climate risks are discussed in more detail in box 3.4 in chapter 3.

Investments in education and infrastructure are fundamental for risk management

Development strategies that bolster households' productivity and income-generating capacities often concurrently enhance their ability to manage climate risks by enhancing prevention and coping (Doan et al. 2023; Hallegatte and Rozenberg 2017; IPCC 2022a) and should be prioritized in poorer and more vulnerable countries.

Investing in education is fundamental to increasing incomes, but it also allows households to better prepare and cope with shocks. One important aspect of risk management is knowledge, and an increase in education leads to an increase in knowledge. Furthermore, evidence suggests that households with higher levels of education have a better understanding of and ability to process risk information such as weather forecasts and early warnings (Hoffmann and Muttarak 2017; Muttarak and Lutz 2014; Muttarak and Pothisiri 2013). In addition, households with

OVERVIEW

more education are less likely to engage in negative coping strategies (Dimitrova 2021; Hill and Mejia-Mantilla 2017; Le and Nguyen 2023).

Improving infrastructure increases access to markets and productivity and also supports risk management and resilience. For example, better infrastructure can improve access to energy, water, and communication, which can allow households to better cope with shocks when they occur. Infrastructure improvements are beneficial for both economic development and resilience, but unlocking synergies depends on how infrastructure is built. Infrastructure investments need to account for future risks, such as an increased frequency and intensity of flooding (Hallegatte et al. 2016; Hallegatte, Rentschler, and Rozenberg 2019). It is important to consider that constructing infrastructure in a resilient manner improves its cost-effectiveness in the long run, and higher up-front investment costs can reduce damages and repair costs in the future (Hallegatte, Rentschler, and Rozenberg 2019).¹⁴

Expanding insurance is also crucial

Beyond these foundational investments in human capital and infrastructure, it is important to strengthen insurance mechanisms that protect individuals from severe poverty and prevent deeper hardship during crises (Gill, Revenga, and Zeballos 2016).

Financial development is important to enable access to credit, formal insurance, and other financial products that can help households and businesses manage climate risk. One of the primary objectives of financial inclusion is to enhance households' capacity to manage common but unpredictable events that entail financial expenses. Mobile money is an example: when a weather crisis strikes, mobile money can allow households to quickly receive transfers or remittances from relatives or migrant family members who live elsewhere (Batista and Vicente 2023; Jack and Suri 2014). For instance, Sub-Saharan Africa has shown significant growth in financial inclusion driven by mobile money account adoption. Yet many adults still conduct transactions in cash, which suggests opportunities to increase financial inclusion through continued payment digitalization (Demirgüç-Kunt et al. 2022). Many people exposed to severe climate hazards are not financially included (figure O.8). These issues are particularly prevalent in Sub-Saharan Africa and the Middle East and North Africa regions, where about one in three people exposed to extreme weather events does not have a financial account (including mobile money).

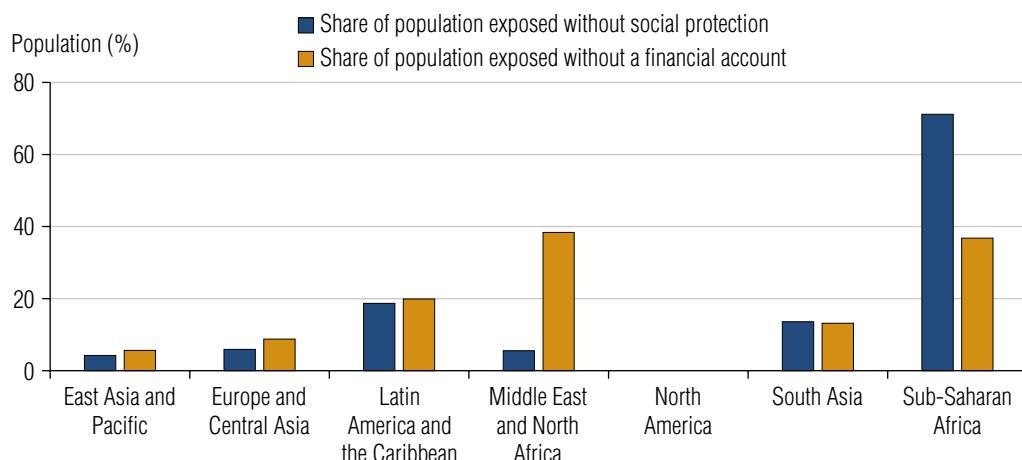
Developing insurance markets and increasing the demand for insurance is central. Household demand for insurance is constrained by several factors. In 2023, the estimated global economic losses due to natural disasters was \$380 billion,¹⁵ of which only about one-third were covered by insurance. In low-income countries, less than 10 percent of losses were covered by insurance, forcing governments to redirect limited development funds toward disaster recovery. Despite its importance for risk management, access to insurance remains insufficient, leaving billions unprotected. One important challenge is affordability, as the demand for insurance is price sensitive (Cai, de Janvry, and Sadoulet 2020; Cole et al. 2013; Hill et al. 2019; Karlan et al. 2014; McIntosh, Sarris, and Papadopoulos 2013). Interventions to reduce prices (for example, reducing reinsurance costs or reducing taxes on insurance products) can increase demand. Moreover, insurance is a more complex financial product than savings or credit

products, and financial literacy training also increases demand for insurance (Cai and Song 2017; Vasilaky et al. 2020). Liquidity constraints also limit the use of insurance, but moving payment of the insurance premium to the end of the coverage period can increase demand (Casaburi and Willis 2018; Liu, Chen, and Hill 2020).

Noncontributory social assistance programs, or social safety nets, aimed at those who are chronically or extremely poor also serve as last-resort insurance. The use of adaptive social protection can help vulnerable people manage risks from climate-related hazards by timely transferring resources to disaster victims (World Bank Group 2023). Post-disaster transfers have a benefit-cost ratio above 1.3 (Hallegatte et al. 2016). For example, the Philippines supported recipients of its flagship social safety net program, the Pantawid Pamilyang Pilipino Program, when they were hit by Typhoon Yolanda in 2013 (World Bank 2022c). In Kenya, the Hunger Safety Net Programme provided aid to over 100,000 additional households in response to droughts during 2015 and issued a special transfer to 200,000 households in anticipation of expected droughts (Hallegatte et al. 2016). Anticipatory cash transfers before the traditional humanitarian response would normally arrive can have a significant additional welfare effect (Pople et al. 2021). Yet, in Sub-Saharan Africa, 71.2 percent of the people exposed to severe cyclones, floods, droughts, and heatwaves are neither covered nor contributing to social protection and are unlikely to receive public support when one of these severe events occurs (figure O.8). Additionally, not all of those covered will have their climate risk fully covered by public safety nets.

FIGURE O.8

A large share of the population in Sub-Saharan Africa does not have access to social protection or a financial account



Source: World Bank calculations using data from the World Bank Group Scorecard indicator: the percentage of people at high risk of climate-related hazards globally, <https://scorecard.worldbank.org/en/scorecard/home>.

Note: The figure shows the share of population exposed to any hazard that neither receives social protection benefits nor contributes to social insurance, and the share of population exposed to any hazard that does not have a financial account (including mobile money). For North America, the share of population exposed to any climate-related hazard and without social protection or access to a financial account is zero. See annex 3B in chapter 3 for more details.

OVERVIEW

While safety nets serve as last-resort insurance, they need to be complemented by social insurance programs designed to protect a broader segment of the population from falling back into poverty because of individual or systemic shocks. Additionally, global insurance mechanisms are essential to help countries manage the effects of large-scale natural disasters affecting multiple nations or pandemics.

Basic systems to deliver timely information on climate risk are fundamental

Climate risk management can be enhanced through expanded early warning systems, hazard maps, and climate knowledge. In Bangladesh, Cyclone Bhola caused 300,000 deaths in 1970, and Cyclone April killed 138,000 people in 1991. Since then, investments in resilient infrastructure, road networks, and early warning systems have significantly reduced fatalities. Cyclone Sidr in 2007 resulted in 3,363 deaths, Cyclone Fani in 2019 caused five, and in 2020, Bangladesh evacuated 2.4 million people for Cyclone Amphan, with 20 fatalities. Yet, one-fifth of the world's population is not covered by an early warning system, even though these systems save lives and greatly reduce climate-related disaster losses in developing countries.¹⁶

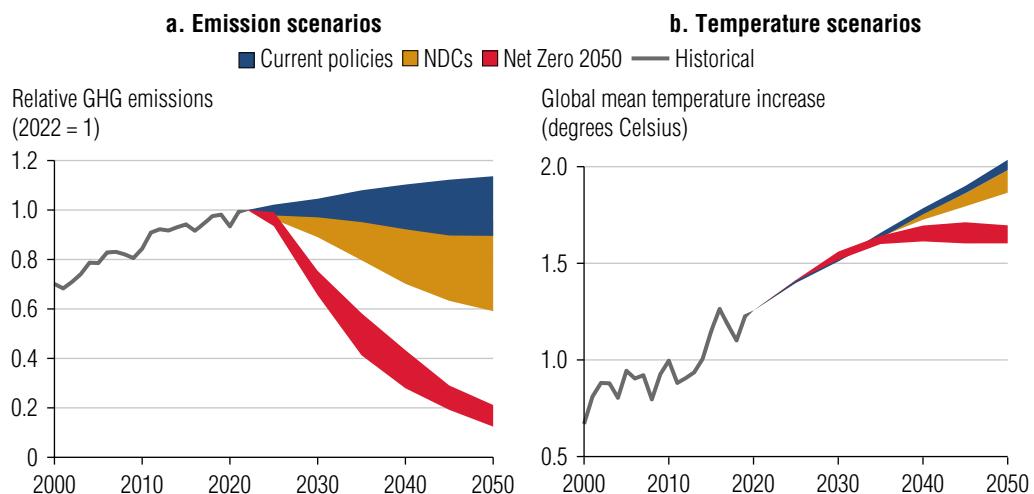
Faster economic transformations to reduce the emissions intensiveness of growth

Faster transformations of the global economy are necessary to limit global warming and reduce climate risks.¹⁷ Since 2015, when the Paris Agreement was adopted, GHG emissions were expected to rise by 16 percent until 2030 based on existing policies. At present, the expected increase is 3 percent, showing that transformations have already occurred over the past years. However, figure O.9 shows that with current policies, temperatures are projected to increase close to 2°C. Even if currently pledged Nationally Determined Contributions (NDCs)¹⁸ were to be enacted, emissions would not fall enough to limit global warming to below 1.5°C (IPCC 2022b). Only a Net Zero 2050 scenario, which is shaped by stringent climate policies and innovation, would have the chance to limit warming to around 1.5°C.¹⁹ A net-zero path would require emissions to decline by 80 percent in advanced economies and 60 percent in emerging market and developing economies by 2035 compared with the 2022 level (IEA 2023b).

Both expanded use of renewable energy and improved energy efficiency are necessary. The energy sector produces three-quarters of global emissions. Despite progress, in 2022 renewable sources added up to just 7 percent of total global energy, up from 4 percent in 1990 (see chapter 3 of the full report). Petroleum (with other liquid fuels) and coal remain the largest sources of energy (32 percent each). To reduce GHG emissions, the reliance on coal and oil will need to be brought down substantially. Doubling the pace of progress in energy efficiency could cut energy bills by one-third and constitute 50 percent of CO₂ reductions by 2030 (IEA, IRENA, et al. 2023). Further advancements and adoption of technology have the potential to speed up the necessary transformations for cutting GHG emissions. Without the growth of key clean energy technologies since 2019 (for example, solar photovoltaic [PV], wind power, heat pumps, electric cars), the increase in emissions would have been three times larger (IEA 2023a).

Carbon pricing policies are key to internalize the externalities of greenhouse gas emissions, incentivize efficiency gains, reduce the reliance on fossil fuels, and spur innovation in less emission-intense technologies (World Bank 2024f). The coverage of carbon taxes and emission trading systems (ETS) has increased from 0.15 percent of global emissions in 1990 to 24 percent in 2024. Despite the progress, three-quarters of global emissions remain unaccounted for, and many emissions have negative effective prices due to pervasive fossil fuel subsidies. Thus, while coverage is increasing, the global total carbon price—which takes into account the additional net effect of indirect pricing from fossil fuel taxes and subsidies—has not increased much since 1994 (Agnolucci et al. 2023). Repurposing fossil fuel subsidies is thus important to remove market distortions and to help move resources to sustainable projects (Damania, Balseca, et al. 2023). Investing in research and development and digitalization is crucial to spur innovation and transitions.

FIGURE 0.9
Projections of emissions and temperatures to 2050



Sources: Panel a: Network for Greening the Financial System (NGFS) 2023, harmonized to historical 2022 emissions estimations from EDGAR data. Panel b: World Bank calculations using projections from NGFS 2023, harmonized to historical 2020 temperature estimations from IPCC 2021.

Note: EDGAR = Emissions Database for Global Atmospheric Research; GHG = greenhouse gas; IPCC = Intergovernmental Panel on Climate Change; NDCs = Nationally Determined Contributions. Ranges for each policy scenario are based on four different projection models: GCAM 6.0, MESSAGE-GLOBIOM 1.1-M-R12, REMIND-MAgPIE 3.2-4.6 Integrated Physical Damages [95th-high], and REMIND-MAgPIE 3.2-4.6 Integrated Physical Damages (median). In panel b, temperature increases are relative to the average global surface temperature of the period 1850–1900 (pre-industrial) (IPCC 2021). Temperature projections refer to the AR6 Surface Temperature increase (50th percentile) from the MAGICC 7.5.3 model.

Informed decisions require understanding trade-offs and synergies and managing transition costs

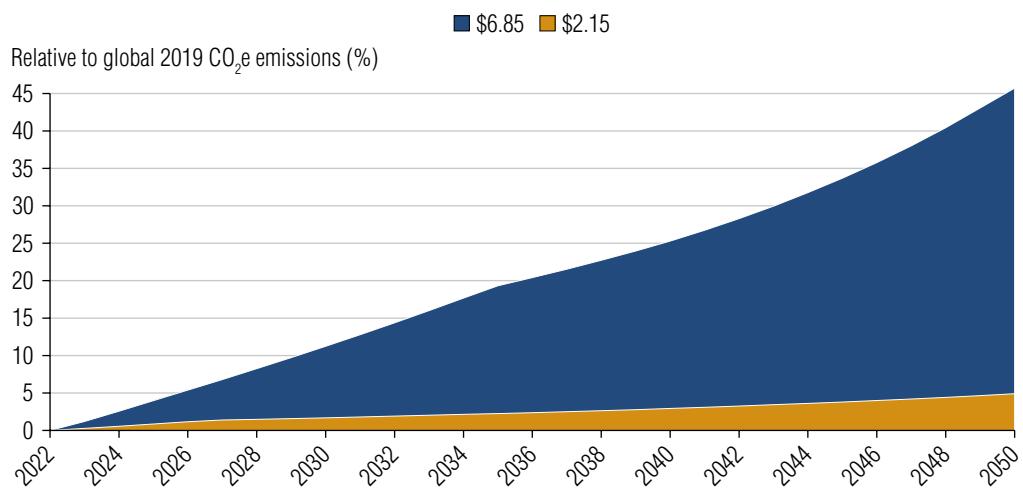
To inform decisions, it is important to understand the trade-off between growing incomes and lowering GHG emissions, find ways to scale up synergistic policies that can help advance on multiple fronts or reduce trade-offs, and manage transition costs to specific groups and communities.

The trade-off between growing incomes and lowering emissions

Past economic growth and poverty reduction have been associated with high GHG emissions. This marks an apparent tension between advancing on poverty reduction, growing people's incomes, and reducing emissions. Unsurprisingly, research suggests that additional emissions attributed to moving individuals out of *extreme* poverty does not materially undermine climate goals, as emissions of low-income households are minuscule (Bruckner et al. 2022). Wollburg, Hallegatte, and Mahler (2023) calculate the additional economic growth that would be required to eradicate extreme poverty, and the additional emissions implied using historical emission intensities (2010–19). Eradicating extreme poverty would entail 4.7 percent more emissions than in 2019 (figure O.10). This number becomes larger at higher poverty lines. At \$6.85 per person per day, additional emissions would reach 46 percent with historical emission intensities (figure O.10). This trade-off is different across countries, depending on their levels of poverty and the sources of economic growth and emission levels. Yet, it is clear that the foregone reduction in GHG emissions from extreme poverty eradication is minimal.

FIGURE O.10

Additional emissions associated with poverty alleviation increase with the level of ambition



Source: Wollburg, Hallegatte, and Mahler 2023.

Note: CO₂e = carbon dioxide equivalent. The figure shows additional emissions relative to 2019 if poverty were to be alleviated at the \$2.15 and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars) using historical emission intensities.

Synergistic policies can ameliorate the trade-offs

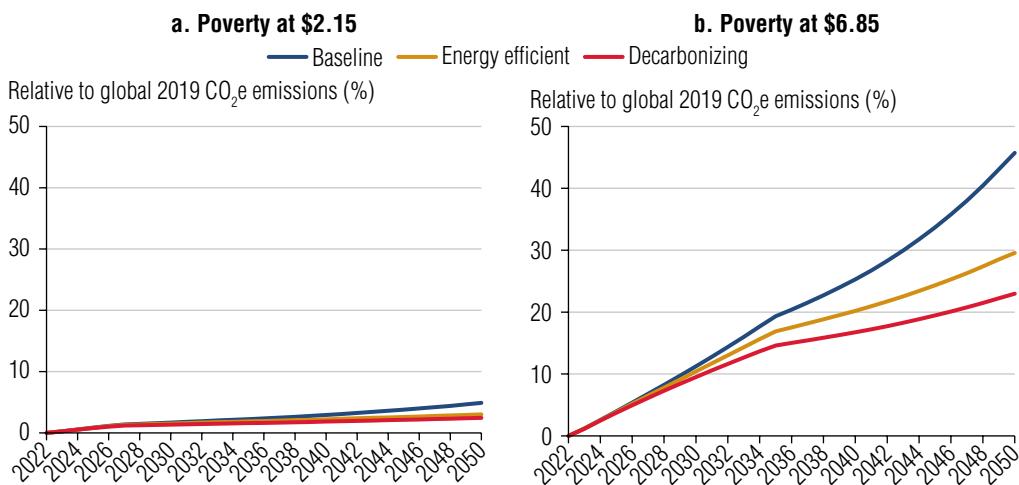
Investment in renewable energy and energy efficiency offers multiple benefits beyond reducing emissions

Studies show that renewable energy investments not only help lower emissions but also meet growing energy demands and improve energy security (World Bank Group 2023). For some countries with low energy access, it can be more cost-effective to develop renewable energy infrastructure than to expand fossil fuel generation (World Bank Group 2023).²⁰ Solar and wind energy are particularly efficient for connecting sparsely populated areas, and lower-income regions can benefit directly from them. For example, in countries such as Uzbekistan and Côte d'Ivoire, where gas supplies are decreasing and electricity demand is rising, transforming power systems to renewable energy is the most cost-efficient solution (World Bank Group 2023).

These investments are also synergistic in the sense that they can ease the trade-off between economic growth, poverty reduction, and emissions. Simulations indicate that investing in renewable energy and energy efficiency combined would in fact lower the additional emissions that accompany the economic growth needed to reduce poverty by more than half (figure O.11) (Wollburg, Hallegatte, and Mahler 2023).

FIGURE O.11

Lower emissions from poverty alleviation projected with energy efficiency and decarbonization



Source: Wollburg, Hallegatte, and Mahler 2023.

Note: CO₂e = carbon dioxide equivalent. The figure shows additional emissions relative to 2019 if poverty were to be alleviated at the \$2.15 and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars). The baseline scenario uses historical emission intensities. Energy-efficient and decarbonizing scenarios assume that all countries achieve the top 10 percent historical performance in energy efficiency and decarbonization.

OVERVIEW

Tackling air pollution is a clear win-win strategy that should be prioritized

Air pollution is a leading environmental risk to people's health (World Bank 2022a). Air pollution is estimated to be responsible for a staggering 6.7 million deaths²¹ annually worldwide, almost the total number of deaths due to COVID-19 to date²² or an amount roughly equivalent to one-third of the combined deaths due to communicable, maternal, neonatal, and nutritional diseases in 2021.²³ Air pollution today carries a global health cost representing 6.1 percent of global GDP in 2019 (World Bank 2022a).

For some countries, particularly those in South Asia and Sub-Saharan Africa, annual exposure levels are particularly high, exceeding 10 times the recommended levels. Indeed, South Asia is home to 37 of the 40 most polluted cities in the world (World Bank 2023e). In South Asia, air pollution causes an estimated 2 million premature deaths each year and imposes significant economic costs. World Bank (2023e) shows that cost-effective strategies to lower air pollution in South Asia not only can save lives but also bring important climate benefits. For example, reduction of air pollution concentrations to World Health Organization (WHO) Interim Target 1 by 2030 would reduce CO₂ by 22 percent and methane by 21 percent.²⁴ Urban development that focusses on mass transit systems can lower both CO₂ emissions and air pollution levels (Mukim and Roberts 2023).

Several other actions can help depending on the context

Another area with sizable synergies is improving agricultural productivity through climate-smart practices, especially for low-income countries (Sutton, Lotsch, and Prasann 2024). In regions where agriculture is an important contributor to emissions, such as Latin America and the Caribbean and Sub-Saharan Africa, such practices will be crucial. For instance, in Colombia, agriculture accounts for 22 percent of the country's GHG emissions, and agricultural expansion over the past two decades has primarily occurred at the expense of forests and natural ecosystems. Climate-smart agriculture increases agricultural productivity, spurring economic growth without deforestation. However, only 15 percent of farms in Colombia use innovative technologies, and most climate-smart agricultural initiatives have remained in the pilot stage. Public policy is needed to promote these practices more widely. This can be achieved by redirecting agricultural support, strengthening innovation systems, facilitating financing services, and improving land information systems and administration (World Bank 2023c). In Cambodia, which could suffer one of the largest losses in rice yields in Southeast Asia because of climate change, analysis indicates that the negative effects of droughts can be entirely mitigated through irrigation or crop-rotation practices (World Bank 2023b).

Repurposing agricultural subsidies to climate-smart and productivity-enhancing practices can reduce overall agricultural emissions by more than 40 percent, the land footprint of agriculture by 2.2 percent, and higher productivity could reduce global extreme poverty by about 1 percent (Laborde et al. 2022). This is not only relevant for lower-income countries, as removing inefficient subsidies alleviates market distortions and also reduces deforestation and

biodiversity loss in high-income countries (Damania, Balseca, et al. 2023). Agricultural and energy subsidies constitute around 3 percent of GDP in lower-middle-income and low-income countries, but only 20 percent of spending on subsidies reaches the bottom 40 percent of the populations (World Bank 2022d).

Moreover, sustainable forest management initiatives not only protect biodiversity and reduce emissions but also provide livelihood opportunities for local communities, thereby reducing poverty and enhancing resilience to climate-related disasters (Barbier 2010; Damania, Polasky, et al. 2023; Grosset, Papp, and Taylor 2023). In Peru, transitioning to a zero-carbon forest sector could generate employment opportunities, yield \$3.5 billion in benefits from restored ecosystem services, and increase the value added of the sector sevenfold by 2050 (World Bank 2022b). More efficient land use could sequester an additional 85.6 billion metric tons of CO₂ equivalent without adverse economic impacts—an amount equivalent to approximately 1.7 years' worth of global emissions (Damania, Polasky, et al. 2023).²⁵

It is important to identify and remove constraints to scale up synergistic policies

While synergistic strategies exist across different geographical contexts and sectors, challenges may still arise in their implementation. For instance, agroforestry may require a fundamental shift in traditional farming techniques, necessitating new skills or knowledge that farmers may not initially possess. Risk aversion can also be a challenge; farmers might be hesitant to adopt new practices because of uncertainty about the outcomes or fear of initial yield reductions. Financial constraints are another common barrier, as up-front costs for resources or training might be prohibitive for lower-income households. Moreover, cultural and social norms can influence the willingness to adopt new methods, as practices deeply ingrained in community identity may not be easily altered. Lastly, the lack of supportive policies or incentives from governments can impede widespread adoption, as can inadequate access to markets or resources necessary to implement these new practices effectively. Addressing these barriers through finance, comprehensive support systems, education, and community engagement is essential for the successful adoption and long-term sustainability of synergistic strategies.

Managing transition costs is important for the poor and vulnerable

Transitioning toward a low-carbon, climate-resilient economy may involve a trade-off between a cost today and benefits in the future, as well as opportunity costs between different priorities. These transitions bring future climate benefits by altering the probability distribution of climate-related hazards, but they can be costly for specific people now.

Transitioning to green industries may lead to or accelerate job displacement in traditional industries that rely heavily on fossil fuels. Reductions in coal production are unlikely to have substantial effects on national employment and output in many economies because of the industry's low labor share. For example, in Indonesia, the world's second-largest coal exporter, the coal industry's share of the GDP is less than 2 percent, and it employs only 0.2 percent of the workforce (World Bank Group 2023). However, effects on local communities can be

OVERVIEW

substantial in some instances (World Bank Group 2023). Challenges arise as displaced workers may face difficulties transitioning to alternative employment because of differences in skills, wages, and geographic locations (World Bank 2023a). For instance, in six South Asian countries (Bangladesh, India, the Maldives, Nepal, Pakistan, and Sri Lanka), workers in pollution-intensive jobs are systematically less educated and are often informally employed; the opposite applies to workers in green jobs. Going beyond education levels to consider foundational skills, analysis in Poland shows that people in green jobs on average have higher numeracy, literacy, and problem-solving skills. There are also major gender differences in green employment across all major occupation groups, with women tending to have browner jobs (World Bank 2022d).

Workers in carbon-intensive sectors can be affected not only by local energy transition policies but also by the global consequences of carbon mitigation policies on trade flows. Changes in goods and labor demands may originate from abroad. Take, for example, the Carbon Border Adjustment Mechanism (CBAM), a carbon tariff that penalizes high-carbon exports to the European Union. If industries in certain countries fail to decarbonize, such systems may redirect demand to producers elsewhere.²⁶ While CBAM is not likely to have a large effect on countries' GDP or trade balances, it may negatively affect workers in some sectors in lower-income countries (World Bank Group 2022).

Consumers, especially those with lower purchasing power or who allocate a significant portion of their budget to food and energy, may encounter challenges from policies aimed at reducing emissions that affect prices. For example, carbon pricing schemes and the removal of fossil fuel subsidies could lead to short-term increases in poverty in several low- and middle-income countries if policies are not carefully designed (World Bank Group 2022). Indirect subsidies, like those for energy, often constitute a higher share of the market income for poorer households (World Bank Group 2022).

The transition costs and how to manage them will vary depending on each country's context. These challenges will also depend on how policies are implemented and how political and economic institutions align to support these transitions (Lankes et al. 2024; Rizk and Slimane 2018). Transition costs, such as higher energy prices or job losses in carbon-intensive sectors, can be particularly hard for poorer people to manage. Therefore, assessing how the green transition affects poor and vulnerable people and designing policies to reduce negative effects are essential.

Policies that invest in skills and reskilling can play a vital role in facilitating the transition of workers affected by industry changes. Active labor market programs, for instance, not only help workers acquire the skills needed for this transition but also ensure a workforce is ready to meet the demand in green industries. Programs supporting internal migration can be particularly valuable (Rigolini 2021). To support communities most affected by job losses, targeted policies are essential. These include initiatives to promote job creation, especially in areas facing employment challenges, and support for climate-smart agricultural practices, job training, and skills development. Such measures are crucial for facilitating the transition to low-carbon and sustainable livelihoods.

It is also important to implement compensatory measures to not disproportionately affect poor households. Well-designed redistribution measures can mitigate the effects on households,

especially those with lower incomes (Blanchard, Gollier, and Tirole 2023). According to the findings of Steckel et al. (2021), redistributing revenues generated from carbon pricing to all individuals, not just the poor, results in a net income gain for poor households. Similarly, redistributing domestic carbon revenues as an equal-per-capita climate dividend more than offsets the negative effects of higher prices, lifting approximately 6 million people out of poverty globally.

To counteract the adverse effects of fuel price hikes on the poor, governments have various policy tools at their disposal beyond cash transfers. For instance, in urban areas, making public transportation more affordable or providing subsidies to assist low-income households in securing housing closer to job opportunities can help mitigate these effects (Liotta, Avner, and Hallegatte 2023). Such incentives also align with emission reduction objectives.

Priorities: Doing what matters, where it matters most

Acting on these multiple fronts requires fundamental changes in how countries approach their national development strategies and their contributions to global public goods. However, there are no simple solutions. The pathways presented above involve difficult trade-offs across objectives and transition costs.

It is important to recognize that low growth and high debt servicing severely constrain the ability of many countries to act. The financing gap for sustainable development is mounting (United Nations and Inter-agency Task Force on Financing for Development 2024; World Bank 2024d). The COVID-19 pandemic, inflation, and the global economic slowdown have exacerbated the already high debt levels in poorer countries (World Bank 2024d). These debt burdens further constrain the already limited fiscal space of lower-income countries (World Bank 2023d, 2024b). Interest payments on their total external debt stock in IDA countries have quadrupled since 2012, reaching an all-time high of \$23.6 billion, which diverts spending away from health, education, and other critical needs (World Bank 2023d). Low-income countries are spending about 2 percent of GDP on interest payments to service debt in 2024 (World Bank 2024c), which is more than half of what they spend on education (about 3.6 percent of GDP [Bend et al. 2023]).

In this constrained environment, there is an urgent need to prioritize the actions that will have the highest return for development and that can allow the world to make progress on the interlinked goals of eradicating poverty, boosting shared prosperity, and making the planet more livable. The guiding principle is to focus on where the poor and vulnerable live and where the emissions are highest and where they are likely to increase most. As shown in chapter 1, extreme poverty will be concentrated increasingly in Sub-Saharan Africa and fragile and conflict-affected countries (in Sub-Saharan Africa and elsewhere). The poorest countries are also most at risk from climate hazards.

Yet, emissions are largely generated by high-income and upper-middle-income countries. Priorities in terms of mitigating emissions should also consider how emissions are evolving.

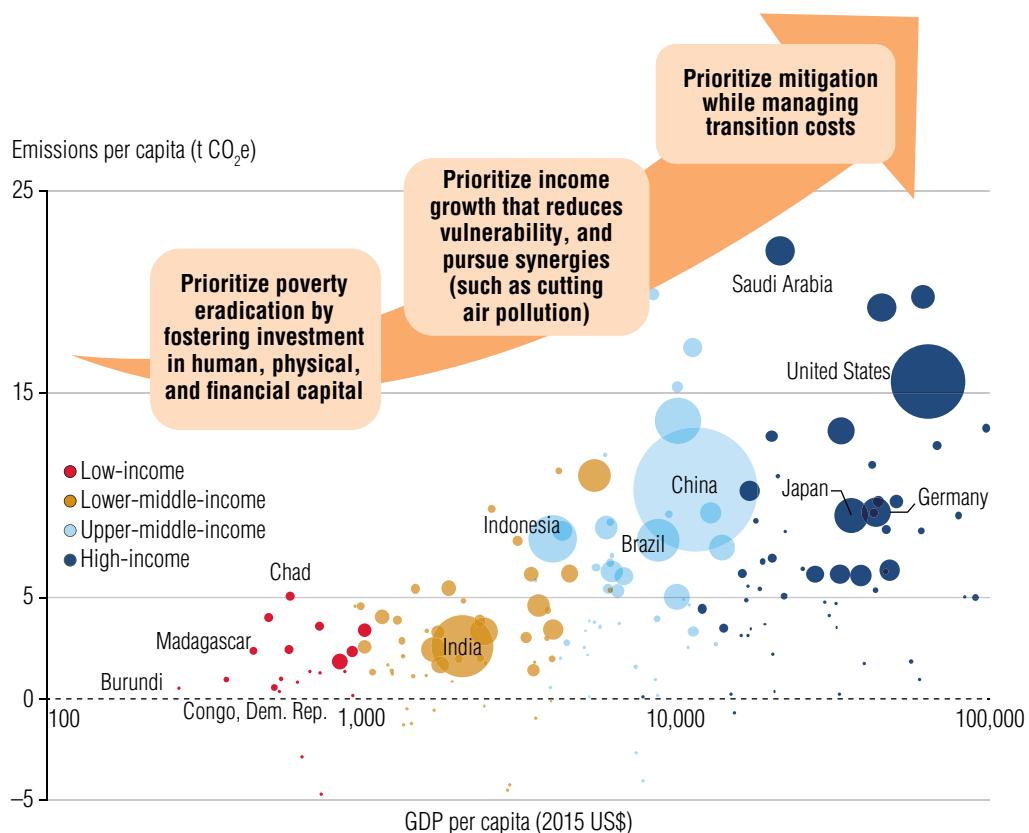
OVERVIEW

Under current policies, GHG emissions from high-income and upper-middle-income countries are projected to decline, but not nearly fast enough to limit warming to around 1.5°C. To reach this goal, additional CO₂ emissions will need to fall to practically zero in these countries. In addition, lower-middle-income countries do not contribute much to emissions today, but without action, they will have a significant role in total emissions in a few decades.

Figure O.12 brings these considerations together and illustrates a simplified way to identify priorities. Importantly, each unique situation requires its own tailored solutions, and the results from this report do not aim to be prescriptive for a specific country. Country-specific studies are recommended to guide prioritization at that level. The following discussion aims to shed light on where attention should be placed from a broader global perspective.

FIGURE O.12

Priorities to advance on the interlinked goals



Source: Global Atmospheric Research (EDGAR), Grassi et al. 2023, and World Development Indicators.

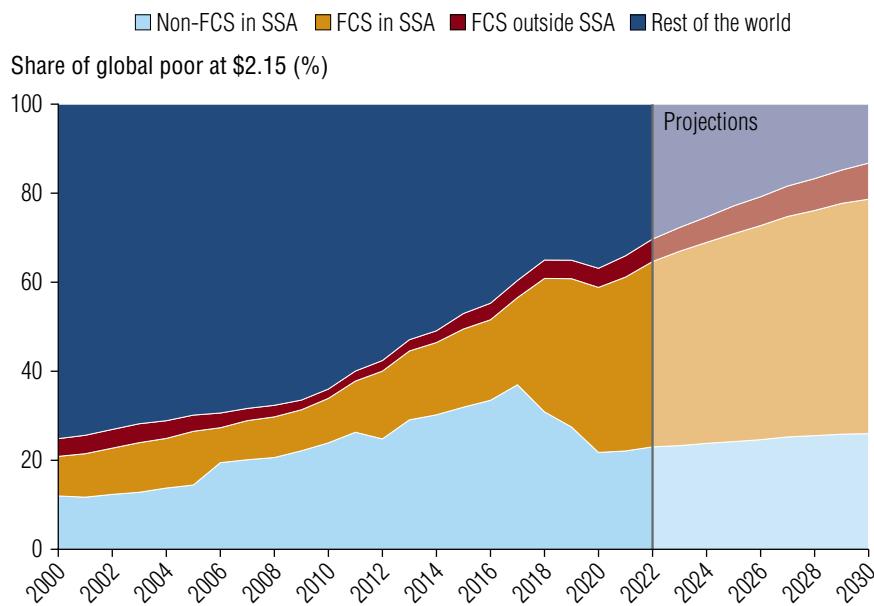
Note: GHG = greenhouse gas; t CO₂e = tons, carbon dioxide equivalent. The size of the bubbles indicates total GHG emissions. Negative emissions occur when ecosystems absorb more carbon than the country emits. A few small countries with very high per capita emissions (Bahrain, Guyana, Iceland, Kuwait, Oman, Palau, Qatar, Trinidad and Tobago, United Arab Emirates) and countries with very low per capita emissions (Central African Republic, Vanuatu) are omitted for visual purposes. The horizontal axis uses a logarithmic scale.

Low-income settings: Prioritize poverty reduction by fostering investment in human, physical, and financial capital

Going forward, extreme poverty will be concentrated increasingly in countries in Sub-Saharan Africa and in FCS (figure O.13). By 2030, one-half of the global extreme poor will be in today's FCS within Sub-Saharan Africa, and an additional one-quarter is projected to be in countries in Sub-Saharan Africa that are not in FCS today. Effectively, the relative concentration of extreme poverty in FCS or Sub-Saharan Africa versus in non-FCS and non-Sub-Saharan Africa will have reversed over the course of three decades. The share of poor in FCS and Sub-Saharan Africa will have grown from one-quarter to more than four-fifths. Current IDA countries will comprise 82 percent of the global poor in 2030 with the currently projected growth rates, and 90 percent of the global extreme poor in 2050.

FIGURE O.13

Increased concentration of extreme poverty in Sub-Saharan Africa and FCS



Source: World Bank calculations using data from the Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org/>.

Note: FCS = fragile and conflict-affected situations; GDP = gross domestic product; SSA = Sub-Saharan Africa. The extreme poverty rate is calculated at \$2.15 per person per day (expressed in 2017 purchasing power parity dollars). Countries in FCS are defined following the World Bank classification of fragility and conflict-affected situations for each year until 2022, and keeping the definition fixed in 2022 for the years after. Between 2022 and 2029, poverty is projected based on per capita GDP projections in *Global Economic Prospects, June 2024* (World Bank 2024c) complemented by the *Macro Poverty Outlook, Spring Meetings 2024* (World Bank 2024e) and the *World Economic Outlook* (IMF 2024), and for 2030, average annual historic growth rates (2010–19) are used. Population coverage is below 50 percent for Sub-Saharan Africa after 2019, and for countries in FCS in 2000 and after 2017.

OVERVIEW

In these settings, higher economic growth is an essential foundation to support poverty reduction and build resilience. Per capita income growth is expected to remain at a meager 1.5 percent in Sub-Saharan Africa and 2.3 percent in IDA countries in 2025 (World Bank 2024c, 2024d). Various factors have contributed to the slow economic growth in IDA countries. First, many of these countries have not benefited from globalization as much as countries that historically had high poverty rates have, in particular Asian countries (Lakner and Milanovic 2016; Milanovic 2016). IDA countries engage less in international trade than other lower-middle-income countries and rely heavily on food imports, making them vulnerable to food price inflation (Laborde, Lakatos, and Martin 2019; World Bank 2024d). Moreover, compared with other countries, IDA economies have exhibited limited technological change (World Bank 2024a) and are still heavily dependent on agriculture and natural resources. IDA countries are also characterized by weak institutions, inhibiting investment and growth (World Bank 2024d).

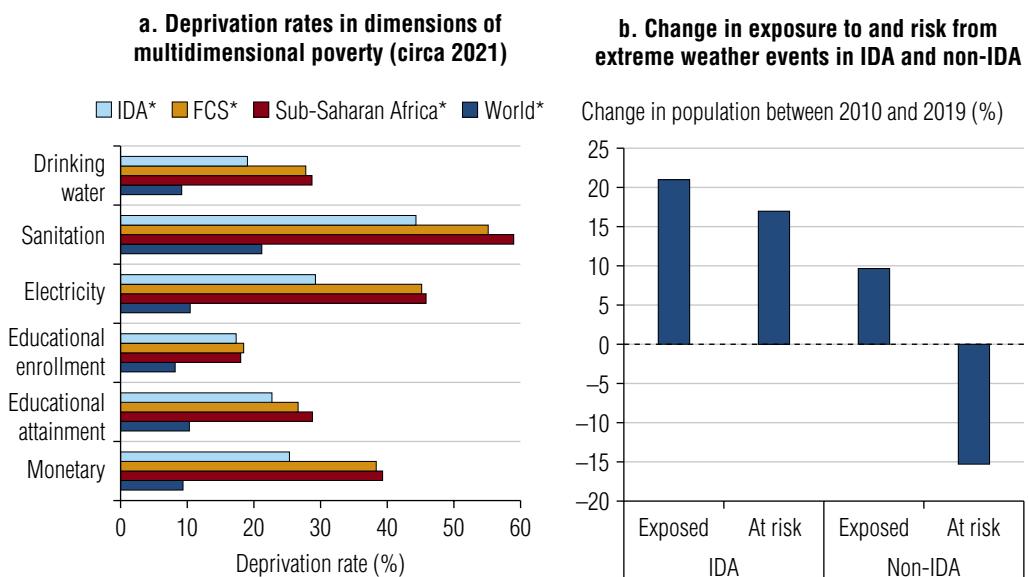
Poverty reduction in IDA countries is hindered by big gaps in human capital and basic infrastructure and services. About one-half of the people in Sub-Saharan Africa and FCS countries lack electricity or sanitation (figure O.14, panel a). Large education gaps also persist. In 20 low-income countries with available data, more than 90 percent of children cannot read or understand a basic text by the end of primary school.²⁷ Yet, investments in education in low-income countries remain very low.²⁸ In 2021, the average low-income country spent only \$54 per student per year, compared with more than \$8,500 in the typical high-income country (Bend et al. 2023). In some of the poorest countries in Sub-Saharan Africa, only 20 percent of respondents surpass the education of their parents, compared with 80 percent in East Asia (van der Weide et al. 2024). In addition, in 15 out of 18 countries with available data in Sub-Saharan Africa, more than half of the inequality in consumption is due to factors beyond an individual's control, such as their place of birth or ethnicity (Sinha, Inchauste, and Narayan 2024). The result is that many people are deprived of the opportunity to use their full potential.

These large gaps and more broadly limited progress on multidimensional poverty have also increased vulnerability to shocks in these countries. For example, of the population in IDA countries covered by the data on risks from extreme weather events used for this report, 56 percent are exposed to extreme weather hazards and 47 percent are at risk. This means that 84 percent of those who are exposed are also at risk. In comparison, while a larger share of people is exposed to an extreme weather event in non-IDA countries (59 percent), only 11 percent are at risk. Between 2010 and 2019, the number of people exposed to extreme weather events rose in both IDA and non-IDA countries, but twice as fast in IDA countries (figure O.14, panel b).²⁹ However, despite the increase in the exposed population, non-IDA countries were able to reduce the population at risk significantly over this period. This is not the case for IDA countries, where the population at risk rose almost one-to-one with the population exposed. In non-IDA countries, the population at risk fell because of the large gains in income and financial access, developments from which people in IDA countries did not benefit as much.

Accelerating economic growth in these settings will not lead to significantly higher GHG emissions. Low-income countries barely contribute to emissions and emissions are not expected to grow significantly under current policies (see chapter 3 of the full report). Still, low-income countries must be careful to avoid getting locked into carbon-intensive technologies and growth paths that will become more costly and less efficient in the future (Hallegatte, Rentschler, and Rozenberg 2019). This is where international financing plays a key role—in enabling these countries to invest in future-oriented technologies now and not lock in on a pathway that will leave them with inefficient and stranded assets in the future (Hallegatte, Rentschler, and Rozenberg 2019).

FIGURE 0.14

Rates of multidimensional poverty and increased risks from extreme weather in IDA countries compared with other countries



Sources: Panel a: World Bank calculations using data from the Global Monitoring Database. Panel b: World Bank calculations using data from Doan et al. 2023.

Note: FCS = fragile and conflict-affected situations; IDA = International Development Association. Panel a: The figure presents the share of population deprived in each indicator of the multidimensional poverty measure for selected regions and country groupings circa 2021. For more information on the multidimensional poverty measure and its components, see chapter 1 of the full report. Panel b: The sample consists of 45 countries that have data both for 2010 and 2019. These countries represent 52 percent of the population in IDA and 63 percent of the population in non-IDA countries. The variables used to compute the risk indicator for the years 2010 and 2019 differ slightly from the risk indicator for the year 2021 used in other parts of the report. *The surveys available for 2020 or later cover less than 50 percent of the population.

Middle-income countries: Prioritize income growth that reduces vulnerability and pursue synergies such as cutting air pollution

Growth in middle-income countries needs to continue and accelerate to lift people above poverty lines of \$3.65 and \$6.85 per person per day, but many countries in this group are stuck in a middle-income trap (World Bank 2024g). As for low-income countries, fast growth that creates jobs and enhances the productive capacity of poorer households is important to serve the dual function of increasing incomes and improving the resilience of these households.

At the same time, the GHG emissions of many middle-income countries cannot be neglected. Even though lower-middle-income countries currently contribute less than higher-income countries to GHG emissions (19 percent versus 29 percent of total emissions in 2022), their emissions will increase over the next decades under current policies and surpass those of high-income countries by 2030 and those of upper-middle-income countries in the 2040s in absolute terms. Therefore, it is essential that lower-middle-income countries start transitioning to a less carbon-intensive pathway soon.

Because growth needs to be less carbon intensive, it is crucial to identify and scale up synergistic policies that can contribute significantly across the intertwined goals. As discussed, tackling air pollution is a clear area with multiple gains, particularly for low- and middle-income countries. In countries where agriculture is important, climate-smart agriculture and repurposing agricultural subsidies could be an important area of action. It is also important to invest early in renewable energy.

High-income and upper-middle-income countries: Accelerate mitigation while managing transition costs

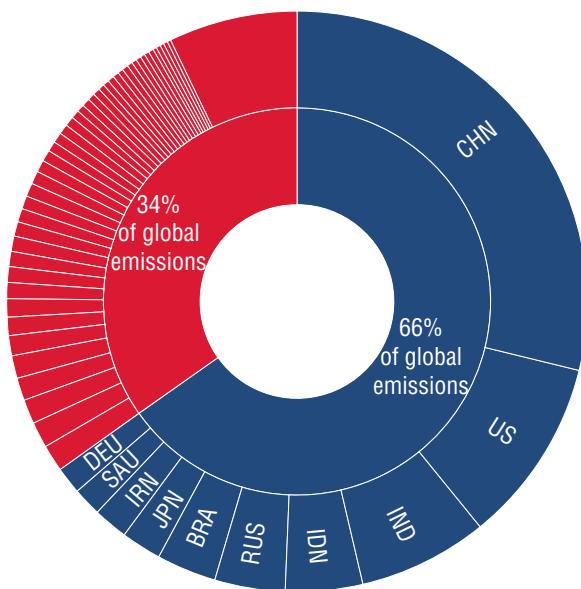
High-income countries and upper-middle-income countries respectively account for 32 percent and 52 percent of global CO₂ emissions, while accounting only for 15 percent and 35 percent of the global population. Ten economies emit two-thirds of global emissions annually (figure O.15, panel a). The next 30 economies, by total emissions, contribute 24 percent of global emissions. The 140 least-emitting economies, which comprise 12 percent of the total population, produce less than 5 percent of GHG emissions.³⁰

Upper-middle-income countries are responsible for an increasing share of global GHG emissions, having overtaken high-income countries in 2004 in terms of total emissions. Today, upper-middle-income countries produce as many GHG emissions as all other income groups combined (see chapter 3 for more details). The trend in per capita emissions in upper-middle-income countries is particularly striking, as they are rapidly converging to the levels of high-income countries (figure O.15, panel b). However, it is also important to note that the

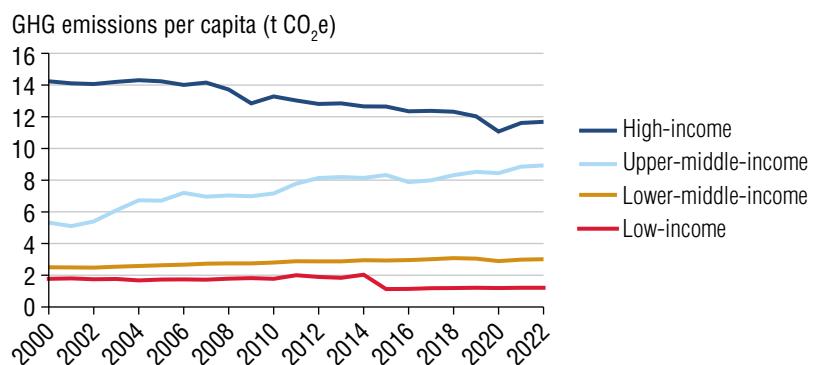
stock of GHG emissions in the atmosphere is what matters for warming (Eyring et al. 2021; IPCC 2022a). Today's high-income countries started emitting large amounts of CO₂ in the mid-nineteenth century, and upper-middle-income countries have caught up quickly over the past 40 years (figure O.15, panel c). In 2022, high-income countries and upper-middle-income countries were responsible for 90 percent of all historical CO₂ emissions, of which emissions from high-income countries make up roughly two-thirds.

FIGURE O.15
Positive relationship between income levels and GHG emissions

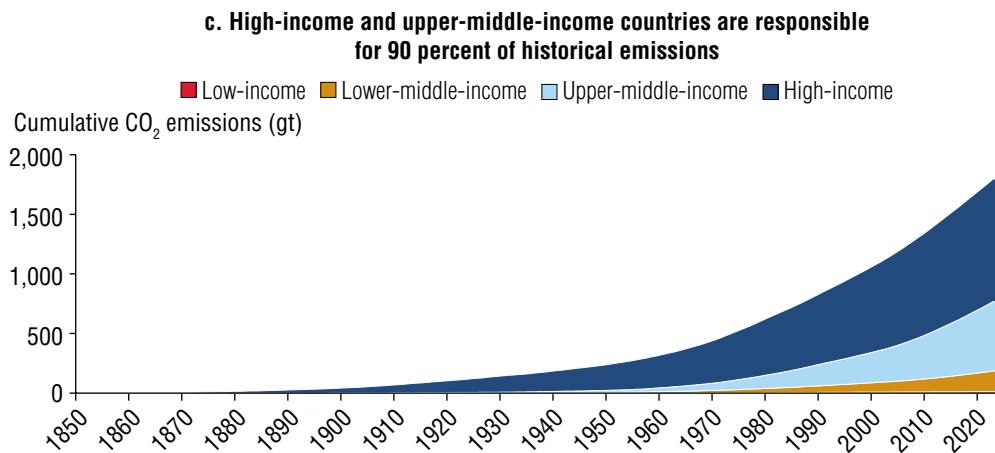
a. Ten economies produce two-thirds of global emissions



b. Emissions per capita are converging between high- and upper-middle-income countries



(continued)

FIGURE 0.15**Positive relationship between income levels and GHG emissions (continued)**

Sources: Panels a and b: World Bank calculations based on data from EDGAR, Grassi et al. 2023, and WDI data; panel c: PRIMAP-hist data from Gütschow, Pflüger, and Busch 2024.

Note: CO₂e = carbon dioxide equivalent; EDGAR = Emissions Database for Global Atmospheric Research; GHG = greenhouse gas; LULUCF = land use, land use change, and forestry; WDI = World Development Indicators. Panel a: The 10 economies are Brazil (BRA), China (CHN), Germany (DEU), India (IND), Indonesia (IDN), Iran, Islamic Republic of (IRN), Japan (JPN), Russian Federation (RUS), Saudi Arabia (SAU), and the United States (US). Data are from 2022. Panel b: Emissions per capita are in tons of CO₂e. Panel c: CO₂ emissions are cumulative in gigatons (gt) and do not include emissions from LULUCF. Panels b and c: Country income groups are fixed at 2022 definitions. In panel b, the drop in emissions from low-income countries in 2015 comes from the Democratic Republic of Congo, where LULUCF emissions declined substantially after 2014.

The quickest way to reduce future climate risks is for high-income countries and upper-middle-income countries with high emissions to drastically cut their emissions while managing transition costs. Accelerated actions by wealthier nations to reduce current emissions could significantly affect global emissions and alter the distribution of future environmental risks worldwide. Upper-middle-income countries also have significant populations at risk from extreme weather events, so it is in their own population's interest to act on reducing GHG emissions.

High-income and upper-middle-income countries need to prioritize and accelerate the shift away from primary energy generated by fossil fuels, which would have to fall by around 60 percent by 2035 and by 90 percent by 2050 compared with 2020 levels. The use of energy will also need to become more efficient.³¹ Recent evidence indicates that countries with significant renewable potential, like Brazil, can fully decarbonize their power systems without higher costs or compromising resilience (World Bank 2023a).

In contrast to lower-income countries, these countries are in a better position to leverage funds and technology to transition to net zero. Research and development is needed to

spur technological innovation to accelerate progress in fully decoupling economic growth from GHG emissions. Several countries have already managed to decouple growth from emissions, and more need to follow. Fostering technology infusion and innovation in upper-middle-income countries will be decisive for these countries to raise incomes while lowering emissions and transition to high-income status (see *World Development Report 2024* [World Bank 2024g]). These processes can catalyze a widespread adoption of renewable energy, the deployment of which requires a higher level of technological sophistication. Yet, it will be important to manage transitions costs to protect their more vulnerable populations.

Across the board: Better data and more international cooperation are needed

Achieving the interlinked goals of eradicating poverty and boosting shared prosperity on a livable planet requires decisive actions. This needs to be achieved in a global environment that has already become more challenging amid the polycrisis—from slow growth prospects and high levels of debt to increased uncertainty, fragility, and polarization. Solutions and policies exist to achieve the interlinked objectives, but these issues are complex and there will be trade-offs. Decisions must be made with a clear understanding of both the trade-offs and complementarities across objectives.

Across the board, more and better data are needed to design solutions that can address these complex policy issues and monitor their effects on vulnerable populations. Data provide the infrastructure for policy. This is essential to both designing and targeting interventions as well as monitoring progress. While data availability has improved in many countries, less than half of IDA countries had a household survey available in 2020 or later. Making progress on these interlinked global challenges requires a solid foundation of evidence. More investment is needed to produce reliable, granular, and timely information. This requires foundational efforts to strengthen national statistical systems and innovative approaches to advance the frontier of data and modeling for welfare analysis. Because the lived experience of poverty goes well beyond what can be captured by monetary measures, it is important to ensure that data efforts also invest in understanding other dimensions of well-being, such as deprivations in access to services, health, or food security.

Moreover, international development cooperation needs to play a larger and more effective role. There is a pressing need for more and better alignment of funding, as well as stronger international cooperation to meet the escalating challenges posed by climate change and development goals. International cooperation to achieve the Sustainable Development Goals (SDGs) and climate goals is ongoing but faces significant challenges and requires urgent action and increased investment. The United Nations 2024 World Economic Situation and Prospects report highlights the need for robust global cooperation to tackle economic vulnerabilities, rising interest rates, and climate disasters. The report stresses that without significant investments in sustainable development and climate action, achieving the SDGs will remain

OVERVIEW

elusive (United Nations 2024; United Nations and Inter-agency Task Force on Financing for Development 2024).

The financing gap for sustainable development is growing, with many developing countries lacking access to affordable finance and facing high debt burdens, which hinder their ability to invest in both development and climate resilience (United Nations and Inter-agency Task Force on Financing for Development 2024; World Bank 2024d). Estimates suggest an additional annual investment of \$4 trillion is needed to meet the SDGs by 2030 (United Nations and Inter-agency Task Force on Financing for Development 2024). Despite reaching the \$100 billion climate finance goal in 2022, significant gaps remain. More financing is needed for adaptation and building resilient infrastructure in the first place. Climate adaptation costs alone for developing countries are expected to be between \$160 billion and \$340 billion annually by 2030 (UNEP 2022).

In particular, lower-income countries will need substantial and immediate investment in both adaptation and mitigation actions (World Bank 2024d). For instance, there is a significant gap between the required and actual funding for climate adaptation and mitigation in Sub-Saharan Africa. Current international adaptation finance flows are estimated to be 5–10 times below the needed levels. Current adaptation costs in Africa are estimated to be in the range of \$7–\$15 billion per year, with projections suggesting these could rise to \$35 billion annually by the 2040s and up to \$200 billion per year by the 2070s if warming exceeds 2°C. If no adaptation measures are implemented, costs could escalate to 7 percent of Africa's GDP by 2100 (UNEP 2022).

It is sometimes argued that climate finance is crowding out other development finance. As this report lays out, most of the policies that support climate resilience generally support development. At the same time, richer countries need to step up their support to low-income countries with financing and technologies so they can accelerate growth in a sustainable way.

The implementation of development and climate policy solutions requires a robust financial framework capable of navigating the fragmented global aid landscape—effectively incorporating domestic resource mobilization with external funding sources, including concessional funding. In particular, it is essential to promote a greater balance and complementarity between leveraged and unleveraged approaches to aid delivery (see box 3.5 in chapter 3 for a discussion on the current challenges in the aid ecosystem). Scaling up both public and private financing for SDGs and climate investments also entails closing policy gaps, enhancing international cooperation, and reforming financial institutions to provide more substantial and sustainable support.

The potential policy pathways can differ drastically depending on a country's historical development trajectory, access to technology and financing, and national priorities. However, countries must also consider their global responsibilities, and international actors have a critical coordination role to play. Ending poverty and boosting shared prosperity on a livable planet will require novel ways of organizing economic activity.

Notes

1. This is expressed in 2017 purchasing power parity dollars.
2. Using the coverage rules in the Poverty and Inequality Platform (Castaneda et al. 2024), data coverage for low-income countries fell somewhat below 50 percent of the population in 2018 and 2019. Comparing poverty rates from 2020 onward to data from 2017 would still show an increase in the headcount at the \$2.15 and \$6.85 poverty lines.
3. Florina Pirlea and Emi Suzuki, “The Impact of COVID-19 on Public Health,” published on Data Blog, World Bank Group (July 26, 2023), <https://blogs.worldbank.org/en/opendata/impact-covid-19-global-health>; “Chapter 2: Current Context: the COVID-19 Pandemic and Continuing Challenges to Global Health,” in *A Healthy Return*, World Health Organization (May 17, 2022), <https://www.who.int/about/funding/invest-in-who/investment-case-2.0/challenges#:~:text=The%20global%20toll%20of%20COVID,extent%20of%20cases%20and%20deaths>.
4. Not only is the share of poor in FCS increasing, but the poverty rates in FCS have also been rising over the past decade (see annex 1D).
5. IDA, a part of the World Bank Group, provides grants and concessional loans to the world’s poorest countries. As of 2024, there are 75 countries eligible for support from IDA, with 75 percent of total commitments concentrated in Sub-Saharan Africa. See the following for more information: <https://ida.worldbank.org/en/ida-financing>.
6. The data set for inequality is based on surveys starting in 2000. Those economies with surveys older than 2000 are excluded. The data set covers 166 economies out of the 170 economies in the Poverty and Inequality Platform.
7. Note that Sub-Saharan Africa measures inequality based on consumption. Inequality based on income would tend to be higher than the numbers reported here.
8. The economies in the low-income and lower-middle-income categories predominantly have consumption surveys that are known to have lower levels of inequality than the income survey widely used in upper-middle-income and high-income countries. This implies that if inequality was measured with income, the levels of inequality would be even higher in low-income and lower-middle-income settings.
9. For more information, see the World Meteorological Organization’s 2022 Greenhouse Gas Bulletin at <https://wmo.int/publication-series/greenhouse-gas-bulletin>.
10. NOAA Research News, “Greenhouse Gas Pollution Trapped 49 Percent More Heat in 2021 than in 1990, NOAA Finds,” NOAA Research, May 23, 2022, <https://research.noaa.gov/2022/05/23/greenhouse-gas-pollution-trapped-49-more-heat-in-2021-than-in-1990-noaa-finds/>.
11. These figures are based on the definitions used to construct the climate risk indicator described in box O.3 and chapter 3. Therefore, figures are consistent but slightly different from the ones presented in chapter 1 as part of the multidimensional poverty measure.
12. For more information, see <https://datatopics.worldbank.org/jobsdiagnostics/>.
13. A household’s capacity to generate income depends on the assets they own or have access to, the existing returns to these assets, and how intensively they are used. In the short term, the distribution of household assets does not change, and variables such as prices, the composition of economic growth, and fiscal transfers will play a more significant role in driving household incomes and reducing poverty. In the medium and long term, however, the level and distribution of assets, along with the returns on the assets that reflect their productivity, will be the primary drivers of household incomes and poverty reduction.
14. Hallegatte, Rentschler, and Rozenberg (2019) estimate that improving the infrastructure resilience of assets exposed to hazards would cost less than 0.1 percent of the GDP of low- and middle-income countries.
15. Jennifer Rudden, “Natural disaster losses cost worldwide 2000–2023,” Statista (February 23, 2024), <https://www.statista.com/statistics/612561/natural-disaster-losses-cost-worldwide-by-type-of-loss/#:~:text=In%202023%2C%20there%20was%20a,to%20118%20billion%20U.S.%20dollars>.

OVERVIEW

16. For more information about early warning systems, see the United Nations website at <https://www.un.org/en/climatechange/early-warnings-for-all>.
17. Warming beyond 1.5°C will increase the magnitude and the share of people exposed to climate hazards substantially (IPCC 2023).
18. Nationally Determined Contributions are climate action plans to cut emissions and adapt to climate change. All parties to the Paris Agreement are required to establish one and update it every five years (<https://www.un.org/en/climatechange/all-about-ndcs#:~:text=Simply%20put%2C%20an%20NDC%2C%20or,update%20it%20every%20five%20years>).
19. Note that some, but not all, Network for Greening the Financial System (NGFS) countries are projected to have no greenhouse gas emissions in 2050 in the Net Zero 2050 scenario. Moreover, the Net Zero 2050 scenario refers to net-zero CO₂ emissions only, while total greenhouse gas emissions are not net zero across all countries. There is also heterogeneity between the models used by NGFS as to when net-zero emissions need to be reached in order to limit warming to 1.5°C.
20. See, for example, World Bank Climate Change and Development Reports for Benin, Brazil, Cameroon, or Tunisia.
21. “Household Air Pollution,” World Health Organization (December 15, 2023), <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>.
22. As of May 17, 2024, the data were obtained from <https://data.who.int/dashboards/covid19/deaths?n=o>.
23. The data are from IHME, <https://vizhub.healthdata.org/gbd-results/>.
24. WHO Interim Target 1 refers to a PM2.5 level of 35 micrograms per cubic meter.
25. The mitigation potential estimates indicate total amount mitigated over time (with a 20-year time horizon) through changes in land use and land management.
26. M. Haddad, B. Hansl, and A. Pechev, “Trading in a New Climate: How Mitigation Policies Are Reshaping Global Trade Dynamics,” blog (February 13, 2024), <https://blogs.worldbank.org/en/developmenttalk/trading-new-climate-how-mitigation-policies-are-reshaping-global-trade-dynamics>.
27. See World Bank SDG Atlas: <https://datatopics.worldbank.org/sdgatlas/goal-4-quality-education?lang=en>.
28. Though there is a consensus of spending at least 4–6 percent of GDP or 15–20 percent of public expenditure on education, only 1 in 10 countries and territories meets the 20 percent benchmark, and only 4 in 10 meet the 15 percent benchmark (UNICEF 2022).
29. Note that this calculation is based on a smaller sample of countries and that the probability of experiencing a hazard is kept constant over time. Changes are therefore driven by population growth and people settling in more exposed areas (Doan et al. 2023).
30. Twenty-five countries in the world with an aggregate population of 100 million people, out of which 10 countries with 75 million people are in Sub-Saharan Africa, had negative greenhouse gas emissions in 2022, so their ecosystems absorbed more carbon than the country emitted.
31. The availability of technology for carbon capture and storage is also assumed to increase under the Net Zero 2050 scenario of Network for Greening the Financial System (NGFS), though only at a limited scale. See for example the NGFS scenarios portal: <https://www.ngfs.net/ngfs-scenarios-portal/explore/>.

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POVERTY, PROSPERITY, AND PLANET REPORT 2024

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Global Poverty Update and Outlook

Summary

- Today, 692 million people (8.5 percent of the world's population) live in extreme poverty—that is, on less than \$2.15 per day. Progress has stalled amid low growth, setbacks due to COVID-19 (Coronavirus), and increased fragility. Poverty in low-income countries is greater than before the pandemic.
- About 44 percent of the world population remains poor by a standard that is more relevant for upper-middle-income countries (\$6.85 per day), and the number of people living on less than this standard has barely changed since the 1990s because of population growth.
- In 2024, Sub-Saharan Africa accounted for 16 percent of the world's population, but 67 percent of the people living in extreme poverty. Two-thirds of the world's extreme poor lives in Sub-Saharan Africa, rising to three-quarters when all fragile and conflict-affected countries are included. About 72 percent of the world's extreme poor lives in countries that are eligible to receive assistance from the International Development Association (IDA).
- Based on the current trajectory, 7.3 percent of the global population is projected to live in extreme poverty in 2030. This means that about 69 million people are projected to escape extreme poverty between 2024 and 2030, compared to about 150 million who did so between 2013 and 2019. In addition, nearly 40 percent of the world's population will likely live on less than \$6.85 per day.
- If growth does not accelerate and become more inclusive, it will take decades to eradicate extreme poverty and more than a century to lift everyone over \$6.85 per day.
- Improving labor incomes by creating more and better jobs and investing in the productive capacity of the poor by investing in fundamentals such as education, infrastructure, and basic services will be important to enable the poor to benefit more from and contribute to growth, and enhance their resilience amid increasing shocks.

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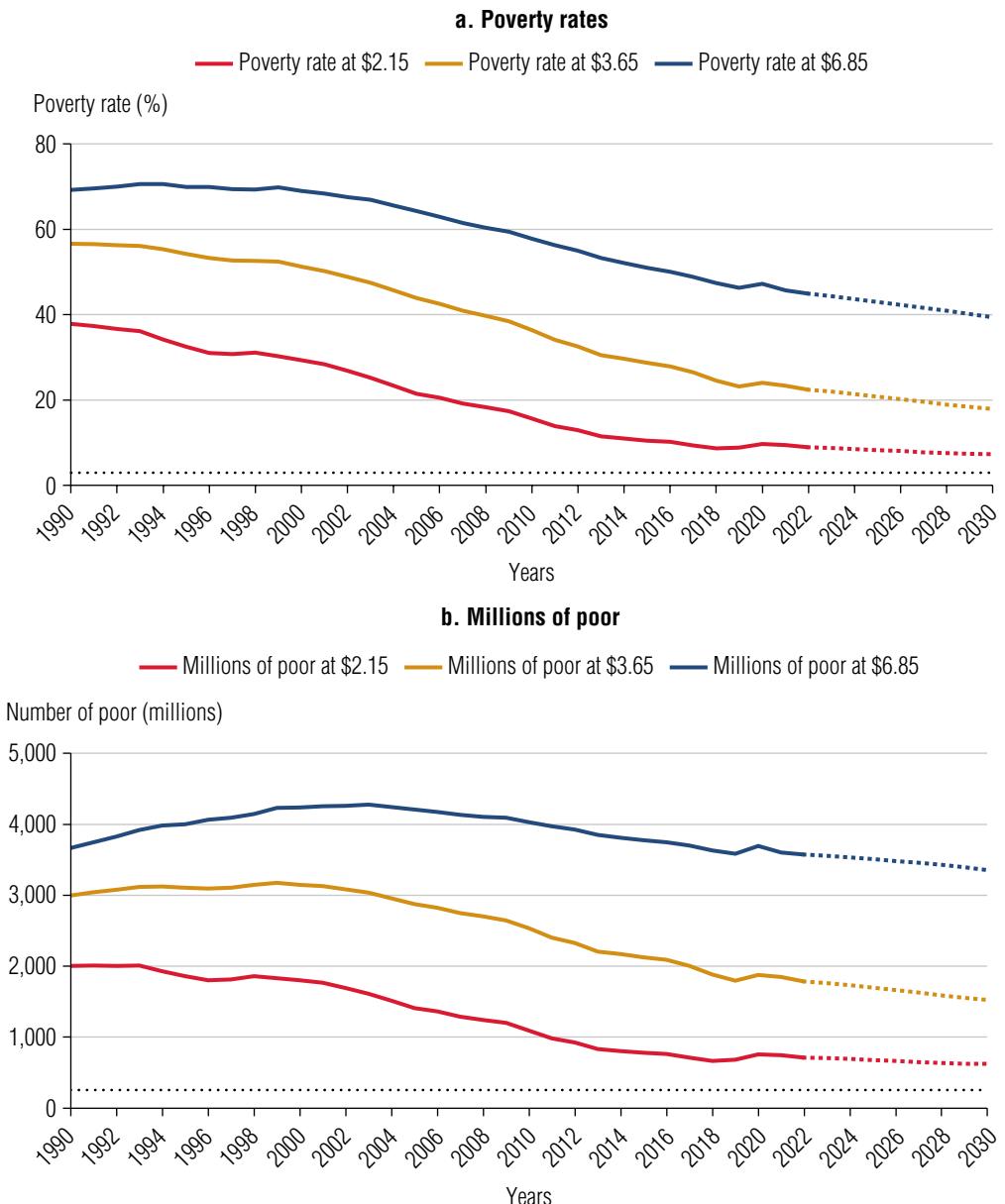
Ending poverty remains a major global challenge

Global poverty reduction has slowed to a near standstill, with 2020–30 set to mark a lost decade

This report presents the first global poverty numbers for the post-COVID-19 pandemic period that are based primarily on survey data up to 2022, as well as nowcasts up to 2024. In 2024, about 8.5 percent of the global population lives in extreme poverty, just slightly below the rate observed before the pandemic (extreme poverty was 8.8 percent in 2019) (figure 1.1). This means that 692 million people in the world still live on less than \$2.15 per day, up from 684 million in 2019.

The extreme poverty line (currently set at \$2.15 per person per day) is a very frugal standard, typical of the cost of basic needs in the poorest countries (Jolliffe and Lakner 2023; Ravallion, Datt, and van de Walle 1991). Using a slightly higher poverty line, which is typical of the national poverty lines used in lower-middle-income countries (\$3.65 per day), about 1.73 billion people are living in poverty in 2024 (21.4 percent of the global population). Using a more widely applicable standard that is typical of upper-middle-income countries (\$6.85 per day), about 43.6 percent of the world's population is living in poverty. The World Bank is now tracking the \$6.85 poverty rate, in addition to the extreme poverty rate, as part of its corporate mission to end extreme poverty and boost shared prosperity on a livable planet (see box 1.1 for the rationale behind this shift). The living standards of 3.53 billion people are below this higher poverty line in 2024, compared with 3.59 billion in 2019.

These estimates offer the first postpandemic assessment of global poverty using household surveys for most of the world population (box 1.2). Previous estimates of poverty during and after the COVID-19 pandemic were based largely on nowcasts, rather than actual survey data, because of the adverse impact of the pandemic on face-to-face survey data collection in many countries (Cuesta and Pico 2020; Mahler, Yonzan, and Lakner 2022; Sumner, Hoy, and Ortiz-Juarez 2020; World Bank 2022).¹ The new estimates of extreme poverty during the pandemic generally align with previously reported projections (annex 1B). The broad patterns of an economic recovery after 2020 are confirmed in the current report. Thus, the direction of change in extreme poverty between 2021 and 2022 predicted from gross domestic product (GDP) growth data has been largely consistent with the new survey-based poverty estimates. For example, the 2020 *Poverty and Shared Prosperity* report predicted an increase of 0.7 percentage points for the world in 2020, and the 2022 edition of the report estimated an increase of 0.9 percentage points, which is similar to the 0.85 percentage point reported in the current report (World Bank 2020, 2022). While differences are small globally, they are larger for some regions, mostly explained by new survey data from specific countries (see annex 1B for further details).

FIGURE 1.1**Poverty between 1990 and 2030 at \$2.15, \$3.65, and \$6.85 per person per day**

Source: World Bank, Poverty and Inequality Platform (PIP) (version September 2024), <https://pip.worldbank.org>.

Note: Poverty rates are reported for the \$2.15, \$3.65, and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars). Between 2022 and 2029 poverty is projected based on per capita gross domestic product growth projections in *Global Economic Prospects, June 2024* (World Bank 2024d) complemented by the *Macro Poverty Outlook, Spring Meetings 2024* (World Bank 2024e) and the *World Economic Outlook* (IMF 2024); for 2030, average annual historic per capita growth rates (2010–19) are used. See annex 1A for more details on the projection methods. In panel a, the black horizontal dotted line is drawn at 3 percent and indicates the World Bank's target of ending extreme poverty by 2030. In panel b, it is drawn at 256 million, which represents 3 percent of the global population projected for 2030.

BOX 1.1**Revisiting the poverty line for a changing global population**

The World Bank applies different thresholds to define poverty globally, relying on national definitions that countries around the world use to describe poverty within their borders. Anyone with an income or consumption below the international poverty line—currently set at \$2.15 per person per day (2017 purchasing power parity dollars, or PPP\$)—lives in extreme poverty. The international poverty line is the median of the national poverty lines in low-income countries. The second poverty line that this report emphasizes is \$6.85 per person per day (2017 PPP\$), which is the median national poverty line in upper-middle-income countries.

The poverty line typical of lower-middle-income countries is \$3.65. This report focuses on the extreme poverty line of \$2.15 and the higher line of \$6.85; poverty measures for any other poverty line are available on the Poverty and Inequality Platform website.^a All these amounts are frugal by rich-country standards—the poverty line typical of high-income countries is \$24.35.

For several decades, the World Bank has monitored extreme poverty, which has also become enshrined in the Sustainable Development Goals as target 1.1. Poverty was also monitored using higher poverty lines but not as an institutional goal. Starting in 2024, the World Bank will also start tracking poverty at the \$6.85 poverty line as part of its vision indicators to reflect evolving conditions (Jolliffe and Lakner 2023; Pritchett 2024; World Bank, n.d.). This shift in focus reflects the facts that the world has become richer and there has been substantial population growth, especially in lower-middle- and upper-middle-income countries. Low-income countries now constitute only 9 percent of the world's population, compared to 58 percent in 1990 when the World Bank started tracking extreme poverty (figure B1.1.1, panel a). Conversely, lower-middle- and upper-middle-income countries now account for three-quarters of the world's population, compared to about one-quarter in 1990. In addition, the distribution of income around the world has evolved. More than half of the global population lives on more than \$6.85 per day today, compared to less than one-third in 1990 (figure B1.1.1, panel b).

With growing income levels, the definition of basic needs expands beyond food, clothing, and shelter and now also includes a healthy diet, good sanitation, internet connectivity, access to electricity, and education, among others (Herforth et al. 2020; Jolliffe and Prydz 2016). The \$6.85 poverty line captures these patterns and helps present a more relevant picture of poverty in many countries. Another poverty concept, the World Bank's societal poverty line, captures more systematically that the cost of meeting basic needs increases as an economy grows and allows for the poverty line to vary across countries over time (see box 1.4).

(continued)

BOX 1.1**Revisiting the poverty line for a changing global population (continued)**

Notwithstanding this expanded vision, eradicating extreme poverty remains at the core of the World Bank's mission. The World Bank is the custodian of Sustainable Development Goals target 1.1., which is to eradicate extreme poverty in the world. Today, more people live in extreme poverty in middle-income countries than in low-income countries (Mahler, Yonzan, and Lakner 2023). Thus, tracking poverty using the international poverty line of \$2.15 remains relevant both for low- and middle-income countries.

FIGURE B1.1.1**The composition of the global population has changed since 1990**

Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: Panel a uses changing income groups over time. Poverty rates are reported for the \$2.15, \$3.65, and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars).

a. For more information, see the Poverty and Inequality Platform at <https://pip.worldbank.org>.

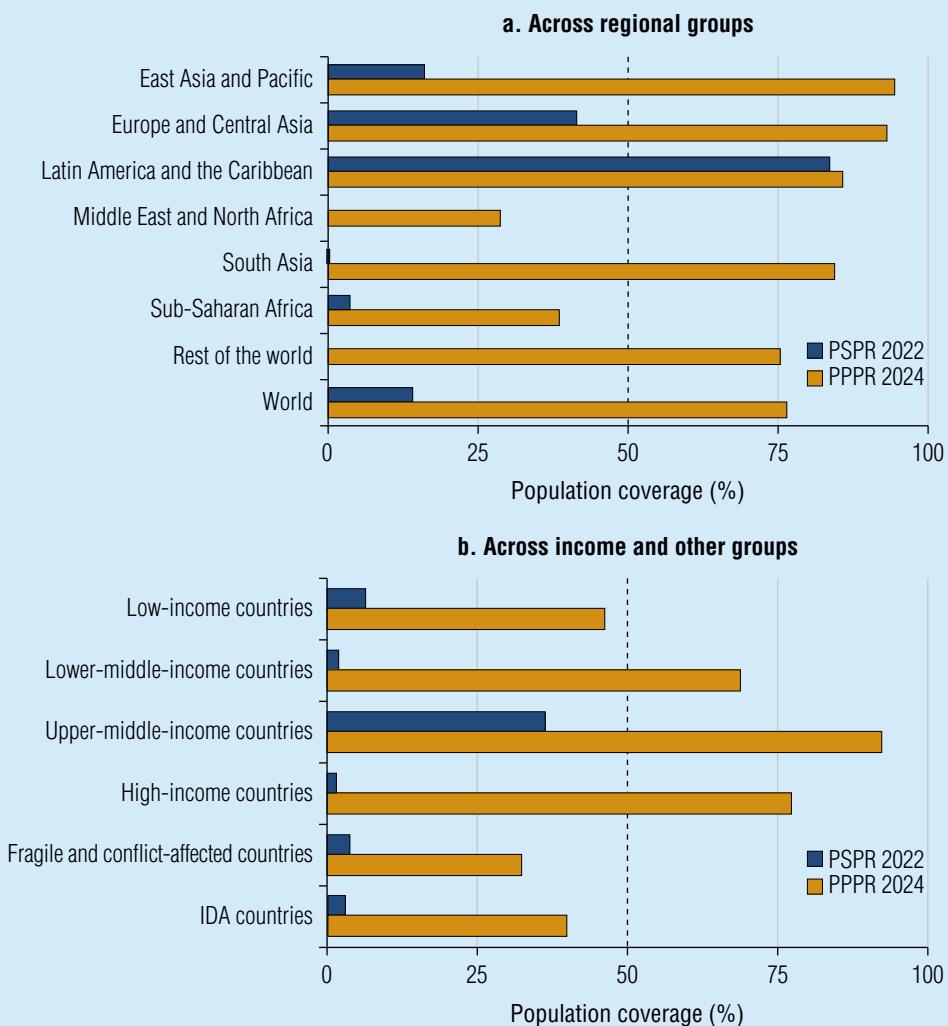
Although there is sufficient recent data coverage globally, the recent survey data available for populous countries, especially in Sub-Saharan Africa, remain limited (box 1.2). As a result, the 2022 estimates reported for Sub-Saharan Africa, as well as the Middle East and North Africa, are based on less than half of the regional population covered by a recent survey. Also note that in recent months new data sets have been released that could not be analyzed in time for inclusion in this report (see box 1.3 and annex 1C). This includes new survey data for Ethiopia, India, Madagascar, Mozambique, and Nigeria, as well as new purchasing power parities (PPPs) for the 2021 reference year. Estimates using these new sources of data are expected to be published in the Poverty and Inequality Platform in 2025.

BOX 1.2

Improvements in survey coverage

This report presents the first estimates for the postpandemic period based on actual survey data for many countries in the world. The 2022 *Poverty and Shared Prosperity* report relied on prepandemic data for most of the world's population (figure B1.2.1). The survey data available for 2020 or later accounted for 14 percent of the world's population and spanned an even smaller share in low- and lower-middle-income countries. In contrast, this report has survey data collected from 98 countries in 2020 or later, representing more than three-quarters of the world's population and two-thirds of the population in low- and lower-middle-income countries. The entire Poverty and Inequality Platform database of household surveys that is used in this report covers 97 percent of the world's population.^a However, this progress is notably missing in Sub-Saharan Africa and the Middle East and North Africa, where survey data are lacking for more than half of the population for 2020 or later (figure B1.2.1, panel a). Similarly, there is a lack of data coverage for low-income countries, International Development Association (IDA) countries, and fragile and conflicted countries (figure B1.2.1, panel b). Although there are sufficient recent global data, the lack of available survey data from such populous countries as Ethiopia and Nigeria increases the uncertainty surrounding global poverty estimates reported in this chapter for the most recent years, especially for the poorest regions and countries. See chapter 4 for a discussion on survey data availability and challenges.

(continued)

BOX 1.2**Improvements in survey coverage (continued)****FIGURE B1.2.1****Share of population with survey data in 2020 or later for global poverty monitoring**

Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: IDA = International Development Association; PSPR 2022 = *Poverty and Shared Prosperity* report 2022; PPPR 2024 = *Poverty, Prosperity, and Planet Report 2024*. IDA countries are countries eligible for grants and concessionary loans from the World Bank's IDA, which provides support to the poorest countries in the world (consisting of low-income countries and some countries in other income groups). Data coverage for 2022 is adequate when there are survey data for the year 2020 or later covering at least 50 percent of the population of a region or country group of interest. This condition is consistent with the coverage rules applied in the Poverty and Inequality Platform for reporting regional and global poverty estimates (Castañeda Aguilar et al. 2024).

a. For more information, see the Poverty and Inequality Platform at <https://pip.worldbank.org>.

BOX 1.3**New data for India and international price levels**

In recent months, the 2022/23 Household Consumption and Expenditure Survey (HCES) for India and purchasing power parities (PPPs) for 2021 were released. These new data sets are not reflected in the report, since the necessary analysis could not be completed in time. While the precise impact of adding these two data sets on global poverty is unclear at the time of this writing, key conclusions of the report are robust, such as the increasing concentration of extreme poverty in Sub-Saharan Africa and fragile countries, and that extreme poverty eradication by 2030 is out of reach. Further details on the new data are available in annex 1C.

Before the India 2022/23 HCES survey can be included in the Poverty and Inequality Platform (PIP), more work is necessary to understand the impact of various methodological changes in the 2022/23 survey, as well as the implications for the historical poverty series in India. One key element that has changed in the 2022/23 HCES survey from previous rounds is the design of the questionnaire that collects information on household consumption. Analysis using previous surveys shows that this is an important change with important implications for the poverty rate. In 2011/12, the extreme poverty rate in India changes from 22.9 percent to 13.4 percent when different recall periods are used. These types of changes are not unprecedented when compared with other countries that have updated their methodologies (Castañeda Aguilar et al. 2022). However, they need to be analyzed carefully to provide an accurate picture of poverty.

The new 2021 PPPs data were released in May 2024, allowing for an updated assessment of price levels around the world. Work is ongoing to analyze changes in price levels relative to the 2017 PPP round that is used in this report. This process also requires an update of the global poverty lines with the new prices.

The pandemic had scarring effects, and the poorest countries still have not recovered

The COVID-19 pandemic hit at an unprecedented scale, causing the biggest setback in the fight against global poverty since World War II (World Bank 2022). Global extreme poverty jumped by 0.85 percentage points in 2020, and 73 million people fell into poverty that year. While the pandemic hit globally, low- and lower-middle-income countries experienced much

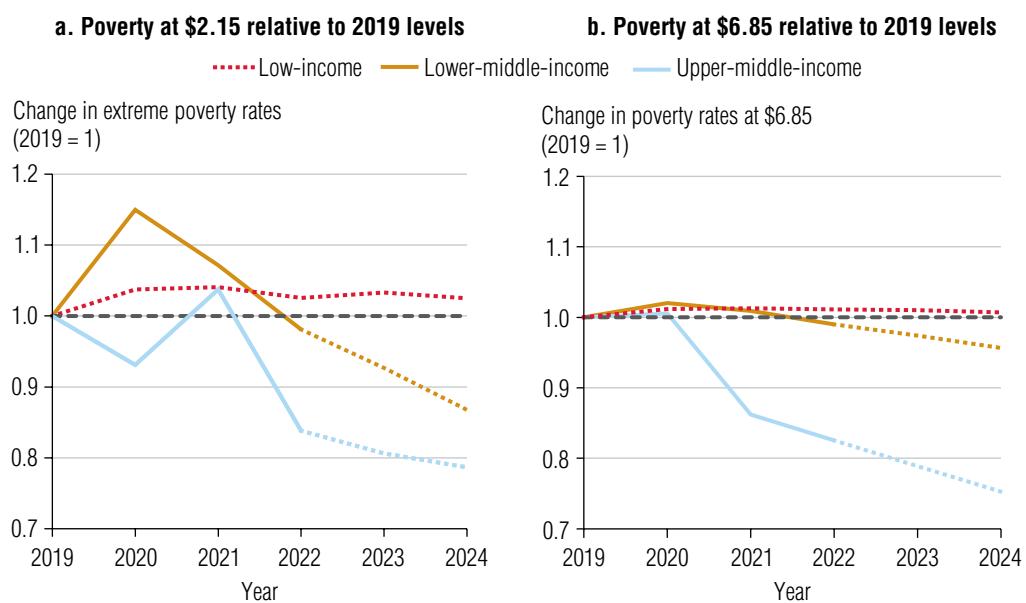
GLOBAL POVERTY UPDATE AND OUTLOOK

larger increases in poverty than upper-middle-income countries (figure 1.2). The recovery from the increase in poverty during COVID-19 has been uneven across countries (Mahler, Yonzan, and Lakner 2022; World Bank 2024d).

Low-income countries have shown less resilience, as the compounded effects of the pandemic and rising food and energy prices have led to poverty rates remaining higher than in 2019.² In low-income countries, extreme poverty is above prepandemic levels (figure 1.2, panel a). The same is true for IDA countries (see annex 1D). Lower-middle-income countries managed to recover from the COVID-19 shock only in 2022: extreme poverty rates fell to 10.5 percent in 2024, after jumping from 12.1 to 13.9 percent between 2019 and 2020. At the \$6.85 poverty line, poverty rebounded to prepandemic levels in 2022 in lower-middle-income countries (figure 1.2, panel b). In contrast, upper-middle-income countries continued to see progress against poverty (as measured against the \$6.85 line) in 2021 and 2022.

FIGURE 1.2

Extreme poverty is still above prepandemic levels in low-income countries



Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: Poverty rates are shown relative to 2019 levels for the \$2.15 and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars). The line for low-income countries is dotted because the surveys covered less than 50 percent of the group's population between 2019 and 2022. Poverty rates for 2022–24 are projected based on per capita gross domestic product growth projections in *Global Economic Prospects* (World Bank 2024d). High-income countries are omitted because poverty rates at both lines are small. Poverty rates at the \$6.85 poverty line did not increase in high-income countries between 2019 and 2024, and changes at the \$2.15 poverty line were marginal (less than 0.05 percentage points). Income group is kept fixed using the fiscal year 2024 classification.

The outlook for poverty reduction is grim under the current pace and inclusiveness of economic growth

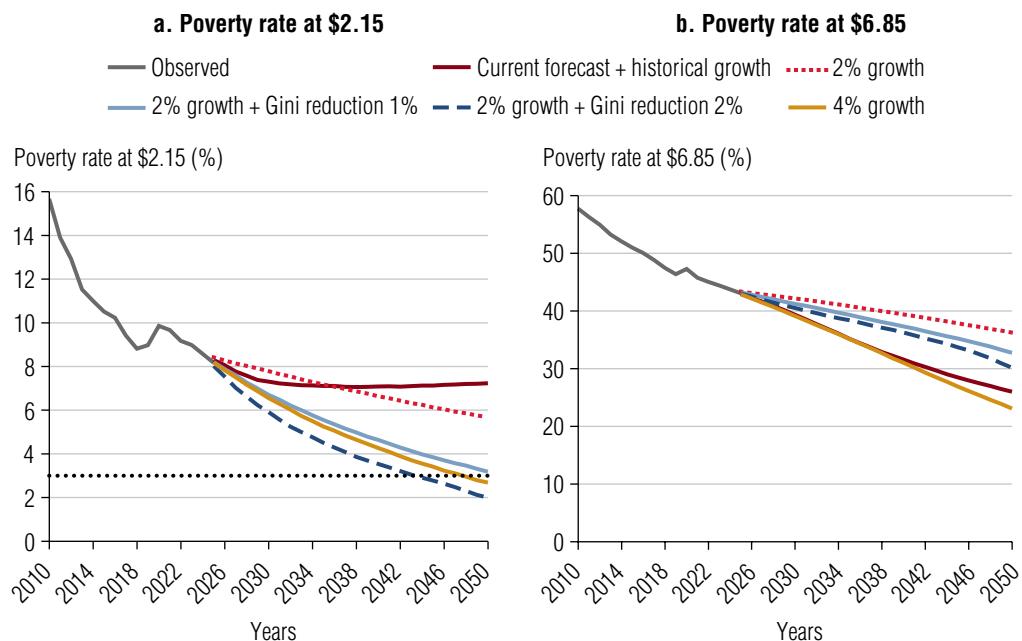
Progress in poverty reduction is projected to remain slow, and the goal of eradicating poverty is far out of reach. Even before the COVID-19 pandemic, the pace of poverty reduction was not fast enough to reach 3 percent by the end of the decade (World Bank 2018). The pandemic put the goal even further out of reach (Mahler, Yonzan, and Lakner 2022). Poverty rates are projected to continue to decline only gradually until 2030. Only 69 million people are projected to escape extreme poverty between 2024 and 2030 (figure 1.1). At this rate, 7.3 percent of the global population will remain in extreme poverty in 2030, more than double the 3 percent target.

At the higher poverty lines, reductions in the poverty rate are projected to continue more noticeably. By 2030, it is expected that slightly less than 40 percent of the global population (equal to more than 3 billion people) will live on less than \$6.85 per day—an 8-percentage-point decline in a decade—and less than 20 percent will have less than \$3.65 per day. This means that poverty at the higher lines is projected to decline at rates similar to the ones achieved in the beginning of this century, while progress in reducing extreme poverty is slowing significantly. This projection reflects several factors, including differences in where the poor at the various lines live and the associated countries' projected growth rates over the next half-decade.

If growth continues to be slow and inequality continues to stagnate or even increase, reaching a global extreme poverty rate of 3 percent will be a lengthy endeavor. In 2023, GDP per capita grew only by 1 percent in low-income countries, and it is expected to rise to only 2.5 percent in 2025. One-third of low-income countries is projected to have lower per capita incomes in 2026 than in 2019 (World Bank 2024d). Under the current forecast scenario—currently projected GDP per capita growth rates until 2029 and historical growth rates thereafter—extreme poverty will not change much between 2030 and 2050 (figure 1.3, panel a). This is due largely to high poverty rates and slow projected and historical growth in Sub-Saharan Africa. If per capita growth were to reach 2 percent annually in every country, extreme poverty would still be almost twice as high in 2050 as the 3 percent goal for 2030, and it would not reach the 3 percent goal for another 60 years. Even with a 4 percent growth rate, which seems out of reach for many countries, it would take until 2048 to reach 3 percent—two decades after the goal of 2030.

In the current slow-growth environment, the projections show the importance and potential of reducing inequality to accelerate progress. If the Gini index in every country were to decrease by 2 percent annually in addition to 2 percent growth, the extreme poverty rate would fall to 2 percent in 2050, compared to about 5.7 percent without changes in inequality (see chapter 2 for more information on the Gini index).

Poverty rates at \$6.85 are projected to fall faster under the current forecast scenario than extreme poverty rates because of higher historical growth rates in East Asia and Pacific and in South Asia (figure 1.3, panel b). Still, it would take more than a century to reach a poverty rate of less than 3 percent at \$6.85 per day. According to the current forecast, 26 percent of the global population would remain below the upper poverty line in 2050, which is not very different from the scenario of 4 percent per year.

FIGURE 1.3**Projections of poverty until 2050 under different scenarios**

Sources: World Bank calculations using data from the Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>; World Bank 2024d; World Bank 2024e; IMF 2024.

Note: Poverty rates are reported for the \$2.15 and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars). Poverty rates are projected after 2022 based on country-level growth in gross domestic product per capita. “Current forecast + historical growth” is based on growth projections in the *Global Economic Prospects, June 2024* (World Bank 2024d), complemented by the *Macro Poverty Outlook* (World Bank 2024e) and the *World Economic Outlook* (IMF 2024) until 2029 and average annual per capita historical growth rates (2010–19) thereafter (see annex 1A for more details). Inequality reduction scenarios refer to a reduction in the country-level Gini index by 1 percent or 2 percent annually. The horizontal dotted line indicates a poverty rate of 3 percent.

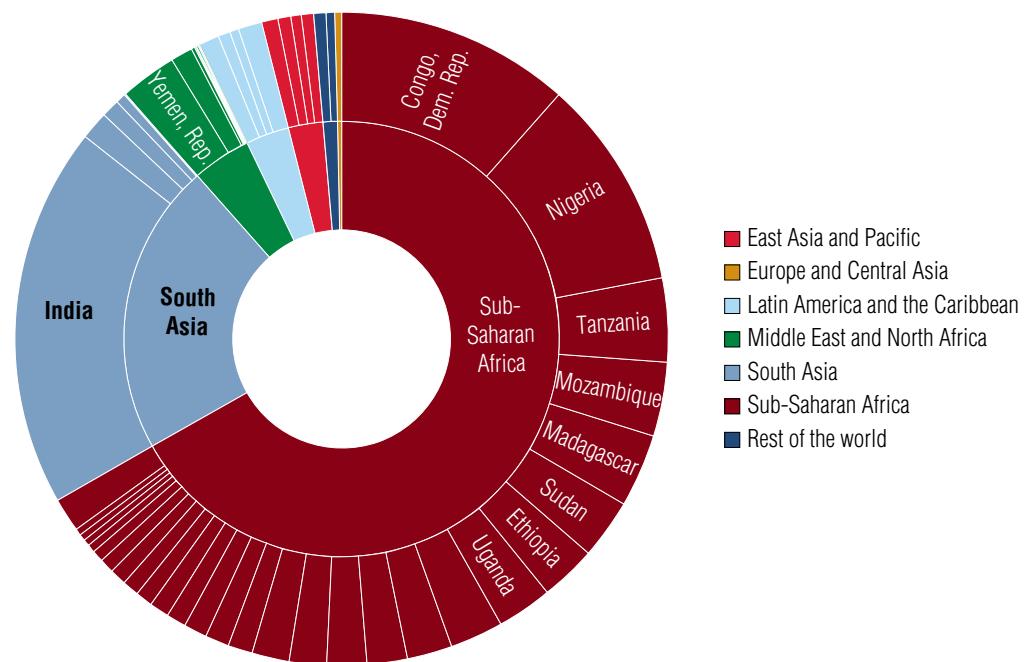
Poverty has been increasingly concentrated in Sub-Saharan Africa and fragile settings, but it is more widespread at higher poverty lines

Sub-Saharan Africa is home to two-thirds of the global extreme poor and 9 of the 10 countries with the highest extreme poverty rates in the world as of 2024.³ While Sub-Saharan Africa accounts for 16 percent of the world’s population, it is home to 67 percent of the global population living in extreme poverty (see table 1D3 in annex 1D). The regional distribution of poverty changes depending on the standard, but overall, most poor people are concentrated in Sub-Saharan Africa and South Asia (figure 1.4). South Asia accounts for one-fifth of the global extreme poor, roughly in line with its global population share (one-quarter).

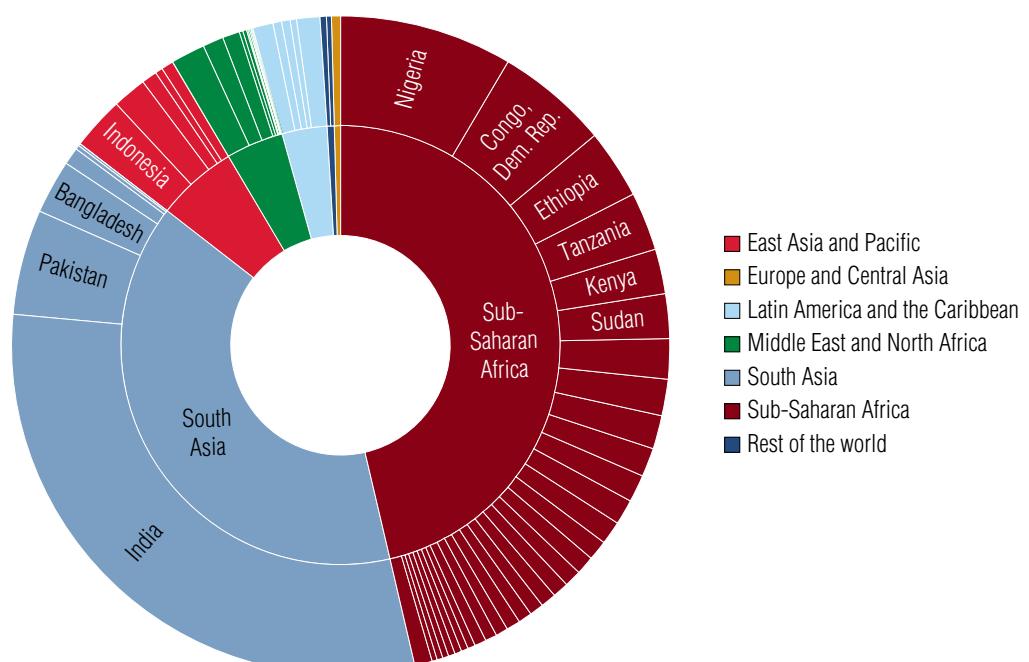
FIGURE 1.4

The regional distribution of poverty changes depending on the standard, but overall, most poor people are concentrated in Sub-Saharan Africa and South Asia

a. Extreme poverty (\$2.15 per person per day) is concentrated in Sub-Saharan Africa



b. Poverty at the \$3.65 line is concentrated in Sub-Saharan Africa and South Asia

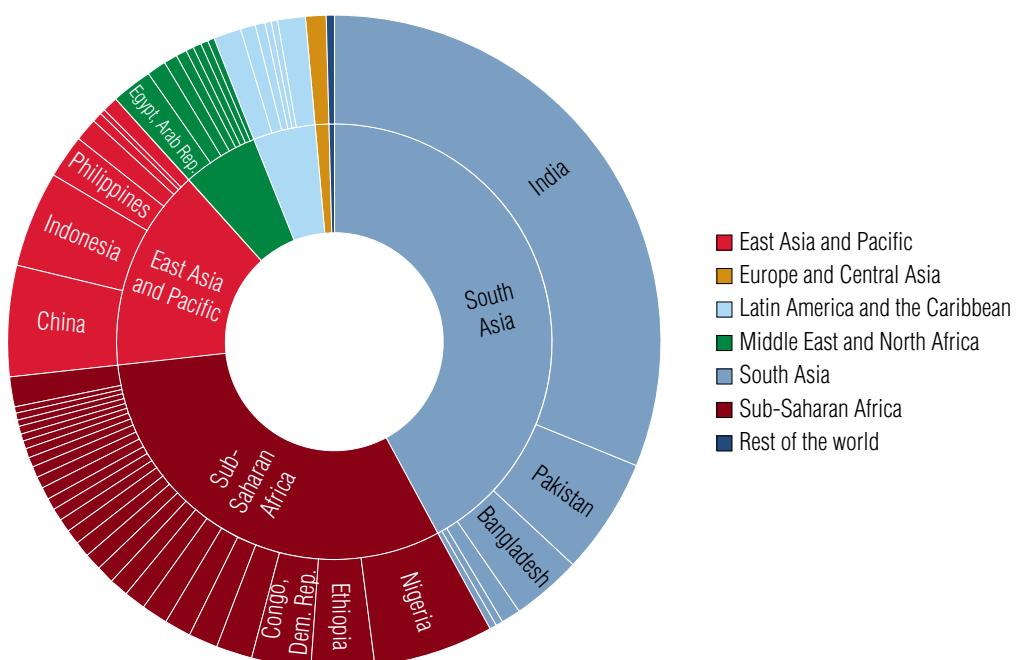


(continued)

FIGURE 1.4

The regional distribution of poverty changes depending on the standard, but overall, most poor people are concentrated in Sub-Saharan Africa and South Asia (continued)

c. Poverty at the \$6.85 line is concentrated in South Asia, followed by Sub-Saharan Africa



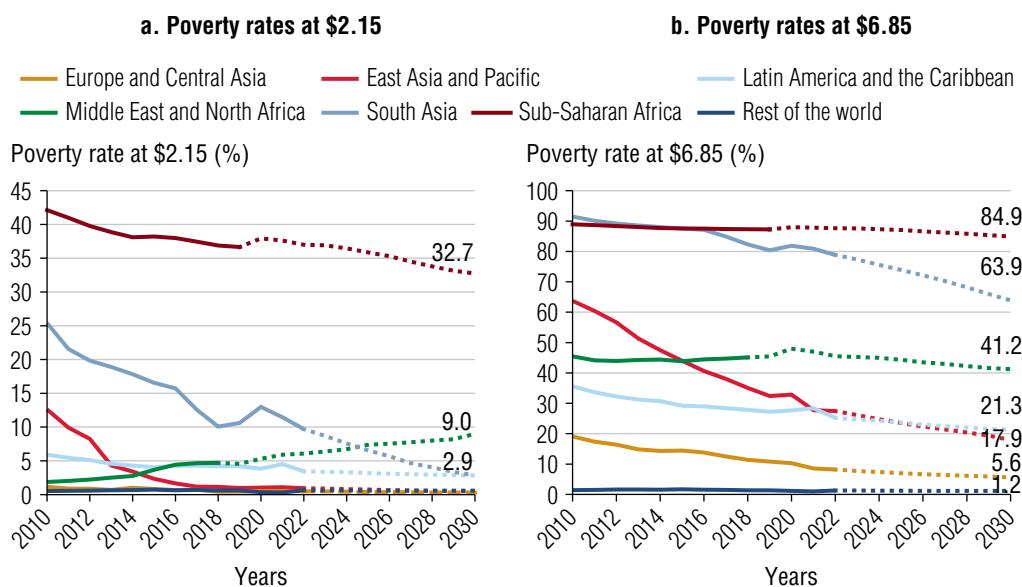
Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: Figures show the composition of poverty at the \$2.15, \$3.65, and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars). In all figures, the inner ring shows the share of the total number of poor living in a particular region, and the outer ring refers to the shares by country. The 10 countries with the most poor people are labeled.

Extreme poverty has been concentrated not only in Sub-Saharan Africa but also in fragile and conflict-affected situations (FCS). In 2000, only one-quarter of the extreme poor was living in a country in Sub-Saharan Africa or one that was fragile (see figure 1.6, panel a). However, by 2014, every second person in extreme poverty was in either Sub-Saharan Africa or FCS. The share of extreme poor in FCS in Sub-Saharan Africa then grew starkly in the late 2010s, driven by countries with large poor populations becoming fragile, such as Niger and Nigeria. By 2024, the share of the extreme poor in Sub-Saharan Africa or FCS had increased to three-quarters, and 42 percent of the global extreme poor was in FCS in Sub-Saharan Africa.⁴

At higher poverty lines, poverty becomes less concentrated. South Asia accounts for the largest share of the poor at the \$6.85 poverty line (figure 1.4, panel b). Of the global population with less than \$6.85 per day, 42 percent live in South Asia, 32 percent in Sub-Saharan Africa, and 15 percent in East Asia and Pacific. About one-quarter of the populations in Latin America and the Caribbean and in East Asia and Pacific is living on less than \$6.85 per day in 2024

(figure 1.5, panel b). Around three-quarters of the population in South Asia and almost the entire regional population in Sub-Saharan Africa (87 percent) live below this higher poverty line. At the higher poverty standard of \$6.85, the share of Sub-Saharan Africa and FCS has also increased, but it is still less than 50 percent (figure 1.6, panel b).

FIGURE 1.5**Poverty forecasts through 2030 by region**

Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

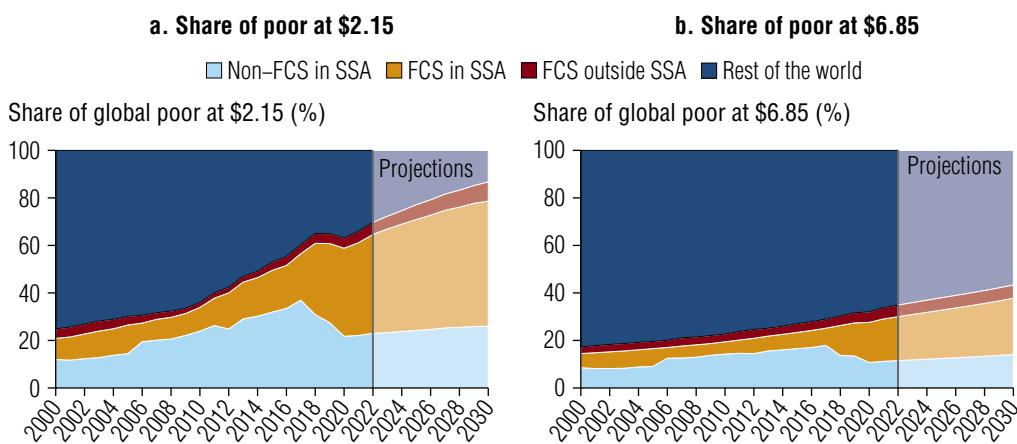
Note: Poverty rates are reported for the \$2.15 and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars). Between 2022 and 2029 poverty is projected based on per capita gross domestic product growth projections in *Global Economic Prospects, June 2024* (World Bank 2024d), complemented by the *Macro Poverty Outlook* (World Bank 2024e) and the *World Economic Outlook* (IMF 2024); for 2030, average annual historic per capita growth rates (2010–19) are used. In Sub-Saharan Africa and in the Middle East and North Africa, surveys cover less than 50 percent of the population after 2019 and 2018, respectively. See annex 1A for more details on the projections.

The Middle East and North Africa and Sub-Saharan Africa are the two regions where extreme poverty is not projected to be eradicated by 2030

While poverty is projected to fall in Sub-Saharan Africa, progress will not be nearly fast enough to eradicate extreme poverty by 2030. About one in three people in Sub-Saharan Africa in 2030 is projected to still be living with less than \$2.15 (figure 1.5, panel a).

The Middle East and North Africa is the only region that has seen a reversal in poverty eradication. In 2014, the Middle East and North Africa had almost eradicated poverty, with an extreme poverty rate of less than 3 percent. Post-2014, slow economic growth, limited job creation, increased fragility and conflict, inflation, and other shocks such as

the pandemic led to a reversal in that progress (Gatti et al. 2023; World Bank 2024d). Extreme poverty in the Middle East and North Africa is projected to continue to rise to 2030 (figure 1.5, panel a).

FIGURE 1.6
Increased concentration of extreme poverty in Sub-Saharan Africa and fragile and conflict-affected situations


Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: FCS = fragile and conflict-affected situations; SSA = Sub-Saharan Africa. Poverty rates are reported for the \$2.15 and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars). Countries in FCS are defined following the World Bank classification of fragile and conflict-affected situations for each year until 2022, and keeping the definition fixed in 2022 for the years after. Between 2022 and 2029 poverty is projected based on per capita gross domestic product growth projections in *Global Economic Prospects, June 2024* (World Bank 2024d), complemented by the *Macro Poverty Outlook, Spring Meetings 2024* (World Bank 2024e) and *World Economic Outlook* (IMF 2024); for 2030, average annual historic per capita growth rates are used. See annex 1A for more details on the projections. Surveys cover less than 50 percent of the population for Sub-Saharan Africa after 2019, and for countries in FCS in 2000 and after 2017.

Regional trajectories of poverty using the higher poverty line of \$6.85 per day are also expected to diverge (figure 1.5, panel b). Globally, 39 percent of the population is projected to live below that line in 2030. In Sub-Saharan Africa, only 15 percent of the population will have levels of daily consumption greater than \$6.85. In South Asia, poverty rates will continue to fall faster, widening the gap with Sub-Saharan Africa, but 64 percent of the population is still projected to be poor by this standard in 2030. The forecasts show that East Asia and Pacific as well as Europe and Central Asia will continue to make progress, while in Latin America and the Caribbean and the Middle East and North Africa reductions in poverty will be small.

The concentration of extreme poverty in fragile countries and Sub-Saharan Africa will continue

The concentration of poverty in Sub-Saharan Africa and FCS is forecasted to intensify (figure 1.6). By 2030, one-half of the global extreme poor will be in today's FCS within Sub-Saharan Africa, and another one-quarter is projected to be in countries in Sub-Saharan Africa that are not in FCS today. Effectively, the relative concentrations of extreme poverty in FCS or Sub-Saharan Africa versus in non-FCS and non-Sub-Saharan Africa will have reversed over the course of three decades. The share of poor in FCS and/or Sub-Saharan Africa will have grown from one-quarter to more than four-fifths.

To eradicate extreme poverty, global support for FCS and Sub-Saharan Africa will be key. People in FCS face numerous challenges that could potentially perpetuate their experience of poverty, including violence, displacement, limited access to basic services, food insecurity, limited opportunities for income generation, and adverse institutional and macroeconomic environments (Evans 2009; FAO-WFP 2019; Keho 2009; Lukunka and Grundy 2020; Mueller and Tobias 2016). Conflict not only has immediate detrimental impacts on human lives, infrastructure and business activity, it also hinders long-term progress by adversely affecting human capital and productivity (Corral et al. 2020; World Bank 2024h).

The changing regional composition of poverty partly explains the role of economic growth behind past gains and current stagnation in poverty reduction

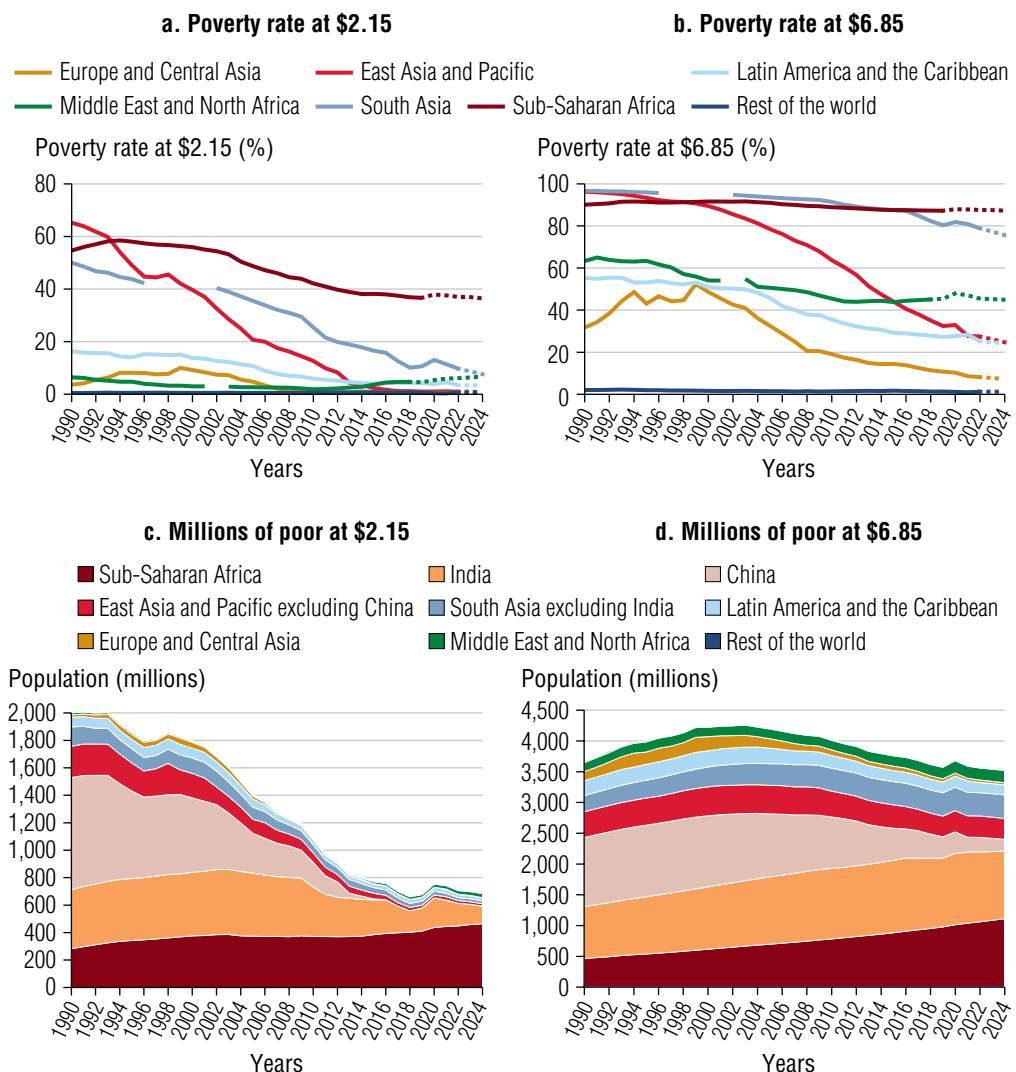
A longer-term view shows that extreme poverty fell significantly between 1990 and 2013, but progress has slowed dramatically since then. From 1990 to 2013, the rate dropped from 37.9 to 11.5 percent (figure 1.1, panel a; figure 1.7, panel a) and 1.2 billion people exited extreme poverty (figure 1.7, panel c). Thereafter, the pace of reduction slowed—even before the COVID-19 pandemic hit (World Bank 2020). From 2013 to 2018, the extreme poverty rate decreased by only 2.8 percentage points. From 2018 on, the trend even reversed.

A large factor that explains the slowing of global poverty reduction over the last decade is the changing regional composition of poverty (see figure 1.7, panels a and c). In 1990, East Asia and Pacific had a higher poverty rate than Sub-Saharan Africa, and South Asia had rates not very different from those of Sub-Saharan Africa. This picture changed markedly over the years. Fueled by rapid growth, East Asia and Pacific experienced historic progress on poverty that also drove the reduction at the global level. Until 2013, global extreme poverty reduction was led by China's rapid economic growth, which lifted more than 800 million people out of extreme poverty over three decades (figure 1.7, panel c). The rest of East Asia also made remarkable

progress, with 210 million people exiting extreme poverty between 1990 and 2024. Moreover, in South Asia (excluding India) the number of extreme poor fell significantly, from 141 to 20 million, over the same period, despite recent stagnation. In India alone, the number of extremely poor people fell from 431 million to 129 million over this period.

Since the early 2010s, progress in reducing global extreme poverty has depended to a much greater extent on Sub-Saharan Africa than it did before. Although the extreme poverty rate in Sub-Saharan Africa has fallen over the past three decades, it did so at much lower rates than in other regions, and not fast enough relative to population growth. Hence, the number of people living in extreme poverty in the region has increased by almost 200 million, rising from 282 million in 1990 to 464 million in 2024. Similarly, in the Middle East and North Africa, the number of people living in extreme poverty doubled, from 15 million in 1990 to 30 million in 2024. Extreme poverty in that region has surged since 2014, driven by fragility, conflict, and inflation (Gatti et al. 2023).

At the higher poverty standard of \$6.85, the 1990s were a period of stagnation. Thereafter, however, the poverty rate at this level also declined sharply, falling from 69.0 to 43.6 percent between 2000 and 2024. This staggered picture is explained largely by China's progress in moving people out of extreme poverty before they could later cross the \$6.85 poverty line (figure 1.7, panel d). In East Asia and Pacific as a whole, the poverty rate in 2024 was one-fourth of the level in 1990 (figure 1.7, panel b). Latin America and the Caribbean and South Asia have also experienced declines, although progress has stalled more recently. Despite this progress in the percentage of people below the \$6.85 line, due to high population growth, the number of people living on less than that has barely changed, declining by about 130 million between 1990 and 2024 (figure 1.1, panel b). In India, there are more people living on less than \$6.85 in 2024 than in 1990, driven by population growth. The same is true for South Asia as a whole and also for Sub-Saharan Africa and the Middle East and North Africa. While many people in East Asia and Pacific have moved from below \$6.85 to above it, shifts in South Asia were concentrated from below \$2.15 to between \$2.15 and \$6.85 (figure 1.7, panel d). See annex 1C for regional poverty estimates for selected years in the period 1990–2024.

FIGURE 1.7**Regional disparities in poverty reduction**

Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

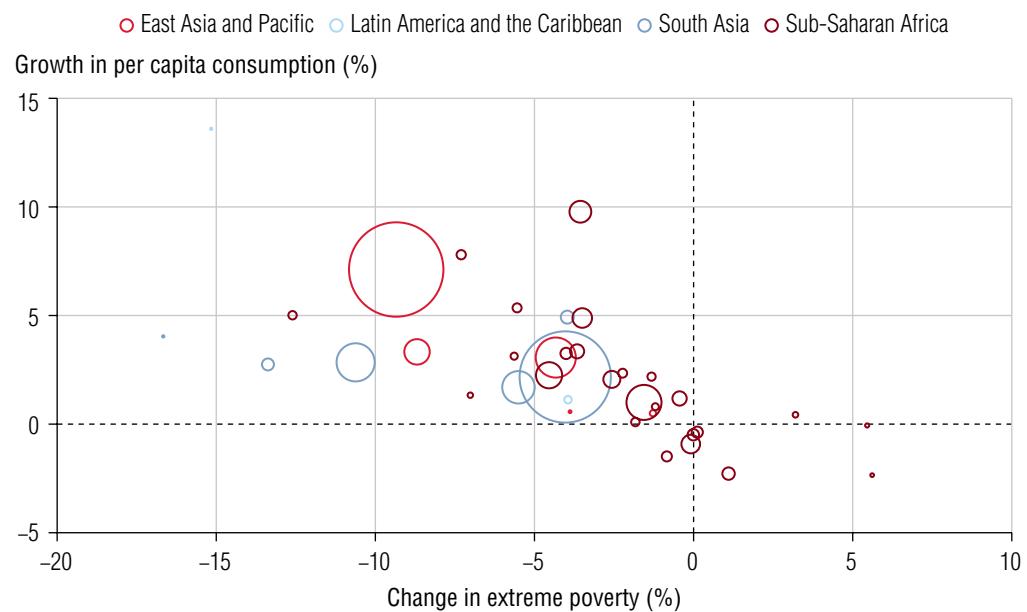
Note: Poverty rates are reported for the \$2.15 and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars). In panels c and d, millions of poor from South Asia and East Asia and Pacific do not include numbers from India and China, respectively, which are shown separately. Poverty rates for 2022–24 are projected based on per capita gross domestic product growth projections in *Global Economic Prospects* (IMF 2024). See annex 1A for more details on the projections. Discontinuity in the series in panels a and b indicates years with insufficient data coverage (that is, survey data do not cover at least 50 percent of the population). More recent estimates for Sub-Saharan Africa and the Middle East and North Africa are projections shown with dotted lines, as survey data do not cover at least 50 percent of the population after 2019 and 2018, respectively. To obtain the global count of millions of poor, panels c and d include all regional estimates of the millions of poor, whether or not there is data coverage.

Reigniting economic growth and making it more inclusive are key to eradicating poverty

Economic growth has been a key factor behind poverty reduction and the differential progress across regions (Bergstrom 2022; Kraay 2006; Lakner et al. 2022). Figure 1.8 shows that high economic growth is strongly linked to rapid reduction in extreme poverty in 39 countries with poverty data that were designated low-income countries in 1990.⁵ Notably, China has recorded the highest annual growth rate (exceeding 9 percent) and has virtually eradicated extreme poverty. In general, countries in East Asia and Pacific and South Asia have shown higher rates of economic growth and poverty reduction than those in Sub-Saharan Africa.

FIGURE 1.8

Economic growth has been an important driver of extreme poverty reduction



Sources: World Bank, Poverty and Inequality Platform (PIP) (version September 2024), <https://pip.worldbank.org>; World Development Indicators database.

Note: This chart plots the annualized growth rate in per capita consumption (or income) against the annualized change in extreme poverty (living on less than \$2.15 per person per day expressed in 2017 purchasing power parity dollars) using the longest comparable spell for each country in the PIP. The first and last survey years in the longest comparable spell vary by country. The countries represented here were designated as low-income countries in 1990 (and have survey data in PIP). The Arab Republic of Egypt and Myanmar are outliers and are not included for presentational purposes. The size of the marker is proportional to population size in the second survey year. For details on survey comparability, see <https://datanalytics.worldbank.org/PIP-Methodology/welfareaggregate.html#comparability>.

The same level of economic growth need not translate into the same level of poverty reduction (Kakwani and Pernia 2000; Lakner et al. 2022; Ravallion 2004). Countries differ in their ability to translate economic growth into poverty reduction. A fundamental nexus between growth and poverty reduction is the labor market and labor incomes. In many settings where poverty is stagnating, the labor market has not been able to deliver more and better jobs.⁶

An important factor to enhance the impact of economic growth on poverty reduction is the level of inequality. Chapter 2 of this report discusses in greater detail the role of inequality in efforts to boost shared prosperity around the world. Relative measures of poverty, such as the World Bank's societal poverty measure, are another way to capture these distributional concerns. As explained in more detail in box 1.4, poverty is assessed largely against absolute lines that are held fixed across countries and over time. In contrast, a relative poverty line increases in tandem with average income. To reduce relative poverty, growth needs to reduce inequality.

BOX 1.4

Progress in societal poverty has stagnated since 2020

The poverty lines of \$2.15, \$3.65, and \$6.85 per person per day (expressed in 2017 purchasing power parity dollars) used in this report are absolute measures, which are fixed in real terms for all countries over time. As highlighted in box 1.1, the definition of what it means to be poor evolves as countries get richer, which motivated the introduction of the \$6.85 line in the World Bank's vision alongside the extreme poverty line (World Bank, n.d.). Applying the same idea more broadly suggests that poverty lines should vary across countries, as well as over time for a particular country. Since 2018, the World Bank has been monitoring the societal poverty line, which is a weakly relative poverty line that increases with a country's income once countries move beyond an income level where extreme poverty is the primary concern (Jolliffe and Prydz 2021; World Bank 2018).^a A decline in relative poverty requires that the poorest parts of the population within a country grow faster than average income, leading to a reduction in inequality.

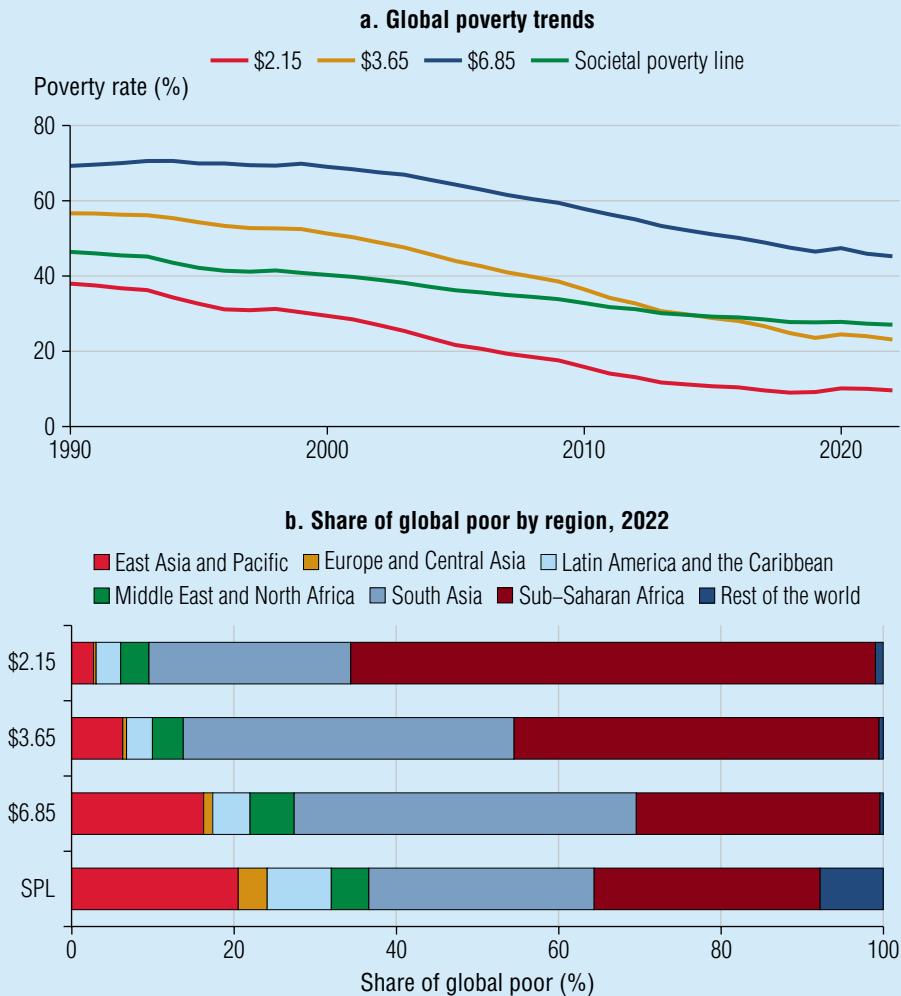
Progress in societal poverty has been slower than the changes at the absolute lines (see figure B1.4.1, panel a). This is as expected, because the societal poverty line is a stricter assessment of poverty in growing economies than the absolute poverty lines. The societal poverty line is more relevant for assessing poverty in higher-income countries and regions. Figure B1.4.1, panel b, shows quite different distributions of poverty across regions, depending on the poverty line used. In particular, the distribution of global poverty is more even across regional groups when the societal poverty line is used.

(continued)

BOX 1.4

Progress in societal poverty has stagnated since 2020 (continued)

FIGURE B1.4.1
Societal poverty line



Source: World Bank, Poverty and Inequality Platform (PIP, version September 2024), <https://pip.worldbank.org>.

Note: SPL = societal poverty line. The poverty lines of \$2.15, \$3.65, \$6.85, and the SPL are per person per day (expressed in 2017 purchasing power parity dollars).

- a. The measure was introduced following the recommendation of the Atkinson Commission on Global Poverty to “introduce a societal headcount ratio measure of global consumption poverty” (World Bank 2017, 144). The societal poverty line is defined as \$1.15 plus half the median level of consumption or income, with the international poverty line of \$2.15 as a floor (Jolliffe et al. 2022). By construction, \$2.15 is the societal poverty line as long as the median level of consumption or income is less than \$2 per person per day, which applies only to the poorest countries. For example, considering two low-income countries, Burundi had a median consumption of \$1.80 (2020–21), compared with \$3.10 (2021–22) for Burkina Faso. The relative component of the societal poverty line applies to countries with levels of consumption exceeding \$2.

To eradicate extreme poverty, Sub-Saharan Africa will need to accelerate economic growth and make it more pro-poor

In Sub-Saharan Africa, economic growth has been historically slower than in other regions, and the outlook is not promising. While progress in poverty reduction is highly varied across countries in Sub-Saharan Africa (see figure 1.8), the region is a systemically low-growth environment, especially since 2015 (Wu et al. 2024). Much of the progress in poverty reduction in East Asia and Pacific and South Asia has been driven by high rates of income growth, rates which Sub-Saharan Africa has not been able to achieve. Population growth also plays an important role: between 1990 and 2022, aggregate GDP in Sub-Saharan Africa grew by 3.4 percent annually (compared to 2.9 percent for the world), while GDP per capita grew only by 0.7 percent annually (compared to 1.6 percent for the world).

Various factors may explain the slow economic growth in Sub-Saharan Africa. First, the region has not benefited from globalization as much as other places that had high poverty rates, in particular Asian countries (Lakner and Milanovic 2016; Milanovic 2016). Moreover, compared to other regions, Sub-Saharan African economies have exhibited limited technological change (World Bank 2024b) and are still heavily dependent on agriculture and natural resources (Thorbecke and Ouyang 2022; Wu et al. 2024). Between 2000 and 2014, economic growth on the continent was driven by the use of natural capital rather than rising levels of productivity (World Bank 2024a). Per capita income growth in Sub-Saharan Africa is expected to remain at a meager 1.5 percent in 2025, further dampening prospects of poverty reduction (World Bank 2024d).

In addition to being slower, economic growth has also been less pro-poor in Sub-Saharan Africa. The impact of economic growth on poverty reduction has been limited, particularly because of high levels of inequality (Bourguignon 2003; Klasen and Misselhorn 2008; Wu et al. 2024). Wu et al. (2024) find that poverty reduction in the region has been limited because of factors that constrain the productive capacity of the poor and their ability to generate income and contribute to economic growth. Examples of such factors include (a) limited access to education, which hinders the accumulation of human capital; (b) lack of basic infrastructure (electricity, sanitation, and drinking water); (c) the economic structure and dependence on natural resources; and (d) the prevalence of conflict and instability.

Reducing poverty requires focusing on job creation and investing in the productive capacity of people

The 1990 *World Development Report* highlighted that the most effective ways to improve the lives of the poor are by (a) promoting growth that uses labor, the poor's most abundant asset, and (b) ensuring widespread access to basic social services, particularly primary education and health care (World Bank 1990). These priorities are still appropriate more than 30 years later and are even more urgent given the losses in human capital due to COVID-19. Enabling the poor to benefit more from economic growth will require better-functioning labor markets (see box 1.5) and substantial investments in the productive capacity of people. Key areas include more education, basic infrastructure, and economic diversification, as well as a progressive income and property taxation that reduces inequality and raises domestic revenue (Lakner et al. 2022; Wu et al. 2024).

BOX 1.5**Better labor markets for poverty reduction**

The private sector creates jobs.^a The roles of government are to ensure that the conditions are in place for strong private sector-led growth, to analyze job market conditions and outcomes, and to remove or mitigate the constraints that prevent the creation of more and better jobs. Government can fulfill these roles by ensuring that the fundamental aspects of macroeconomic stability, the business environment, and rule of law are in place.

In addition, governments can help set priorities to increase the ability of the labor market to create jobs. As economies evolve and new challenges emerge, so too must the policies aimed at fostering employment, ensuring that they remain relevant and effective over time. This dynamic nature of policy design allows for the anticipation of future labor market trends and to preemptively address potential obstacles to job creation and improvements in job quality. Effective job strategies, leading to sustained labor productivity enhancements that are essential for fostering economic growth, reducing poverty, and ensuring inclusive outcomes in the long term, depend heavily on the following job transitions:

- ***Sectoral Transition.*** The transition from agriculture to nonagricultural sectors is vital for economic growth, accompanied by substantial productivity gaps. In low-income countries, the share of employment in nonagricultural sectors remains minor compared to that in high-income countries, highlighting the growth potential through sectoral transitions. **Removing structural barriers, such as improving access to credit and resolving land-tenure issues, can facilitate this transition.**
- ***Spatial Transition.*** The move from rural to urban areas is associated with higher wages and greater productivity, yet the share of urban workers in low-income countries is much lower than in high-income countries. **Addressing skill mismatches and improving rural education quality can enhance urban employment opportunities and thus support spatial transitions.**
- ***Occupational Transition.*** The high skill premium and the smaller share of skilled workers in low-income countries than in high-income countries suggest significant growth opportunities through occupational transitions. **Investing in education and training to increase the skilled labor supply is essential for meeting the demand in more productive sectors.**

(continued)

BOX 1.5**Better labor markets for poverty reduction (continued)**

- *Organizational Transition.* Exporting activities, indicative of organizational transitions, are significantly more productive than nonexporting activities but involve only a small fraction of the workforce in lower-income countries. **Reducing the cost of formal employment and encouraging technology adoption can facilitate this transition, highlighting the productivity potential through organizational transition.**

Completing these job transitions is key to closing massive income gaps and combating poverty. Evidence suggests that poverty rates among workers are significantly lower on the advanced side of each transition, indicating that progress in these transitions can significantly reduce poverty rates by shifting people to more productive activities.^b

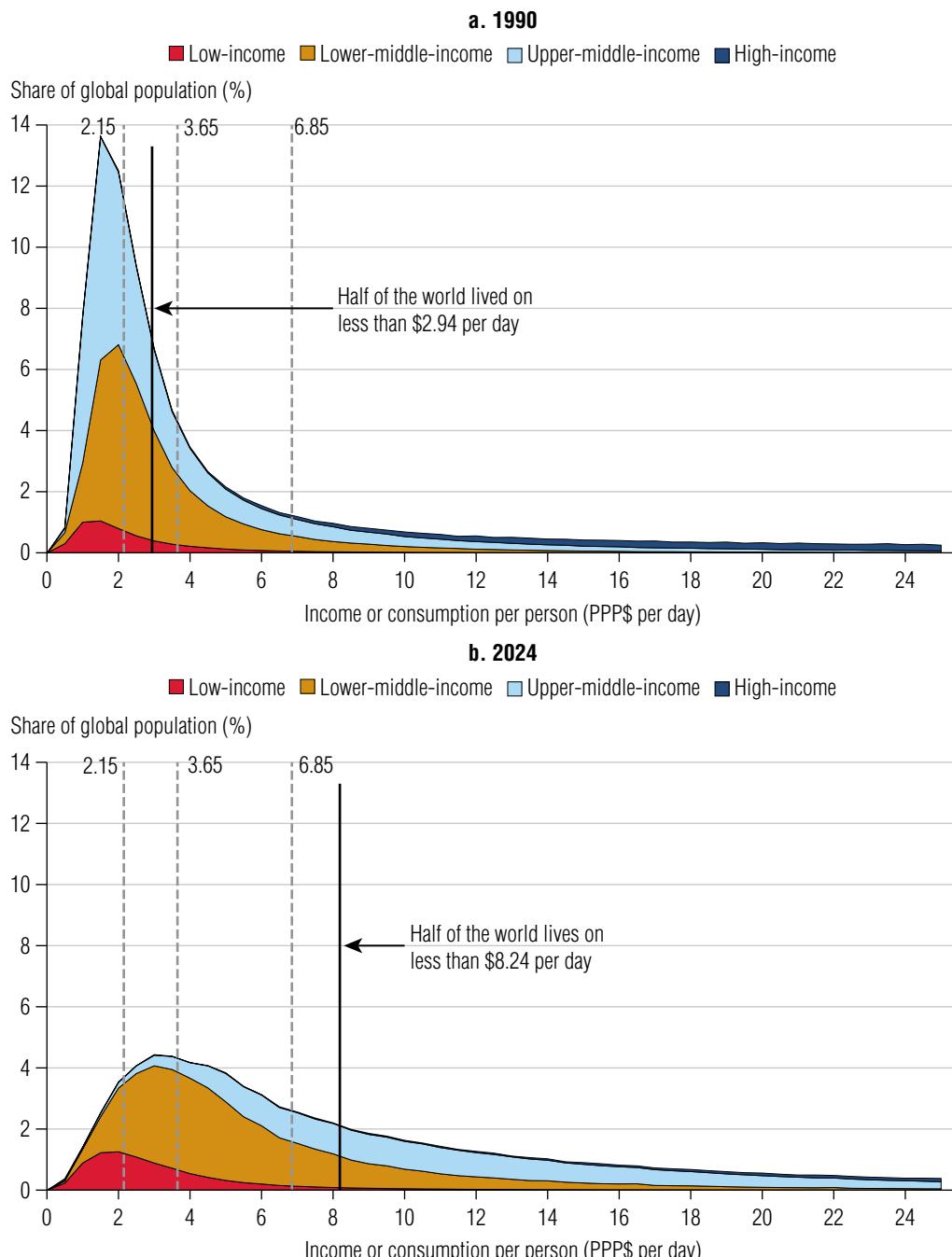
a. See World Bank (2012) and references therein.

b. For more information, see <https://datatopics.worldbank.org/jobsdiagnostics/>.

These elements are important not only to raise incomes but also to reduce the risk of people falling back into poverty. Even though the distribution of incomes has changed significantly since 1990, a significant share of the population continues to live close to the poverty lines discussed in this chapter (figure 1.9, panels a and b). With 50 percent of the global population living below or close to the two poverty lines, even small shocks can push many people back into poverty. For example, in 2014, the Middle East and North Africa had almost eradicated extreme poverty, but in 2030 almost 1 in 10 people in the region is projected to live in extreme poverty. Globally, the COVID-19 pandemic pushed about 73 million people into extreme poverty in a single year. While the pandemic was a global shock, the impacts and the ability to recover were not the same for people with different household characteristics such as their location, demographics, employment, and levels of incomes, among other factors.

FIGURE 1.9

Income levels in the world have grown between 1990 and 2024, but many people remain vulnerable to falling back into poverty



Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: This figure shows the distribution of the population over income or consumption levels in 1990 and 2024, cut off at \$25 per person per day and expressed in 2017 purchasing power parity dollars (PPP\$). More than 86 percent of the global population lived below the \$25 per person per day threshold in 1990, and about 80 percent live under the threshold in 2024.

Profile of the global poor: People living in poverty typically live in rural areas and are younger and less educated

To inform policies that target the poor with the aim of raising incomes and enhancing resilience, it is key to understand the spatial and demographic profile of the population living in poverty at different levels and the extent of multidimensional poverty. The remainder of this chapter presents this evidence, using harmonized data to provide a global perspective.

This section profiles the global poor in terms of where they live, as well as their age and educational attainment. The analysis spans up to 152 countries with microdata from or around 2022, the latest year with sufficient data coverage. The data represent 87 percent of the world's population.⁷ The spatial and demographic profiles of the poor at both the \$2.15 poverty line (extreme poverty line) and the \$6.85 poverty line are presented.

Global poverty estimates, and hence the profiling of the global poor, assume an equal allocation of resources within households, regardless of the age and gender composition of these households. That is, a household's poverty status is defined if per capita household income or consumption falls below the poverty line and all individuals living in a poor (nonpoor) household are counted as individually poor (nonpoor) as well. However, the costs of basic needs differ for children and adults, and within-household inequality can be traced back to individuals' age and gender (Bargain, Lacroix, and Tiberti 2022; World Bank 2018). Given that the within-household inequality, particularly between men and women, is not observable with the data at hand, the breakdowns by gender are not reported here.⁸ In addition, poverty estimates ignore potential economies of scale benefits at the household level. Larger households typically enjoy economies of scale in consumption because goods such as housing or consumer durables can be shared within the household, leading to an overestimation of poverty for children and rural areas (Jolliffe and Tetteh-Baah 2024; Salmeron-Gomez et al. 2023).

Extreme poverty in rural areas remains high, but a large share of the poor lives in urban areas

More than three-quarters of the global extreme poor lived in rural areas in 2022, and half of the global extreme poor lived in rural Sub-Saharan Africa alone (figure 1.10, panel a).⁹ In nearly all regions, the rate of extreme poverty is higher in rural areas than urban areas, with rural poverty at 16 percent and urban poverty at 5 percent for the world as a whole (see figure 1.10, panel c). The difference between rural and urban poverty is most pronounced in Sub-Saharan Africa, where the rural poverty rate is 46 percent and the urban poverty rate is 20 percent.

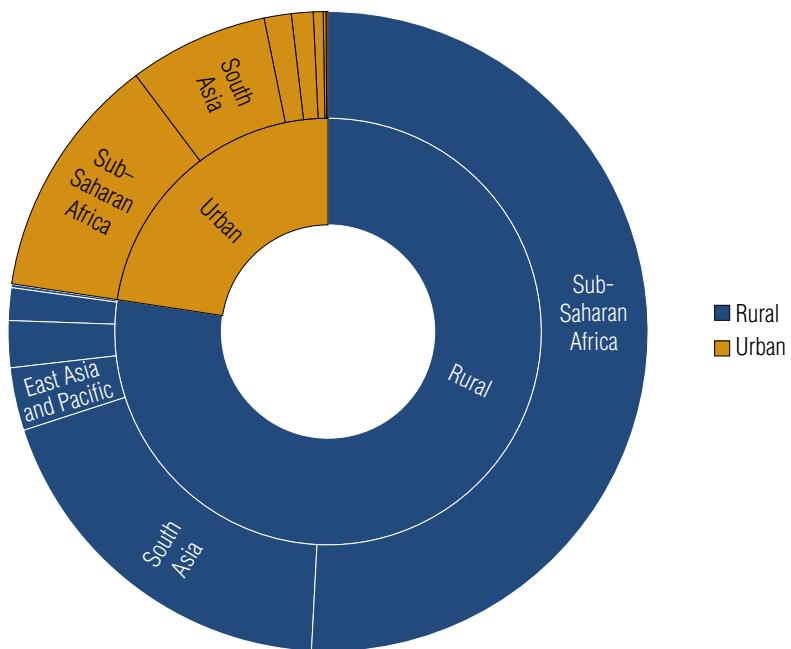
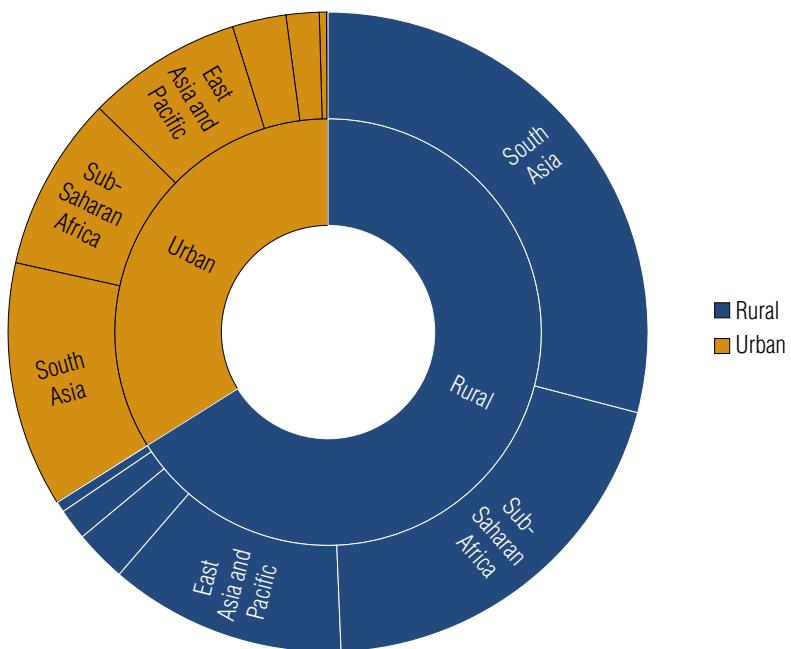
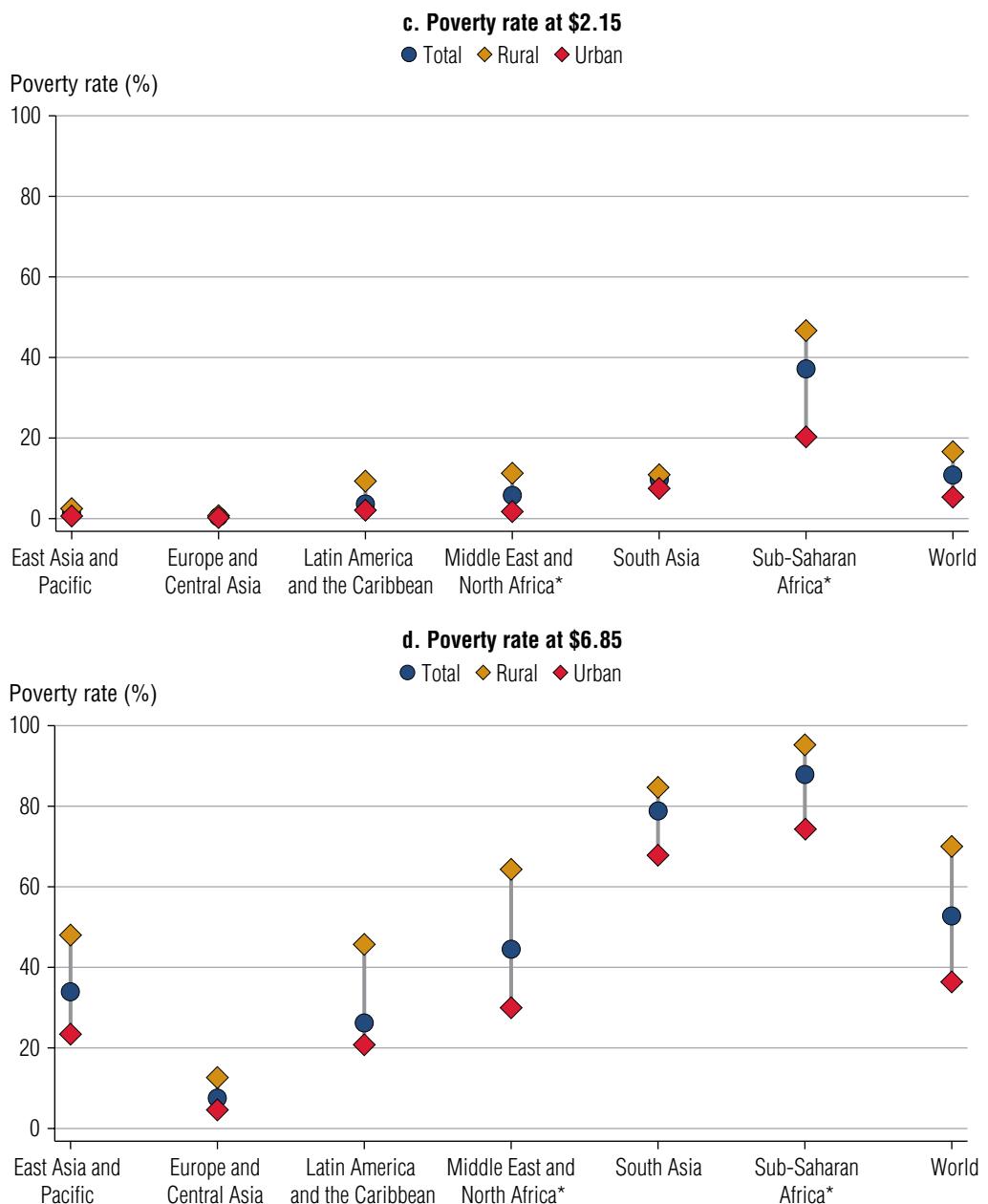
FIGURE 1.10**Comparison of rural and urban poverty rates, 2022****a. Share of global poor at \$2.15****b. Share of global poor at \$6.85***(continued)*

FIGURE 1.10**Comparison of rural and urban poverty rates, 2022 (continued)**

Source: World Bank, Global Monitoring Database (GMD) (version September 2024).

Note: Poverty rates are reported for the \$2.15 and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars). In panels a and b, selected regions are labeled. In panels c and d, estimates are not reported for the rest of the world, where poverty rates are low and there may be only a few observations for population subgroups.

*For the Middle East and North Africa and Sub-Saharan Africa, the recent survey data do not cover at least 50 percent of the population.

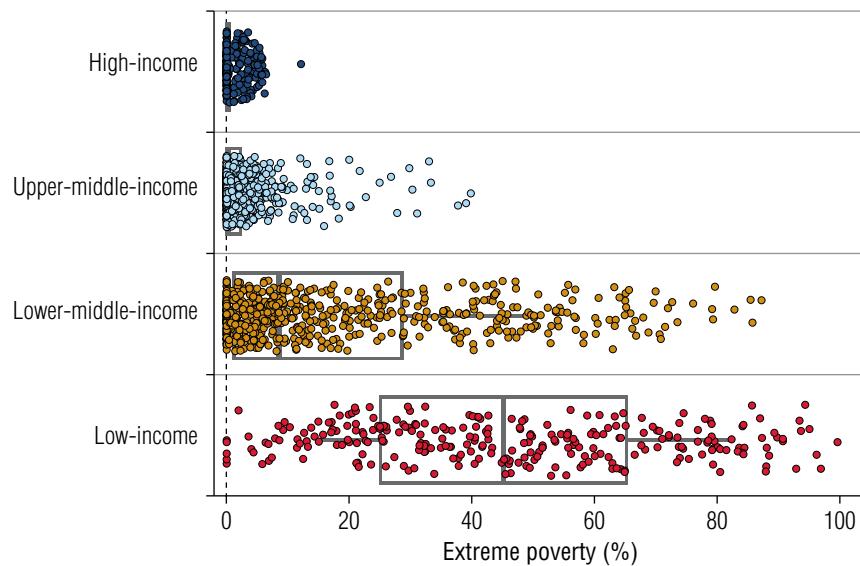
At the \$6.85 poverty line, both rural and urban poverty rates are higher, as expected; however, importantly, rural-urban poverty gaps are larger in nearly all regions (figure 1.10, panel d). The absolute difference in rural and urban poverty rates is most pronounced in East Asia and Pacific and in Latin America and the Caribbean (around 25 percentage points each), especially compared with South Asia (17 percentage points). Globally, the difference in the rural and urban poverty rates is 35 percentage points at the \$6.85 poverty line, compared to 11 percentage points at the \$2.15 extreme poverty line. Poverty is still largely a rural phenomenon at the higher poverty line, but from a global point of view it is less concentrated in rural areas than extreme poverty. This is explained largely by the large share of the extreme poor in Sub-Saharan Africa who live in rural areas. At the \$6.85 poverty line, 66 percent of the global poor lived in rural areas in 2022 (figure 1.10, panel b).

Against this background, rural populations need to be in the focus of poverty reduction efforts, especially in Sub-Saharan Africa and South Asia, particularly when extreme poverty is addressed. Yet urban areas cannot be ignored since that is where around a third of the global poor lives (according to the \$6.85 line).

Poverty rates vary greatly across subnational areas

The Global Subnational Atlas of Poverty uses detailed survey data to capture regional differences in poverty within a country. Figure 1.11 shows the distribution of these subnational poverty rates, grouping countries by their income group. There is large variation among the subnational areas. While the median subnational area among lower-middle-income countries has a poverty rate of less than 10 percent, the poorest 5 percent of subnational areas have poverty rates exceeding 60 percent, well above the median among the low-income countries.

Similarly, there are also very poor subnational areas in upper-middle-income countries. For example, in some parts of Namibia, an upper-middle-income country, over 30 percent of the population lives on less than \$2.15. The poorest areas in the country are sparsely populated and not well connected to the rest of the country. In South Africa, also an upper-middle-income country, the province Eastern Cape has a poverty rate of 36 percent, which is five times higher than the poverty rate in Western Cape and Gauteng and more similar to poverty rates in regions in Guinea-Bissau or Lesotho. In the capital region of Chad, only 3 percent of the population lives on less than \$2.15, while the poverty rate of the whole country is 31 percent. Similar patterns are seen with the poverty line of \$6.85, where some subnational areas in Latin America and the Caribbean or East Asia and Pacific show rates comparable to countries in Sub-Saharan Africa.

FIGURE 1.11**Distribution of subnational extreme poverty rates by income group, 2021**

Sources: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>; Global Subnational Atlas of Poverty (database).

Note: The extreme poverty rate reported for the \$2.15 per person per day poverty line (expressed in 2017 purchasing power parity dollars). Each dot refers to one subnational area, which is assigned to income groups based on the country it is in. The boxes depict the interquartile range and the vertical line in each box depicts the respective median values. The lower whisker represents the 10th percentile, while the upper whisker represents the 90th percentile.

The poor still have large educational gaps, and COVID-19 increased the gaps for children

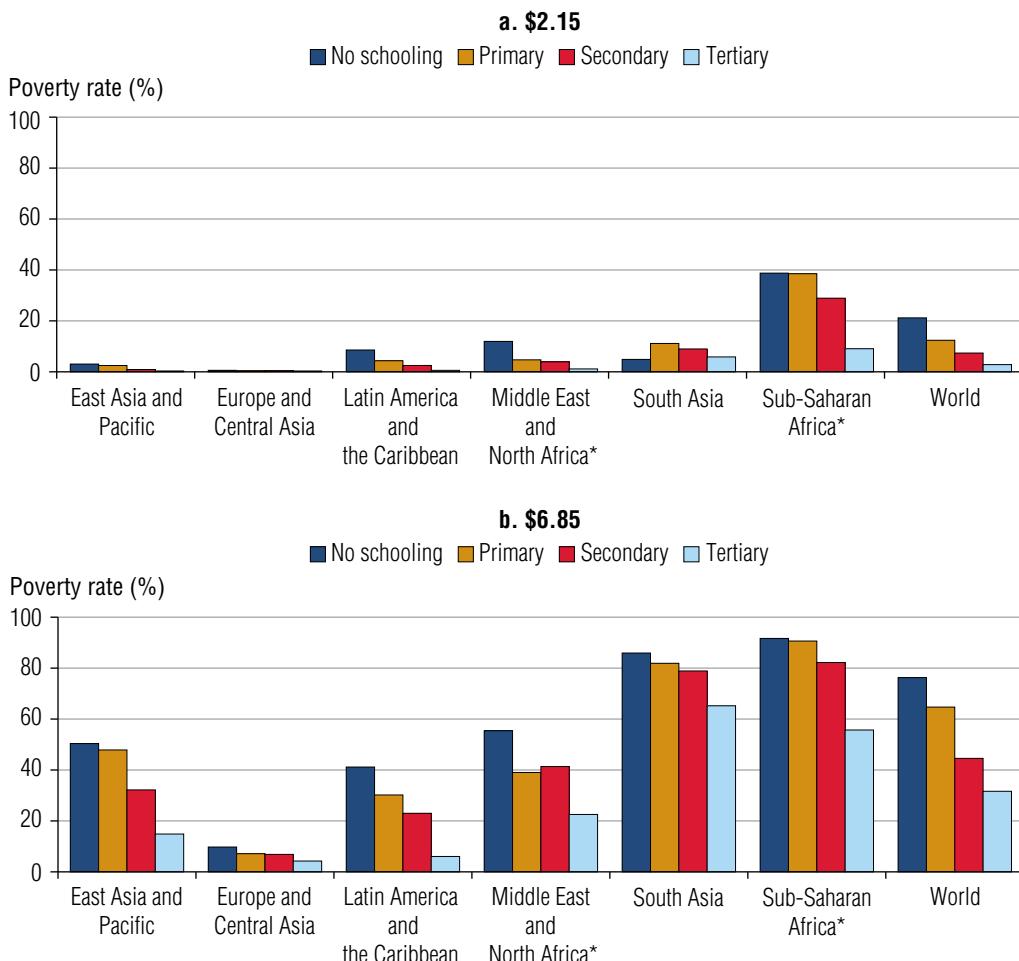
The 2022 data confirm the negative correlation between educational attainment and poverty. In nearly all regions of the world, the rate of extreme poverty declines with education (figure 1.12, panel a).¹⁰ Among the population age 15 or above globally, one-fifth of those without any formal education lives in extreme poverty, while 3 percent of those with tertiary education lives in extreme poverty. These patterns are compounded by regional effects. Adults age 15 or above without formal education who live in Sub-Saharan Africa show the highest rate of extreme poverty at 39 percent, while only 0.6 percent of the same demographic group residing in Europe or Central Asia lives in extreme poverty. Tertiary education in Sub-Saharan Africa is associated with lower levels of extreme poverty, but it is still 9 percent—a rate comparable to that of secondary school graduates in South Asia or that of people having no formal education in Latin America and the Caribbean.

At the poverty line of \$6.85, the gradient between educational attainment and poverty becomes even more pronounced across all regions. Around three-quarters of the population age 15 or above without any formal education lives on less than \$6.85 a day (figure 1.12, panel b). Obtaining even primary education reduces the likelihood of living in poverty to 65 percent, and a secondary education further reduces it to 44 percent. About one-third of the population age 15 or above with tertiary education lives in poverty.

Focusing on closing education gaps is also a policy priority, given the significant educational losses due to the pandemic, particularly for the poor. School closures led to learning losses in language, literacy, and mathematics of around 30 percent in multiple countries. In 2021, in several countries a quarter of all young people were not in education, employment, or training (Schady et al. 2023). Poorer households were also less likely to use remote work and schooling (Narayan et al. 2022). Schooling disruptions affected poorer households more than richer ones. It is estimated that students in low- and lower-middle-income countries could face future earning losses of up to 10 percent due to the pandemic, suggesting a permanent scarring effect (Schady et al. 2023). This generation of students now risks losing \$21 trillion in potential lifetime earnings in present value—the equivalent of 17 percent of today's global GDP (World Bank et al. 2022). The loss in schooling is likely to have a larger impact on poverty in the future than the immediate effect of the pandemic on poverty (Decerf et al. 2024).

Children and young adults are more likely to be living in poor households

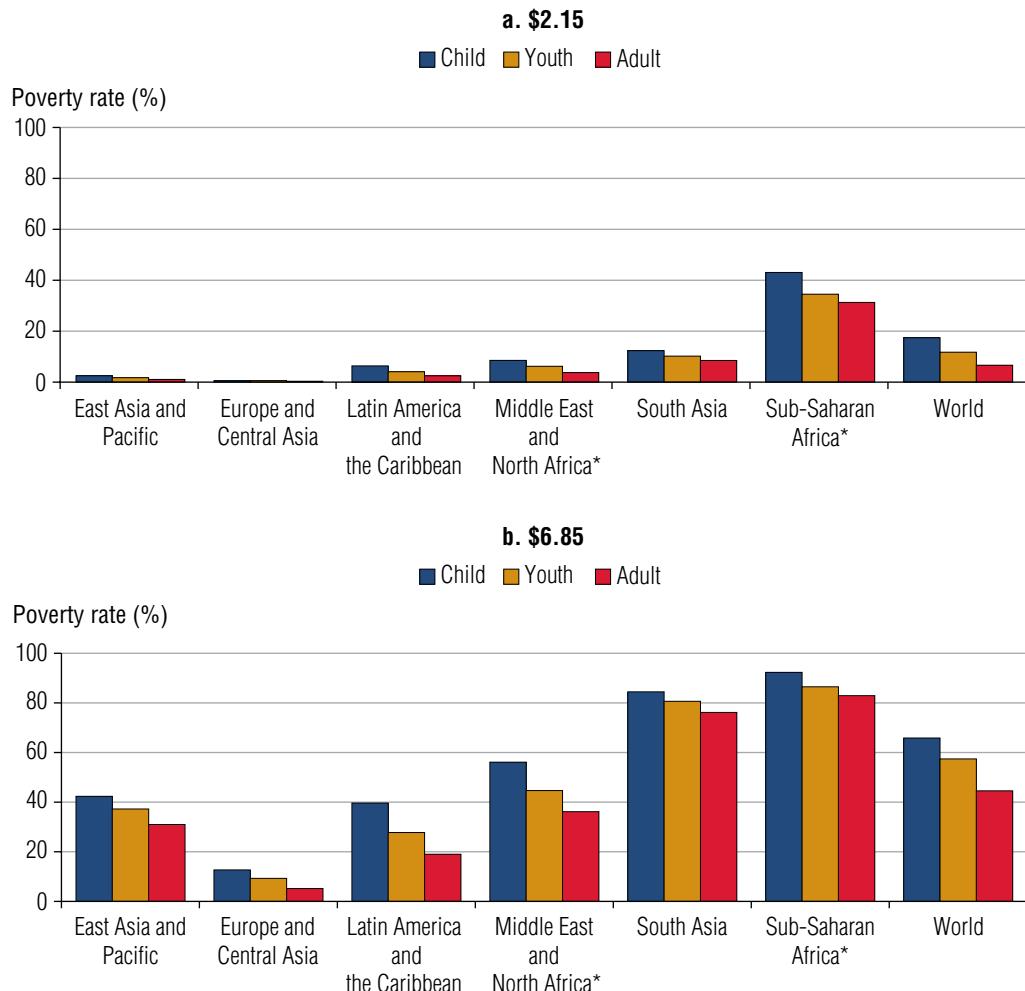
Globally, 6 of 10 extremely poor people (living on less than \$2.15 per day) are children or young adults.¹¹ In nearly all regions of the world, the share of children who live in extreme poverty is higher than the equivalent share for youth or adults (figure 1.13). More precisely, the extreme poverty rate for children is 17 percent, compared with about 12 percent for youth and 7 percent for adults (figure 1.13, panel a). In Sub-Saharan Africa, the region that drives the global estimates of extreme poverty, poverty rates for children and adults are 42 and 31 percent, respectively. At the poverty line of \$6.85, while poverty rates are significantly higher across several regions, the poverty rate is still higher for children and youth than for adults. Sub-Saharan Africa and South Asia have similarly high poverty rates for the different age groups. Europe and Central Asia has the lowest poverty rates.

FIGURE 1.12**Percent of population living in poverty by educational attainment, 2022**

Source: World Bank, Global Monitoring Database (GMD) (version September 2024).

Note: Poverty rates are reported for the \$2.15 and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars). Estimates are based on population age 15 or above. Estimates are not reported for the rest of the world, where poverty rates are low and there might be few observations for some population subgroups. The extreme poverty rate in South Asia is driven by India, where less than 1 percent of the population age 15 or above have no formal education.

* For the Middle East and North Africa and Sub-Saharan Africa, the recent survey data do not cover at least 50 percent of the population.

FIGURE 1.13**Age profile of the poor, 2022**

Source: World Bank, Global Monitoring Database (GMD) (version September 2024).

Note: Poverty rates are reported for the \$2.15 and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars). Estimates are not reported for the rest of the world, where poverty rates are low. Age cutoffs are defined as follows: child (<18), youth (15–24), adult (25+). Note that older children (ages 15–17) are included in both the child and youth categories.

* For the Middle East and North Africa and Sub-Saharan Africa, the recent survey data do not cover at least 50 percent of the population.

Poverty reduction policies should prioritize the well-being of children and young adults to give everyone a fair start in life, irrespective of parental resources. Poor households tend to have more children yet have limited financial resources to provide adequate nutrition and education for these children and give them a chance to have a better life in the future (Beegle, Dehejia, and Gatti 2003; Salmeron-Gomez et al. 2023). Young adults fare worse in the labor market, especially if they are women (Kabeer 2021; Mayer, Moorti, and McCallum 2019). Children and women are disproportionately affected by economic and climatic shocks and recover more slowly from such

shocks (Escalante and Maisonnave 2023; World Bank 2023b). Beyond their intrinsic value to individual well-being, equal opportunities for young adults and women have instrumental benefits for the whole society (Mayer, Moorti, and McCallum 2019; Mitra, Bang, and Biswas 2015).

Multidimensional poverty broadens the understanding of poverty to guide actions

The World Bank's Multidimensional Poverty Measure (MPM), which was first published in 2018, seeks to provide a broader view of poverty by assessing deprivations across multiple dimensions of well-being to understand poverty beyond monetary deprivation (World Bank 2018). Deprivations in nonmonetary and nonmarket dimensions, such as access to schooling and basic infrastructure, compound poverty and perpetuate cycles of inequality.

A person is considered multidimensionally poor if their consumption is below the extreme poverty line of \$2.15 per day or if they live in a household with too many deprivations in education and basic infrastructure. More precisely, the household is considered deprived in education if there is at least one school-age child who is not enrolled in school or if no adult in the household has completed primary education. For basic infrastructure, a household is considered deprived if it lacks access to drinking water, sanitation, or electricity.¹² Therefore, a country's MPM is at least as high as its monetary poverty, but it may be considerably higher, reflecting the additional role of nonmonetary dimensions to impoverishing households.

About 1 in 10 people globally is multidimensionally poor

While it is difficult to compare multidimensional poverty over time, the multidimensional poverty rate has decreased from 14.7 percent in 2019 (World Bank 2022) to 13.4 percent in 2021, the most recent year reported here.¹³ The slight reduction in multidimensional poverty, which is driven by the nonmonetary indicators, should be interpreted with caution, as the most recent estimate of 13.4 percent is based on limited recent data (table 1.1 indicates that only about one-third of the world's population had survey data in 2020 or later for estimating multidimensional poverty). Table 1.1 summarizes the different dimensions and indicators that make up the multidimensional poverty rate by region.¹⁴ Estimating multidimensional poverty places greater demands on the data since several dimensions need to be observed for the same set of households. Therefore, the recently available data for several regions, as well as for the whole world, do not represent at least half of the population and are thus shaded gray.¹⁵ This lack of data highlights the importance of improving the availability of multtopic household survey data, as discussed in more detail in chapter 4.

The regional differences in multidimensional poverty mirror those found for the extreme poverty line of \$2.15, which is not surprising given that monetary deprivation is an important component in the construction of the MPM. The highest multidimensional poverty rate is found in Sub-Saharan Africa, where 52.6 percent of people face deprivation. In South Asia, multidimensional poverty is also significantly greater than monetary poverty, which is driven by low rates of educational enrollment and attainment, next to low access to sanitation.¹⁶

TABLE 1.1**Deprivations in educational attainment and access to basic infrastructure lift multidimensional poverty above the extreme poverty rate, 2021**

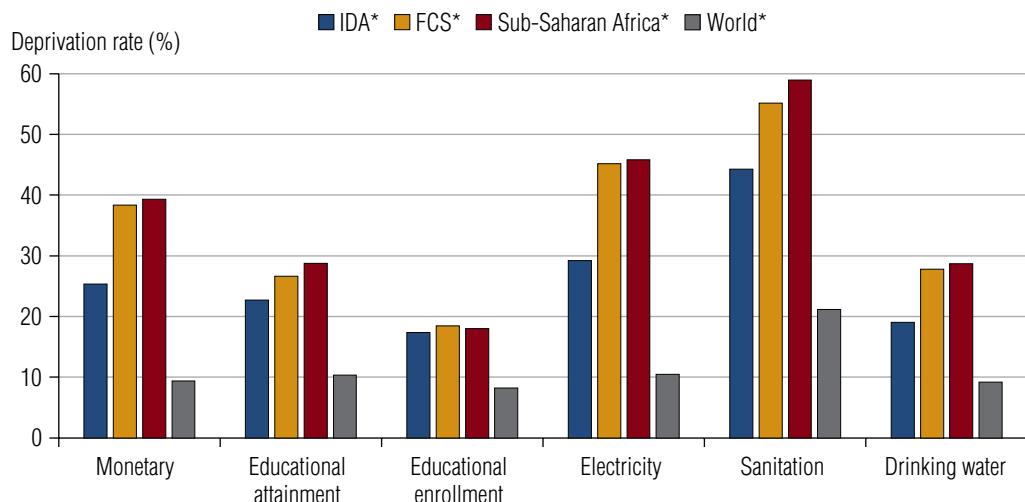
Region	Monetary	Deprivation rate (%)						Multidimensional poverty rate	Number of economies	Coverage (%)			
		Education		Basic infrastructure									
		Educational attainment	Educational enrollment	Electricity	Sanitation	Drinking water							
East Asia and Pacific	2	5	2	1	9	4	2.7	12	26				
Europe and Central Asia	0	1	1	2	8	4	2.1	24	78				
Latin America and the Caribbean	3	8	2	1	17	3	3.6	18	86				
Middle East and North Africa	1	7	2	0	2	1	1.5	3	24				
South Asia	4	15	18	6	23	5	11.2	6	11				
Sub-Saharan Africa	39	29	18	46	59	29	52.6	24	31				
Rest of the world	0	1	2	0	0	0	1.0	23	69				
World	9	10	8	10	21	9	13.4	110	37				
IDA countries	25	23	17	29	44	19	35.6	38	34				
Countries in FCS	38	27	18	45	55	28	50.4	13	27				

Source: World Bank, Global Monitoring Database (GMD) (version September 2024).

Note: FCS = fragile and conflict-affected situations; IDA = International Development Association. The table presents the multidimensional poverty rate and share of population deprived in each indicator by region and rest of the world for circa 2021. "Multidimensional poverty rate" is the share of the population in each region defined as multidimensionally poor. "Number of economies" is the number of economies in each region for which information is available in the window between 2018 and 2024, three years within the circa 2021 reporting year. The monetary poverty rate is based on the international poverty line of \$2.15 per person per day (in 2017 purchasing power parity dollars). Regional and total estimates are population-weighted averages of survey year estimates for 110 economies and are not comparable with those presented in the previous section because of differences in country coverage. "Coverage" refers to the share of the population that is covered by a recent survey (in 2020 or later). Groupings with less than 50 percent coverage are shaded. The coverage rule applied to the estimates is identical to that used in the rest of the chapter. The absence of data for China and India reduces coverage for the East Asia and Pacific and South Asia regions, as well as the world.

Individuals in countries in FCS, Sub-Saharan Africa, and countries that are eligible for support from the IDA of World Bank are significantly more deprived along all dimensions of the MPM indicator than the average global citizen (figure 1.14). In all three groups, multidimensional poverty is significantly higher than monetary poverty alone (compare table 1.1). In Sub-Saharan Africa and countries in FCS, 40 percent or more of the population is deprived of access to electricity and sanitation. While differences from other countries in educational attainment and enrollment are smaller than in other dimensions, substantial gaps remain, particularly in attainment.

FIGURE 1.14
The poorest countries lag behind in many dimensions of multidimensional poverty in 2021



Source: World Bank, Global Monitoring Database (GMD) (version September 2024).

Note: FCS = fragile and conflict-affected situations; IDA = International Development Association. The figure presents the multidimensional poverty rate and share of population deprived for selected groupings and the world circa 2021, using the same data as in table 1.1. See table 1.1 and notes to table 1.1 for more details.

* Less than 50 percent of the population is covered with a recent survey (conducted in 2020 or later).

Especially in Sub-Saharan Africa countries, multidimensional poverty is considerably higher than monetary poverty alone

There can be significant differences in the poverty rate, depending on whether monetary deprivation alone or other dimensions are considered. In fact, figure 1.15 highlights that in some countries, multidimensional poverty is more than twice as high as monetary poverty at the \$2.15 line. Most of these countries are in Sub-Saharan Africa, which is because the MPM, like the extreme poverty line, focuses on the most basic achievements. In other countries in Sub-Saharan Africa, such as Zambia and Zimbabwe, there is almost perfect overlap of the two measures, which is the case for those countries in figure 1.15 that lie on or near the 45-degree line.

In fact, there is considerable heterogeneity across countries in Sub-Saharan Africa when levels of monetary and multidimensional poverty are compared. With the same extreme poverty rate of 31 percent, Angola and Chad vary significantly in the MPM (47 and 81 percent, respectively).

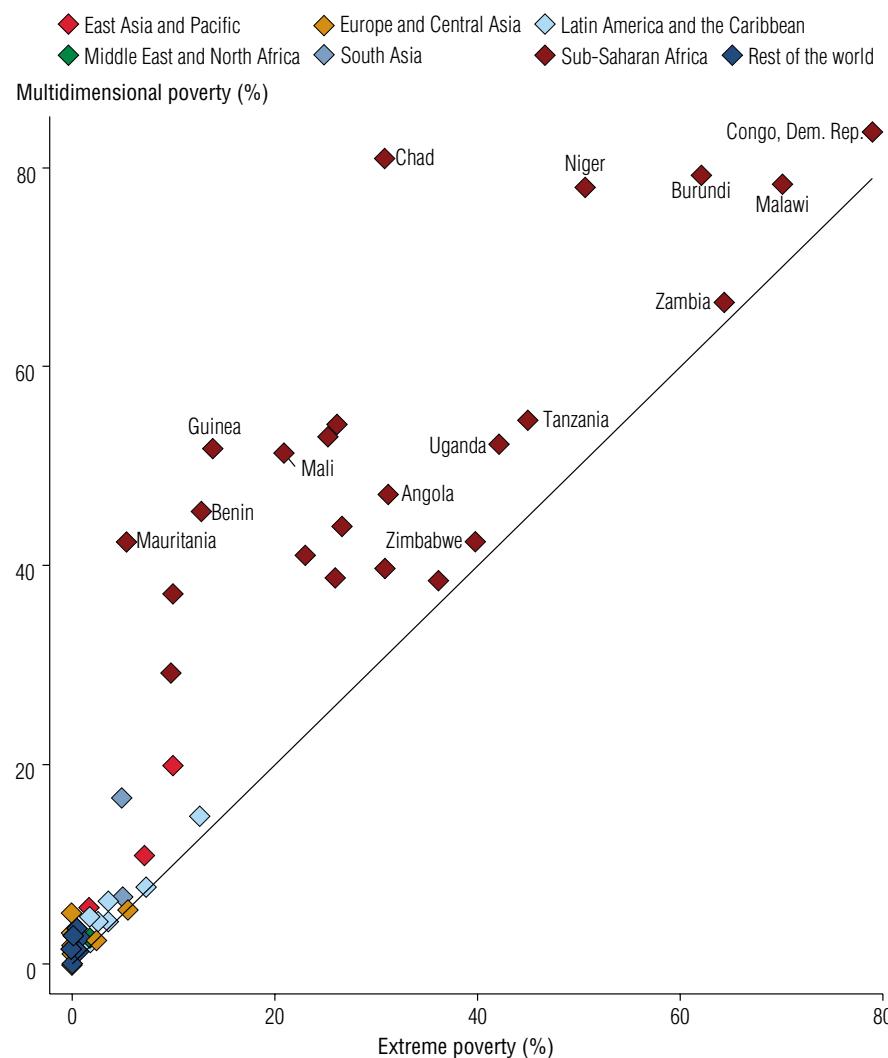
GLOBAL POVERTY UPDATE AND OUTLOOK

When poverty is assessed across multiple dimensions, the poverty status of Chad is similar to that of countries such as Burundi and Malawi, where extreme poverty levels are above 60 percent. Angola, Benin, Guinea, and Mauritania also have similar levels of multidimensional poverty, with extreme poverty levels ranging from 5 to 31 percent.

Deprivation is multifaceted, and measuring poverty based solely on consumption may fall short of giving a comprehensive perspective on people's well-being. It may also fall short of connecting poverty alleviation to policy options that improve people's welfare even if they do not immediately raise consumption levels.

FIGURE 1.15

Higher rates of multidimensional poverty than monetary poverty, especially in Sub-Saharan Africa



Source: World Bank, Global Monitoring Database (GMD) (version September 2024).

Note: Each marker represents a country in circa 2021. Extreme poverty is reported using the \$2.15 per person per day poverty line (expressed in 2017 purchasing power parity dollars). See table 1.1 and notes to table 1.1. for more details on multidimensional poverty. The solid line is a 45-degree line.

Annex 1A. Methodology

Poverty and Inequality Platform data and methodology for the measurement of global poverty

Regional and global poverty rates are computed by estimating poverty in each country and aggregating across regions and for the world. Data for measuring poverty come from the World Bank's Poverty and Inequality Platform (PIP), which aggregates welfare data from country-level household surveys. The platform includes over 2,300 household surveys from 170 countries representing 97 percent of the world's population. Most of these surveys come from the Global Monitoring Database (GMD), which is described in more detail below. For this report, 297 more surveys have been added to the number used for the 2022 *Poverty and Shared Prosperity* report (World Bank 2022). This improvement in survey data coverage has made it possible to report global poverty up to 2022, a two-year lag from the publication year of this report. The 2022 *Poverty and Shared Prosperity* report had a three-year lag.

Welfare is computed using either consumption or income data. In PIP, three-fifths of countries rely on consumption data, while income measures are used mostly by countries in Latin America and the Caribbean and high-income countries. In general, consumption is a smoother measure of welfare than income, which can exhibit large fluctuations, for instance after loss of employment or because of seasonal factors (see annex 2D in chapter 2, chapter 4, and World Bank 2016 for a more in-depth discussion on both concepts). Survey data are converted to internationally comparable welfare measures using the 2017 round of purchasing power parity (PPP). Welfare values of less than \$0.25 (2017 purchasing power parity dollars, or PPP\$) more likely reflect measurement errors rather than extremely low consumption. Thus, a minimum consumption or income level of \$0.25 (2017 PPP\$) is assumed for all individuals (see more details on the bottom censoring of welfare distributions in chapter 2, annex 2C).

For countries that do not have survey data for a particular year, poverty rates are estimated on the basis of the most recent available survey data. If a survey is available only prior to the reference year, the most recent welfare distribution is extrapolated forward using growth rates from national accounts, either real GDP per capita or real household final consumption expenditure per capita. Not all economic growth feeds into growth in household income. Therefore, a pass-through rate between national accounts data and household welfare is assumed, which is based on estimations from Mahler, Castañeda Aguilar, and Newhouse (2022). The pass-through rate is 0.7 when the last household survey of the country uses a consumption aggregate and is 1 when the last household survey of the country uses an income aggregate (Mahler and Newhouse 2024). The extrapolation is distribution neutral—that is, no changes in inequality are assumed. For years between two survey years, poverty is interpolated on the basis of the two surveys, again based on data from national accounts while assuming the same pass-through rates. More technical details on the extrapolation and interpolation methods can be found in the *Poverty and Inequality Platform Methodology Handbook* (World Bank 2024f).

Even though PIP contains a large number of surveys, there are countries (less than 3 percent of the global population) for which poverty cannot be estimated for several reasons, such

as unavailable survey or national accounts data or unreliable price data. These countries are assigned the average regional poverty rate using countries with data in those regions as defined by PIP regional definitions (World Bank 2024f). This allows the computation of regional and global poverty rates. Regional poverty estimates are reported for a reference year if there is survey data for at least 50 percent of the region's population. Global poverty estimates are reported for a reference year if there is survey data covering at least 50 percent of the world's population and at least 50 percent of the population in low- and lower-middle-income countries. A country is considered covered if a nationally representative survey is conducted in the country within three years on either side of a reference year. As an exception, surveys conducted prior to COVID-19 do not count for coverage in 2020 or later, and vice versa.

The societal poverty line is defined as $\max(\$2.15, \$1.15 + 0.5 \times \text{Median})$, meaning it is the larger of either \$2.15 per person per day (international poverty line) or \$1.15 plus half of the median consumption or income of the country. For countries with median consumption or income greater than \$2.00 per person per day, this is a relative poverty measure, reflecting the fact that national poverty lines increase as economies grow. The societal poverty line corresponds approximately to how national poverty lines vary with average income around the world (Jolliffe and Prydz 2021).

All technical details on how the World Bank estimates and reports monetary poverty can be found in the *Poverty and Inequality Platform Methodology Handbook* (World Bank 2024f).

Projection methods

Projections are used to generate up-to-date and future poverty numbers. In this report, nowcasting refers to the years 2023 and 2024, for which survey data are not yet available to meet the global population coverage. Forecasting refers to the years thereafter, the future at the time of writing. Poverty nowcasting and forecasting are done using growth rates of GDP per capita, like the methods used in earlier years when a country does not have a survey in a particular year. Mahler, Castañeda Aguilar, and Newhouse (2022) find that projections based on per capita GDP growth work nearly as well as using 1,000 development variables combined. There are two key assumptions in projecting poverty on the basis of GDP per capita growth rates. First, it is assumed that all households in a country benefit equally from economic growth. This is called distribution neutrality, as each household's income in a country is scaled by the same fraction of GDP per capita growth and there is no change in inequality. Second, as explained for the imputation of poverty rates in the previous section, pass-through rates are applied to the GDP per capita growth rate. These are 0.7 if the most recent survey uses consumption and 1 if it is an income survey. The methodology used to nowcast and forecast is consistently applied across all countries. This is necessary to ensure comparability. Alternative country and regional nowcasts using a range of methods with assumptions specific to each group are available in the World Bank's *Macro Poverty Outlook*. The differences in estimates from various methodologies are reported on the Poverty and Inequality Platform Nowcast web page.

GDP per capita growth rates up to 2029 are taken from the *Global Economic Prospects, June 2024* report (World Bank 2024d), which are supplemented with the April 2024 *Macro Poverty Outlook* (World Bank 2024e) or the April 2024 *World Economic Outlook* (IMF 2024) when

Global Economic Prospects is not available. When GDP data are missing, average annual historical GDP per capita growth rates (over the period 2010 to 2019) from the World Development Indicators are used to extend the series up to 2030.

Figure 1.3 in the main text includes scenarios that allow for distributional changes, for example, a reduction in the Gini index by 1 or 2 percent. These changes in the Gini index are modeled by assuming a linear growth incidence curve following the methodology introduced by Lakner et al. (2022).

Global Monitoring Database and Global Subnational Atlas of Poverty

The Global Monitoring Database (GMD) is a World Bank repository of nationally representative household surveys. These surveys are conducted by national statistical offices, sometimes in collaboration with the World Bank. These survey data sets have information on household income and consumption (sometimes disaggregated into food and nonfood consumption) as well as harmonized demographic variables, such as household size, age, gender, and rural or urban location of households, among others. The GMD is the main source of data for the World Bank's poverty and inequality estimates published in the Poverty and Inequality Platform (World Bank 2024g).

Beyond monetary indicators of well-being, the GMD has harmonized data on a range of other topics, including school enrollment, educational attainment, and access to basic infrastructure services (for example, electricity and improved sanitation) which are used in estimating the MPM. Since survey instruments differ across countries, harmonization of data is done as best as possible. Researchers can access these harmonized survey data from the Poverty and Inequality Platform (World Bank 2024g). Both the GMD and the Poverty and Inequality Platform are updated periodically; this report uses the latest versions of data available, dated September 2024.

The Global Subnational Atlas of Poverty (World Bank 2023a) combines several sources of data, including household survey data from the GMD, as well as administrative boundaries, among others, to visualize global poverty at subnational levels. The Global Subnational Atlas of Poverty has custom shapefiles that can be linked to the subnational geographic units in the GMD. The custom shapefiles follow a harmonized spatial hierarchy across countries, consisting of four administrative levels, from country to district and finer units.

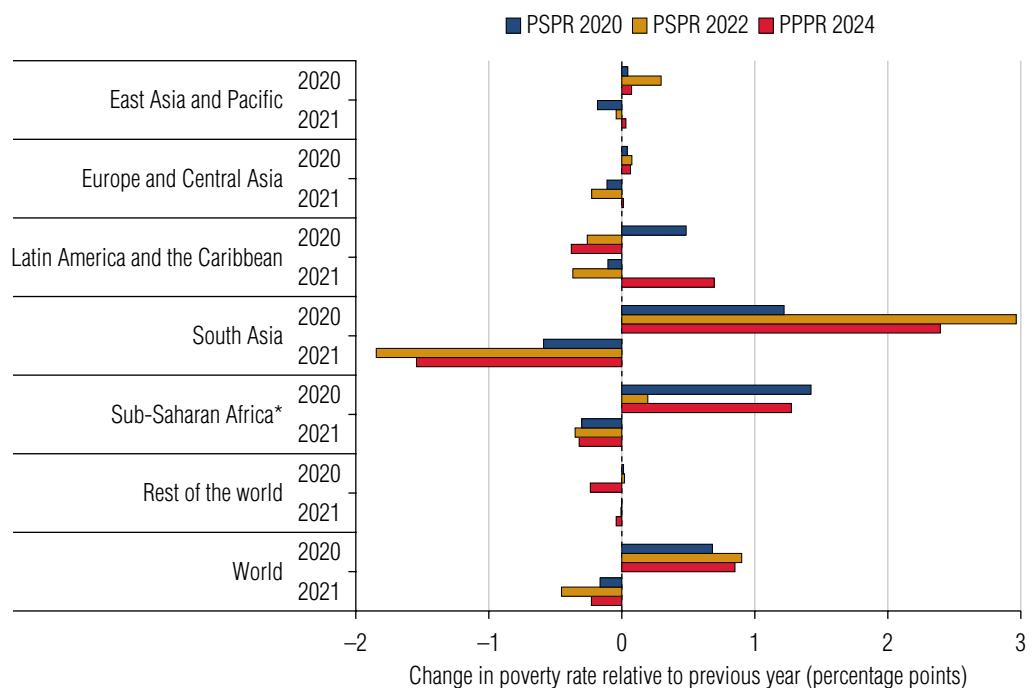
Annex 1B. Survey-based estimates of the COVID-19 impact confirm previous nowcasts

Because of the lack of timely survey data during the pandemic, previous poverty estimates were based on projections using information on GDP.¹⁷ Throughout the pandemic, the economic growth impacts and poverty projections were revised, sometimes heavily, as new data regarding the spread of COVID-19, how it disrupted economic activities, and how countries responded differently became available.

GLOBAL POVERTY UPDATE AND OUTLOOK

Estimates based on the latest survey data indicate that 73 million people fell into extreme poverty in 2020.¹⁸ This figure is in between the range 60–86 million estimated in the 2020 *Poverty and Shared Prosperity* report (PSPR) and close to the 71 million presented in the 2022 PSPR. Globally, the 2020 PSPR predicted an increase in extreme poverty between 0.7 and 1 percentage points, the 2022 PSPR estimated an increase of 0.9 percentage points, and this report estimates a 0.85 percentage point rise. Figure 1B1 shows that poverty estimates are generally aligned, at least for the world in 2020. Poverty estimates for some regions have been revised more noticeably, as new surveys became available. Some regions show large changes in poverty estimates, which can be explained mostly by new survey data becoming available.¹⁹ New survey data from Uzbekistan resulted in a downward revision in the extreme poverty series for Europe and Central Asia by about 2 percentage points (Castaneda et al. 2024). The previous reports extrapolated poverty for Uzbekistan from a relatively old survey conducted in 2003. New surveys also reflect the impact of social protection programs in Latin America (mainly Brazil) and the group of advanced countries (classified as the “rest of the world”), which are not captured well by distribution-neutral extrapolations based on national accounts aggregates.

FIGURE 1B.1
Changes in poverty rates during the COVID-19 pandemic



Sources: World Bank 2020, 2022; World Bank, Poverty and Inequality Platform (PIP, version September 2024), <https://pip.worldbank.org>.

Note: PPPR = *Poverty, Prosperity, and Planet Report*; PSPR = *Poverty and Shared Prosperity* report. Poverty is reported using the \$2.15 per person per day poverty line (expressed in 2017 purchasing power parity dollars). Estimates for the Middle East and North Africa are not shown because population coverage is insufficient and was not reported in the earlier publications. Different editions of PIP and growth data have been used for each of the three reports. The latest available growth data used for nowcasting poverty at the time of writing the 2020 PSPR was the June 2020 version of the Global Economic Prospects (GEP) database. The 2022 PSPR used the June 2022 version of GEP and accounted for some distributional impacts of COVID-19 on households. See box 1.3 of the 2022 PSPR for more details (World Bank 2022).

* Less than 50 percent of the population is covered with a recent survey (conducted in 2020 or later).

Annex 1C. New data for India and international price levels have recently become available

After completing the analysis for this report, two important data sets that have implications for global poverty monitoring became available. First, new official household expenditure data for India were published, the first microdata released since 2011–12. Second, new PPPs for 2021 have been released by the International Comparison Program (ICP). Following the World Bank’s process to update PIP, when new data become available, extensive analysis and validations are done before the global poverty estimates are updated. This process could not be completed in time for the release of the report. This annex discusses the potential implications of the new data.

New microdata for India available for 2022–23

India is an important country for global poverty measurement because of its population size. In recent months, new Household Consumption and Expenditure Survey (HCES) microdata for 2022–23 were released.²⁰ As this is the first time that budget survey microdata for India have been released since 2011–12, incorporating these data into the international poverty estimates requires significant background work.²¹ Therefore, this report does not incorporate the 2022–23 HCES estimates.

One key element that needs to be analyzed with the new data and that has implications for the estimation of poverty is the change in the recall periods used to capture various consumption items. The World Bank’s poverty estimates for India historically have been based on consumption data collected using the Uniform Reference Period (URP), in which all consumption items are collected by asking survey respondents for their consumption in the previous 30-day period. The current series in the PIP, going back to 1977–78 for India, is based on the URP survey instrument. With the 2011–12 round of the National Sample Survey (NSS), the Modified Mixed Reference Period (MMRP) was introduced (in addition to the URP instrument in that round), with the recall period set at 7 days for perishable items, 365 days for the five low-frequency items, and 30 days for the remaining items (Government of India Planning Commission 2014).²² To maintain comparability with historical data, the World Bank’s poverty count for India has thus far been based on consumption measures derived by using the URP instrument. However, with future rounds of the surveys adopting the MMRP instrument, the World Bank has noted the need to switch to using the MMRP-based consumption aggregate for poverty monitoring for India (World Bank 2018).

The implications of different recall periods were discussed in the 2018 version of the PSPR (World Bank 2018). The 2011–12 survey has both the URP and the MMRP aggregates and

allows for a comparison of poverty based on the two approaches. In this survey, the extreme poverty rate roughly halves from 22.9 percent when the URP was used to 13.4 percent when the MMRP instrument was used. This is a big change in the poverty rate estimated for India, but it is not unprecedented. Many countries around the world have improved their measurement of consumption, leading to higher measured levels of consumption, similar to India's case. Some recent examples include the Harmonized Surveys on Household Living Conditions program conducted in 10 West African Economic and Monetary Union countries, which, similarly to the change in India, harmonized reference periods across all countries and led to sizeable changes in poverty rates (Castañeda Aguilar et al. 2022).²³ Research has found that changes in survey design can lead to substantial shifts in poverty estimates (De Weerdt, Gibson, and Beegle 2020; Gibson et al. 2015). These changes are particularly large with a poverty line that is fixed in real terms, that is, updated only over time for changes in inflation. At national poverty lines, these revisions are often smaller, since the national poverty lines are updated to consider the change in the consumption measure (see discussion below and Mahler, Foster, and Tetteh-Baah [2024]).

Ongoing work is analyzing the implications of the various recall periods for the poverty estimates in India. In addition, other comparability and methodological issues need to be assessed before the 2022–23 survey can be included in PIP. The 2011–12 and 2022–23 surveys also differ in other ways, such as the mode of survey collection, the number of visits, and the sampling design.

Robustness of the report's findings to different India poverty rates

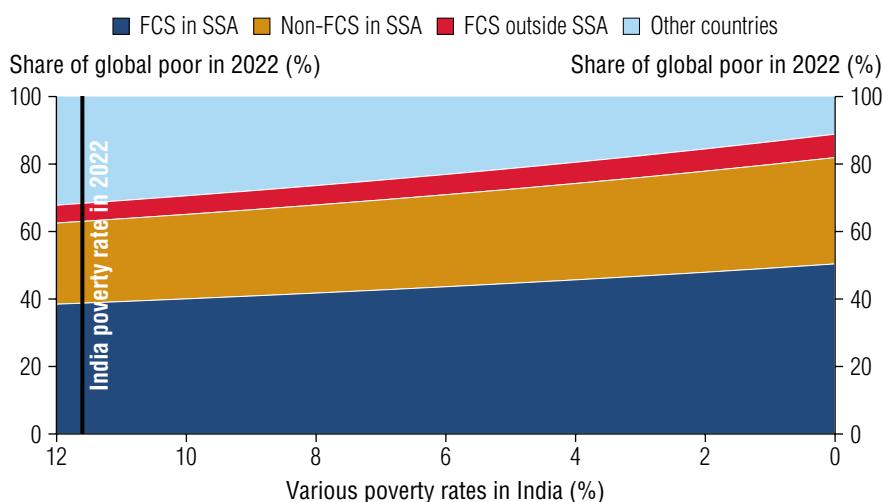
While more analysis is needed to estimate international poverty for India using new data, robustness checks suggest that key findings of the report would not be affected in a meaningful way. One key conclusion of the report is that extreme poverty currently is concentrated in Sub-Saharan Africa and fragile countries. A reduction in India's poverty rate today, as suggested by the comparison between MMRP and URP in 2011–12, further intensifies this concentration. Figure 1C.1 shows how a reduction in the poverty rate for India from the baseline estimate affects the concentration of extreme poverty in 2022.²⁴ The vertical line is drawn at the India estimate that is included in the baseline results in the main text (see figure 1.6, panel a, in the main text of this chapter), suggesting that around two-thirds of the extreme poor are in Sub-Saharan Africa and fragile countries. If the India poverty rate is halved, Sub-Saharan Africa and fragile countries would account for three-quarters of the global poor.

Further analysis is needed to update the India trend in recent years with the new data. If the India estimate is revised down also for the recent past, extreme poverty will be further concentrated in Sub-Saharan Africa. As the report has argued, the shift toward Sub-Saharan Africa, a region with slow progress against poverty, has contributed to a slowdown in global poverty reduction. Therefore, such an increasing concentration toward Sub-Saharan Africa by itself strengthens the finding of a slowdown in recent years.

Another conclusion of this report is that extreme poverty eradication will take longer than the original target date of 2030. In the baseline results in the main text, extreme poverty in India was already projected to fall below 3 percent by the end of this decade, so India's contribution to global extreme poverty is projected to decline significantly over the next decade. These estimates are based on projections of growth in GDP per capita over the next decade, as well as historic growth rates (see annex 1A). Even setting the extreme poverty rate in India in 2030 to zero, the global extreme poverty rate in 2030 would only fall from 7.31 to 6.72 percent, still well above the 3 percent target.

Finally, using the 2011–12 data for India, the impact of the new welfare aggregate is smaller for higher poverty lines. Using the \$6.85 poverty line, the national poverty rate declines from 90.3 to 87.4 percent, which is considerably smaller than the impact for extreme poverty reported above. This suggests that the impacts of the India revision on global poverty measured at this line will be smaller.

FIGURE 1C.1
Concentration of extreme poverty in Sub-Saharan Africa and fragile and conflict-affected situations under various poverty rates for India in 2022



Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: FCS = fragile and conflict-affected situations; SSA = Sub-Saharan Africa. Figure shows the share of the global extreme poor in 2022 under various scenarios for extreme poverty in India. Extreme poverty is reported using the \$2.15 per person per day poverty line (expressed in 2017 purchasing power parity dollars). Moving along the horizontal axis to the right *decreases* extreme poverty in India. Vertical line is drawn at the India estimate included in the baseline results (figure 1.6, panel a, in the main text).

2021 PPPs

New PPPs for the 2021 reference year were released by the ICP in May 2024. Each time the ICP releases new PPPs, it takes some time for the World Bank to analyze and adopt them for global poverty monitoring. For example, the 2017 PPPs currently used for global poverty monitoring

were published in May 2020 and adopted in September 2022. Preliminary results of the 2021 PPPs suggest considerable stability with the 2017 PPPs, at least at the aggregate level, so it seems plausible that the 2021 PPPs will be adopted sooner.²⁵

PPPs are price indices used to adjust for relative differences in living costs across countries. PPPs are used to convert (a) income or consumption data and (b) national poverty lines, both expressed in local currency units, into a common, comparable currency (typically the US dollar PPP). Poorer countries tend to have lower price levels, especially for nontradables such as labor costs, so they become richer when PPPs instead of standard market exchange rates are used for assessing well-being. The World Bank's global poverty lines have always been based on national poverty lines, expressed in US PPP dollars. For example, the current international poverty line of \$2.15 (2017 PPP\$) is the median value of the national poverty lines of low-income countries around 2017.

With the 2021 PPPs, an updated list of national poverty lines around 2021 will be used to update the World Bank's poverty lines. Over the next months, World Bank researchers will re-examine national poverty lines and investigate whether there have been updates to these national poverty lines. As national statistical systems around the world build more capacity, improvements in the quality of recent survey data have been observed. As the above example of India highlights, these quality improvements lead to an increase in the amount of measured consumption. When this happens to the aggregates, countries in turn revise upward their national poverty lines, which in the poorest countries are typically based on an estimated minimum cost of basic needs. Mahler, Foster, and Tetteh-Baah (2024) identify 12 countries, mostly low-income countries in West Africa, in which mean consumption has increased by an average of 46 percent, when old and new survey data are compared. Indeed, national poverty lines have also increased by an average of 50 percent in 10 of these 12 countries. This means that if the 2021 PPPs are eventually adopted, the international poverty line could be revised upward by more than what pure price movements would suggest. This will reflect how national poverty lines, as well as the welfare aggregates that underlie the global poverty measure, increase when more consumption is collected in higher-quality surveys.²⁶

Net impact of all changes (new India data and PPPs)

At the time of writing, the net impact of these various changes on global poverty is unclear. While the new data in India are expected to bring down India's estimate of extreme poverty, it is possible that there will be an upward revision of the international poverty line when the new PPPs are adopted. While methodological revisions can lead to uncertainty, it is important that the most accurate and up-to-date data are reflected through periodic updates. The improvements that countries have made in their measurement of consumption and poverty, as well as the up-to-date information on international price levels, are welcomed, and they are likely to be adopted once the World Bank's researchers and the broader scholarly community have had an opportunity to assess them.

Annex 1D. Regional and global poverty estimates, 1990–2024

TABLE 1D.1

Percentage of population living in poverty by region

Region and poverty line	1990	1995	2000	2005	2010	2015	2019	2020	2021	2022	2023	2024
\$2.15 per day												
East Asia and Pacific	65.2	49.0	39.7	20.7	12.6	2.3	1.0	1.1	1.1	1.0	0.9	0.8
Europe and Central Asia	3.6	8.1	9.2	4.7	1.2	0.8	0.5	0.5	0.5	0.5	0.5	0.5
Latin America and the Caribbean	16.3	14.0	13.8	10.7	5.9	4.1	4.2	3.8	4.5	3.5	3.4	3.3
Middle East and North Africa	6.4	4.7	3.0	2.7	1.9	3.7	4.6	5.3	5.9	6.1	6.4	6.7
South Asia	50.0	43.8	--	35.5	25.4	16.6	10.6	13.0	11.4	9.7	8.7	7.6
Sub-Saharan Africa	54.6	58.0	56.0	48.7	42.1	38.2	36.7	37.9	37.6	37.0	36.9	36.5
Eastern and Southern Africa	--	57.5	56.3	50.2	44.2	41.7	43.1	44.5	44.2	43.6	43.7	43.2
Western and Central Africa	55.2	58.8	--	46.5	39.1	33.0	27.3	28.3	27.9	27.3	27.0	26.5
Rest of the world	0.4	0.5	0.5	0.5	0.5	0.7	0.6	0.4	0.3	0.6	0.6	0.6
World	37.9	32.5	29.3	21.5	15.7	10.5	8.8	9.7	9.5	9.0	8.8	8.5
FCS	--	49.9	--	38.1	31.7	29.5	29.2	30.7	30.9	30.8	31.1	30.9
IDA	54.4	50.5	48.3	39.1	31.0	27.5	25.7	26.7	26.5	26.0	26.1	25.8
\$3.65 per day												
East Asia and Pacific	87.3	77.3	67.8	49.1	34.2	15.1	7.2	6.4	5.8	5.4	5.1	4.8
Europe and Central Asia	11.7	19.6	21.4	12.3	4.8	3.2	2.0	2.1	1.9	1.7	1.6	1.6
Latin America and the Caribbean	31.3	28.7	27.1	22.5	14.7	10.8	10.2	9.9	10.5	8.9	8.8	8.6
Middle East and North Africa	26.4	25.5	18.7	16.7	12.7	13.1	14.6	16.0	16.7	16.2	16.3	16.4
South Asia	83.5	80.0	--	73.7	65.8	56.9	42.1	44.9	42.2	38.8	36.7	34.3
Sub-Saharan Africa	75.1	77.6	77.6	73.7	69.0	65.7	63.9	65.1	64.8	64.2	64.1	63.5
Eastern and Southern Africa	--	76.4	76.8	73.9	69.6	67.8	68.2	69.2	69.0	68.4	68.4	68.0
Western and Central Africa	76.9	79.5	--	73.3	68.1	62.6	57.6	59.0	58.5	58.0	57.7	57.0
Rest of the world	0.7	0.8	0.8	0.8	0.7	0.9	0.8	0.6	0.5	0.8	0.8	0.8
World	56.6	54.2	51.2	43.9	36.4	28.7	23.2	24.0	23.4	22.4	22.0	21.4
FCS	--	68.2	--	61.4	56.6	54.8	53.4	55.2	55.9	55.8	56.0	55.7
IDA	78.7	77.0	75.9	69.8	62.2	56.8	53.0	53.9	53.5	52.5	52.5	52.0
\$6.85 per day												
East Asia and Pacific	96.3	93.4	89.5	78.5	63.7	44.0	32.4	32.9	27.8	27.4	26.1	24.7
Europe and Central Asia	31.7	43.1	48.7	32.6	19.1	14.5	10.8	10.3	8.6	8.2	7.7	7.4
Latin America and the Caribbean	55.3	53.1	50.8	45.7	35.6	29.2	27.2	27.6	28.4	25.2	24.7	24.3
Middle East and North Africa	63.3	63.4	54.1	50.6	45.5	43.8	45.4	48.0	47.0	45.5	45.2	44.9

(continued)

TABLE 1D.1**Percentage of population living in poverty by region (*continued*)**

Region and poverty line	1990	1995	2000	2005	2010	2015	2019	2020	2021	2022	2023	2024
South Asia	96.7	95.9	--	93.6	91.5	87.5	80.4	81.9	80.9	78.8	77.3	75.6
Sub-Saharan Africa	90.1	91.4	91.6	91.0	88.9	87.5	87.3	88.0	87.8	87.7	87.6	87.3
Eastern and Southern Africa	--	90.0	90.4	90.1	88.1	87.4	88.2	88.9	88.7	88.5	88.5	88.3
Western and Central Africa	92.7	93.5	--	92.2	90.2	87.7	85.8	86.7	86.5	86.4	86.2	85.9
Rest of the world	2.1	2.0	1.6	1.5	1.4	1.7	1.3	1.2	1.0	1.3	1.3	1.2
World	69.2	69.9	69.0	64.2	57.8	51.0	46.3	47.2	45.7	44.9	44.3	43.6
FCS	--	85.8	--	81.9	79.0	78.6	78.0	79.7	80.2	80.6	80.5	80.4
IDA	93.3	93.1	92.5	90.9	88.0	85.0	82.8	83.5	83.1	82.5	82.3	81.9

Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: FCS = fragile and conflict-affected settings; IDA = International Development Association. Poverty rates are reported for the poverty lines of \$2.15, \$3.65, and \$6.85 per person per day (expressed in 2017 purchasing power parity dollars). The definition of IDA and FCS is kept fixed using the World Bank fiscal year 2024 classification. Poverty estimates are not reported for years with insufficient data coverage (that is, less than 50 percent of the regional population). These missing observations are marked (--). However, poverty estimates are presented for the recent years (2019–22) using nowcasting methods, even if there is insufficient data coverage, and are thus grayed out (for example, Middle East and North Africa, Sub-Saharan Africa, and FCS). Estimates presented for all regions and country groups for 2023 and 2024 are based on poverty nowcasts and are also grayed out. See chapter 1, annex 1A, for details about coverage rules and the methodology for projecting or nowcasting poverty.

TABLE 1D.2**Millions of people living in poverty by region**

Region and poverty line	1990	1995	2000	2005	2010	2015	2019	2020	2021	2022	2023	2024
\$2.15 per day												
East Asia and Pacific	1045	840	721	393	248	48	21	22	23	20	19	18
Europe and Central Asia	17	38	43	22	6	4	2	3	3	2	2	2
Latin America and the Caribbean	71	67	71	59	35	25	27	25	29	23	22	22
Middle East and North Africa	15	12	8	8	6	14	19	22	25	26	28	30
South Asia	571	557	--	547	422	294	197	245	218	186	168	149
Sub-Saharan Africa	282	342	376	374	371	385	411	437	444	448	458	464
Eastern and Southern Africa	--	203	226	229	231	250	287	305	311	314	323	327
Western and Central Africa	114	139	--	144	139	135	124	132	134	134	136	137
Rest of the world	4	5	5	5	5	8	7	4	4	7	7	7
World	2005	1862	1800	1409	1093	778	684	757	746	713	705	692
FCS	--	274	--	263	247	259	280	301	310	314	325	332
IDA	470	497	538	492	438	433	443	470	477	479	491	496

(continued)

TABLE 1D.2**Millions of people living in poverty by region (*continued*)**

Region and poverty line	1990	1995	2000	2005	2010	2015	2019	2020	2021	2022	2023	2024
\$3.65 per day												
East Asia and Pacific	1397	1326	1232	932	674	310	152	136	124	115	109	103
Europe and Central Asia	54	92	101	58	23	16	10	11	9	9	8	8
Latin America and the Caribbean	137	137	140	124	86	66	66	64	68	58	58	57
Middle East and North Africa	61	66	54	53	44	50	60	67	71	69	71	73
South Asia	953	1018	--	1136	1093	1010	784	844	802	745	712	673
Sub-Saharan Africa	388	457	521	565	607	662	717	749	765	777	796	809
Eastern and Southern Africa	--	270	308	338	364	407	455	474	485	493	506	515
Western and Central Africa	159	187	--	227	243	256	262	275	280	285	290	294
Rest of the world	7	8	8	8	8	10	9	6	6	9	9	9
World	2996	3105	3147	2876	2534	2124	1797	1878	1845	1783	1763	1732
FCS	--	374	--	424	440	481	511	541	560	569	585	597
IDA	681	758	845	877	879	895	912	949	962	967	988	1000
\$6.85 per day												
East Asia and Pacific	1542	1603	1626	1490	1255	902	683	696	590	584	557	530
Europe and Central Asia	147	203	229	153	91	70	53	51	43	40	38	36
Latin America and the Caribbean	242	254	263	252	208	180	175	179	185	165	163	162
Middle East and North Africa	146	164	155	159	157	168	186	200	199	195	197	199
South Asia	1103	1221	--	1443	1519	1554	1496	1541	1538	1513	1499	1481
Sub-Saharan Africa	466	539	615	698	782	883	979	1013	1038	1062	1087	1112
Eastern and Southern Africa	--	318	363	412	461	524	589	609	624	638	654	669
Western and Central Africa	192	221	--	286	321	359	390	404	414	424	433	443
Rest of the world	19	19	16	15	15	18	15	13	11	14	14	14
World	3665	4003	4239	4210	4027	3775	3586	3692	3602	3574	3555	3534
FCS	--	471	--	565	615	688	747	781	804	822	841	861
IDA	807	916	1030	1143	1243	1340	1425	1471	1496	1518	1548	1574

Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: FCS = fragile and conflict-affected settings; IDA = International Development Association. Millions of people living in poverty are reported for the poverty lines of \$2.15, \$3.65, and \$6.85 per person per day (expressed in 2017 purchasing power parity dollars). The definition of IDA and FCS is kept fixed using the World Bank fiscal year 2024 classification. Poverty estimates are not reported for years with insufficient data coverage (that is, less than 50 percent of the regional population). These missing observations are marked (--). However, poverty estimates are presented for the recent years (2019–22) using nowcasting methods, even if there is insufficient data coverage, and are thus grayed out (for example, Middle East and North Africa, Sub-Saharan Africa, and FCS). Estimates presented for all regions and country groups for 2023 and 2024 are based on poverty nowcasts and are also grayed out. See chapter 1, annex 1A, for details about coverage rules and the methodology for projecting or nowcasting poverty.

TABLE 1D.3**Share of global poor (percent)**

Region and poverty line	1990	1995	2000	2005	2010	2015	2019	2020	2021	2022	2023	2024
\$2.15 per day												
East Asia and Pacific	52.1	45.1	40.1	27.9	22.7	6.2	3.0	2.9	3.1	2.8	2.7	2.6
Europe and Central Asia	0.8	2.1	2.4	1.6	0.5	0.5	0.3	0.3	0.4	0.3	0.3	0.3
Latin America and the Caribbean	3.6	3.6	4.0	4.2	3.2	3.2	3.9	3.3	4.0	3.2	3.1	3.2
Middle East and North Africa	0.7	0.7	0.5	0.6	0.6	1.8	2.7	2.9	3.3	3.7	3.9	4.3
South Asia	28.5	29.9	--	38.9	38.6	37.8	28.9	32.3	29.2	26.1	23.8	21.5
Sub-Saharan Africa	14.1	18.4	20.9	26.5	33.9	49.5	60.1	57.7	59.6	62.9	65.0	67.1
Eastern and Southern Africa	--	10.9	12.6	16.3	21.2	32.2	42.0	40.3	41.7	44.1	45.8	47.3
Western and Central Africa	5.7	7.5	--	10.2	12.7	17.3	18.1	17.4	17.9	18.8	19.3	19.8
Rest of the world	0.2	0.3	0.3	0.4	0.5	1.0	1.0	0.5	0.5	1.0	1.0	1.0
FCS	--	14.7	--	18.6	22.6	33.2	41.0	39.7	41.6	44.0	46.0	47.9
IDA	23.5	26.7	29.9	34.9	40.1	55.6	64.8	62.1	64.0	67.2	69.6	71.7
\$3.65 per day												
East Asia and Pacific	46.6	42.7	39.1	32.4	26.6	14.6	8.5	7.3	6.7	6.5	6.2	6.0
Europe and Central Asia	1.8	3.0	3.2	2.0	0.9	0.7	0.6	0.6	0.5	0.5	0.5	0.4
Latin America and the Caribbean	4.6	4.4	4.4	4.3	3.4	3.1	3.6	3.4	3.7	3.3	3.3	3.3
Middle East and North Africa	2.0	2.1	1.7	1.8	1.7	2.4	3.3	3.6	3.8	3.9	4.0	4.2
South Asia	31.8	32.8	--	39.5	43.1	47.5	43.6	45.0	43.5	41.8	40.4	38.9
Sub-Saharan Africa	12.9	14.7	16.5	19.6	24.0	31.2	39.9	39.9	41.5	43.6	45.2	46.7
Eastern and Southern Africa	--	8.7	9.8	11.8	14.4	19.1	25.3	25.3	26.3	27.6	28.7	29.8
Western and Central Africa	5.3	6.0	--	7.9	9.6	12.0	14.6	14.6	15.2	16.0	16.4	17.0
Rest of the world	0.2	0.2	0.2	0.3	0.3	0.5	0.5	0.3	0.3	0.5	0.5	0.5
FCS	--	12.1	--	14.7	17.4	22.6	28.4	28.8	30.3	31.9	33.2	34.5
IDA	22.7	24.4	26.8	30.5	34.7	42.1	50.7	50.6	52.2	54.2	56.1	57.7
\$6.85 per day												
East Asia and Pacific	42.1	40.1	38.3	35.4	31.2	23.9	19.0	18.9	16.4	16.3	15.7	15.0
Europe and Central Asia	4.0	5.1	5.4	3.6	2.3	1.9	1.5	1.4	1.2	1.1	1.1	1.0
Latin America and the Caribbean	6.6	6.3	6.2	6.0	5.2	4.8	4.9	4.8	5.1	4.6	4.6	4.6
Middle East and North Africa	4.0	4.1	3.7	3.8	3.9	4.4	5.2	5.4	5.5	5.5	5.5	5.6
South Asia	30.1	30.5	--	34.3	37.7	41.2	41.7	41.7	42.7	42.3	42.2	41.9
Sub-Saharan Africa	12.7	13.5	14.5	16.6	19.4	23.4	27.3	27.4	28.8	29.7	30.6	31.5
Eastern and Southern Africa	--	8.0	8.6	9.8	11.5	13.9	16.4	16.5	17.3	17.9	18.4	18.9
Western and Central Africa	5.2	5.5	--	6.8	8.0	9.5	10.9	10.9	11.5	11.9	12.2	12.5

(continued)

TABLE 1D.3**Share of global poor (percent) (continued)**

Region and poverty line	1990	1995	2000	2005	2010	2015	2019	2020	2021	2022	2023	2024
Rest of the world	0.5	0.5	0.4	0.4	0.4	0.5	0.4	0.3	0.3	0.4	0.4	0.4
FCS	--	11.8	--	13.4	15.3	18.2	20.8	21.1	22.3	23.0	23.7	24.4
IDA	22.0	22.9	24.3	27.2	30.9	35.5	39.7	39.8	41.5	42.5	43.6	44.6

Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: FCS = fragile and conflict-affected settings; IDA = International Development Association. The shares of the global poor for regions and other groupings are reported for the poverty lines of \$2.15, \$3.65, and \$6.85 per person per day (expressed in 2017 purchasing power parity dollars). The definition of IDA and FCS is kept fixed using the World Bank fiscal year 2024 classification. Poverty estimates are not reported for years with insufficient data coverage (that is, less than 50 percent of the regional population). These missing observations are marked (--). However, poverty estimates are presented for the recent years (2019–22) using nowcasting methods, even if there is insufficient data coverage, and are thus grayed out (for example, Middle East and North Africa, Sub-Saharan Africa, and FCS). Estimates presented for all regions and country groups for 2023 and 2024 are based on poverty nowcasts and are also grayed out. See chapter 1, annex 1A, for details about coverage rules and the methodology for projecting or nowcasting poverty.

Notes

1. See annex 1A for more details on the methods used for nowcasts and projections.
2. Using the coverage rules in the Poverty and Inequality Platform (Castaneda et al. 2024), data coverage for low-income countries fell somewhat below 50 percent of the population in 2018 and 2019. Comparing poverty rates from 2020 onward to data from 2017 would still show an increase in the headcount at the \$2.15 and \$6.85 poverty lines.
3. These countries are Madagascar, the Democratic Republic of Congo, Mozambique, South Sudan, Malawi, the Central African Republic, Zambia, Burundi, the Republic of Yemen, and Niger (in descending order of poverty rates).
4. Not only is the share of poor in FCS increasing, but the poverty rate in FCS has also been rising over the past decade (see annex 1D).
5. Tetteh-Baah, Lakner, and Serajuddin (2024) show that the GDP per capita of the 22 countries that have been unable to escape low-income status has grown by only 0.26 percent annually since 1987.
6. For more information, see the World Bank Jobs Group's diagnostics and data site at <https://datatopics.worldbank.org/jobsdiagnostics/>.
7. The main source of these data is the Global Monitoring Database, a World Bank repository of nationally representative household surveys (see annex 1A for more details). In a few cases, the underlying data and methodology for measuring poverty when profiling the global poor slightly differ from the data and methodology in the Poverty and Inequality Platform (PIP). For example, grouped data are used for China in the Poverty and Inequality Platform (PIP), while micro-level data are used for profiling the poor. Also, the global database for profiling the poor has one survey data set for each country that is closest to the reference year, whereas PIP uses all available surveys and interpolates when necessary.
8. The 2022 edition of the *Poverty and Shared Prosperity* report estimated 101 poor women for every 100 poor men. The assumed equal allocation likely underestimates poverty for women.
9. The Poverty and Inequality Platform includes a spatial price adjustment between urban and rural areas for many countries in the database. The methods are country specific.

10. The only exception is South Asia, where the extreme poverty rate for the population age 15 or above without formal education is relatively low. This may be explained by measurement error, as less than 1 percent of the population age 15 or above in India has no formal education, so the estimation sample is small.
11. Age cutoffs for children, youth, and adults differ across countries and international organizations. This report adopts the United Nations International Children's Emergency Fund definition for children (less than 18 years) and the International Labour Organization definition for youth (or young adults) (15 to 24 years). This means that older children between the ages of 15 and 17 are included in both children and youth. Adults are defined in this report as persons age 25 or above.
12. Each of three dimensions is equally weighted (one-third), and within each of the dimensions, each indicator is equally weighted (one-third for consumption, one-sixth for each education indicator, and one-ninth for each infrastructure indicator).
13. The MPM uses survey data within a three-year window either side of the reporting year, which for multidimensional poverty is 2021 in this report. Within this window, survey estimates are held constant. Therefore, the sample of countries changes across reporting years, and for some countries the same survey estimate is used across several reporting years, giving the impression that there has been no progress. Some of the components of multidimensional poverty, such as adult education, do not change dramatically over a six-year period.
14. Within this window, survey estimates are held constant, which differs from the monetary poverty estimates reported previously in this chapter. In the latter, surveys are interpolated and extrapolated to a common year using growth rates in national accounts (see annex 1A for details). While these methods are well established for monetary poverty, doing so for nonmonetary dimensions, as well as their overlap, is currently not possible.
15. As explained previously in this chapter, a country is covered if it has a survey that is within three years of 2021, as long as that survey was conducted in 2020 or later. However, the MPM, like the monetary poverty estimates, still uses the pre-2020 data in its estimation. In the case of the MPM, a three-year window around 2021 is applied; that is, it uses data from between 2018 and 2024. The number of countries that are used in the MPM estimates is indicated in table 1.1. These surveys cover 49.2 percent for the world population, 66.2 percent for Sub-Saharan Africa, 70 percent for IDA countries, and 49.7 percent for countries in FCS. These figures differ from the coverage rates reported in the table, since the latter do not count pre-2000 data for data coverage in 2021.
16. The estimate for South Asia is based on data from Bangladesh, Bhutan, Maldives, Nepal, Pakistan, and Sri Lanka. However, only the surveys from Bangladesh, Bhutan, and Nepal were conducted after 2019, so they are the only countries that are included in the population coverage reported in table 1.1.
17. More technical details on the methodology for nowcasting or forecasting poverty can be found in the work of Mahler, Castañeda Aguilar, and Newhouse (2022) and Mahler, Yonzan, and Lakner (2022).
18. The estimated number of people falling into poverty reported here includes only the change in the number of poor from 2019 to 2020 and does not account for a counterfactual change in poverty that would have been observed in the absence of COVID-19. See Mahler, Yonzan, and Lakner (2022) for estimates that account for the additional counterfactual impact.
19. Xie et al. (2024) provide a more detailed evaluation of poverty nowcasts for 2020 and 2021.
20. Earlier in 2024, the National Sample Survey Office of the government of India published a fact sheet with key summary statistics based on these data.
21. Two rounds of NSSs have been conducted since 2011–12: 2014–15 and 2017–18. The 2014–15 NSS has the same socioeconomic and demographic information as the 2011–12 round and provides data on household expenditures on services and durables. However, only a subset of the 2014–15 round was released by the government. The 2017–18 NSS round was not released due to concerns over data quality.
22. Since 1999–2000, India has been experimenting with various recall periods to improve the accuracy of consumption data collection. In the 2011–12 survey, India utilized three recall periods: the URP, Mixed Reference Period (MRP), and MMRP. In 2011–12, MRP was adopted for official poverty rate calculations, and it was indicated that future data collection would transition to using MMRP. For the 2022–23 survey, India used exclusively the MMRP recall period for collecting consumption data.

23. For example, in Senegal, the poverty rate was estimated to be 28.8 percent in 2018 using an extrapolation of the older survey compared to 7 percent using the updated harmonized survey. Unlike for India, the two aggregates were not collected in the same survey, which complicates these comparisons. For example, errors in the extrapolation model are also important.
24. For simplicity, the figure shows reductions from the estimate that are included in the main text. Scenarios with greater poverty than currently estimated are omitted.
25. In previous updates of purchasing power parity (PPP) data, large changes in the level of global poverty were observed. For example, the number of poor people in the world increased by 400 million when the 2005 PPPs were adopted (Chen and Ravallion 2010). This outcome led to debates among researchers and the recommendation by the Atkinson Commission that the World Bank should not revise global poverty estimates with new PPP data, which reflected not only real changes in relative prices across countries but also ICP methodological changes (World Bank 2017). Unlike in the past, the ICP methodology has substantially stabilized in the recent 2011 and 2017 rounds (Deaton and Schreyer 2022).
26. An important question that World Bank researchers will investigate is whether this upward revision in national poverty lines reflects (a) an increase in the definition of what it means to be poor or (b) simply a change in the scale on which consumption and the associated poverty lines are measured. As countries get richer, national definitions of poverty increase, which is captured by the World Bank's Societal Poverty Line, which is discussed in box 1.4 in the main text of this chapter. Regardless of the driver, the World Bank's extreme poverty line will remain anchored to how the poorest countries in the world define poverty.

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Shared Prosperity

Summary

- *Growth in average income alone is not a sufficient marker of development, and that is why it is important to track a measure of the inclusiveness of growth or shared prosperity. The Global Prosperity Gap, a new indicator of shared prosperity, tracks how far the world is, on average, from a threshold of \$25 per person per day, with a specific emphasis on the incomes of the poorest.*
- *Progress in reducing the Prosperity Gap has stalled since the COVID-19 (Coronavirus) pandemic, highlighting a slowdown in inclusive income growth over this period.*
- *A high level of inequality can reflect a lack of opportunities for socioeconomic mobility, which can further hinder prospects for inclusive growth and poverty reduction over time. A longer-term view shows that within-country inequality has declined for the average country. The number of economies with high inequality, defined as having a Gini index above 40, has also continuously declined since the 2000s.*
- *Despite a reduction in the number of economies with high inequality, the percentage of people living in economies with high inequality has stayed roughly the same in the last decade, from over 23 percent of the global population in 2013 to 22 percent (1.7 billion) in 2022. Another 70 percent (5.6 billion) lives in an economy with moderate inequality, and just 7 percent (612 million) lives in economies with low inequality according to this measure. The number of economies with high inequality could be higher if income surveys were available for all economies.*
- *Today, high levels of income or consumption inequality are concentrated among countries in Sub-Saharan Africa and in Latin America and the Caribbean.*
- *Faster and more inclusive growth is needed to accelerate progress in achieving shared prosperity. At current growth rates, a typical upper-middle-income country will need 100 years to close the Prosperity Gap. The number of years needed can be reduced if income growth is substantially faster or more inclusive. Countries can achieve the same level of prosperity with less growth and a decrease in the level of inequality.*

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- *Inclusive growth efforts need to be focused on creating opportunities for everyone to proactively contribute to the economy. Moreover, this requires structural conditions that enable socioeconomic mobility, so that everyone can use their productive capacity to its full extent. Addressing inequality for low- and lower-middle-income countries requires tackling all phases of inequality; fiscal redistribution alone is not the solution.*

Introduction: A new take on shared prosperity

Two new measures of shared prosperity: The Global Prosperity Gap and the number of economies with high inequality

Since 2013, the World Bank has been tracking a measure of shared prosperity, recognizing that growth in average income alone is not a sufficient indicator of development. How growth benefits the least well-off is an important dimension to consider for improvements in societal welfare. Starting with this report, the World Bank has adopted two new measures of shared prosperity: the *Global Prosperity Gap* and the *number of economies with high inequality* to better capture the notion of shared prosperity, combining concerns for economic progress and equity. Box 2.1 discusses the change in the measures, and annex 2A includes some comparisons between the old and new measures.

BOX 2.1

Why the new shared prosperity measures?

The concern for shared prosperity is not new to the World Bank, but the precise measures have changed. The two new indicators are replacing the growth in income or consumption of the poorest 40 percent of the population in a country (the bottom 40)—the measure used since 2013. Growth in the bottom 40 effectively moved attention away from growth in the average toward growth among the poorer segments of the distribution, thereby influencing country-level policy design and policy discussions to address their impact on the most disadvantaged.

However, 10 years of implementing the bottom 40 growth indicator has exposed some limitations. First, growth in the bottom 40 was defined as a country-level measure and could not be aggregated to a global estimate. Similarly, a country's growth in the bottom 40 cannot be broken down among regions or demographic groups, making it difficult to understand drivers of aggregate changes.^a Second,

(continued)

BOX 2.1**Why the new shared prosperity measures? (continued)**

the bottom 40 tracks most closely the growth in incomes of those who live close to the 40th percentile of the country and largely ignores the growth of the poorest people in the country. Third, data demands have resulted in a selective assessment of global progress. While the Global Prosperity Gap, like global poverty estimates, can be assessed using a single round of data, growth in the bottom 40 requires two comparable rounds of data over a particular time window. Meeting this condition has been challenging due to infrequent surveys and frequent breaks to survey comparability, particularly among the poorest countries. As a result, in its latest edition, growth in the bottom 40 was available for only 26 of 80 low- and lower-middle-income countries (Global Database of Shared Prosperity, 13th edition, circa 2016–21),^b while the data underpinning the global measures of poverty and the Prosperity Gap provide more complete coverage. Last, while the bottom 40 captures inequality when explicitly compared with the growth in the mean, it leaves the link to inequality open to interpretation.^c

Together, the new indicators address the shortcomings of the bottom 40 measure: they will track the degree to which global growth is pro-poor, allow for identification of the countries driving the changes, and will retain a focus on country-level inequality irrespective of the prosperity achieved.

- a. The adoption of the Prosperity Gap adds the focus on *global* shared prosperity in addition to *country-level* shared prosperity, which was the only focus of the previous shared prosperity measure. The new measure is thus similar to the reporting on global poverty in chapter 1, which gives equal weight to all citizens of the world. Moreover, like the poverty measure, the Prosperity Gap can also be reported for each country. The high-inequality indicator, on the other hand, gives equal weight to every economy.
- b. For the latest update of the Global Database of Shared Prosperity, see <https://www.worldbank.org/en/topic/poverty/brief/global-database-of-shared-prosperity>.
- c. Contrary to the Sustainable Development Goal target, which measures explicitly whether the growth of the bottom 40 is higher than the growth in the national average.

The Global Prosperity Gap brings together the notions of *progress* (measured by growth in average income) and improvements in *equity* (measured by the reduction in inequality in society) into one indicator of inclusive growth. The Global Prosperity Gap captures how far people's incomes are from a global prosperity standard, which is set at \$25 per person per day. This benchmark represents the average income when countries transition from upper-middle-income to high-income status. This measure gives a greater weight to the incomes of the poor: poorer households contribute significantly more to the gap than their better-off counterparts.¹ Consequently, income growth among the poorest households also matters significantly more for reducing the Global Prosperity Gap than growth among the better-off.

Three main reasons why tracking within-country inequality is important

In addition to the Global Prosperity Gap, which focuses on the income differences of everyone around the world, the World Bank is now tracking an indicator that emphasizes within-country inequality directly. That indicator is the number of economies with high inequality as measured by the Gini index, based on income or consumption. While complete equality is neither feasible nor necessarily desirable—for instance, a part of inequality of wages reflects differences in efforts—there is a broad consensus that when inequality in a country is too high, it is harmful.

Tracking inequality is important for various reasons. First, high inequality within countries slows the pace of poverty reduction. How economic growth translates into raising the income of the poor strongly depends on the existing levels of inequality. In countries where levels of income or consumption inequality are higher, a given increase in growth delivers a smaller reduction in poverty (Bourguignon 2003). Simulations have shown that declines in inequality can have a significant impact on reducing poverty (Bergstrom 2022; Lakner et al. 2022). This means that policies to reduce inequality can have a double dividend over time. However, the double dividend has been missed in some cases. As chapter 1 has shown, poverty reduction in Sub-Saharan Africa has been slow, driven largely by slow growth. However, a lack of improvement in inequality has also been a missed opportunity for poverty reduction (Sinha, Inchauste, and Narayan 2024) in a region where a large share of countries have high inequality (see discussion on within-country inequality below). As discussed later in this chapter, achieving shared prosperity, like reducing poverty, is affected negatively by the level of inequality. There is a separate question whether inequality impedes the level of growth, but the evidence on this is ambiguous, both conceptually and empirically (Banerjee and Duflo 2003; Baselgia and Foellmi 2022; Brueckner and Lederman 2018; Forbes 2000; Gründler and Scheuermeyer 2018; Li and Zou 1998).²

Second, high inequality often reflects a lack of opportunities for socioeconomic mobility. Inequality of outcomes today is closely related to inequalities in opportunities and thus a sign of more deep-rooted problems (Brunori, Ferreira, and Peragine 2013; Chetty et al. 2017; Corak 2013). High levels of inequality within a country can therefore be symptomatic of the inability of some population groups to rise along the economic and social ladder for reasons that are outside of their control, such as their gender, race, parental background, or place of birth. This is not only unjust, but also inefficient, because it means that some groups cannot participate in economic activity using their full potential.³ Furthermore, inequality of outcomes and opportunities today directly affects the opportunities for the next generation (Atkinson 2015; van der Weide et al. 2024; World Bank 2017b). For instance, very unequal societies tend to exhibit greater inequalities among schools or neighborhoods, so inequalities today have a strong impact on children's opportunities tomorrow.

Third, monitoring inequality is important since perceptions of inequality matter for policy and have broad social implications. Societal frictions have been linked to actual or perceived high

inequality levels—for example, the social discontent seen during the Arab Spring (World Bank 2016). Concurrently, lower inequality is correlated with higher levels of political and social stability as well as social cohesion (World Bank 2016). Evidence also suggests that high inequality has been disproportionately reducing political participation among low-income voters relative to high-income voters (Erikson 2015) and at the same time increasing the share of political contributions of high-net-worth households (Cagé 2023). How individuals perceive inequality is correlated with their perceived position in income distribution as well as with the shocks they face. Perceptions do change, however, as the nature of shocks changes and as people are informed about their actual positions in the income distribution (Cruces, Perez-Truglia, and Tetaz 2013; Hvidberg, Kreiner, and Stantcheva 2023). Studies on advanced economies emphasize that people are most sensitive to income comparison with those they view as peers (Amendola, Dell'Anno, and Parisi 2019; Card et al. 2012; Hvidberg, Kreiner, and Stantcheva 2023); however, those studies also highlight that people tend to underestimate inequality most within these groups (Hvidberg, Kreiner, and Stantcheva 2023). Given the implications of the perception of inequality, the gaps between actual and perceived inequalities, and individuals' willingness to adjust their perceptions monitoring inequality with objective measures can potentially add to a more informed public discourse.

The next section of this chapter introduces the Global Prosperity Gap as one of two new measures of the World Bank to monitor shared prosperity and presents historical trends and projections. It also discusses the roles of growth in average incomes and changes in inequality in explaining these trends. The third section discusses the trends in country-level inequality. The final section summarizes policy actions that support inclusive growth.

Progress in shared prosperity has stalled since the COVID-19 pandemic

Today, the Global Prosperity Gap is about five: On average, incomes around the world have to increase fivefold to reach the prosperity standard of \$25 per person per day

In 2024, the typical person in Tanzania lives on \$2.50 per day. In the Lao People's Democratic Republic, a typical person lives on almost \$5 per day, while in Uzbekistan the corresponding figure is around \$12.50. In contrast, in a country like Bulgaria, which recently entered high-income status, the typical person earns close to \$25 per day.⁴ What would it take to bring the typical person in Tanzania or in Lao PDR or in Uzbekistan to the level of prosperity enjoyed by people in countries as they enter high-income status? Their incomes would have to increase by factors of 10, 5, and 2 for people in Tanzania, Lao PDR, and Uzbekistan, respectively. These factors highlight the massive shortfalls from a global standard of prosperity that are a harsh reality for most people in most developing countries.

In this report, the World Bank is introducing a new measure of shared prosperity that combines these shortfalls into a single number for the world. The Global Prosperity Gap is the average factor by which every person in the world would need to increase their income to reach a prosperity standard of \$25 per day (see box 2.2).

In 2024, the Prosperity Gap is 4.9—meaning that incomes on average would have to increase almost fivefold to reach the prosperity standard of \$25 per person per day (figure 2.1, panel a). Reductions in the Global Prosperity Gap correspond to increases in shared prosperity, as the average shortfall from the global prosperity standard is reduced. The global prosperity standard is set at \$25 per person per day—roughly equal to the average per capita household income at the point where countries transition from upper-middle-income to high-income status, according to the World Bank’s income classification (Kraay et al. 2023).⁵ The Prosperity Gap includes income of every person in the world, which is characteristic of a shared prosperity measure; however, it places much more weight on the income shortfalls of the poor than of the rich.⁶ The typical person in Tanzania who lives on just \$2.50 per day contributes 10 times more to the Global Prosperity Gap than a person who enjoys \$25 per day.⁷ See box 2.2 for an intuitive explanation and annex 2B for a more technical presentation.

BOX 2.2

How is the Prosperity Gap calculated?

The Prosperity Gap captures how far a society is from \$25 per person per day, which is close to the average per capita household income when countries reach high-income status. The society’s shortfall is the average shortfall among all individuals living in that society but giving poorer people a greater weight. The Prosperity Gap is defined as the average income multiple needed to reach that \$25 standard for every member of that society (Kraay et al. 2023).

Note that the typical person in Tanzania, the Lao People’s Democratic Republic, and Uzbekistan has less than \$25 per day so they contribute with a factor greater than 1, and the typical person in Bulgaria has \$25 per day so they contribute with a factor of 1 (figure B2.2.1). The typical person in France lives above the \$25 standard and makes only a small contribution to the measure. While income growth experienced by any person in the world will help reduce the Prosperity Gap, the magnitude of that reduction grows exponentially the poorer the individual is. That means that the typical person in Tanzania—the poorest person in this example—will contribute more to the Prosperity Gap, and gains in their income will count more than the others.

(continued)

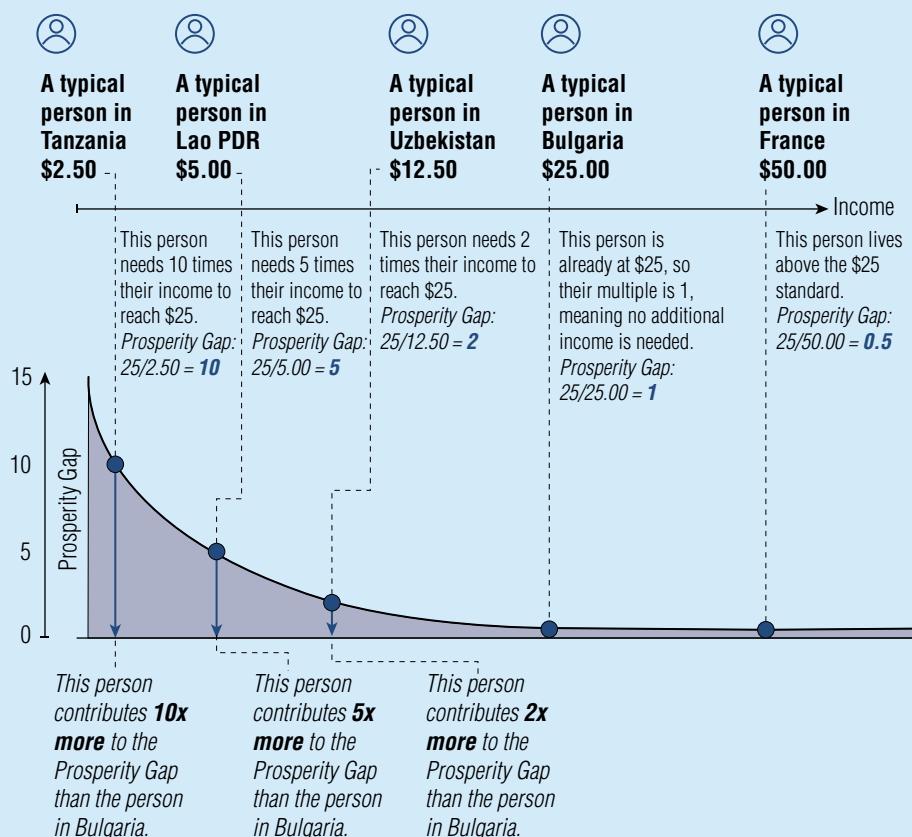
BOX 2.2

How is the Prosperity Gap calculated? (continued)

FIGURE B2.2.1

The Prosperity Gap captures how far societies are from \$25 per person per day

Let's say there are five people with the following levels of daily income:



To find the Prosperity Gap in this example, these numbers are averaged:

$$\text{Prosperity Gap} = (10 + 5 + 2 + 1 + 0.5)/5 = 18.5/5 = 3.7$$

So, the society's Prosperity Gap is 3.7. This means that, on average, everyone's incomes need to be multiplied by 3.7 to reach the \$25 per day standard. If the five people in the example were the only people in the world, the Global Prosperity Gap would be 3.7.

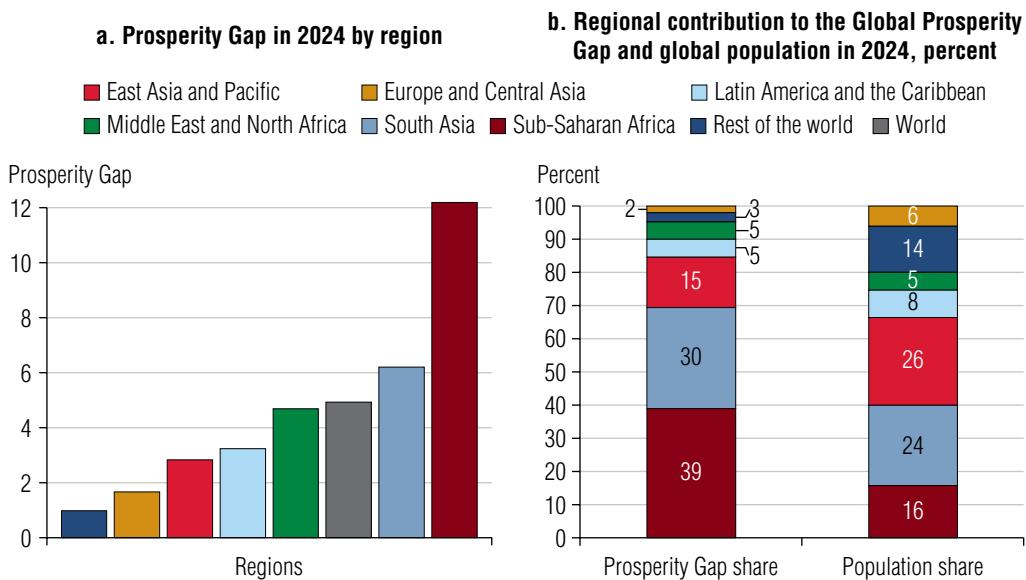
Source: World Bank.

Note: All \$ values are in 2017 purchasing power parity dollars.

An advantage of this new measure is that it can be easily decomposed, allowing for a better understanding of the main drivers of shared prosperity. The Prosperity Gap for a person is just the factor by which their income must increase to achieve \$25 per day. The Prosperity Gap for a country is the average of these gaps for all people in the country. The Prosperity Gap for a region, such as Sub-Saharan Africa, is the population-weighted average of the Prosperity Gaps for all countries in the region. Finally, the Prosperity Gap for the world is a population-weighted average of the Prosperity Gaps for all regions in the world. Country Prosperity Gaps can thus be expressed as population-weighted average gaps of groups (provincial, state, ethnic, gender, or others) within the country.

The poorest regions of the world have higher Prosperity Gaps than richer regions (figure 2.1, panel a). In 2024, the Prosperity Gap ranges from 1.7 in Europe and Central Asia to 12.2 in Sub-Saharan Africa among the geographic regions.⁸ This signals the large disparities in income and inequality levels across regions. In Sub-Saharan Africa, incomes would need to rise over 12-fold, on average, to reach the global prosperity standard of \$25. The region with the second-highest regional Prosperity Gap is South Asia, with a gap of 6.2 in 2024, followed closely by the Middle East and North Africa, for which the trend has been extrapolated from 2018 because of a lack of recent survey data. A breakdown by region shows that Sub-Saharan Africa accounts for 39 percent of the global gap, followed by South Asia (31 percent) and East Asia and Pacific (15 percent) (figure 2.1, panel b).

FIGURE 2.1
Sub-Saharan Africa has the highest Prosperity Gap and contributes the most to the Global Prosperity Gap, followed by South Asia



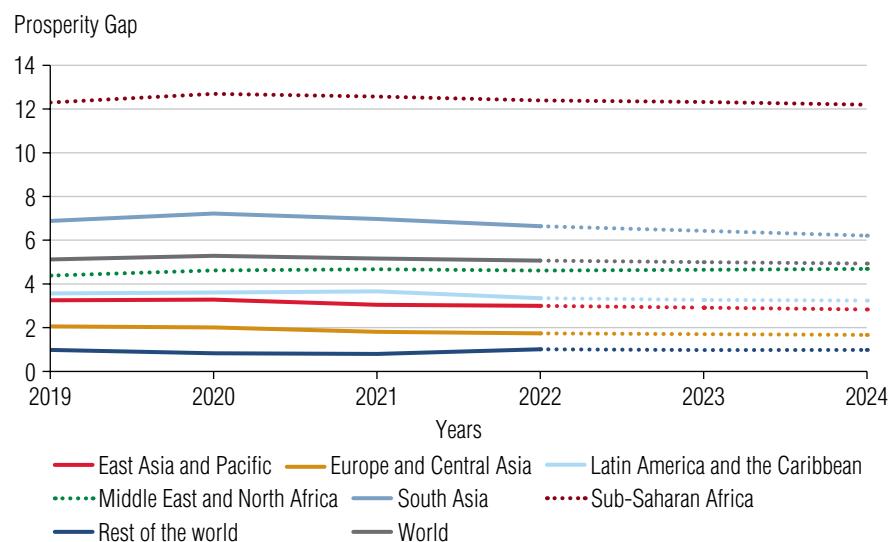
Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: Regional Prosperity Gaps are reported in panel a, while the region's population-weighted contributions (percent) to the Global Prosperity Gap and the region's population share (percent) are shown in panel b. Regions follow the definition in the Poverty and Inequality Platform. The estimates for 2024 are projected starting in 2019 for the Middle East and North Africa, starting in 2020 for Sub-Saharan Africa, and starting in 2023 for all other regions. See annex 1A for further details on projection. The label values may not add to 100 percent due to rounding.

The COVID-19 pandemic slightly increased the Prosperity Gap, but since 2022 it has returned to prepandemic levels. The Global Prosperity Gap increased from 5.1 in 2019 to 5.3 in 2020 and then fell back to 5.1 in 2022 (figure 2.2). In 2024, the gap is estimated to be 4.9—slightly below the 2019 level. In other words, in the past five years, the Global Prosperity Gap has fallen by only 0.8 percent annually, compared with 2.1 percent annually in the five years from 2014 to 2019 (figure 2.3).

FIGURE 2.2

There has been minimal progress in reducing the Prosperity Gap since the COVID-19 pandemic



Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

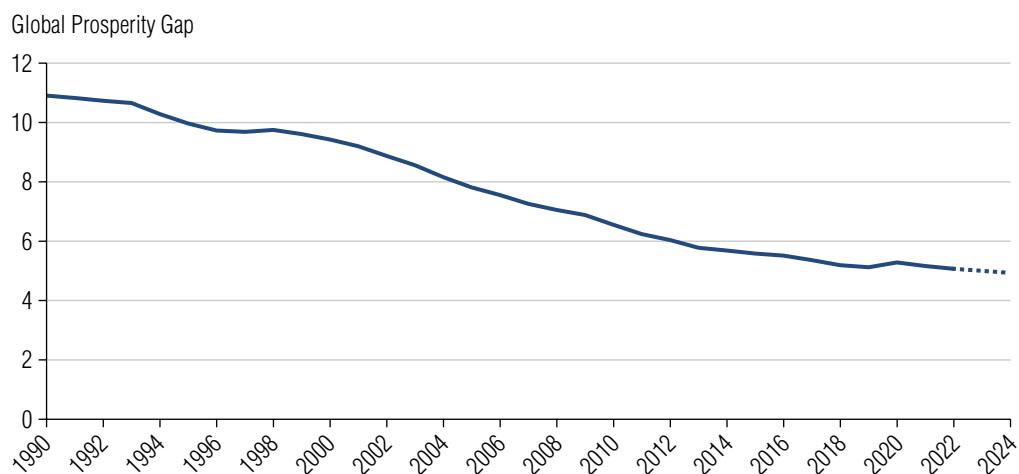
Note: The estimates for 2023 and 2024 are projected for all regions. For the Middle East and North Africa, the latest available year with enough population coverage to report the region's estimate is 2018. Estimates for all years after 2018 for the region are projected. Likewise, for Sub-Saharan Africa, estimates are projected starting in 2020. See chapter 1 for further details on population coverage. See annex table 2E.1 in annex 2E for these estimates.

In 2020, the gap rose the most in Sub-Saharan Africa and South Asia. While the gap had rebounded back to the 2019 level in South Asia by 2021, in Sub-Saharan Africa it remains almost the same as in 2019. In the Middle East and North Africa, the gap in 2024 exceeds the level before the pandemic. However, the estimate for that region has large uncertainties, as only a handful of countries in the region have reported a survey in recent years. In other regions, the changes in the Prosperity Gap have been small, signaling little progress during this period.

Over the past 30 years, the Global Prosperity Gap has fallen by more than half

Despite the recent stagnation in the Prosperity Gap, there has been substantial progress in improving shared prosperity since the 1990s (figure 2.3). In 1990, the average gap from the global prosperity standard was 10.9, meaning that incomes on average needed to be increased close to elevenfold to bring everyone around the world to \$25 per day. By 2024, this gap has more than halved. During the past 30 years, the Global Prosperity Gap only increased (worsened) twice: during the Asian financial crisis (an increase of 0.7 percent from 1997 to 1998) and during the COVID-19 pandemic (an increase of 3.2 percent from 2019 to 2020).

FIGURE 2.3
There has been considerable progress in reducing the Global Prosperity Gap since 1990



Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

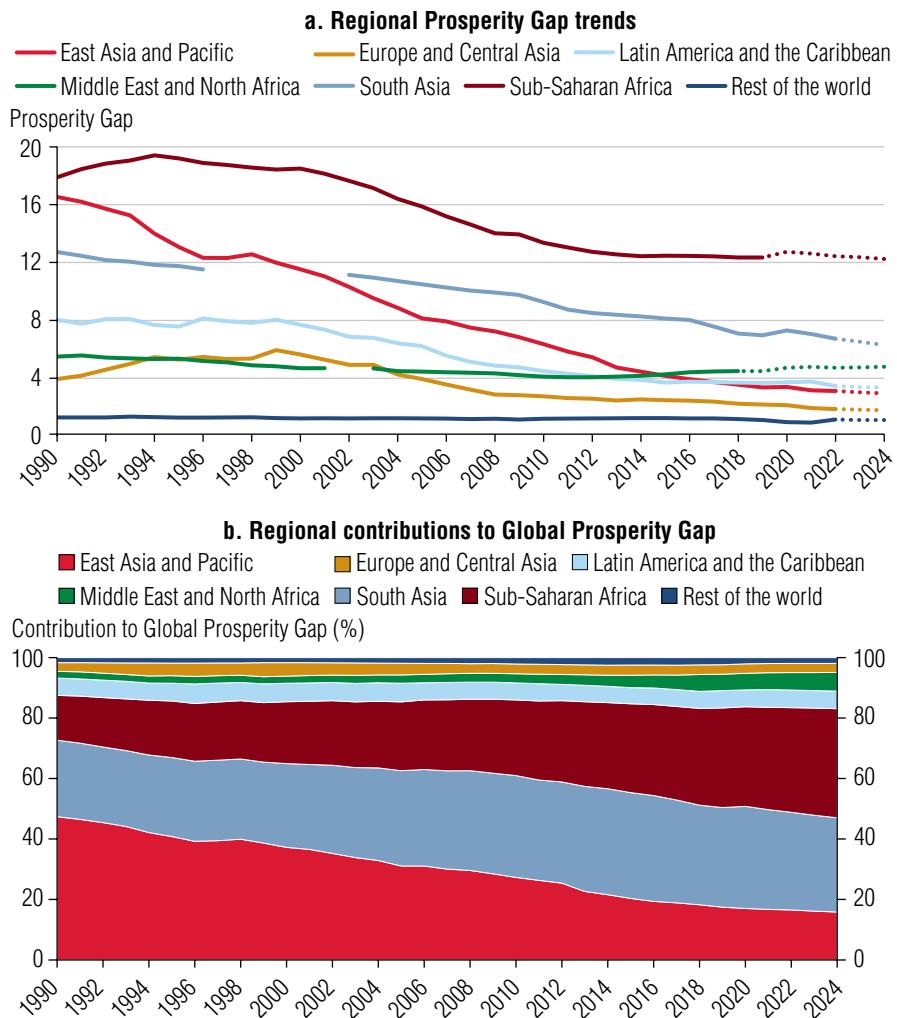
Note: The estimates in 2023 and 2024 are projected. The prosperity threshold is set at \$25 per person per day in 2017 purchasing power parity dollars.

Historical trends also show the uneven progress in shared prosperity across regions and the large role of East Asia and Pacific in driving global progress over the past three decades (figure 2.4, panel a). In line with the poverty trends in chapter 1, strong progress in East Asia and Pacific has meant that the region's Prosperity Gap has decreased the most, falling from 16.5 in 1990 to 2.8 in 2024. Sub-Saharan Africa started with a similar Prosperity Gap in 1990 (17.9), and, while some progress was made over the next three decades, the Prosperity Gap still stands at 12.2 in 2024. Worryingly, progress in reducing the Prosperity Gap in Sub-Saharan Africa stalled in the last decade.

The contributions of different regions to the Global Prosperity Gap have changed significantly, driven by these differential rates of progress in shared prosperity across regions (figure 2.4, panel b). In 1990, East Asia and Pacific contributed the most (46 percent) to the total Prosperity Gap. Next came South Asia (25 percent) and Sub-Saharan Africa (16 percent). By 2024, the East Asia and Pacific contribution to the global gap is estimated to fall to just

15 percent. Progress in South Asia over the same period since 1990 reduced its absolute contribution to the Global Prosperity Gap, but since the pace of progress was slower than in East Asia and Pacific, its share has increased by 2024 to 30 percent. The contribution of Sub-Saharan Africa to the Global Prosperity Gap is estimated to have increased by 23 percentage points, reaching 39 percent in 2024. This means that more inclusive growth in Sub-Saharan Africa and South Asia is key for future reductions in the Global Prosperity Gap.

FIGURE 2.4
The East Asia and Pacific region has driven the reduction of the Global Prosperity Gap



Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

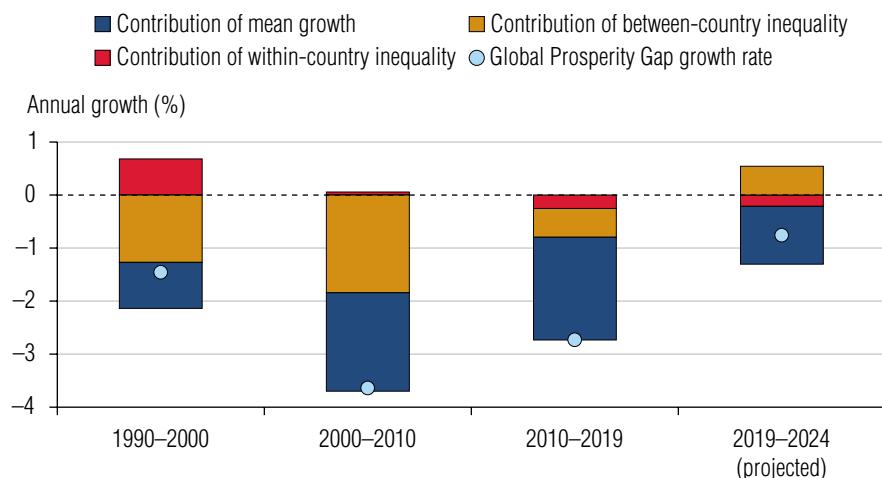
Note: Regional Prosperity Gaps are reported in panel a, while the regions' population-weighted contributions (percent) to the Global Prosperity Gap are reported in panel b. Estimates for all regions are projected after 2022, while estimates for the Middle East and North Africa are projected as of 2019 and those for Sub-Saharan Africa are projected as of 2020. Population coverage is less than 50 percent of the regions' population for the year 2002 in the Middle East and North Africa and for the years 1997–2001 in South Asia. To obtain the aggregate share of the Global Prosperity Gap, panel b includes all regional estimates whether or not there is data coverage. Regions follow the definitions in the Poverty and Inequality Platform.

Both growth and reductions in inequality contributed to increases in shared prosperity, although the role of inequality has declined in recent decades

Between 1990 and 2024, the Global Prosperity Gap improved at an annual rate of 2.3 percent, with global mean income increasing at an annual rate of 1.48 percent and global inequality declining by 0.86 percent. The changes in the Global Prosperity Gap can be exactly decomposed into growth in mean income and changes in inequality (see annex 2B and Kraay et al. [2023] for further detail). Note that overall inequality is the inequality between all citizens of the world, which captures differences both between and within countries.⁹ The gains in prosperity globally over the past three decades were driven primarily by catch-up growth in populous and relatively poorer regions of the world, in particular China and other countries in East Asia and Pacific. Relatively poorer countries grew, on average, faster than higher-income countries (Mahler, Yonzan, and Lakner 2022a). The growth of these populous and relatively poorer countries led to a substantial reduction in between-country inequality, which accounts for most of global interpersonal inequality (Lakner and Milanovic 2016).

Not all periods in the last three and a half decades experienced the same rates of growth and inequality reduction, however (figure 2.5). Between 1990 and 2000, the Global Prosperity Gap improved at an annual rate of 1.5 percent, with 0.9 percent gains coming from improving

FIGURE 2.5
The COVID-19 pandemic abruptly slowed the gains in the Global Prosperity Gap



Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: A decrease in the Prosperity Gap is an improvement in welfare. Growth is calculated as the log difference.

Change in the Prosperity Gap is the sum of the (negative) growth in the mean income and the decline in total inequality. Positive growth in the mean decreases (improves) the Prosperity Gap and thus, in the figure, the contribution of the mean growth is shown as the negative of mean growth. That is, for all the periods in the graph, there was positive growth in the global mean, which is displayed as a negative contribution. Inequality is measured using the inequality measure related to the Prosperity Gap. Change in total inequality is the sum of changes in between-country and within-country inequality. See annex 2B for further details.

mean income and 0.6 percent from the narrowing of overall global inequality driven by a faster decline of inequality between countries. The between-country inequality decreased by 1.3 percent, while the average within-country inequality rose by 0.7 percent, for a 0.6 percent net change in overall global inequality. The reductions in the Global Prosperity Gap were larger in the subsequent two decades (annualized reduction of 3.6 percent between 2000 and 2010, and by 2.7 percent between 2010 and 2019). These reductions were driven by strong economic growth and the narrowing of global inequality, but the contribution of inequality declined significantly after 2010. In the most recent period, between-country inequality is expected to worsen (increase), which will dampen the progress on global shared prosperity. Sluggish growth in developing economies following the pandemic is one factor affecting this trend (World Bank 2024b). It follows the largest single-year increase relative to the last three decades in global income inequality that the world experienced in 2020 (Mahler, Yonzan, and Lakner 2022a). Average within-country inequality, on the other hand, is expected to decrease (discussed in the section on within-country inequality below).

The Prosperity Gap worsens when inequality is higher

For a given level of average income, countries with greater inequality have a higher Prosperity Gap. Table 2.1 presents two examples to illustrate this point. First, Benin and Cameroon have similar mean household consumption levels, but Benin has a lower Prosperity Gap (greater shared prosperity) than Cameroon because it has lower inequality. Second, despite Colombia being significantly richer than Peru in terms of mean income, Peru has a lower Prosperity Gap (greater shared prosperity) due to its lower level of inequality. Put differently, higher inequality means that Colombia would need an average income of \$22.60 per day (or 30 percent higher than its current level) to have the same Prosperity Gap as Peru. This illustrates how countries with higher inequality require higher average income to reach the same level of prosperity as countries with lower inequality. In other words, higher inequality leads to an “inequality penalty.”

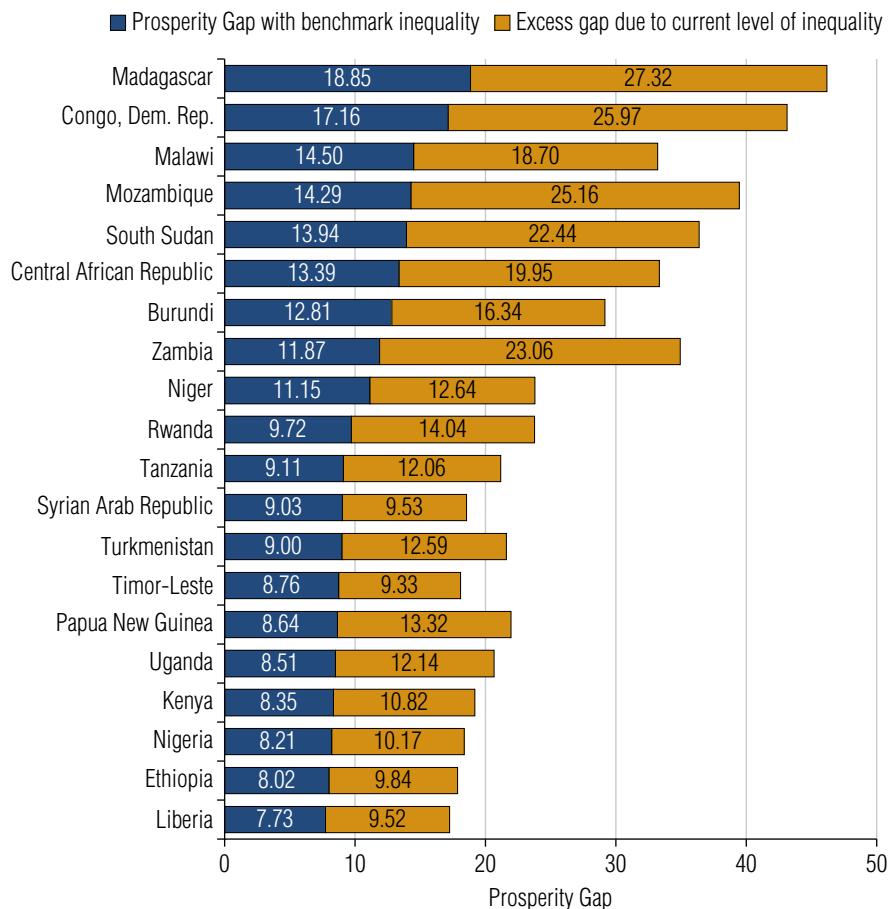
TABLE 2.1
An inequality penalty is built into the Prosperity Gap index

	Benin	Cameroon	Peru	Colombia
	2021	2021	2022	2022
Prosperity Gap	7.20	8.32	3.60	4.69
Mean income	5.02	5.37	12.4	17.3
Inequality	1.44	1.79	1.79	3.25

Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: The Prosperity Gap is calculated using the global prosperity standard of \$25 per person per day in 2017 purchasing power parity dollars (PPP\$). The table also shows the decomposition of the Prosperity Gap into the product of (25/mean income) and inequality. Inequality is measured using the inequality measure related to the Prosperity Gap—the average income multiple needed to reach the mean income (see annex 2B for details). Mean income is expressed in 2017 PPP\$ per person per day. Estimates for each country are reported using the most recent survey data.

FIGURE 2.6
Inequality increases the Prosperity Gap



Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

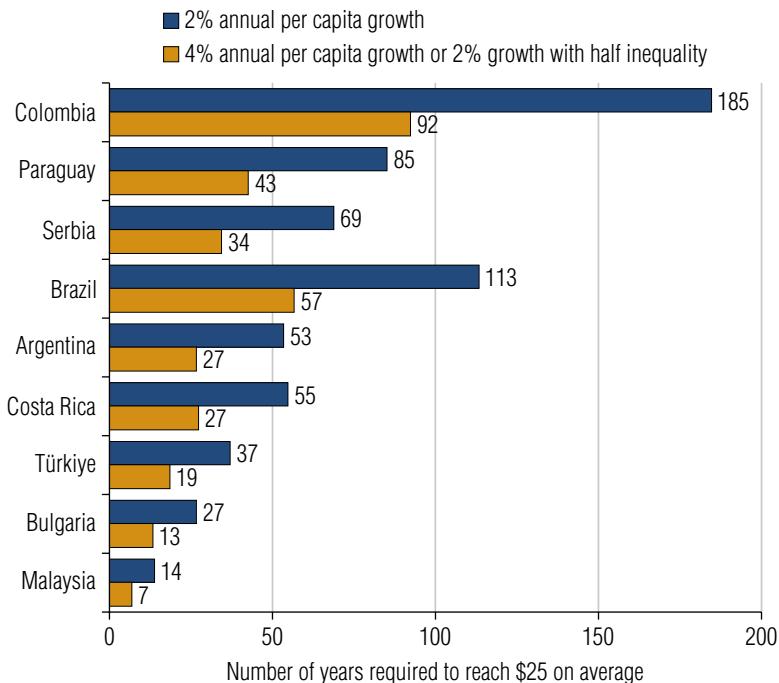
Note: Each bar indicates the Prosperity Gaps with benchmark level of inequality (dark blue) and with current level of inequality (yellow) for the 20 poorest countries with data, ranked by average per capita household consumption. Countries are ranked from the poorest (top) to the richest (bottom). The benchmark inequality is the lowest observed inequality in the Poverty and Inequality Platform. Estimates are reported using the latest household survey.

To illustrate this inequality penalty further, figure 2.6 shows the 20 poorest nations in the world ranked according to their mean household per capita income (the poorest at the top to the richest at the bottom). For each country, the figure reports a hypothetical Prosperity Gap with a benchmark level of inequality equal to the lowest observed inequality in the Poverty and Inequality Platform database (dark blue bar) and the Prosperity Gap with the current level of inequality in the country (dark blue + yellow bars). The resulting difference in the Prosperity

Gaps signals the magnitude of the influence of “excess” inequality (yellow segment of the bar). For instance, Madagascar would have a Prosperity Gap of 18.8 instead of 27.3 had its inequality been at the hypothetical benchmark level. In other words, excess inequality in Madagascar is responsible for a 45 percent larger Prosperity Gap. Likewise, Tanzania—a country that is more equal than Madagascar—has a Prosperity Gap of 9.1 with a benchmark level of inequality or 12.6 with the current level of inequality, suggesting a 38 percent impact of excess inequality. Note also that when countries have the same level of inequality (as in the dark blue bars), Prosperity Gaps are largest for the poorest nation and smallest for the richest nation. However, different levels of inequality across countries change the ranking of countries. For instance, Zambia, the eighth poorest nation by mean income, is ranked the fourth-worst-off nation by the Prosperity Gap, illustrating the high level of inequality in Zambia. Put differently, while Zambia and Niger have similar levels of mean income (\$2.69 and \$2.53 per day, respectively), the Prosperity Gap in Zambia is almost double that in Niger (23.1 and 12.6, respectively), signaling the sizable differences in inequality.

The impact of high inequality on shared prosperity is also illustrated by the time required for individuals in each country on average to reach the prosperity standard of \$25 per day.¹⁰ Figure 2.7 plots the number of years it will take select upper-middle-income countries to reach \$25 on average, assuming each country grows at 2 percent per capita annually (dark blue bars), which is slightly higher than the global average annual household income growth in the past three decades, or 4 percent per capita annually (yellow bars). In both cases, inequality within the country is kept fixed. Countries are ranked according to their mean per capita income, with the poorest on top and the richest at the bottom. Generally, it is expected that richer countries (those at the bottom) will face a shorter time than the poorer countries to reach \$25 per person per day. However, this is not always the case. For example, Serbia, a country which has a lower mean income (\$20) than Brazil (\$21), will need about 69 years to reach \$25 on average, compared to 113 years for Brazil, if both countries grow at 2 percent per capita annually. Brazil faces a time horizon close to 1.6 times longer than that of Serbia precisely because inequality in Brazil is close to 1.6 times greater than in Serbia. With a 4 percent annual per capita income growth instead, Brazilians on average will reach \$25 in 57 years instead of 113 years, signaling the crucial role of income growth. A reduction of the same magnitude is also possible if the country grows annually at 2 percent per capita with half the current level of inequality. While halving inequality is an extreme ask, this thought experiment highlights that, by actively working toward reducing inequalities today, countries can pave the way for faster shared prosperity gains in the future.

FIGURE 2.7
Inequality delays prosperity



Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: Only results for select upper-middle-income countries using the latest survey are reported. Countries are ranked from the poorest (top) to the richest (bottom) by average household per capita income. Each country is assumed to grow at 2 percent per capita annually (dark blue bars) or 4 percent per capita annually (yellow bars) with the current level of inequality. The number of years required to reach \$25 per person on average is equivalent if countries grow at 2 percent per capita annually with a level of inequality that is half the current level or grow annually at 4 percent with the current level of inequality.

Within-country inequality: The number of economies with high inequality

The second new World Bank indicator of shared prosperity tracks the *number of economies with high inequality*. These are defined as economies with a Gini index greater than 40, based on the most recent household survey for a country. The Gini index is a measure of inequality that is bounded between 0 (a society in which everyone has the same income and hence perfect equality) and 100 (where one person has all the income and hence the most unequal society).

Looking at all economies since 2000, a Gini of 40 roughly defines the top one-third of economies with the highest levels of inequality. While no single statistic can fully convey the full picture of inequality, the Gini index has many desirable properties and it is likely the most

familiar measure of inequality, known to the widest audience, and with a long history of use (Haddad et al. 2024). It is also important that most inequality measures are highly correlated with the Gini index (Haddad et al. 2024).¹¹ Annex 2D and chapter 4 discuss the issues that arise in the measurement of high inequality and explain why a threshold of 40 is used.

The indicator used in this report is based on either income or consumption inequality, depending on the welfare measure adopted by each country. Box 2.3 outlines the various concepts of welfare and what they mean for levels of inequality. Most high-income countries and countries in Latin America and the Caribbean use income, while the rest of the world tends to use consumption. For the same country, the inequality of income tends to be higher than the inequality of consumption, since savings increase with income.¹² Looking across countries, however, countries that use consumption—typically low-income and lower-middle-income countries—are, on average, more unequal (Haddad et al. 2024). As these differences are important, the analysis differentiates between income- and consumption-based countries wherever possible. In addition to the threshold of 40 that is used by the World Bank in its vision indicator, this chapter also splits out economies with a Gini index below 30 (World Bank, n.d.).¹³

BOX 2.3

Concepts of welfare and differences in measured inequality

The level of inequality depends on the underlying concept of welfare that is captured. Economic inequality is generally captured in one of three welfare spaces—income, consumption, or wealth—each reflecting different aspects of welfare and different observed levels of inequality. Whereas *income* signals an individual's or family's potential buying power, *consumption* expenditure is the realization of that buying power. Households generally do not consume all their income. What is left over (that is, savings), tends to be greater for richer households than for poorer households. This implies that the distribution of consumption tends to be more equal than the distribution of income (see annex 2D and chapter 4 for further detail). Whereas income and consumption both represent the flow of resources—that is, how much one earns or spends in a given time frame, typically a year—*wealth* represents a stock of resources such as accumulated assets, including property, corporate stock holdings, or savings, as well as other investments that can be inherited or acquired. For example, a house (or stock) is wealth, and the rent (or dividends) is the income generated from this asset. The distribution of wealth tends to be much more unequal than either income or consumption.^a

(continued)

BOX 2.3**Concepts of welfare and differences in measured inequality (*continued*)**

These concepts are interlinked. For instance, recent increases in income inequality have been attributed to the higher rate of return of wealth among the richest (Piketty 2014). Nevertheless, these concepts of welfare are distinct in several crucial ways. Unlike income, which can fluctuate annually, wealth tends to accumulate over time and is more resistant to short-term economic changes. This likely makes wealth a better indicator of long-term resilience and a better signal for economic opportunity or mobility. However, among the three concepts outlined here, wealth remains the most difficult to capture. This is in part due to measurement challenges that similarly plague income measurement in developing countries, along with the potential to “hide” wealth offshore that is a concern even for the countries with the most comprehensive data (Zucman 2015). Given these challenges, this report uses income or consumption, depending on the type of survey available.

a. For example, see the studies by Saez and Zucman (2020) for the United States and by Alvaredo, Atkinson, and Morelli (2018) for the United Kingdom.

See annex 2D for a more detailed discussion of the differences between income and consumption surveys. Chapter 4 expands on the challenges of measuring inequality using household surveys, including the likely underrepresentation of top incomes. Correcting for “missing” top incomes will increase the level of inequality; however, it is not clear whether the trends would be much different with or without the correction (see chapter 4 and World Bank 2016).

Economies with high inequality are concentrated in Latin America and the Caribbean and in Sub-Saharan Africa

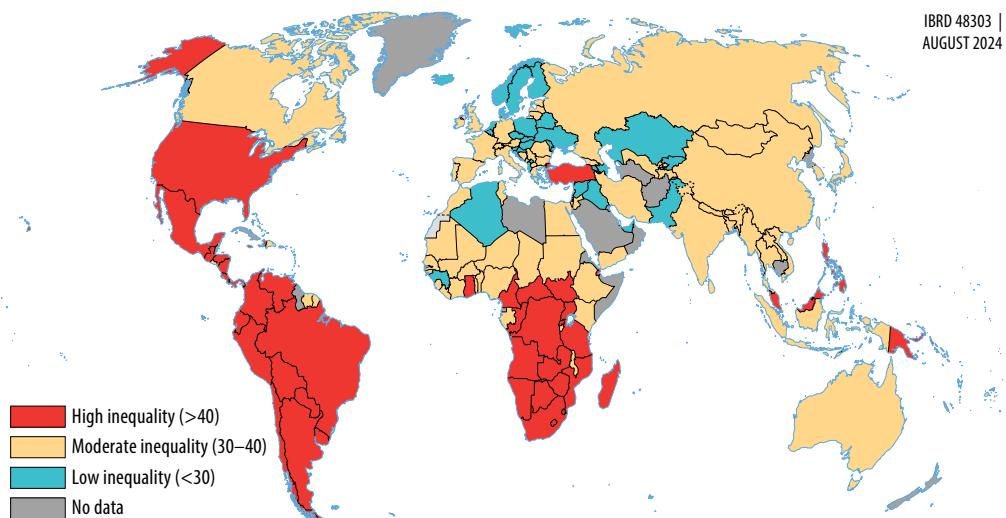
Using the latest round of household surveys for each economy, 49 economies worldwide had a Gini index above 40. High-inequality economies are concentrated in Latin America and the Caribbean as well as Sub-Saharan Africa (map 2.1). Over 80 percent of the countries in Latin America and the Caribbean had a Gini index above 40, with Brazil and Colombia being the most unequal countries, followed by countries in Central America. Within Sub-Saharan Africa, inequality is highest in Southern, Central, and Eastern Africa and lowest in Western Africa (map 2.1). At the other end of the spectrum, the Gini index is low for Nordic, Eastern European, and ex-Soviet countries. Overall, Europe and Central Asia has one of the highest

numbers of economies with relatively low inequality. Only Türkiye exhibits higher levels of inequality than the rest of the region.

High inequality is more prevalent in low- and middle-income countries as well as countries in fragile and conflict-affected situations (FCS) (figure 2.8). The high-income economies with elevated levels of inequality are Chile, Panama, the United States, and Uruguay (table 2F.1). In contrast, around two-fifths of middle-income countries and one-third of low-income countries exhibit high levels of inequality. Although data are limited, two-fifths of FCS countries have high levels of inequality, compared to only a quarter of non-FCS countries in the sample. Of the 68 International Development Association (IDA) countries with data, less than 15 percent were in the low-inequality group and more than double that (37 percent) were in the high-inequality group.¹⁴

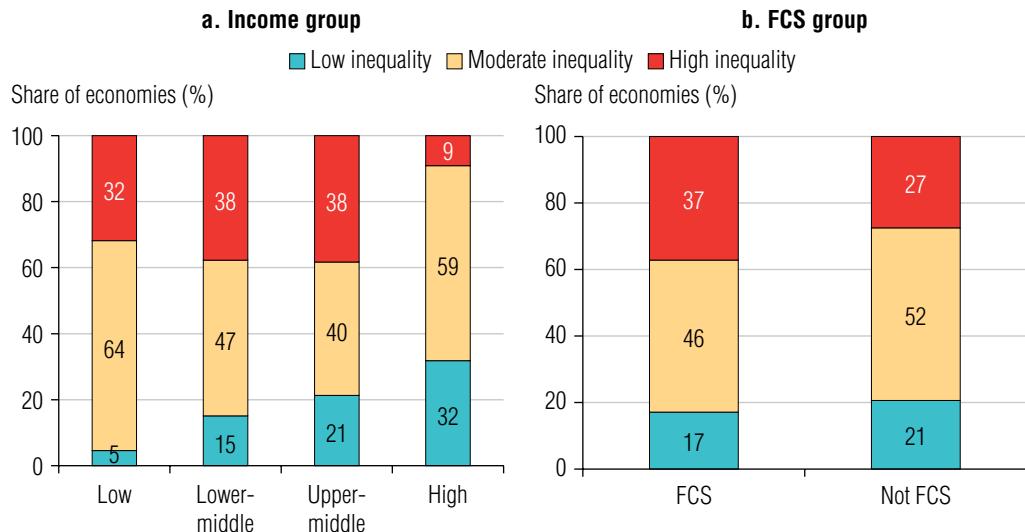
MAP 2.1

The 49 economies with high inequality are concentrated in Sub-Saharan Africa and Latin America and the Caribbean



Sources: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>; Haddad et al. 2024.

Note: The map presents the Gini index from the latest available survey (after 2000), which measures the inequality of income or consumption, depending on the economy. High-inequality economies have a Gini index above 40, moderate-inequality economies are those with a Gini index between 30 and 40, and low-inequality economies are those with a Gini index below 30. See annex table 2F.1 for the economy classifications, Gini indexes, year of survey, and the type of welfare—income, or consumption—used.

FIGURE 2.8**Poorer and conflict-affected economies tend to be more unequal**

Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

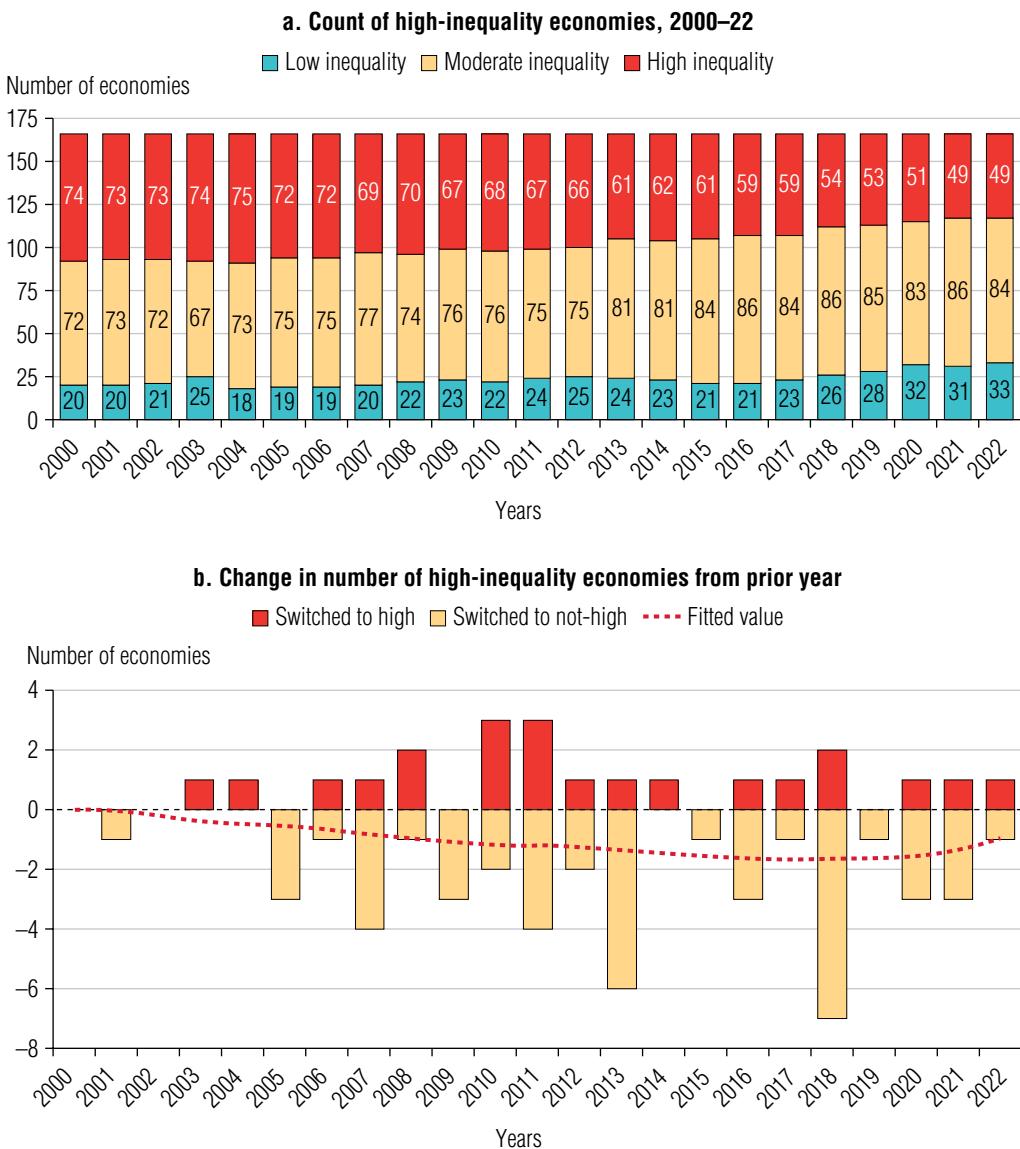
Note: FCS = fragile and conflict-affected situations. High-inequality economies have a Gini index above 40, moderate-inequality economies are those with a Gini index between 30 and 40, and low-inequality economies are those with a Gini index below 30. The data cover 166 economies, with at least one household survey in the Poverty and Inequality Platform between 2000 and 2022. The Gini index is from the latest survey year. Income group and FCS status are based on fiscal year 2024 lists. The label values may not add to 100 percent due to rounding.

The number of economies with high inequality has fallen, but the percentage of people living in high-inequality economies has not changed much in the past decade

The number of economies with high inequality declined from 74 in 2000 to 49 in 2022 (figure 2.9, panel a). This aggregate view understates the movements of economies across these groups. In a typical year, some economies see their Gini index rise above 40, while others cross the threshold in the other direction. Since 2005, in a typical year, more economies have exited the high-inequality status than have fallen into it, illustrating this progress (figure 2.9, panel b). When a household survey is not available for an economy in 2022, the high-inequality indicator uses the latest Gini index available for that economy.¹⁵ Note that while there has been progress in the number of economies moving out of the high-inequality category, the number of people living in economies with high inequality has stayed roughly the same in the last decade, from over 23 percent (1.7 billion) of the global population in 2013 to 22 percent (1.8 billion) in 2022. The majority of the global population today (70 percent [5.6 billion]) lives in an economy with moderate inequality while relatively few (8 percent [609 million]) live in economies with low inequality (figure 2F.1).

FIGURE 2.9

There is a steady decline in the number of economies with high inequality since 2000

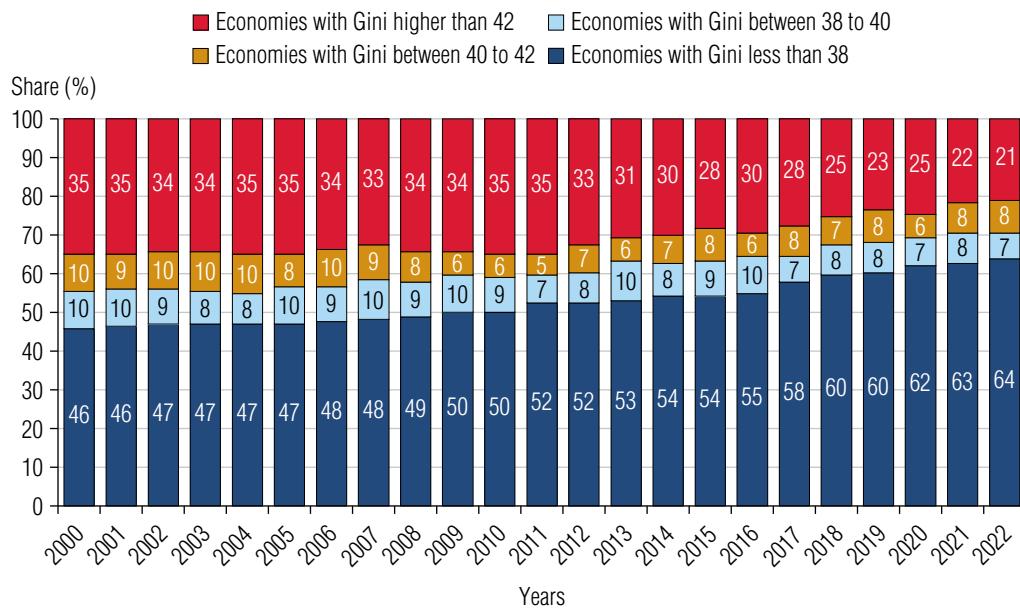


Sources: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>; Haddad et al. 2024.

Note: High-inequality economies have a Gini index above 40, moderate are those with a Gini index between 30 and 40, and low are those with a Gini index less than 30. When no survey is available in a given year, data from the most recent survey year are used. The earliest survey is backcasted when the first survey is available only after 2000 to avoid missing values. The graph covers 166 economies with at least one household survey in the Poverty and Inequality Platform between 2000 and 2022.

The observed reduction in the number of economies with high inequality is not sensitive to small changes around the threshold value of 40. To see this, figure 2.10 shows the share of economies that had a Gini index within a 5 percent range of the threshold. Those with Gini values above 42 (5 percent over the threshold) are indicated in dark red and those with Gini values below 38 (5 percent less than the threshold) are shown in dark blue. Even with a threshold Gini value of 38 (or 42), the share of economies with high inequality would still be declining over time. This means that the trend of economies exiting high-inequality status is not due to marginal cases of inequality around the threshold.

FIGURE 2.10
The decline in the number of economies with high inequality is not driven by small changes around the threshold



Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: This figure shows the share of economies with a Gini index below 38 (dark blue), between 38 and 40 (light blue), between 40 and 42 (yellow), and over 42 (dark red). The values of 38 and 42 are ± 5 percent from 40. When no survey is available for a given year, data from the most recent survey year are used. The earliest survey is backcasted when the first survey is available only after 2000 to avoid missing values. The graph covers 166 economies with at least one household survey in the Poverty and Inequality Platform between 2000 and 2022. The label values may not add to 100 percent due to rounding.

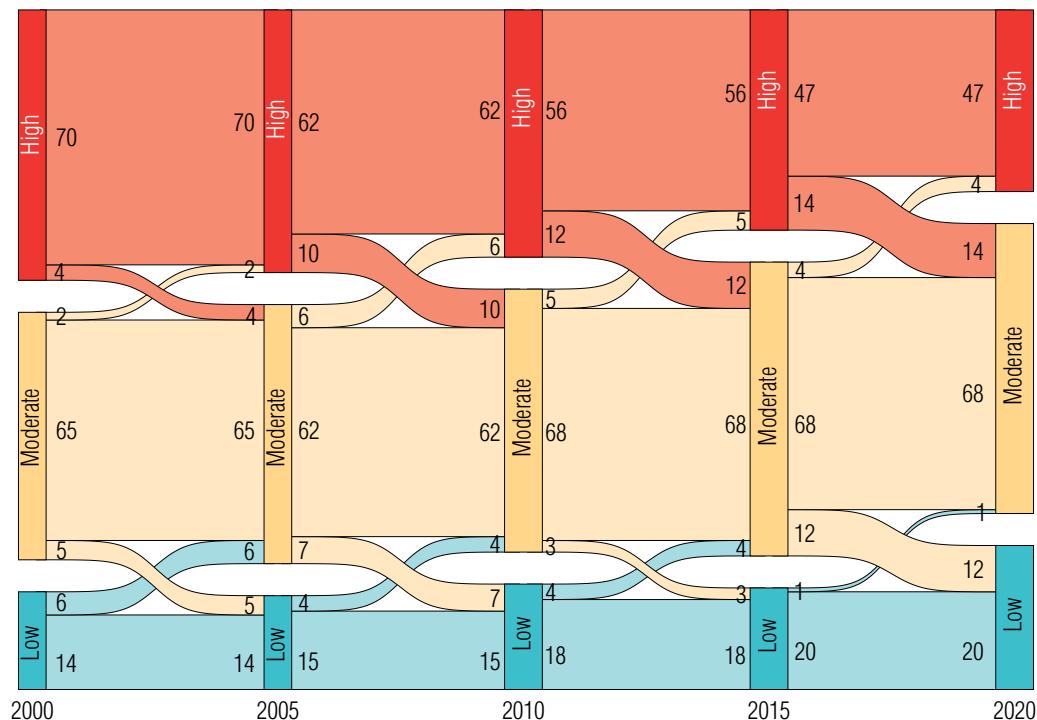
The falling number of high-inequality economies (74 to 49) has led to an increase in the number of both low-inequality (20 to 33) and moderate-inequality (72 to 84) economies.

Figure 2.11 depicts the movement of economies into and out of all three inequality categories—high (above 40), moderate (between 30 and 40), and low (below 30)—for each five-year period between 2000 and 2020. Except during 2010–15, more economies transitioned from moderate-inequality status to low-inequality status than from moderate- to high-inequality status. In all

periods, more economies exited than entered high inequality. For every two economies that moved out of the high-inequality group (23 between 2000 and 2020), one was added to the moderate-inequality group (11) and one was added to the low-inequality group (12).

FIGURE 2.11

More economies moved to a lower-inequality group than to a higher-inequality group, 2000–20



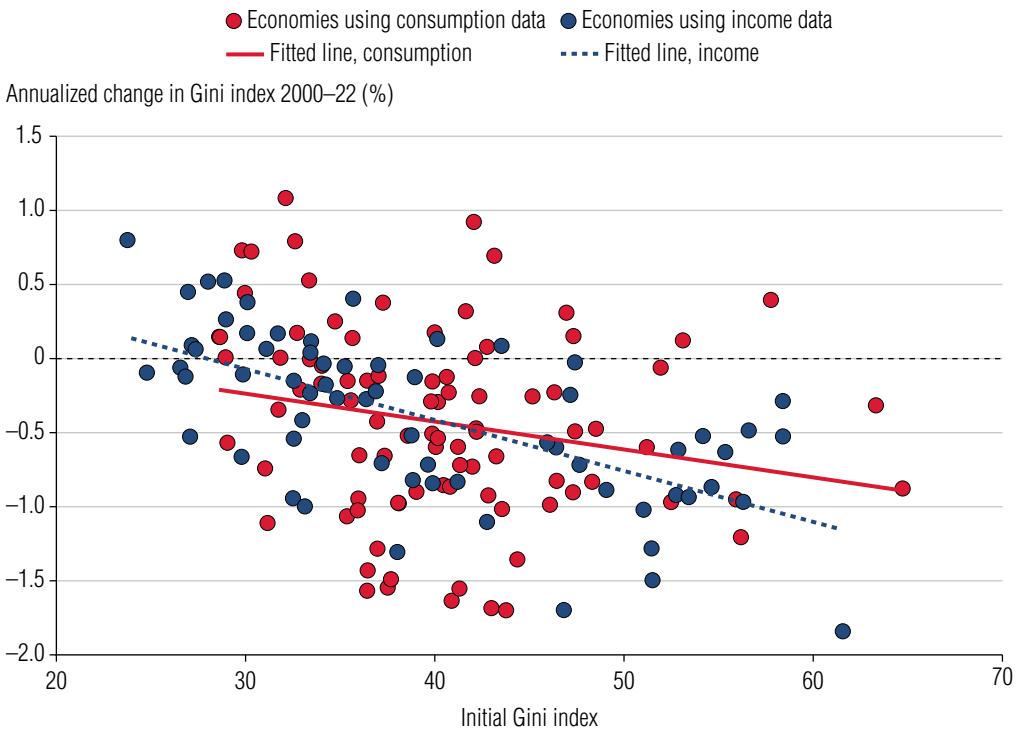
Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: High inequality is defined as economies with a Gini index above 40, moderate as those between 30 and 40, and low as those below 30. This chart shows the number of economies in each group in the start year and end year at five-year periods. When no survey is available for a given year, data from the most recent survey year are used. The earliest survey is backcasted when the first survey is available only after 2000 to avoid missing values.

Countries with high initial levels of inequality have experienced faster reductions in inequality in the last two decades, leading to some convergence of inequality levels across countries, which explains the changes in the number of economies with high inequality just described (figure 2.12). Average annual changes in inequality are close to zero among countries with a Gini index of less than 30. On average, the annual reduction in inequality has been greater for countries with larger initial Gini values. In Bolivia, for example, the Gini index of income decreased from above 58 in 2005 to 41 in 2021 (a decline of 30 percent). Similarly, Botswana, with an initial Gini index of consumption close to 65, experienced a decline of 18 percent between 2002 and 2015. The finding of inequality convergence holds for both countries with income or consumption as the measure of welfare.

FIGURE 2.12

The reduction in inequality has been faster for economies with high levels of initial inequality



Sources: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>; Haddad et al. 2024 (updated).

Note: Initial Gini index for each economy is for the earliest available year, starting with 2000. The vertical axis shows the (annualized) percent change between the initial Gini and its final value, obtained from the latest survey round. The sample consists of 155 economies with at least two surveys. There might be breaks in comparability over such a long period, which are not controlled for.

Inequality has declined for the typical country in recent decades, although the pandemic had disparate impacts across countries

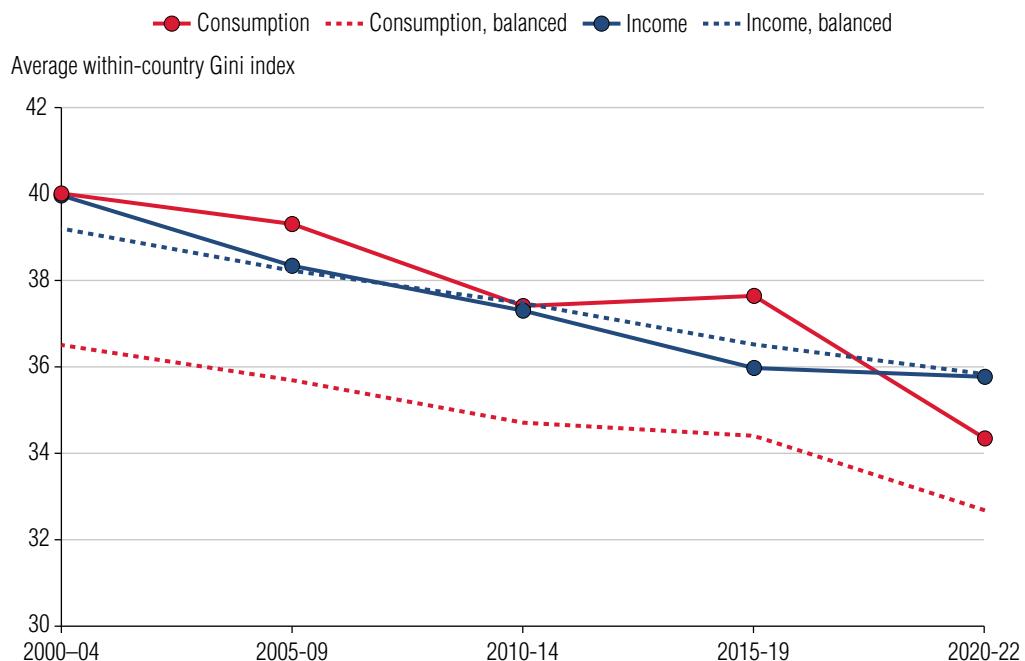
Thus far, this analysis has focused on movements of economies around the high-inequality threshold; however, it is also important to look at the evolution of inequality more generally. To analyze the evolution of within-country inequality over the long term, figure 2.13 shows the average Gini at half-decade intervals starting with 2000 by aggregating all surveys conducted within each interval. Since many countries lack data for every year, pooling surveys at half-decade periods allows a meaningful comparison of average within-country inequality over time. On average, 123 countries are represented at each interval. Figure 2.13 provides four ways of summarizing average within-country inequality across the world over the past two decades.

Irrespective of the approach, average within-country inequality has been on a downward trend since 2000. Similar analysis had shown an increase over the preceding period before 2000 (World Bank 2016).

The average consumption Gini, after briefly rising in 2015–19 by 0.23 Gini points, returned to a long-term downward trend from 2020–22. On the other hand, the average income Gini continued to fall until 2015–19 but has somewhat plateaued in the most recent period.

Since not all countries conduct a household survey at five-year intervals, the full sample at each half-decade interval comprises different sets of countries. To examine the impact of such shifts, inequality trends are also analyzed using a smaller balanced sample that includes the same set of countries throughout. The dashed lines in figure 2.13 show averages across income and consumption Ginis, restricting the sample to 63 countries (of which 43 conduct income-based surveys) that have a survey in each period. Results based on this balanced sample of countries further confirm the downward trends in average within-country inequality around the world, with consumption Ginis falling faster than income Ginis in 2020–22.

FIGURE 2.13
Average within-country inequality has been falling in the past 20 years

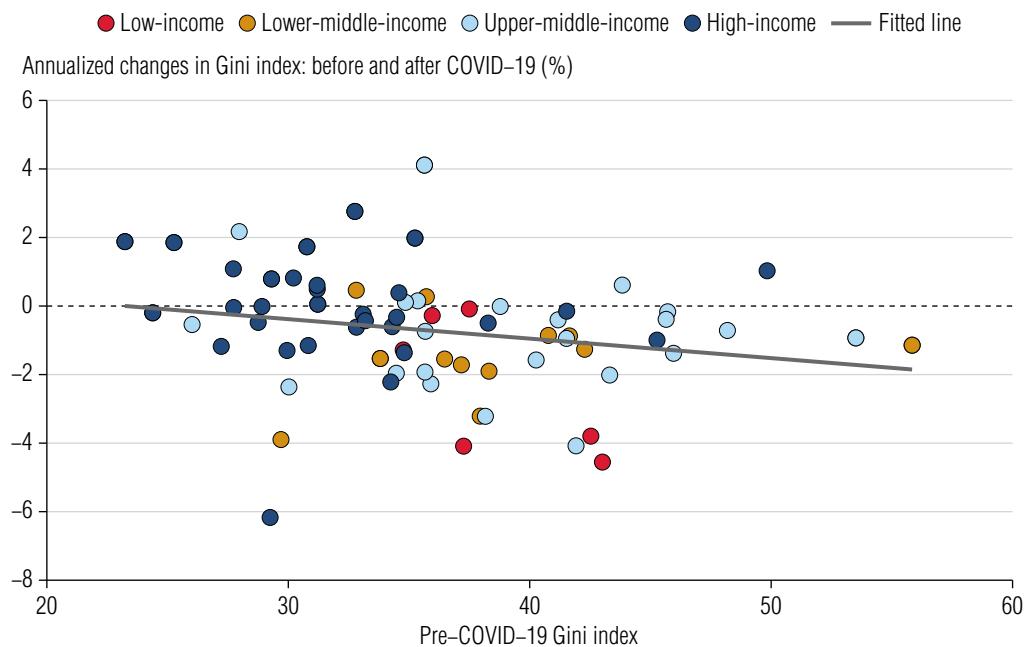


Source: Word Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: The sample comprises 121 economies in 2000–04, 131 in 2005–09, 137 in 2010–14, 133 in 2015–19, and 93 economies in 2020–22. The balanced sample comprises 63 economies, 43 of which are income-based surveys. In cases where economies conducted several survey rounds within a half-decade period, the figure uses the median Gini value for the economy across surveys within that interval. Simple averages are used, unweighted by population.

To highlight the changes since the pandemic, figure 2.14 examines shifts in within-country inequality before and after COVID-19. This analysis is based on a sample of 72 countries that reported a survey after 2020 and had comparable data from a pre-COVID-19 round.¹⁶ For each country, the changes in inequality compare the Gini index from the most recent survey round conducted before COVID-19 (2019 or earlier) with the latest available round after the first wave of COVID-19 (2021 or later). Countries with their latest survey dating to 2020 are excluded from this analysis, as COVID-19 affected most countries during that year.

FIGURE 2.14
Most economies experienced a decline in inequality after COVID-19



Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: Sample consists of 72 economies that reported a survey after 2020 and had comparable data from a pre-COVID-19 round (2019 or earlier). The changes in inequality are calculated by comparing the Gini value from the most recent round of survey conducted in an economy before the COVID-19 pandemic, with its latest available and comparable round after the pandemic. The trend line, reported for all economies, is not weighted by population size.

Within-country inequality is observed to have fallen in many countries, with greater reductions in countries that were more unequal before the pandemic, which is similar to the patterns observed over the longer period above (figure 2.12). In slightly more than half the cases where inequality fell, the observed reductions exceed 1 Gini point, which has previously been used as a rough adjustment for sampling errors (World Bank 2016).¹⁷ For the countries with a reduction in inequality, the average decline was highest among low-income countries (falling by an average 2.7 Gini points), followed by lower-middle-income countries (2.2 Gini points), upper-middle-income countries (1.5 Gini points), and high-income countries (0.7 Gini points).¹⁸ Of the 72 countries, 6 saw an increase of more than 1 Gini point and 28 saw a decline of more than 1 Gini point. Of the 28 countries with a reduction in inequality of more than 1 Gini point,

9 are in Sub-Saharan Africa, 7 are in Latin America and the Caribbean, 6 are in Europe and Central Asia, 2 each are in the East Asia and Pacific region and from the rest of the world grouping, and 1 each is from the Middle East and North Africa region and the South Asia region.

Effectively addressing inequality requires a comprehensive approach that tackles structural sources of inequality

High levels of inequality are the result of several structural factors, and the appropriate actions to address inequality will vary across countries. Policies to reduce inequality have been reviewed extensively in the literature. For example, World Bank (2016) reviewed the policy evidence at the global level. More recently, World Bank reports have highlighted factors and important policies to reduce inequality in Sub-Saharan Africa, one of the regions with the highest levels of inequality (Sinha, Inchauste, and Narayan 2024; World Bank 2024a). The Latin America and Caribbean Inequality Review focuses on inequality along various dimensions, including income, wealth, education, health, and political power (Alvaredo et al. 2023; Bancalari et al. 2023; Fernández et al. 2024; Lupu 2024). The review aims to provide evidence to understand why, despite major structural economic and social changes, inequality in Latin America and the Caribbean persists at exceptionally high levels. Given these detailed reviews on policies and inequality, this section does not aim to provide an exhaustive review of all policy options, nor does it offer universal prescriptions. Instead, this section gives a broad overview of the policy space and outlines the interlinkages between inequalities defined at various stages.

There is nothing inevitable about inequality. Policies can affect structural sources of inequality at three interrelated stages. First, they can address inequality in acquiring human capital and other assets, before individuals join the labor market, such as policies aimed at reducing differences in educational attainment. These differences oftentimes reflect an inequality of opportunity, encompassing factors that are linked to circumstances that are out of an individual's control, such as birthplace, parental income, gender, race, and others. Second, policies can address inequality in using skills and assets, which arise from market and institutional distortions in the labor, product, capital, and input markets. These distortions include anticompetitive or discriminatory practices, or policies and regulations that provide preferential treatment or restrict market access for some, while limiting access for others, thus curtailing their productive potential and limiting earning opportunities. Third, fair fiscal policies can be leveraged to improve the redistributive impact of taxes and transfers. Despite equalizing opportunities, inequality could still arise *ex post* simply due to bad luck or shocks. The poor and vulnerable face a greater risk due to the changing global climatic (chapter 3) and economic conditions.

Structural inequalities at each stage reinforce each other and are dynamic. For instance, differences in parental income—reflective of inequality in the previous generation—have been directly linked to inequality in building productive capacities (inequality of opportunities for the current generation) as well as the current generation's ability to utilize those capacities

(Chetty et al. 2017; Corak 2013; World Bank 2017a). The latter is what economists have termed intergenerational mobility (or persistence, in the case of lack of mobility). Recent work on Latin America has estimated that as much as one-half to two-thirds of current inequality could be due to circumstances that are out of individuals' control (Brunori, Ferreira, and Neidhöfer 2023). This means that a society with high inequality is also likely to have greater inequality of opportunity, which further leads to lower mobility across generations, which, in turn, leads to further inequality. Policies are key to break such cycles of worsening inequality. World Bank (2024b) and Sinha, Inchauste, and Narayan (2024) provide a comprehensive overview of various policies in these three stages, but some brief examples are included here.

Key actions to tackle inequalities in building productive capacities that would help equalize opportunities include the following: (a) increasing access to quality education, from early childhood through higher education, which significantly affects skill development and future earning potential; (b) supporting the accumulation of human capital within the family by expanding the opportunities and resources available for child development at home (c) reducing disparities in health and nutrition, including prenatal care and early childhood health; (d) expanding access to basic public services; (e) improving access to productive assets such as land; and (f) creating a social environment that allows for better early life experiences, such as reducing exposure to crime and improving the availability of community resources. For instance, Brazil has been successful in reducing inequality by providing public education and free universal health care (World Bank 2016).

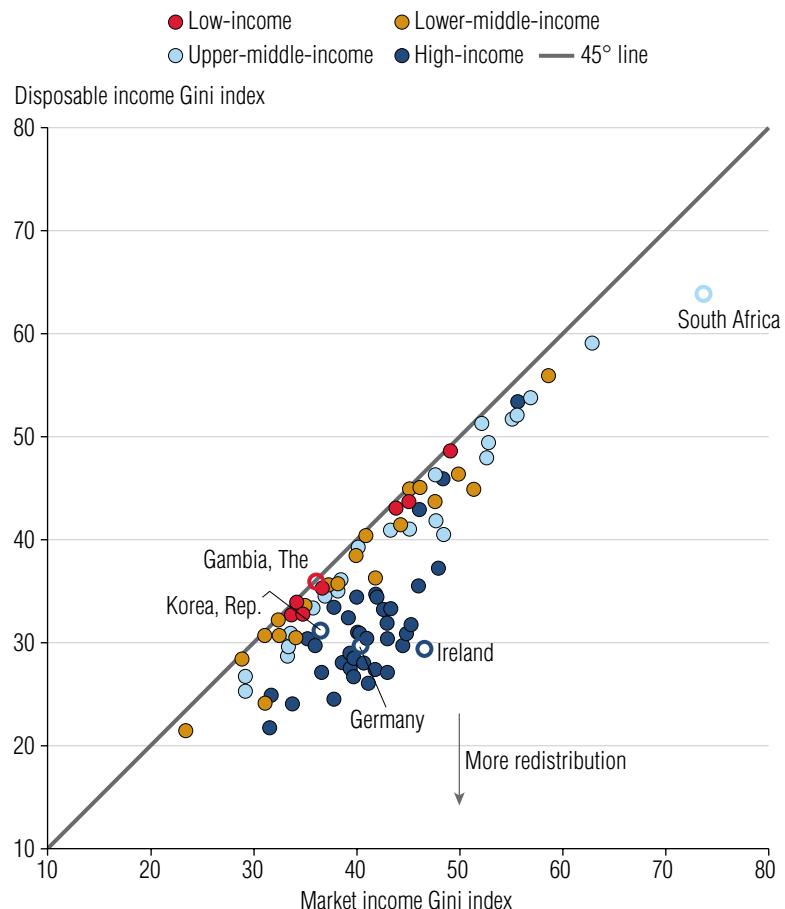
Inequality in utilizing productive capacities arises during individuals' active participation in the labor market and is shaped by differences in employment dynamics, types of incomes, and workplace conditions. As discussed above, these ex post inequalities in outcomes are linked to ex ante inequality of opportunity, which, left unaddressed, can affect the ex ante inequalities of the following generation. Government policies to reduce inequalities in using productive capacities include fostering market-based innovations to provide better access to capital and technology, facilitating the expansion of connective infrastructure to promote access to markets, fostering participation in global value chains, tackling labor market segmentation and frictions, enhancing legal protection, promoting competition, and reducing discrimination.

Finally, government policies on taxes and transfers determine how inequality in market income is translated into the inequality in disposable income, which is what was used to measure inequality and poverty in this report. Governments can significantly reduce inequality by making tax systems more progressive and redistribute income through pro-poor transfers. Investing in adequate social protection programs, such as unemployment benefits, pensions, and health care, helps mitigate income inequality by providing support to the disadvantaged, protecting them against shocks, and delivering long-term inclusive income growth. It is important, however, to note that policy effects may vary across countries. The net effect of taxes, transfers, and subsidies substantially increases consumable income for the poorest households in high-income countries, but these measures decrease consumable income for the poorest households in low-income countries (World Bank 2022).

High-income countries deliver more fiscal redistribution while exhibiting less inequality initially because they are more effective at targeting resources and have more fiscal space

Figure 2.15 plots the Gini index of disposable income against the Gini index of market income.¹⁹ Although we refer to income throughout this section, countries that use consumption as their main measure are also included.²⁰ In all countries with available estimates, inequality is reduced after direct taxes and transfers are accounted for.²¹ However, how much countries redistribute varies greatly, which is indicated by the distance from the 45-degree line. At one extreme, Ireland has reduced the Gini index by 17 points (from 46.6 to 29.4 in 2018), whereas The Gambia has reduced it by 0.2 points (from 36.1 to 35.9 in 2015/16).²²

FIGURE 2.15
Market versus disposable income



Sources: Adapted from Wai-Poi, Sosa, and Bachas (forthcoming) and Lustig 2023.

Note: The data are from the Commitment to Equity (CEQ) Institute, the Organisation for Economic Co-operation and Development (OECD), and World Bank databases, which collectively cover 96 economies over the past decade across all income groups and regions. The analysis includes the latest data point available for each country from the CEQ database and the OECD, which might differ from the latest year in the Poverty and Inequality Platform that has been used in the rest of the report. See also annex 2D and chapter 4 for discussion of the differences in inequality when income and consumption are used as the welfare aggregate.

High-income countries conduct more fiscal redistribution, but they also need to do less since they start out with a more equal distribution of market incomes. For instance, South Africa has greatly reduced its income inequality in absolute terms through taxes and transfers in the last decades. However, inequality remains high even after redistribution because South Africa's pre-fiscal inequality is among the highest in the world (World Bank 2022). Fiscal redistribution reduces the Gini in South Africa by around 10 points (from 73.7 to 63.8 in 2015), which is almost the same as the extent of redistribution in Germany (from 40.3 to 29.9 in 2019). However, since South Africa starts out with much greater inequality, it ends up with a Gini that is double that of Germany's level. Countries end up with the same inequality in disposable income, but in different ways. For example, the Republic of Korea's inequality of disposable income is only slightly higher than Germany's, but its redistribution is about half, since it starts out with a more equal pretax distribution.²³

In general, high-income countries achieve greater fiscal redistribution. The extent of fiscal redistribution depends on a broad set of fiscal policies, such as taxes and transfers. High-income countries are more effective at targeting taxes and transfers and at ensuring that poor households are better-off as a result of these fiscal policies. In low-income countries, incomes of all households (including poor households) are lower after taxes, transfers, and subsidies (World Bank 2022). This is because high-income countries rely on direct taxes and transfers, while low- and middle-income countries rely more on indirect taxation and subsidies, which generate mixed and generally more muted distributional impacts. Most African households pay far more in taxes than they receive in transfers and subsidies, effectively leaving them poorer (Sinha, Inchauste, and Narayan 2024; World Bank 2024a). As a consequence, although taxes and spending reduce inequality in all economies, the magnitude is considerably lower in low-income countries.

One reason for the heterogeneity across countries is fiscal space. As countries develop, the total amount of taxes collected as a share of gross domestic product increases, leaving countries with more resources to support redistribution. Another reason is the composition of these taxes. The importance of indirect taxes (for instance, value added tax, sales taxes, and tariffs) declines and personal income taxes become more prominent as countries become richer (Bachas, Jensen, and Gadenne 2024). In fact, only the richest decile usually pays direct taxes of around 5 percent of income in low-income countries, which is slightly lower than the share paid by the poorest decile in a typical high-income country (World Bank 2022). Both of these factors limit the redistributive capacity of low-income countries. These countries have fewer resources to redistribute than high-income countries, and they raise taxes in a less progressive way because indirect taxes are broad-based taxes that do not take household income levels into account.

Improving the effectiveness of fiscal policies in poorer countries is not easy. Informality weakens the effectiveness of fiscal policy (Bachas, Jensen, and Gadenne 2024). Food subsidies and tax exemptions on food and energy do not reach the poor as intended. Although these goods and services constitute a large share of poor households' consumption baskets, the households obtain these items mainly in the informal economy, such as through small,

unregistered stores and markets or directly from home production with no pass-through of consumption taxes to final prices. For example, in Rwanda, the share of the household budget spent in informal stores falls from 90 percent for the lowest income decile of households to 70 percent for the highest decile (Bachas, Gadenne, and Jensen 2023). Thus, value added tax exemptions and subsidies ultimately benefit richer households that are more able to make use of these benefits (World Bank 2022). In addition, these exemptions reduce total revenues and thus limit what can be achieved through the transfer side.

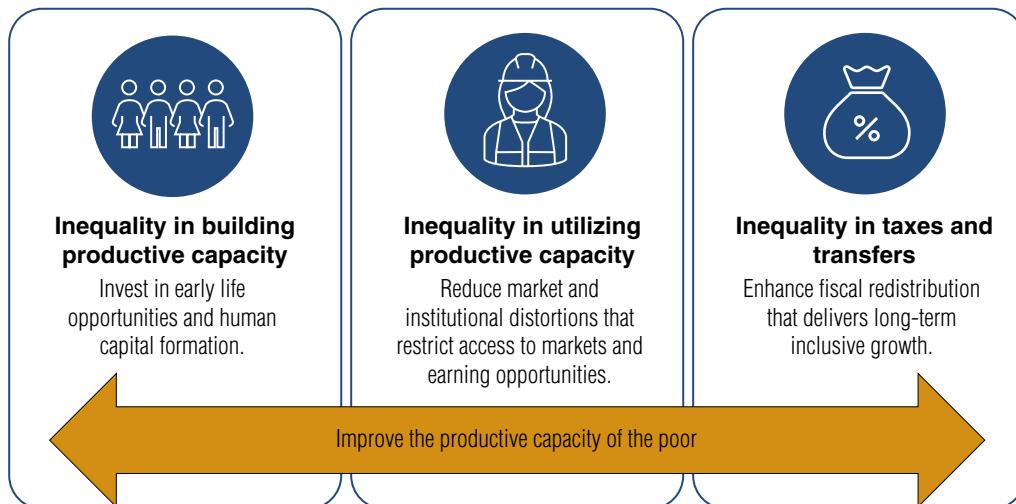
Another consideration is that prefiscal inequality is relatively low for low-income countries, at an average Gini of 36; higher for lower-middle-income (42) and upper-middle-income (48) countries; but it is lower for high-income countries, with a respective Gini index of around 40. As countries develop, their market inequality tends to increase and then fall again as they become richer (World Bank 2024d). These changes result from various structural and random shocks affecting the economies to various degrees (see related discussion in Alvaredo et al. [2023]). Additionally, this comparison is complicated by the difference between income- and consumption-based measures of inequality. The share of income-based measures increases with a country's income level. This has two major implications. First, inequality of low-income countries is likely underestimated, since consumption inequality is, on average, lower than income-based inequality. Second, most high-income countries use income-based measures, while upper-middle-income countries use both income and consumption measures. As a consequence, the described relationship is likely less steeply increasing with income at low levels of development (low-income countries) but decreasing at high levels of development (high-income countries).

Addressing inequality for low- and lower-middle-income countries requires focusing on tackling all phases of inequality; fiscal redistribution alone is not the solution

Sub-Saharan Africa actually redistributes more than non-African countries with comparable income levels, but it is not enough to offset the high market inequality (Sinha, Inchauste, and Narayan 2024; World Bank 2024a). Addressing inequality effectively requires a holistic approach that targets all three stages. Policies directly addressing inequality-reinforcing barriers at these various stages can simultaneously close opportunity gaps and boost socioeconomic mobility (Sinha, Inchauste, and Narayan 2024; World Bank 2016) (figure 2.16). In 15 of 18 countries in Sub-Saharan Africa with available data, more than half of the inequality in consumption is due to factors beyond an individual's control, such as their place of birth or ethnicity (Sinha, Inchauste, and Narayan 2024). Sub-Saharan Africa also does worse than similar countries in terms of educational mobility (Narayan et al. 2018). In some of the poorest countries in the region, only 20 percent of respondents surpass the education of their parents, compared with 80 percent in East Asia (van der Weide et al. 2024). Chapter 3 of this report also highlights the importance of building resilience, which involves many of the actions mentioned here. Building resilience is also key for reducing inequality, so households do not slide back as the result of shocks, which will become more frequent in the future.

FIGURE 2.16

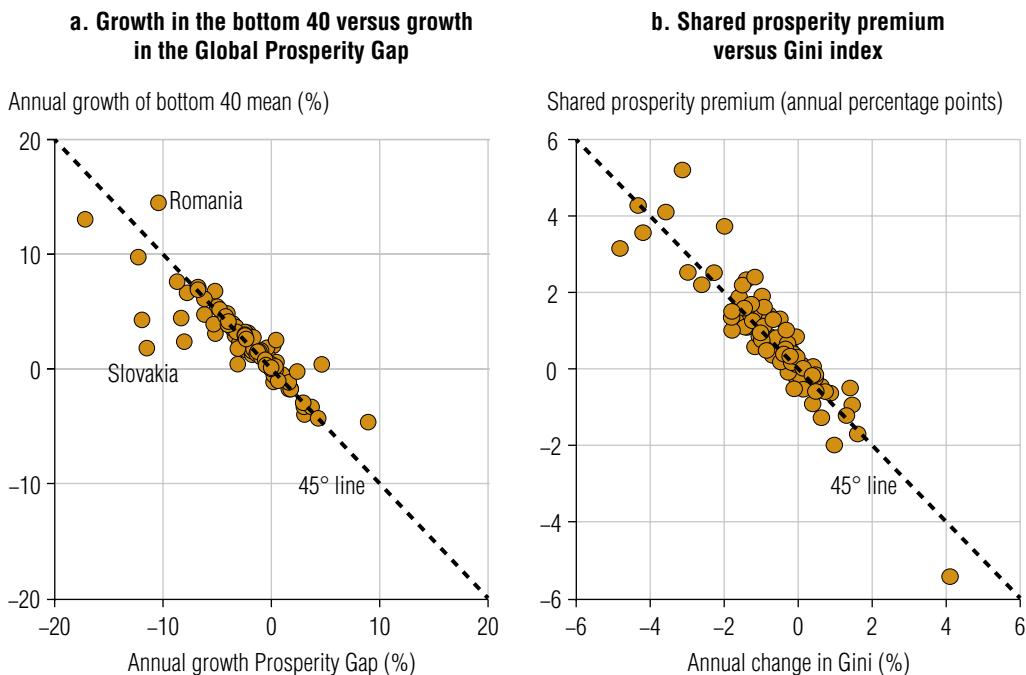
Effectively addressing inequality requires a comprehensive approach that tackles all phases of inequality



Source: World Bank.

Annex 2A. Comparing the growth in the mean of the bottom 40 percent versus the Global Prosperity Gap and the Gini index

Figure 2A.1, panel a, compares the growth in the Prosperity Gap with the growth in the mean of the bottom 40 percent of the distribution (bottom 40). It is expected that the two measures would be negatively correlated, since a greater *improvement* in the income of the poor (higher bottom 40 growth) is associated with a faster *decline* in the Prosperity Gap. The takeaway is that the changes in the bottom 40 closely align with the changes in the Prosperity Gap, and they overwhelmingly move in the same direction. In some cases, the bottom 40 change is greater (for example, for Romania), while in other cases the Prosperity Gap change is greater (such as for the Slovak Republic). This can be explained by the sensitivity of the measures to changes at different parts of the distribution of income or consumption.

FIGURE 2A.1**Old and new measures of shared prosperity track each other well**

Sources: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>; Global Database of Shared Prosperity (13th edition).

Note: The figure plots those economies with comparable data between the years spanning circa 2016 to 2021 as reported in the Global Database of Shared Prosperity, 13th edition (<https://pip.worldbank.org/shared-prosperity>). The estimates of Prosperity Gap, Gini index, and growth in the mean income of the bottom 40 percent are calculated using the latest available data in PIP (Poverty and Inequality Platform). The shared prosperity premium is defined as the difference between the growth in the bottom 40 and growth in the overall mean. A positive premium means that the mean of the bottom 40 grows faster than the overall mean.

Similarly, figure 2A.1, panel b, compares the shared prosperity premium—difference between the growth of the bottom 40 and growth of the overall mean (Lakner et al. 2022)—with the change in the Gini index. Once again, the two measures can be expected to correlate negatively, since a *larger* shared prosperity premium (that is, the poorer parts of the distribution growing faster than the overall population) leads to a *reduction* in inequality. With few exceptions, the two measures track each other well, especially when changes are small.

Annex 2B. The Global Prosperity Gap

The Global Prosperity Gap is *the average factor by which incomes need to be multiplied to bring everyone in the world to the prosperity standard of \$25 per person per day*. Let y_i represent the income of individual $i = 1, \dots, N$ and let $z = \$25$ per person per day represent the prosperity standard, then the Global Prosperity Gap (GPG) is:

$$GPG = \frac{1}{N} \sum_{i=1}^N \frac{z}{y_i}.$$

The Global Prosperity Gap summarizes how far the world is, on average, from achieving a prosperity standard defined at the global level. The measure was developed by Kraay et al. (2023) and has since been adopted by the World Bank (2024c). Since this number represents a shortfall, the measure falls as welfare improves. The indicator has a pro-poor weighting scheme, so that individuals who are further behind the prosperity standard contribute proportionally more to the Prosperity Gap than individuals closer to the standard. Similarly, while growth anywhere in the world contributes to reducing the gap, the indicator rewards the growth of the poorest the most.

The global prosperity standard is set at \$25 per person per day, roughly equal to the average per capita household income when countries reach high-income status, according to the World Bank's income classification. Two properties of the prosperity standard are important. First, the prosperity standard is simply a scaling factor, so it does not influence the trends, growth rates, or ranking across groups as long as the same threshold is applied to everyone. In other words, the conclusion of which region in the world is driving the trend in the Global Prosperity Gap will not change regardless of whether the global standard scales upward or downward. Second, the prosperity standard can easily be adapted to specific circumstances. For example, if applying a prosperity standard that was half (double) the global standard, namely, \$12.5 per day (\$50 per day), then the Prosperity Gap would also be half (double) the shortfall calculated at \$25 per day.

Subgroup decomposition of the Prosperity Gap

The Global Prosperity Gap can be expressed as a population-weighted average of the Prosperity Gaps for different subgroups, allowing for an assessment of which regions, countries, or population groups are driving the changes. For example, using population sizes, the Global Prosperity Gap can be easily decomposed into Prosperity Gaps of world regions, each regional gap can be divided into country gaps, and the country gaps can be separated into gaps of provinces or relevant population groups (such as ethnicity).

More formally, let each group $g = 1, \dots, G$ have a Prosperity Gap of PG_g ; then the Global Prosperity Gap can be decomposed as follows:

$$GPG = \sum_{g=1}^G \frac{N_g}{N} \times PG_g,$$

where N is the total population and N_g is the population of group g .

Decomposition of the Prosperity Gap into mean and inequality

The Prosperity Gap can be written as product of the shortfall of the average income from the prosperity threshold, z/\bar{y} , and an inequality measure, $I(y, \bar{y})$ (Kraay et al. 2023). The latter captures the average shortfall from the mean income of society and is referred to as the mean ratio deviation.

$$\text{Prosperity Gap} = \left(\frac{z}{\bar{y}} \right) \times I(y, \bar{y}), \text{ and } I(y, \bar{y}) \equiv \frac{1}{N} \sum_{i=1}^N \frac{\bar{y}}{y_i}.$$

The growth in the Prosperity Gap can be decomposed into growth in mean income and growth in inequality. Formally, the growth in the Prosperity Gap, $\Delta PG(y_t, z)$, from initial period t to final period $t+1$ (approximated as the change in logarithms) can be expressed as

$$\ln \underbrace{\left(\frac{PG(y_{t+1}, z)}{PG(y_t, z)} \right)}_{\text{growth in prosperity gap}} = \underbrace{\ln \left(\frac{I(y_{t+1}, \bar{y}_{t+1})}{I(y_t, \bar{y}_t)} \right)}_{\text{growth in inequality}} - \underbrace{\ln \left(\frac{\bar{y}_{t+1}}{\bar{y}_t} \right)}_{\text{growth in mean}}.$$

The mean ratio deviation can be multiplicatively decomposed into within-group and between-group inequalities. Formally, for mutually exclusive groups $g = 1, \dots, G$ with population N_g , income distribution y_g , and mean income \bar{y}_g , the mean ratio deviation is given by

$$I(y, \bar{y}) = \underbrace{\left(\sum_{g=1}^G \frac{N_g}{N} \frac{\bar{y}}{\bar{y}_g} \right)}_{\text{between-group inequality}} \underbrace{\left(\sum_{g=1}^G w_g I(y_g, \bar{y}_g) \right)}_{\text{within-group inequality}}, \text{ where } w_g = \frac{N_g / \bar{y}_g}{\sum_{g'=1}^G N_{g'} / \bar{y}_{g'}}.$$

Annex 2C. Bottom coding welfare distributions

The data at the bottom of the income and consumption distributions are known to have measurement issues due to transient factors and measurement errors (Ravallion 2016). For consumption surveys, zero and very low reported consumption are likely to be the result of measurement error, given that there is a biological minimum consumption level required to sustain life. For example, as many as 13 consumption surveys in the Poverty and Inequality Platform have observations with zero consumption. For income surveys, very low, zero, and even negative incomes are more plausible, as individuals can finance consumption by drawing down savings. Even in the case of income, however, the minimum threshold

for consumption could be a satisfactory threshold to bottom code, recognizing that the consumption levels of those individuals with low income are unlikely to be lower and could well be considerably higher.²⁴

Sensitivity to low income or consumption is a desirable feature of any distribution-sensitive measure. However, some welfare measures cannot incorporate negative or zero incomes. In addition, small positive values can have an extreme influence on distribution-sensitive indexes (Cowell and Victoria-Feser 2006; Cowell and Flachaire 2007), which also applies to the Prosperity Gap. Hence, income or consumption is often bottom coded at some strictly positive value.²⁵ For a discussion on bottom coding the Prosperity Gap, see Kraay et al. (2023).

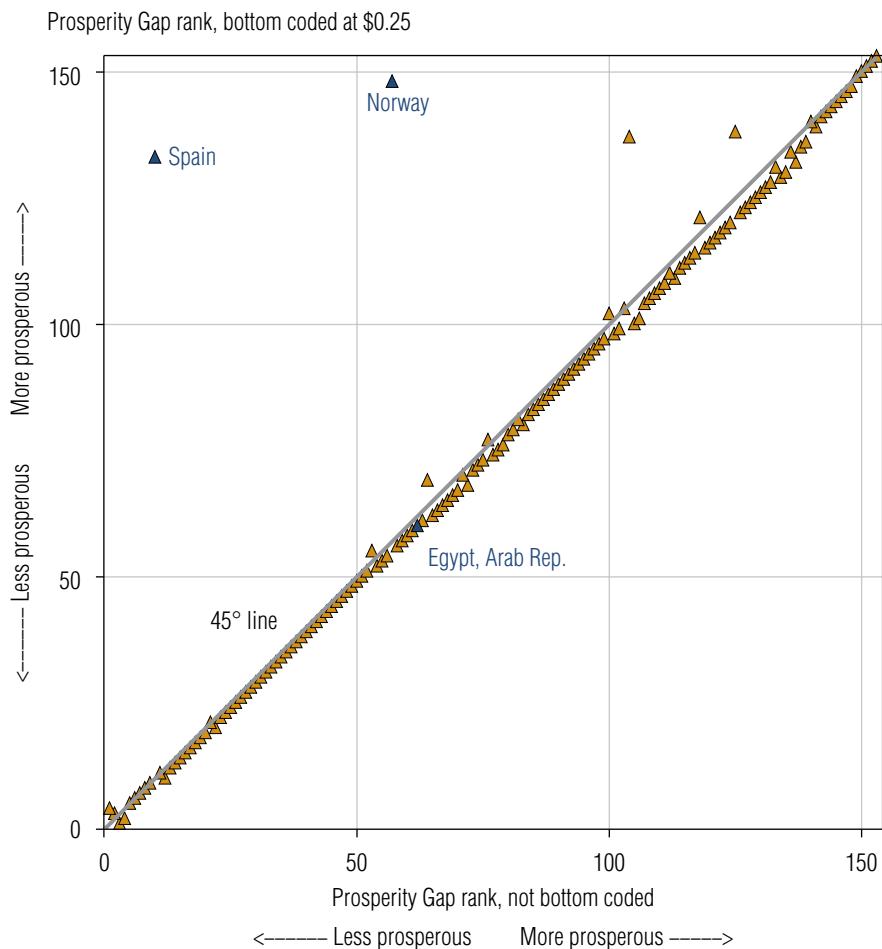
All indicators in the Poverty and Inequality Platform were previously reported by truncating income or consumption distributions at zero (in other words, observations with a negative value were dropped). In addition, ad hoc adjustments were made for the indicators that could not accept zero values. For example, in the case of the mean log deviation, zero values were replaced with a small positive value, while zero values were dropped in the case of the Watts index.

With the September 2024 edition of the Poverty and Inequality Platform data, which is used in this report, all poverty, prosperity, and inequality indicators are calculated using income and consumption distributions that (a) do not include negative incomes (that is, they are dropped as before) and (b) replace all other observations below \$0.25 per person per day with \$0.25 per person per day. For details on the need to bottom code, threshold used, methods explored, and the effect on indicators, see Yonzan et al. (forthcoming).

Figure 2C.1 shows the impact of bottom coding on the Prosperity Gap. It shows the rank-rank correlation of the Prosperity Gap between bottom coding a distribution at \$0.25/day and not bottom coding using the most recent survey from each country. It ranks the countries from the least prosperous (rank of 1) to the most prosperous. Most observations are close to the 45-degree line, suggesting limited reranking. Not bottom coding would mean, for example using the latest surveys, that Norway would be wrongly classified as less prosperous than Egypt (a country with an average household income more than eight times lower) because of a few very small income observations in Norway. Spain is in a similar situation. Bottom coding addresses these data issues at the country level, while it has a minimum impact on aggregate results (Yonzan et al., forthcoming).

FIGURE 2C.1

The rank-rank correlation of the Prosperity Gap between bottom coding at \$0.25/day and not bottom coding



Source: Yonzan et al., forthcoming.

Note: Each observation is from the latest (post-2000) country survey ranked from the least prosperous (rank of 1) to the most prosperous. On the vertical axis, countries are ranked after bottom coding the distribution at \$0.25/day in 2017 purchasing power parity dollars. Observations with zero values are not included in either sample since they are dropped in the case with no bottom code.

Annex 2D. Measuring the number of economies with high inequality

The new World Bank indicator of the *number of economies with high inequality* is defined as those with a Gini index greater than 40 based on the most recent household survey for an economy. The indicator is reported for all economies with harmonized consumption or income

aggregates in the World Bank's Poverty and Inequality Platform. The indicator tracks the number of *economies*, and therefore all *economies*, regardless of population, count the same.

The indicator is based on either income or consumption inequality, depending on the welfare measure adopted by each economy. Most high-income countries and countries in Latin America and the Caribbean use income, while the rest of the world uses consumption (table 2D.1). In the latest year, only 6 percent of low-income and lower-middle-income countries have income-based surveys. This poses a challenge because income inequality is generally higher than consumption inequality for the same sample of households (Deininger and Squire 1996).²⁶

TABLE 2D.1**Statistics of Gini indexes in the Poverty and Inequality Platform, post-2000**

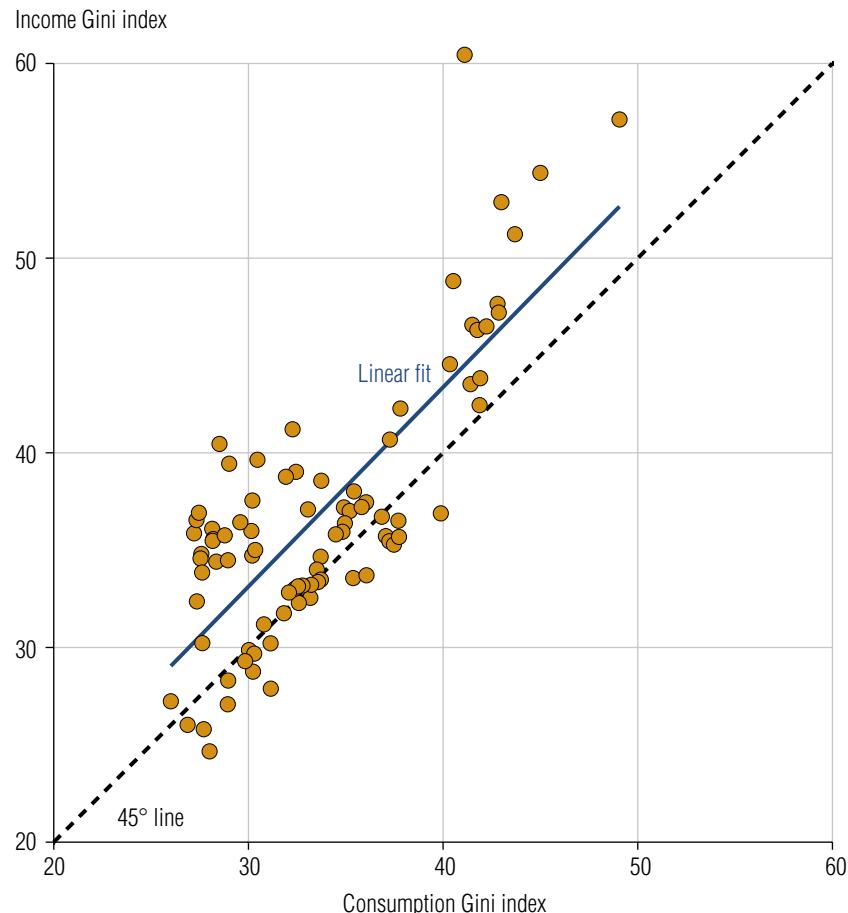
	Economy count	Survey count	Share of LICs and LMICs	Average Gini
Income-based surveys	66	1,057	0.06	37.3
Consumption-based surveys	100	570	0.71	36.2
Total	166	1,627	0.45	36.9

Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: LICs = lower-income countries; LMICs = lower-middle-income countries.

Among countries that have both income- and consumption-based surveys for the same year, the average consumption-based Gini index is 4.5 points, or 10 percent, lower than the corresponding income-based index (Haddad et al. 2024). Figure 2D.1 plots income and consumption Gini indexes for these countries. Most observations are above the 45-degree line, which suggests that for this group of countries, income-based Gini indexes are, on average, higher than consumption-based Gini indexes. Two main factors explain this difference. At the lower end, consumption is generally bounded by a subsistence level of consumption, while income can take zero and negative values in a given year. At the higher end, not all income is spent on consumption, but some is saved or invested.

The difference in observed Gini indexes between countries that use consumption and those that use income (36.2 versus 37.3, that is, a difference of 1.1 Gini points [see table 2D.1]) is considerably smaller than the observed difference for the countries that report both measures (4.5 Gini points) (Haddad et al. [2024]). This is explained by the fact that the sample of countries is fundamentally different when countries that use consumption and countries that use income are compared. Countries that use consumption—typically low- and lower-middle-income countries—are, on average, more unequal than countries that use income, many of which are high-income countries. Because these differences are challenging to account for, where possible, the analysis in chapter 2 differentiates between income- and consumption-based countries. Chapter 4 provides a broader discussion of this issue. The systematic difference also raises the question whether income and consumption inequalities should be compared against the same threshold, which is discussed further below.

FIGURE 2D.1**Relationship between income and consumption Ginis for countries with both**

Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: Estimated relationship between income and consumption Gini indexes for countries that have surveys reporting both welfare aggregates in a given year.

Why the Gini index?

High inequality is tracked with the Gini index, which is a summary measure of inequality that is bounded between zero (a society where everyone has the same income and hence perfect equality) and 100 (where one person has all the income and hence maximum inequality).

While no single statistic can fully convey the full picture of inequality, the Gini index has many desirable properties, is likely the most familiar measure of inequality, is known to the widest audience, and has enjoyed a long history of use (Haddad et al. 2024). The fact that it is bounded from 0 to 100 makes it easy to interpret. It considers everyone's income as opposed to only segments of the distribution, like income shares or ratios. It satisfies the major axioms required of a distributional measure, including the Pigou-Dalton transfer axiom.²⁷

Nonetheless, it is important to acknowledge its shortcomings. First, every index has an implicit welfare judgment built in, and the Gini index is no exception. The Gini depends on ranks rather than on income levels, which makes it relatively insensitive to very large income gaps at the top of the distribution. Instead, the Gini index is more sensitive to changes in the middle of the income distribution (Atkinson 1970; Allison 1978; Jenkins 2009). Hence, transfers affecting the middle class change the measure more than equivalent transfers at the bottom or the top. Second, the index cannot be exactly additively decomposed into contributions of between-group inequality (for instance, inequality coming from the average differences between groups, such as by geographical region) and within-group inequality (Bourguignon 1979; Shorrocks 1980). Third, while the extremes are easy to interpret, a one-point change in the index is not readily interpretable.

At the same time, two things are worth noting. First, most inequality measures are highly correlated with the Gini index. The Spearman and Pearson correlations between the Gini index and four commonly used inequality measures—mean log deviation, Palma ratio, income ratio of the 90th to the 10th income percentiles (or p90/p10), and Theil (T) index—range from 0.908 to 0.999 (Haddad et al. 2024). More substantially, the high correlation across indexes means that the selection of the index does not make much practical difference in the classification of economies into low, moderate, or high inequality (Haddad et al. 2024).²⁸ The global patterns, therefore, are indistinguishable from each other.

Why the threshold of 40 for the Gini index?

There are no universally recognized standards for defining high levels of inequality globally. There is no consensus on a specific threshold at which inequality becomes “high” or detrimental to developmental or growth outcomes. Cross-country data fail to identify any distinct tipping points along the range of Gini indexes.

In the absence of predefined standards, the Gini index threshold of 40 was chosen on the basis of the following considerations. First, several United Nations reports define countries with Gini indexes above 40 as highly unequal. For instance, the United Nations Statistics Division classifies countries as having low inequality if their Gini index is less than 25, moderately low if it is between 25 and 30, moderately high if it is between 30 and 40, highly unequal if it is between 40 and 45, and very high if it is above 45 (United Nations 2022).²⁹ Further, a UNICEF report defines a Gini index above 40 as high or severe inequality (UNICEF 2018), and finally, a World Bank report on inequality in educational outcomes considered Gini indexes for earnings above 40 to be unequal and above 50 highly unequal (Porta et al. 2011). Second, a Gini threshold of 40 separates approximately the top third of all Gini indexes from surveys conducted between 2000 and 2022 (67th percentile equals 41.1), as well as the top third of the separate consumption and income distributions (67th percentile equals 40.8 and 41.6, respectively) (Haddad et al. 2024).³⁰ Finally, a poll conducted by Haddad et al. (2024) of World Bank experts working on poverty and inequality in various countries found that the median expert viewed inequality over 40 as high when using consumption and considered 45 high when using income.

While there are some differences when thresholds are defined for income-only and consumption-only surveys, this gap has narrowed over time. In the 1990s, the 67th percentile of consumption (income) Ginis corresponded to values of 44.1 (49.1). In comparison, using data from the latest available surveys of all economies, the 67th percentile corresponds to 39.3 (40.3).³¹ Trends in the number of economies with high inequality reported in this chapter are robust to the range of thresholds reported here and those shown in figure 2.10 in the main text. With all these results in mind, the same threshold was chosen across income and consumption surveys, which is simpler to communicate and follows the practice of United Nations agencies.

Annex 2E. Prosperity Gap estimates by region

TABLE 2E.1
Prosperity Gap estimates, by region

Region	1990	1995	2000	2005	2010	2015	2019	2020	2021	2022	2023	2024
East Asia and Pacific	16.5	13.0	11.5	8.06	6.26	4.06	3.25	3.28	3.04	3.00	2.92	2.83
Europe and Central Asia	3.83	5.18	5.54	3.83	2.63	2.36	2.06	2.01	1.81	1.74	1.70	1.67
Latin America and the Caribbean	8.01	7.52	7.64	6.15	4.40	3.60	3.57	3.61	3.67	3.36	3.28	3.25
Middle East and North Africa	5.40	5.25	4.59	4.35	4.00	4.16	4.38	4.62	4.67	4.61	4.65	4.69
South Asia	12.7	11.7	--	10.4	9.19	8.05	6.88	7.22	6.97	6.64	6.43	6.21
Sub-Saharan Africa	17.9	19.2	18.5	15.8	13.3	12.4	12.3	12.7	12.6	12.4	12.3	12.2
Eastern and Southern Africa	17.0	18.7	19.0	17.0	14.4	13.5	--	14.7	14.5	14.3	14.2	14.1
Western and Central Africa	19.2	19.9	--	14.2	11.8	10.8	9.54	9.74	9.66	9.56	9.51	9.42
Rest of the world	1.15	1.15	1.09	1.10	1.07	1.11	0.98	0.83	0.80	1.01	0.98	0.98
World	10.9	9.96	9.43	7.81	6.55	5.58	5.12	5.28	5.16	5.07	5.00	4.93

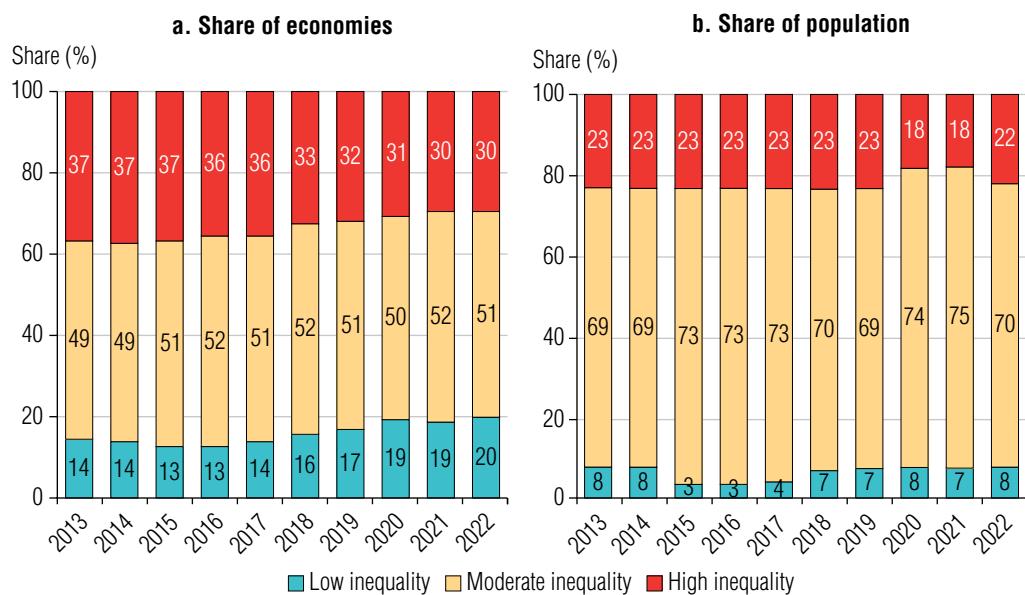
Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: The estimates for Middle East and North Africa and Eastern and Southern Africa are projected starting in 2019. Western and Central Africa and Sub-Saharan Africa are projected starting in 2020. All other regions are projected in 2023 and 2024. For further details on projection, see annex 1A of chapter 1.
Gray shading = projected estimate.

Annex 2F. Further results on within-country inequality

FIGURE 2F.1

Whereas the share of economies with high inequality has declined, the share of population living in economies with high inequality has barely changed in the past decade



Sources: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org/>; Haddad et al. 2024.

Note: High-inequality economies are those with a Gini index above 40, moderate-inequality economies are those with a Gini index between 30 and 40, and low-inequality economies are those with a Gini index less than 30. When no survey is available in a given year, data from the most recent survey year are used. The earliest survey is backcasted when the first survey is only available after 2000 to avoid missing values. The graph covers 166 economies with at least one household survey in the Poverty and Inequality Platform. The label values may not add to 100 percent due to rounding. See also figure 2.9.

TABLE 2F.1**Gini index in latest available survey, by economy**

Economy and group	Region	Survey year	Welfare type	Gini index
High inequality				
Angola	Sub-Saharan Africa	2018.17	Consumption	51.3
Argentina	Latin America and the Caribbean	2022	Income	40.7
Bolivia	Latin America and the Caribbean	2021	Income	40.9
Botswana	Sub-Saharan Africa	2015.85	Consumption	53.3
Brazil	Latin America and the Caribbean	2022	Income	52.0
Cabo Verde	Sub-Saharan Africa	2015	Consumption	42.4
Cameroon	Sub-Saharan Africa	2021.67	Consumption	42.2
Central African Republic	Sub-Saharan Africa	2021	Consumption	43.0
Chile	Latin America and the Caribbean	2022	Income	43.0
Colombia	Latin America and the Caribbean	2022	income	54.8
Comoros	Sub-Saharan Africa	2014	Consumption	45.3
Congo, Dem. Rep.	Sub-Saharan Africa	2020	Consumption	44.7
Congo, Rep.	Sub-Saharan Africa	2011.67	Consumption	48.9
Costa Rica	Latin America and the Caribbean	2023	Income	46.7
Djibouti	Middle East and North Africa	2017	Consumption	41.6
Ecuador	Latin America and the Caribbean	2023	Income	44.6
Eswatini	Sub-Saharan Africa	2016.17	Consumption	54.6
Ghana	Sub-Saharan Africa	2016.75	Consumption	43.5
Grenada	Latin America and the Caribbean	2018.36	Consumption	43.8
Guatemala	Latin America and the Caribbean	2014	Income	48.3
Haiti	Latin America and the Caribbean	2012	Consumption	41.1
Honduras	Latin America and the Caribbean	2019	Income	48.2
Jamaica	Latin America and the Caribbean	2021	Consumption	40.2
Lesotho	Sub-Saharan Africa	2017.14	Consumption	44.9
Madagascar	Sub-Saharan Africa	2012.73	Consumption	42.6
Malaysia	East Asia and Pacific	2021.46	Income	40.7
Mexico	Latin America and the Caribbean	2022	Income	43.5
Micronesia, Fed. Sts.	East Asia and Pacific	2013	Consumption	40.1
Mozambique	Sub-Saharan Africa	2019.92	Consumption	50.3
Namibia	Sub-Saharan Africa	2015.27	Consumption	59.1

(continued)

TABLE 2F.1**Gini index in latest available survey, by economy *(continued)***

Economy and group	Region	Survey year	Welfare type	Gini index
Nicaragua	Latin America and the Caribbean	2014	Income	46.2
Panama	Latin America and the Caribbean	2023	Income	48.9
Papua New Guinea	East Asia and Pacific	2009.67	Consumption	41.9
Paraguay	Latin America and the Caribbean	2022	Income	45.1
Peru	Latin America and the Caribbean	2022	Income	40.3
Philippines	East Asia and Pacific	2021	Income	40.7
Rwanda	Sub-Saharan Africa	2016.77	Consumption	43.7
São Tomé and Príncipe	Sub-Saharan Africa	2017	Consumption	40.7
South Africa	Sub-Saharan Africa	2014.83	Consumption	63.0
South Sudan	Sub-Saharan Africa	2016.5	Consumption	44.1
St. Lucia	Latin America and the Caribbean	2015.78	Consumption	43.7
Tanzania	Sub-Saharan Africa	2017.92	Consumption	40.5
Türkiye	Europe and Central Asia	2021	Income	44.4
Uganda	Sub-Saharan Africa	2019.64	Consumption	42.7
United States	Rest of the world	2022	Income	41.3
Uruguay	Latin America and the Caribbean	2022	Income	40.6
Venezuela, RB	Latin America and the Caribbean	2006	Income	44.7
Zambia	Sub-Saharan Africa	2022	Consumption	51.5
Zimbabwe	Sub-Saharan Africa	2019	Consumption	50.3
Moderate inequality				
Australia	Rest of the world	2018	Income	34.3
Austria	Rest of the world	2021	Income	30.7
Bangladesh	South Asia	2022	Consumption	33.4
Benin	Sub-Saharan Africa	2021.75	Consumption	34.4
Bosnia and Herzegovina	Europe and Central Asia	2011	Consumption	33.0
Bulgaria	Europe and Central Asia	2021	Income	39.0
Burkina Faso	Sub-Saharan Africa	2021.67	Consumption	37.4
Burundi	Sub-Saharan Africa	2020.15	Consumption	37.5
Canada	Rest of the world	2019	Income	31.7
Chad	Sub-Saharan Africa	2022	Consumption	37.4
China	East Asia and Pacific	2021	Consumption	35.7
Côte d'Ivoire	Sub-Saharan Africa	2021.75	Consumption	35.3

(continued)

TABLE 2F.1**Gini index in latest available survey, by economy (continued)**

Economy and group	Region	Survey year	Welfare type	Gini index
Cyprus	Rest of the world	2021	Income	31.3
Dominican Republic	Latin America and the Caribbean	2022	Income	37.0
Egypt, Arab Rep.	Middle East and North Africa	2019.43	Consumption	31.9
El Salvador	Latin America and the Caribbean	2022	Income	38.8
Estonia	Europe and Central Asia	2021	Income	31.8
Ethiopia	Sub-Saharan Africa	2015.5	Consumption	35.0
Fiji	East Asia and Pacific	2019.15	Consumption	30.7
France	Rest of the world	2021	Income	31.5
Gabon	Sub-Saharan Africa	2017	Consumption	38.0
Gambia, The	Sub-Saharan Africa	2020.08	Consumption	38.8
Georgia	Europe and Central Asia	2022	Consumption	33.5
Germany	Rest of the world	2020	Income	32.4
Greece	Rest of the world	2021	Income	32.9
Guinea-Bissau	Sub-Saharan Africa	2021.75	Consumption	33.4
India	South Asia	2021.25	Consumption	32.8
Indonesia	East Asia and Pacific	2023	Consumption	36.1
Iran, Islamic Rep.	Middle East and North Africa	2022.23	Consumption	34.8
Ireland	Rest of the world	2021	Income	30.1
Israel	Rest of the world	2021	Income	37.9
Italy	Rest of the world	2021	Income	34.8
Japan	Rest of the world	2013	Income	32.9
Jordan	Middle East and North Africa	2010.24	Consumption	33.7
Kenya	Sub-Saharan Africa	2021	Consumption	38.7
Korea, Rep.	Rest of the world	2021	Income	32.9
Lao PDR	East Asia and Pacific	2018.42	Consumption	38.8
Latvia	Europe and Central Asia	2021	Income	34.3
Lebanon	Middle East and North Africa	2011.77	Consumption	31.8
Liberia	Sub-Saharan Africa	2016	Consumption	35.3
Lithuania	Europe and Central Asia	2021	Income	36.7
Luxembourg	Rest of the world	2021	Income	32.7
Malawi	Sub-Saharan Africa	2019.31	Consumption	38.5
Mali	Sub-Saharan Africa	2021.57	Consumption	35.7

(continued)

TABLE 2F.1**Gini index in latest available survey, by economy *(continued)***

Economy and group	Region	Survey year	Welfare type	Gini index
Malta	Rest of the world	2020	Income	31.4
Marshall Islands	East Asia and Pacific	2019.5	Consumption	35.5
Mauritania	Sub-Saharan Africa	2019.6	Consumption	32.0
Mauritius	Sub-Saharan Africa	2017	Consumption	36.8
Mongolia	East Asia and Pacific	2022	Consumption	31.4
Montenegro	Europe and Central Asia	2021	Income	34.3
Morocco	Middle East and North Africa	2013.5	Consumption	39.5
Myanmar	East Asia and Pacific	2017	Consumption	30.7
Nauru	East Asia and Pacific	2012.69	Consumption	32.4
Nepal	South Asia	2022.5	Consumption	30.0
Niger	Sub-Saharan Africa	2021.5	Consumption	32.9
Nigeria	Sub-Saharan Africa	2018.75	Consumption	35.1
North Macedonia	Europe and Central Asia	2019	Income	33.5
Portugal	Rest of the world	2021	Income	34.6
Qatar	Rest of the world	2017.5	Income	35.1
Romania	Europe and Central Asia	2021	Income	33.9
Russian Federation	Europe and Central Asia	2021	Income	35.1
Samoa	East Asia and Pacific	2013.25	Consumption	38.7
Senegal	Sub-Saharan Africa	2021.71	Consumption	36.2
Serbia	Europe and Central Asia	2021	Income	33.1
Seychelles	Sub-Saharan Africa	2018.08	Income	32.1
Sierra Leone	Sub-Saharan Africa	2018	Consumption	35.7
Solomon Islands	East Asia and Pacific	2012.79	Consumption	37.1
Spain	Rest of the world	2021	Income	33.9
Sri Lanka	South Asia	2019	Consumption	37.7
Sudan	Sub-Saharan Africa	2014	Consumption	34.2
Suriname	Latin America and the Caribbean	2022	Consumption	39.2
Switzerland	Rest of the world	2020	Income	33.7
Taiwan, China	Rest of the world	2021	Income	31.6
Tajikistan	Europe and Central Asia	2015	Consumption	34.0
Thailand	East Asia and Pacific	2021	Consumption	34.9

(continued)

TABLE 2F.1**Gini index in latest available survey, by economy (continued)**

Economy and group	Region	Survey year	Welfare type	Gini index
Togo	Sub-Saharan Africa	2021.63	Consumption	37.9
Tunisia	Middle East and North Africa	2021.23	Consumption	33.7
Tuvalu	East Asia and Pacific	2010	Consumption	39.1
United Kingdom	Rest of the world	2021	Income	32.4
Uzbekistan	Europe and Central Asia	2022	Consumption	31.2
Vanuatu	East Asia and Pacific	2019.21	Consumption	32.3
Viet Nam	East Asia and Pacific	2022	Consumption	36.1
West Bank and Gaza	Middle East and North Africa	2016.75	Consumption	33.7
Yemen, Rep.	Middle East and North Africa	2014	Consumption	36.7
Low inequality				
Albania	Europe and Central Asia	2020	Consumption	29.4
Algeria	Middle East and North Africa	2011.17	Consumption	27.6
Armenia	Europe and Central Asia	2022	Consumption	27.9
Azerbaijan	Europe and Central Asia	2005	Consumption	26.6
Belarus	Europe and Central Asia	2020	Consumption	24.4
Belgium	Rest of the world	2021	Income	26.6
Bhutan	South Asia	2022	Consumption	28.5
Croatia	Europe and Central Asia	2021	Income	28.9
Czechia	Europe and Central Asia	2021	Income	26.2
Denmark	Rest of the world	2021	Income	28.3
Finland	Rest of the world	2021	Income	27.7
Guinea	Sub-Saharan Africa	2018.5	Consumption	29.6
Hungary	Europe and Central Asia	2021	Income	29.2
Iceland	Rest of the world	2017	Income	26.1
Iraq	Middle East and North Africa	2012	Consumption	29.5
Kazakhstan	Europe and Central Asia	2021	Consumption	29.2
Kiribati	East Asia and Pacific	2019.27	Consumption	27.8
Kosovo	Europe and Central Asia	2017	Consumption	29.0
Kyrgyz Republic	Europe and Central Asia	2022	Consumption	26.4
Maldives	South Asia	2019.6	Consumption	29.3
Moldova	Europe and Central Asia	2021	Consumption	25.7

(continued)

TABLE 2F.1**Gini index in latest available survey, by economy (continued)**

Economy and group	Region	Survey year	Welfare type	Gini index
Netherlands	Rest of the world	2021	Income	25.7
Norway	Rest of the world	2019	Income	27.7
Pakistan	South Asia	2018.5	Consumption	29.6
Poland	Europe and Central Asia	2021	Income	28.5
Slovak Republic	Europe and Central Asia	2021	Income	24.1
Slovenia	Europe and Central Asia	2021	Income	24.3
Sweden	Rest of the world	2021	Income	29.8
Syrian Arab Republic	Middle East and North Africa	2022	Consumption	26.6
Timor-Leste	East Asia and Pacific	2014	Consumption	28.7
Tonga	East Asia and Pacific	2021	Consumption	27.1
Ukraine	Europe and Central Asia	2020	Consumption	25.6
United Arab Emirates	Rest of the world	2018	Income	26.4

Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Notes: Data include latest consumption or income surveys in the Poverty and Inequality Platform. High-inequality economies are those with a Gini index above 40, medium-inequality economies are those with a Gini index between 30 and 40, and low-inequality economies are those with a Gini index below 30. Economies are sorted by inequality group (high, moderate, or low) and alphabetically within each group. Decimal years indicate that the survey was conducted over two calendar years. The number before the decimal indicates the first year of the survey and the numbers after the decimal indicate the proportion of the survey occurring in the second year.

Notes

1. For a description of the welfare index that the Global Prosperity Gap is based on, see Kraay et al. (2023).
2. Inequalities can reflect fair differences in effort and talent, which in turn provide the incentives that generate both higher social and economic mobility. At the same time, high inequality may be symptomatic of factors that are detrimental to growth or could lead to political and social instability that weakens growth.
3. A study from the United States has found that inequality of opportunity has a negative effect on economic growth (Marrero and Rodríguez 2013). Using global data, Ferreira et al. (2018), however, did not find robust evidence of inequality of opportunity worsening growth outcomes. Combining the concepts of inequality in incomes and opportunity, Aiyar and Ebeke (2020) provide evidence that income inequality exerts a negative effect on growth, when inequality of opportunity is high.

4. The typical person refers to the individual with the median income or consumption. The reported estimates are projections for 2024 as reported in the Poverty and Inequality Platform. Bulgaria entered high-income status according to the fiscal year 2025 list (see Metreau, Young, and Eapen [2024]). Since the latest reference year with household survey data is aligned with the fiscal year 2024 classifications, this report uses the fiscal year 2024 list to classify countries.
5. The standard is also close to the median poverty line in high-income countries (Jolliffe et al. 2022). Furthermore, the choice of \$25 as the threshold affects the *level* of the Prosperity Gap, but it is completely irrelevant to the ordering of countries and changes over time which are what the measure is primarily used for. Another threshold would imply rescaling the Prosperity Gap—for example, a threshold of \$100 ($4 \times \25) would mean that the Global Prosperity Gap in 2024 is approximately 20 (4×5) as opposed to around 5.
6. The importance of individuals decreases exponentially with increases in income. For example, a person with \$30 gets a weight of 0.83, while a person with \$20 gets a weight of 1.25, or 1.5 times the weight of the person with \$30, although both are \$5 from the threshold. As a practical matter, the people living above \$25 contributed 2 percent to the Global Prosperity Gap in 2024, while they account for 20 percent of the global population. The Prosperity Gap can be written as the product of (\$25/mean income) and inequality. This formulation already shows that the index decreases (improves) as mean income increases or inequality decreases. For further details, see annex 2B.
7. Sensitivity to low incomes is a desirable feature of any distribution-sensitive measure. However, some welfare measures, including the Prosperity Gap, cannot incorporate negative or zero incomes. The underlying distributions used to calculate all welfare measures—poverty, prosperity, and inequality—in the Poverty and Inequality Platform are bottom coded at \$0.25 per person per day. See annex 2C for details.
8. To report a global estimate, 50 percent of the global population needs to be covered by a recent survey and, in addition, 50 percent of the population of low- and lower-middle-income countries needs to be covered as well. Globally, this criterion is satisfied up to 2022. Estimates beyond 2022 are projected for the global estimate and all regions (for further details, see annex 1A of chapter 1). In addition, survey data for the Middle East and North Africa and Sub-Saharan Africa remain limited (see box 1.2 of chapter 1). As a result, the estimates presented starting in 2019 for the Middle East and North Africa and starting in 2020 for Sub-Saharan Africa are projected on the basis of less than half of the regional population covered by a recent survey.
9. Milanovic (2005) has proposed three ways of capturing global inequality. Concept 1 considers only the differences in mean incomes across countries, or just the inequality *between* countries. Concept 2 adjusts the former by allowing for population differences across countries. Concepts 1 and 2 do not account for inequality within countries. Concept 3, in contrast, considers the interpersonal incomes of everyone in the world and thus incorporates inequality both between and within countries. The Global Prosperity Gap captures concept 3 inequality. Note, however, that the inequality indicator related to the Prosperity Gap is multiplicatively decomposable into inequality between and within countries (see annex 2B and Kraay et al. [2023]).
10. This is similar to the idea of the average poverty exit time outlined by Morduch (1998).
11. The high correlation in rankings using various inequality indexes means that the selection of the index does not make much practical difference in the classification of economies as having low, moderate, or high inequality. The global patterns, therefore, are indistinguishable from each other. When engaging in country-level dialogue, a broader menu of indexes can be used to inform policy discussions (see annex 2D for more details on this).
12. For instance, the Philippines had a consumption Gini index of 37.3 and an income Gini index of 40.7 in 2021. The survey preferred by the World Bank country expert is used when both income and consumption surveys are available.

13. A Gini index of less than 30 is defined as low inequality, following previous United Nations reports (see annex 2D for details). While any threshold is somewhat arbitrary, it is useful to study progress against high inequality, as well as progress toward low inequality.
14. The IDA, a part of the World Bank Group, provides grants and concessional loans to the world's poorest countries. As of 2024, there are 75 countries (of which 68 are accounted for in the Gini data set) eligible for support from IDA, with 75 percent of total commitments concentrated in Sub-Saharan Africa. For more information, see <https://ida.worldbank.org/en/ida-financing>.
15. Not all economies have a survey in every year. To compare the same set of economies throughout, the latest Gini index is used. The finding of declining high inequality could be confounded by the fact that the number of economies with updated data has risen over time. One way to check the trends in declining within-country inequality while accounting for the differences in reporting standards across economies is to compute average inequality estimates for each economy at a 10-year interval. This ensures that the compositions of economies during 2000–09 and 2010–19 remain largely similar (142 of 166 economies had at least one survey in both the 2000–09 and 2010–19 periods). Economies are then assigned to a high-inequality status if their decadal average Gini exceeds 40. This analysis confirms the drop in the number of economies with high inequality: falling from 61 during the first decade of 2000 to 48 in the subsequent one.
16. Survey comparability depends on various characteristics such as the sampling process, questionnaire, methodological changes in the construction of welfare aggregates, consistent price deflation over time and space, and so on. The Poverty and Inequality Platform contains metadata on the comparability of poverty estimates within countries over time. For further detail on the comparability assessment, see Castaneda Aguilar et al. (2019) and the *Poverty and Inequality Platform Methodological Handbook* (<https://datanalytics.worldbank.org/PIP-Methodology/>).
17. Based on Alvaredo and Gasparini (2015), World Bank (2016) used a change in 1 Gini point as a rough check on statistical significance due to lack of confidence intervals.
18. Mahler, Yonzan, and Lakner (2022) attribute changes in inequality among richer countries in 2020 to the extensive social protection measures that were put in place during the pandemic.
19. See the Commitment to Equity (CEQ) Institute (<https://commitmenttoequity.org/datacenter/>) for data. Data for the 96 economies include 8 low-income countries, 20 lower-middle-income countries, 24 upper-middle-income countries, 7 high-income countries that are not members of the Organisation for Economic Co-operation and Development (OECD), and 37 OECD high-income countries (for the 6 countries for which both CEQ and OECD data are available, OECD data are used). The OECD studies include direct taxes and transfers but not indirect taxes and subsidies or in-kind health and education spending. The disposable income-based Gini index here is the closest measure to the Gini index used in the rest of this chapter, although it is important to recognize that it comes from different sources, leading to some differences. For methodological details, see Lustig (2023). Likewise, note that the difference between the gross and disposable income distribution in most developing countries is extremely fuzzy. In general, surveys inform on “disposable” incomes. Getting back gross incomes requires identifying informality features to impute social security and health insurance contributions, which is often challenging. On the other hand, fully accounting for redistribution would require including indirect taxation and subsidies as well as in-kind public spending, which is also nontrivial.
20. In countries that use consumption data to estimate poverty and inequality, household consumption from the survey is equated with disposable income. After equating consumption to disposable income, a backward calculation is conducted by adding employee and employer nonpension contributions, such as unemployment benefits, disability, and health, and direct personal income taxes (excluding all contributions to social security) (Lustig 2022). In a next step, benefits from the nonpension contributions and government direct transfers (cash and near-cash) are subtracted (Lustig 2022). Note that disposable income is market income after income taxes and nonpension contributions are deducted and direct cash transfers and social pensions are added. In contrast, market income is wages and salaries, contributor pension payments, income from capital and private transfers before taxes and transfers. In this approach, savings are not accounted for.

21. The CEQ methodology, which goes beyond the income concepts used here, focuses on direct taxes on household income and indirect taxes on household consumption, as well as direct transfers to households, spending on health and education, and energy and food subsidies. Agriculture subsidies are occasionally included, as is employer-paid health insurance. However, active labor market policies, corporate income tax, infrastructure spending, and many tax incentives are excluded.
22. World Bank (2022) draws on the CEQ approach also to estimate inequality for these broader concepts that include indirect taxes and subsidies, as well as in-kind transfers and user fees. This report, however, discusses only disposable income, since this offers the greatest country coverage. The broader concepts are not available for the advanced economies. For details, see Lustig (2023). Note that the difference between market, or pretax, and disposable, or post-tax or transfer, income is often used to assess by how much government policies impact inequality. While this is a very useful measure, it is important to stress that this does not capture all government policies, notably the policies that impact premarket inequality and in-market inequality as described above and which are fundamental. Furthermore, even within the space of fiscal policies, disposable income does not provide the full picture (World Bank 2022): for example, indirect taxes (such as sales taxes) and indirect subsidies (for instance, subsidized prices for electricity) are not captured in disposable income. Similarly, in-kind transfers, such as government health and education, spending are not accounted for.
23. In Korea (2020), the Gini index of market income is 36.5 and the Gini index of disposable income is 31.2, which implies fiscal redistribution of 5.3 Gini points. In Germany (2019), the respective figures are 40.3 (market Gini), 29.9 (disposable Gini), and 10.4 (redistribution).
24. There are 20 income surveys in the Poverty and Inequality Platform database in which measured incomes are zero in the lowest percentiles of the income distribution and a consumption survey is available for the same year. These countries are all upper-middle-income or high-income countries in Eastern Europe. Pooling across all surveys, median consumption over those percentiles for which reported incomes are zero is \$2.64 per day, with the lowest consumption percentile being \$0.84 per day.
25. For example, the Luxembourg Income Study bottom (and top) codes the distribution of log income at three times the interquartile range below (above) the first (third) quartile when reporting inequality measures (Neugschwender 2020).
26. There are other differences in how countries measure well-being. For instance, prices are generally lower in rural than in urban areas—meaning that real income or consumption expenditure values can be sensitive to the use of appropriate spatial deflators. However, these deflators vary considerably across countries (Mancini and Vecchi 2022). Income can further be defined in various ways (market, pretax, post-tax, and pretransfer, disposable), and each has various levels of inequality. The household surveys reported in the Poverty and Inequality Platform capture mostly disposable (post-tax and transfer) income. See also chapter 4.
27. This transfer axiom means that a transfer from a richer person to a poorer person always reduces inequality. Income shares are insensitive to such transfers if they occur within the quantile group. Other properties include symmetry (if people swapped incomes, the measure remains unchanged) and scale invariance (if everyone's income increases tenfold, the measure is unchanged).
28. Only with the p90/p10 ratio are there notable rerankings of economies compared with the Gini index. Because the p90/p10 ratio discards information contained in other percentiles, it has fewer theoretically desirable properties, which in turn could explain the observed patterns.
29. The report uses the same harmonized cross-country survey data as in this report and does not distinguish between income- and consumption-based measures of welfare. If using a data set with systematically higher Gini indexes for countries, for example, the World Inequality Database, which corrects for missing incomes at the very top of the income distribution and which thus has higher Gini indexes on average, then the appropriate threshold to use for high inequality would potentially be higher than 40. See also chapter 4 for a related discussion.

30. Haddad et al. (2024) used all surveys in the Poverty and Inequality Platform starting in 2000. This report does the same. Furthermore, for years where no survey is available, following Haddad et al., this report uses the Gini index from the last available survey for the economy. For years prior to the first survey year, the Gini index from the first survey is backcasted. For instance, if the economy's first survey was conducted in 2005, all years prior to 2005 have the same Gini index as in 2005.
31. There have also been efforts to transform the consumption-based measures to income and vice versa to address any systematic differences between countries that use consumption and those that use income (see discussion above). Haddad et al. (2024) found that the 67th percentile threshold, when the available consumption surveys, as well as income surveys converted to consumption, are considered, is between 39.3 and 40.1. The same threshold when consumption surveys are converted to income and pooled with the available income surveys range between 45.3 and 45.5.

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Livable Planet

Protecting People from Extreme Weather Events

Summary

- Today, one in five people is at risk from an extreme weather event in their lifetime. This means they are likely to face severe setbacks in their livelihoods, significantly hindering poverty reduction efforts.
- Protecting people from extreme weather events requires acting on two fronts: (a) lowering vulnerability by enhancing risk management and (b) preventing the escalation of future climate hazards by accelerating transformations to reduce the emissions intensiveness of growth.
- To inform decisions, it is important to understand the trade-off between growing incomes and lowering greenhouse gas (GHG) emissions, find ways to scale up synergistic policies that can help advance on multiple fronts or reduce trade-offs, and manage transition costs of climate mitigation policies to specific groups and communities.
- Priorities should consider where countries stand on the interlinked goals.
- Poverty reduction by fostering investments in human, physical, and financial capital needs to be prioritized in low-income settings.
- Middle-income countries need to prioritize income growth that reduces vulnerability and synergies such as cutting air pollution.
- Upper-middle- and high-income countries account for four-fifths of global GHG emissions. These countries need to act fast in transitioning to low-carbon-intense economies, while managing transition costs particularly for the poor and vulnerable.
- Fostering international cooperation and closing financing gaps for sustainable development are critical to enable the transition toward more sustainable, low-carbon, and resilient economies. Achieving a world free of poverty on a livable planet is possible but requires serious and immediate efforts.

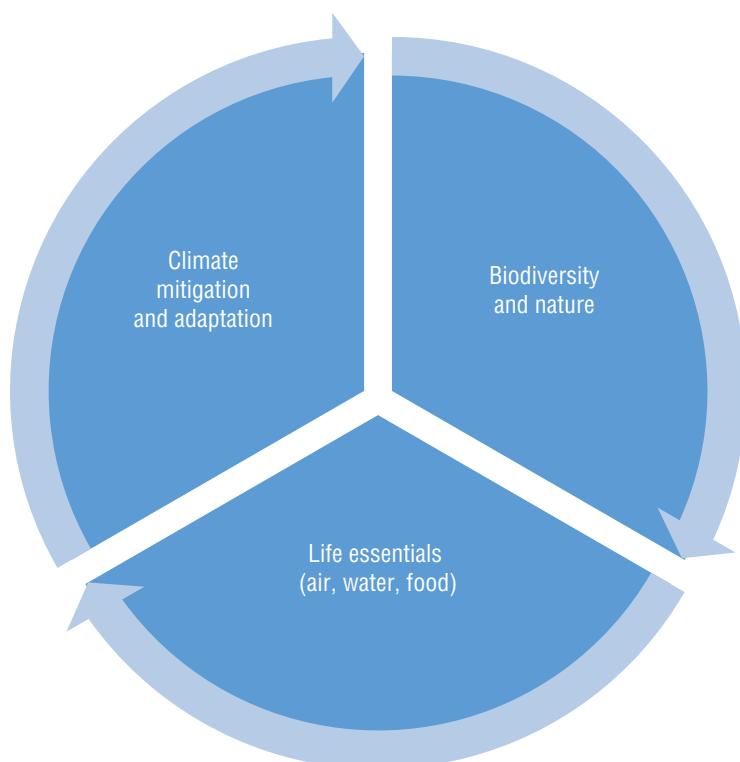
A reproducibility package is available for this book in the Reproducible Research Repository at <https://reproducibility@worldbank.org>.

The concept of a livable planet

The goals of ending extreme poverty, boosting shared prosperity, and ensuring a livable planet are closely interlinked. The World Bank's vision recognizes this and tracks the multidimensional concept of a livable planet along three dimensions: climate mitigation and adaptation, biodiversity and nature, and life essentials (figure 3.1) (World Bank, n.d.). These three areas underscore that to sustain a livable planet, action on various aspects, such as reducing the risks from climate-related hazards; preserving healthy ecosystems; and ensuring access to life essentials such as food, water, and low air pollution, is necessary.

This chapter concentrates on one aspect of the complex relationship between poverty, shared prosperity, and livable planet: the need to protect people from the worsening impacts of climate-related hazards. Acting on this front is fundamental to support the goals of ending poverty and increasing shared prosperity on a livable planet.¹

FIGURE 3.1
Livable planet dimensions



Source: Original figure for this publication (World Bank, n.d.).

Every year, extreme weather events have a negative impact on millions of households (Baquié and Fuje 2020; Hallegatte and Walsh 2021; Hill and Porter 2017; Kochhar, Knippenberg, and Leon 2023; Pape and Wollburg 2019). Hallegatte, Bangalore et al. (2016) estimate that tropical storms, floods, droughts, and earthquakes push 26 million people into poverty every year.

The poor are more likely to be adversely affected by hazardous events than the nonpoor. For example, while wealthier people can save parts of their income in formal financial institutions and diversify their portfolio, the poorest often hold only in-kind assets such as livestock or housing, which are more likely to be destroyed by natural disasters (Dercon 2004; Hallegatte and Walsh 2021).² Two-thirds of the global extreme poor also work in the agricultural sector and are more likely to rely on other forms of natural capital for income generation and food security, making them more vulnerable to extreme weather events, rising temperatures, and environmental degradation (Angelsen et al. 2014; Azzarri and Signorelli 2020; Castaneda et al. 2016; Dang, Hallegatte, and Trinh 2024; Fedele et al. 2021; Ortiz-Bobea et al. 2021). This creates a vicious cycle: vulnerability traps the poor in poverty and pushes others into poverty, while poverty exacerbates vulnerability to climate-related hazards (Hallegatte, Fay, and Barbier 2018; Triyana et al. 2024). Evidence shows that resilience is generally lower for poorer people because of several interconnected factors (Hill and Narayan 2020).

Poorer countries and people will suffer stronger negative consequences from climate-related hazards, leading to increases in poverty (Cevik and Jalles 2023; Dang, Cong Nguyen, and Trinh 2023; Diffenbaugh and Burke 2019; Gilli et al. 2023; Tol 2018). The setbacks that climate shocks can cause for poverty reduction are well-documented by many country-level assessments, with various degrees of severity (Dang, Hallegatte, and Trinh 2024; World Bank Group 2023). If global warming surpasses critical thresholds, impacts will likely be magnified beyond current projections (IPCC 2023a).

Climate-related hazards also have negative impacts on nonmonetary aspects of welfare that will undermine future incomes and poverty reduction. Higher temperatures affect people's health and lead to excess mortality rates, especially in poorer and hotter countries and older populations, diminishing productivity and welfare (Acevedo et al. 2020; Carleton et al. 2022). Heat exposure also significantly reduces education outcomes, with long-term consequences for the livelihoods of children and broader economic development (Park, Behrer, and Goodman 2021; Randell and Gray 2019). Lower agricultural output caused by warming and extreme weather events exacerbates food insecurity (Barrett 2021; Hasegawa et al. 2018). Undernourishment and undernutrition reduce educational attainment (Glewwe and Miguel 2007). Annex 3A discusses progress and challenges in food and nutrition security in recent years. The increased frequency and severity of natural disasters are also expected to be important drivers of both internal and cross-border migration (World Bank 2023i). These events can displace millions of people, often forcing them to move to safer areas within their

own countries. For example, in 2022, floods in Pakistan displaced around 8 million people (Beyer and Milan 2023).³

To effectively manage climate risks, especially for poorer populations, it is essential to understand the determining factors of these risks now and in the future. The first part of this chapter describes the elements that lead to climate risk, with a focus on extreme weather events and people's well-being, and highlights the fact that protecting people from extreme weather events requires action to reduce their vulnerability to and the likelihood of hazards. First, reducing vulnerability calls for improving risk management by investing in the capacity to prepare for shocks and the ability to cope afterward. Second, there must be a significant reduction of GHG emissions to prevent the escalation of hazards associated with global warming. Failure to act now will exacerbate development challenges in the future.

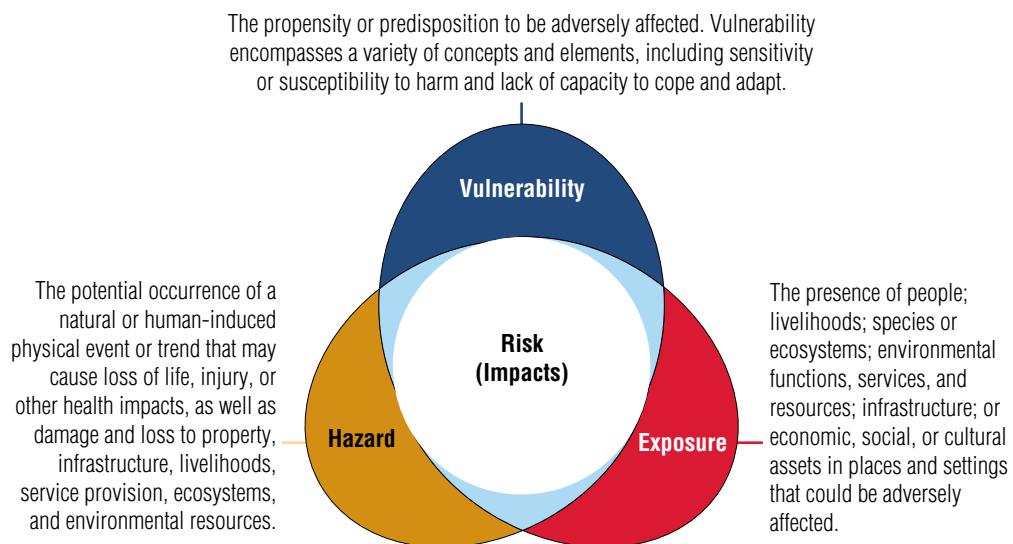
The second part of this chapter discusses how advances in development and climate action require understanding and managing of trade-offs between inclusive economic growth and lowering emissions, transition costs, and identifying synergistic actions that can be scaled up. The chapter ends with a discussion on policy priorities depending on where economies stand on the interlinked goals of eradicating poverty, boosting shared prosperity, and reducing GHG emissions.

The importance of protecting people from extreme weather events

Unpacking climate risks

Risk depends on three elements: hazard, exposure, and vulnerability (figure 3.2). Climate-related hazards are characterized by natural or human-made physical events or trends occurring with a sufficiently high possibility that can result in death, harm, or other health effects, as well as destruction and loss to property, infrastructure, livelihoods, service provision, and other resources. Exposure is defined as the presence of people and livelihoods in places and settings that could be adversely affected by one or more hazards. For example, in the case of a flood hazard, those exposed would be the people who could be adversely affected by floodwaters. Vulnerability is the propensity or predisposition to be adversely affected. Continuing the flood example, not everyone who is exposed to a flood hazard may be vulnerable, because some are sufficiently resilient to not experience any adverse effects. People who are sufficiently vulnerable and are exposed to one or more hazards are deemed at risk for climate-related hazards.

FIGURE 3.2
Risks depend on hazard, exposure, and vulnerability



Source: IPCC 2023a.

Nearly one in five people is likely to experience a severe weather shock in their lifetime that they will struggle to recover from

The World Bank has developed an indicator that tracks the number of people at high risk for climate-related hazards across the world (World Bank, n.d.). Nearly one in five people (18 percent) is at high risk from climate-related hazards globally, meaning that they are likely to experience a severe climate shock in their lifetime that they are going to struggle to recover from. This measure combines information on people's exposure to extreme weather hazards (specifically floods, heat, drought, and cyclones) with information on their vulnerability to severe impacts from these events when they occur. Vulnerability reflects the propensity to be adversely affected or unable to cope with the effects. Those at risk are people both exposed to a severe weather event and vulnerable to its impact. Box 3.1 summarizes how the indicator was constructed, and annex 3B provides more details.

About 60 percent of the world population was exposed to extreme floods, droughts, cyclones, or heat waves in 2021 (figure 3.3). In other words, more than 4 billion people in the world live in areas likely to experience an extreme weather event. Globally, 42 percent of people are exposed to heat waves, 10 percent to floods, 18 percent to droughts, and 7 percent to cyclones. These exposure numbers are expected to increase as climate change is increasing the frequency and intensity of these events (IPCC 2023a).

Exposure to these four hazards varies by region (figure 3.3). The South Asia region has the largest share of population that is exposed to shocks (88 percent), followed by East Asia and Pacific (68 percent). The global exposure to heat waves is driven by East Asia and Pacific, where

half of the population is exposed, and South Asia, where four of five people are exposed. More than 1 in 10 people in East Asia and Pacific, South Asia, and the Middle East and North Africa are exposed to floods. Exposure to droughts, among all hazards, is highest in Europe and Central Asia, Latin America and the Caribbean, North America, and Sub-Saharan Africa.

For individuals in low-income countries, droughts are the leading hazard (figure 3.3). Exposure to heat waves is greater in lower-middle- and upper-middle-income countries. Individuals in high-income countries are most often exposed to droughts. Overall, the share of population exposed to any type of hazard follows an inverted U-shaped curve with country income levels, with the highest share of exposure in lower-middle-income countries (73 percent), followed by upper-middle-income countries (55 percent). Exposure rates in low-income and high-income countries are lower (41 percent and 32 percent, respectively). Behind these aggregate numbers lie substantive within-country differences. For instance, greater exposure to floods is concentrated in urban areas, where poorer households settle in more flood-prone locations because of land scarcity and lower cost (Rentschler, Salhab, and Jafino 2022).

BOX 3.1

Measuring climate risks: The percentage of people at high risk from climate-related hazards globally

The *percentage of people at high risk from climate-related hazards globally* is defined as the number of people who are both exposed to a set of key climate-related hazards (floods, droughts, cyclones, and heat waves) and highly vulnerable (that is, they have a propensity to be significantly affected or unable to cope with the impacts) as a share of the world population. People are counted as at high risk from climate-related hazards if they are exposed to at least one hazard and are identified as highly vulnerable in at least one dimension of vulnerability (see figure B3.1.1). Annex 3B provides a full list of aspects used and more details on how the indicator is constructed.

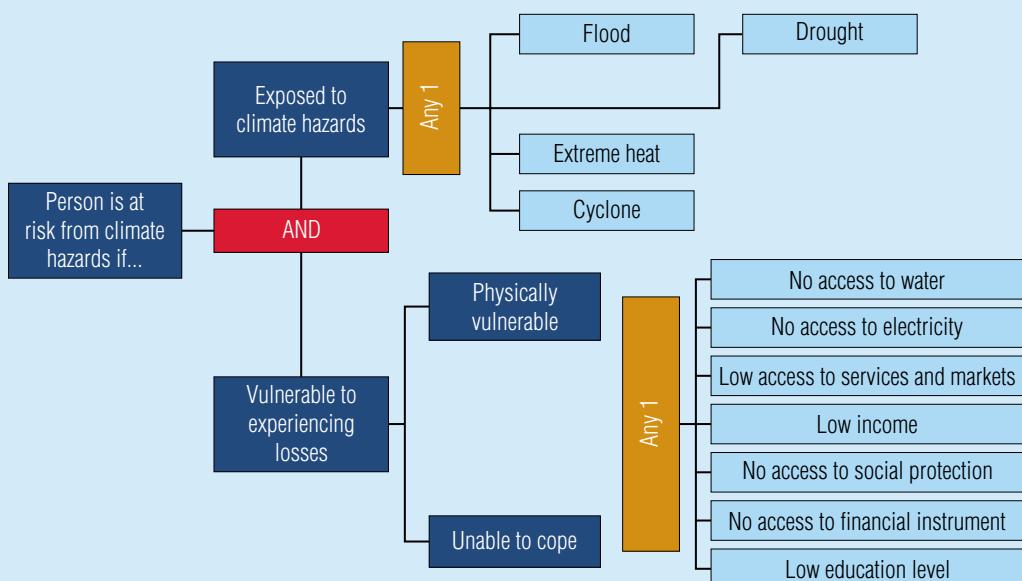
This indicator follows the traditional risk framework in which risk is the combination of hazard, exposure, and vulnerability. Hazard is the potential occurrence of an extreme event, exposure is the scope of people affected in the location of the hazard, and vulnerability is the propensity or predisposition of these people to be adversely affected. Here, vulnerability is proxied by a set of indicators measuring (a) the physical propensity to experience severe losses (proxied by the lack of mobility and access to basic infrastructure services, such as water and electricity) and (b) the inability to cope with and recover from losses (proxied by low income, not having education, not having access to financial services, and not having access to social protection).

(continued)

BOX 3.1**Measuring climate risks: The percentage of people at high risk from climate-related hazards globally (continued)**

The indicator is based on a sample of 103 economies with data on all vulnerability dimensions and spans 86 percent of the world population.^a Despite this broad coverage, note that data availability is insufficient for some climate-vulnerable economies. For instance, this is the case for most Small Island States, which are at risk from intensifying climate change (Thomas et al. 2020; Vousdoukas et al. 2023). The latest available data within three years before or after 2021 are used. The indicator currently takes into account a subset of climate hazards using historical data, a subset of vulnerability dimensions, and an aggregation methodology similar to approaches used for multidimensional poverty measures. The methodology will be revised over time as new data are collected and new methodologies are developed. Chapter 4 discusses in more detail measurement challenges with respect to the indicator and some areas in which the indicator will be updated in future rounds.

FIGURE B3.1.1
Counting people at high risk from climate-related hazards

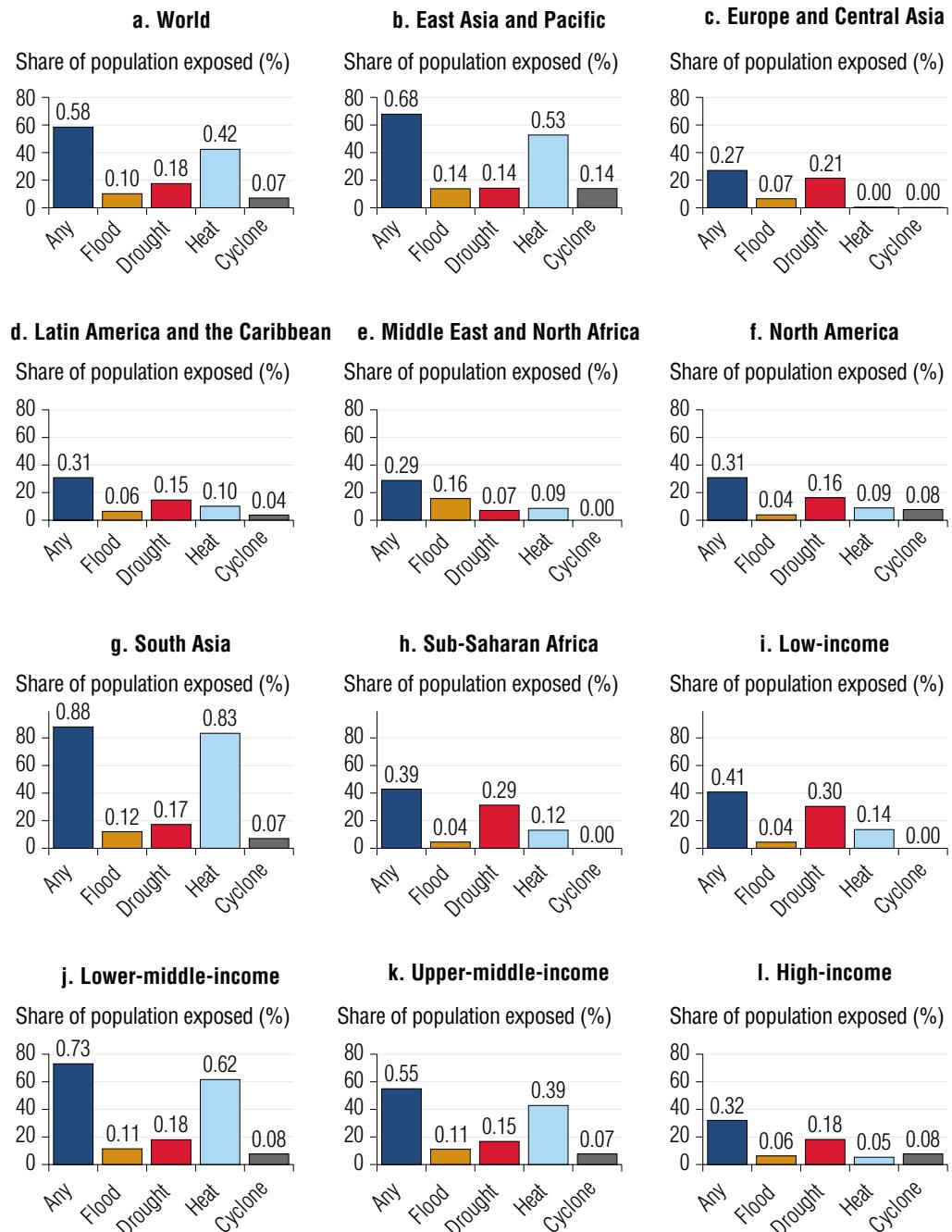


Source: World Bank Group Scorecard indicator, <https://scorecard.worldbank.org/en/scorecard/home>.

a. The coverage by region is 89 percent for East Asia and Pacific, 95 percent for Europe and Central Asia, 87 percent for Latin America and the Caribbean, 45 percent for the Middle East and North Africa, 100 percent for North America, 98 percent for South Asia, and 65 percent for Sub-Saharan Africa.

FIGURE 3.3

South Asia and lower-middle-income countries have the highest exposure rates to extreme weather hazards



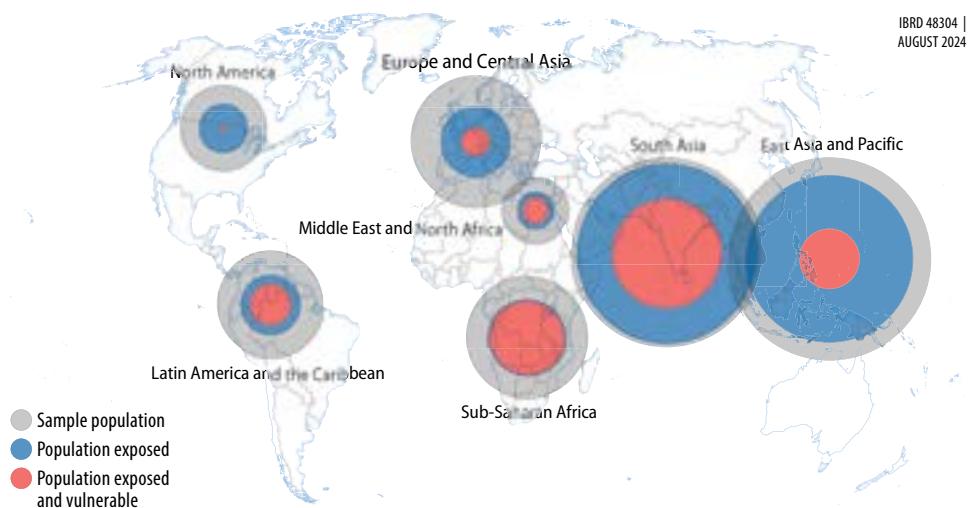
Source: World Bank Group Scorecard indicator: the percentage of people at high risk of climate-related hazards globally, <https://scorecard.worldbank.org/en/scorecard/home>.

Note: See box 3.1 and annex 3B for more details on the calculation of the share of population exposed. For low-income countries and the Middle East and North Africa region, the indicator covers less than 50 percent of the population.

Being at high risk is defined as being exposed to hazards and also being vulnerable to their impacts. Nearly one in five people (17.9 percent) is at high risk from climate-related hazards globally. Sub-Saharan Africa has the largest share of people at high risk from extreme weather events (map 3.1). In Sub-Saharan Africa, nearly the same proportion of people exposed to an extreme weather event is also at high risk (39.2 percent and 37.3 percent, respectively, of the total population). In Latin America and the Caribbean and the Middle East and North Africa, 13.2 percent and 13.9 percent of the population is at risk, respectively. In East Asia and Pacific, less than one-tenth of people are at risk. The share of people at risk is lowest in North America, where less than 1 percent of the population is at high risk, despite 31 percent of the population being exposed to any weather shock. In absolute terms, South Asia has the largest total population at high risk from extreme weather events (594 million people, or 32 percent of the sample population).

MAP 3.1

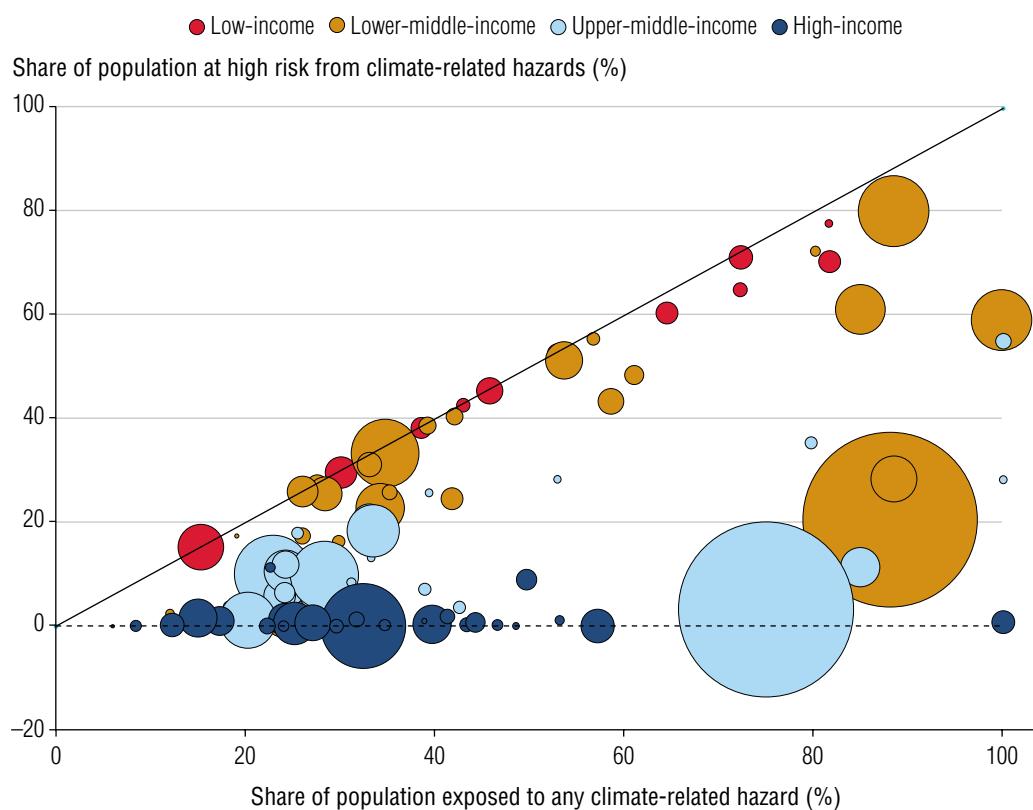
Large populations are exposed to extreme weather events in South Asia and East Asia and Pacific, and vulnerability is high in Sub-Saharan Africa



Source: World Bank Group Scorecard indicator: the percentage of people at high risk of climate-related hazards globally, <https://scorecard.worldbank.org/en/scorecard/home>.

Note: Gray circles depict the overall population in the sample in the data, blue circles show the population exposed to any type of hazard, and red circles indicate the population exposed to any type of hazard and vulnerable along at least one dimension. The placement of circles is for illustrative purposes only and reflects populations for the respective region as a whole. The blue circle for Sub-Saharan Africa is barely visible because almost everyone in Sub-Saharan Africa who is exposed is also vulnerable. For the Middle East and North Africa region, the indicator covers less than 50 percent of the population.

Figure 3.4 shows that economies can have similar levels of exposure but different levels of risk and vice versa. For economies along the 45-degree line, vulnerability is high, since everyone who is exposed is also at risk. In economies that are further away from the line, people are less vulnerable, since the share of population that is at risk can be significantly smaller than the share of the population exposed. The figure shows that low-income and some lower-middle-income countries are very close to the 45-degree line. Economies with higher incomes have much lower levels of risk at similar levels of exposure.

FIGURE 3.4**For similar levels of exposure, risks vary**

Sources: World Bank Group Scorecard indicator: the percentage of people at high risk of climate-related hazards globally, <https://scorecard.worldbank.org/en/scorecard/home>, and World Development Indicators, <https://databank.worldbank.org/source/world-development-indicators>.

Note: Bubble size indicates population. Exposure refers to the population exposed to floods, droughts, cyclones, or heat waves. Risk refers to the population exposed and vulnerable along at least one of the seven dimensions of vulnerability (see box 3.1 and annex 3B for more details on the construction of the indicators).

The comparisons between exposure and risk highlight that risks can be mitigated. While exposure in Sub-Saharan Africa is not as great as in other regions, high levels of vulnerability keep people at high risk. This is explained by people in Sub-Saharan Africa having a greater propensity or predisposition to be adversely affected. The region lags in factors that are important to management and coping, such as access to basic infrastructure services (for example, water and

electricity, income, education, and financial services). For instance, in Sub-Saharan Africa, only 50 percent of the population has access to electricity and 65 percent of the population has access to basic drinking water (see annex 3C for a discussion on the livable planet dimension of water and sanitation and chapter 1 for a discussion of multidimensional poverty), making them more vulnerable to adverse shocks. Box 3.2 depicts climate risks in countries that are part of the International Development Association.

BOX 3.2

Climate risks in IDA countries are high because of slow progress in growing incomes and limited improvements in other key dimensions of vulnerability

Countries eligible to borrow from the International Development Association (IDA) account for about three-quarters of the global extreme poor.^a While IDA countries are different in many respects, they have common challenges from low per capita incomes, widespread extreme poverty, and heightened fragility (World Bank 2024b).

Vulnerability to climate change-related and other natural disasters is a pressing concern for IDA countries (World Bank 2024b). Natural disasters are occurring with increasing frequency in these settings, causing significant damage already. Between 2011 and 2022, they caused an average loss of 1.3 percent of gross domestic product, which is considerably higher than that of other lower-income countries (World Bank 2024b). Low-income countries and Small States are particularly vulnerable to the effects of climate change, due to lack of resilience and adaptive capacity (Jafino et al. 2020; World Bank 2024a). Extreme weather events are also significantly affecting food security in IDA countries, especially those in fragile and conflict-affected situations (FAO et al. 2023; World Bank 2024b).

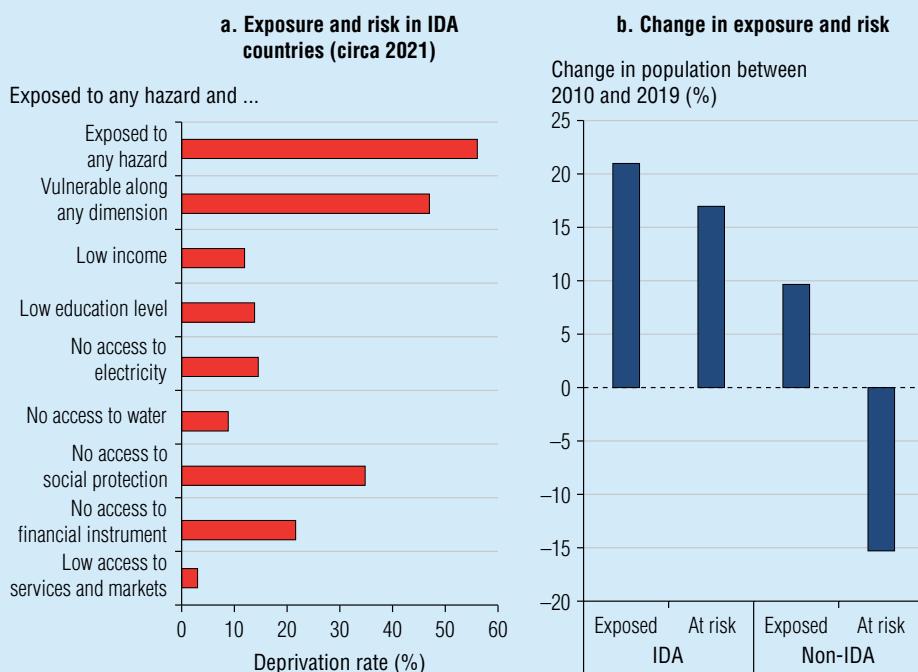
Of the population in IDA countries covered by the data on risks from extreme weather events used for this report, 56 percent are exposed to extreme weather hazards and 47 percent are at risk (figure B3.2.1, panel a). This means that 84 percent of those who are exposed are also at risk. In comparison, while a larger share of people is exposed to extreme weather events in non-IDA countries (59 percent), only 11 percent are at risk. Vulnerability is high along several dimensions in IDA countries. Lack of social protection is the most common deprivation, followed by lack of financial inclusion, access to electricity, and education.

Climate risks are increasing in IDA countries. Between 2010 and 2019, the number of people exposed to extreme weather events rose in both IDA and non-IDA countries but twice as fast in IDA countries (figure B3.2.1, panel b). For this calculation, the probability of experiencing a hazard is kept constant over time, and the changes are therefore driven by population growth and people settling in more exposed areas (Doan et al. 2023). However, despite the increase in the exposed population, non-IDA countries were able to significantly reduce the number of people at risk over this period. This is not the case for IDA countries,

(continued)

BOX 3.2**Climate risks in IDA countries are high because of slow progress in growing incomes and limited improvements in other key dimensions of vulnerability (continued)**

in which the number of people at risk rose almost one to one with the population exposed. These differences are also apparent when the share of people at risk is examined. Whereas in IDA countries it fell by 5 percent, it fell by 22 percent in non-IDA countries.^b In non-IDA countries, the population at risk dropped because of the large gains in income and financial access, developments from which people in IDA countries did not benefit as much.

FIGURE B3.2.1**Risks from extreme weather in IDA countries are high and reductions in vulnerability have been limited**

Sources: World Bank Group Scorecard indicator: the percentage of people at high risk of climate-related hazards globally, <https://scorecard.worldbank.org/en/scorecard/home>, in panel a and data from Doan et al. 2023 in panel b.

Note: IDA = International Development Association. Exposure refers to the population exposed to floods, droughts, cyclones, or heat waves. Risk refers to the population exposed and vulnerable in at least one of seven aspects (see box 3.1 and annex 3B for more details on the construction of the indicators). In panel b, the sample consists of 45 countries that have data for both 2010 and 2019. These countries represent 52 percent of the population in IDA countries and 63 percent of the population in non-IDA countries. The variables used to compute the risk indicator for 2010 and 2019 differ slightly from the risk indicator for the year 2021 used in other parts of the report.

- The IDA, a part of the World Bank, provides grants and concessional loans to the world's poorest countries. As of 2024, there are 75 countries eligible for support from IDA, with 75 percent of total commitments concentrated in Sub-Saharan Africa. For more information, see <https://ida.worldbank.org/en/ida-financing>.
- The fact that the population at risk grew but the share of population at risk fell in IDA countries is explained by population growth.

Small States and Small Island States are particularly vulnerable to the effects of climate change due to high levels of exposure and lack of resilience and adaptive capacity (see box 3.3 for a discussion of climate risks in Small States). However, most of these countries are not included in the risk indicator because of lack of data on all vulnerability dimensions. Furthermore, there are various factors that shape vulnerability and risk that cannot be considered in the vulnerability index, one of which is gender (chapter 4 discusses some measurement challenges in more detail). Women are employed predominantly in agriculture in low-income countries, the sector most affected by climatic shocks, and female farmers are more vulnerable than male farmers (Erman et al. 2021). Access to and control of assets are important determinants in the vulnerability to climate-related hazards, with women highly disadvantaged within households (Lankes et al. 2024). Extreme weather events have been shown to increase domestic violence against women (Abiona and Koppensteiner 2018; Sekhri and Storeygard 2014). Women still shoulder the majority of domestic work, which becomes even more pronounced after disasters, hindering their ability to pursue or resume employment (Eastin 2018; Erman et al. 2021). Not being able to engage in income-generating activities further reduces long-run opportunities and exacerbates vulnerabilities. Eastin (2018) shows that climate shocks and natural disasters are associated with declines in women's economic and social rights and that this decline is more pronounced in poorer and more agricultural societies. Therefore, natural disasters disproportionately affect women in terms of income, employment, and life expectancy (Erman et al. 2021).

BOX 3.3

Small States face significant economic and climate-related challenges

Small States—those with a population of 1.5 million or less—face multiple challenges. Since 2000, per capita growth rates have been slower in Small States than in other emerging market and developing economies (EMDEs) and advanced economies (World Bank 2024a). Small States were hit hard by the COVID-19 pandemic; in 2020, GDP per capita contracted by 11 percent in Small States, seven times as much as in other EMDEs (World Bank 2023e).

Small States are particularly vulnerable to extreme weather events. Since 1990, natural disasters have caused an average annual loss of 4.8 percent of GDP per year in Small States, compared with less than 0.5 percent in other EMDEs (World Bank 2023e). Many Small States are Small Island States, which are exposed to large storms and floods that cause significant welfare losses (Heinen, Khadan, and Strobl 2019). The slow onset of challenges induced by climate change, mainly rising temperatures and sea levels, will heavily affect these economies under current trajectories (Voudoukas et al. 2023).

(continued)

BOX 3.3**Small States face significant economic and climate-related challenges (*continued*)**

For example, in the Maldives, sea levels could rise 0.5 to 0.9 meters by 2100 (World Bank 2024c). At least 80 percent of the land mass lies less than 1 meter above mean sea level, and more than 40 percent of the population resides within 100 meters of the coastline. Without adaptation, a 1-in-10-year coastal flood could damage 3.3 percent of total assets in the country by 2050 (World Bank 2024c). In addition, ocean pollution from significant amounts of per capita waste and coastal infrastructure development negatively affects island and marine ecosystems, adding to the stress from sea level rise and higher ocean temperatures (World Bank 2024d). These issues are not specific to the Maldives; other Small Island States face similar concerns (Thomas et al. 2020; Vousdoukas et al. 2023; World Bank 2023d). Rising sea levels and extreme weather events degrade coral reefs, beaches, and land and as a result pose a severe threat to tourism and agriculture, which are important sectors for most Small Island States (Thomas et al. 2020).

Yet many Small States have limited fiscal space to invest in risk management and climate adaptation. Forty percent of the EMDEs that are Small States are at high risk of debt distress or already in it, roughly twice the share for other EMDEs, and more than half are at least at moderate risk of debt distress (World Bank 2024a). The pandemic further diminished available fiscal space. All these factors pose significant challenges, and Small States need to improve institutional capacity, enhance competitiveness, and boost education to tackle them. Small Island States, in particular, urgently need to invest in adaptation measures to address sea level rise, coastal flooding, and cyclones, as well as heat stress (Thomas et al. 2020; World Bank 2023d). Adaptation will require a combination of natural-based solutions and an expansion of climate-resilient infrastructure (Vousdoukas et al. 2023; World Bank 2024c).

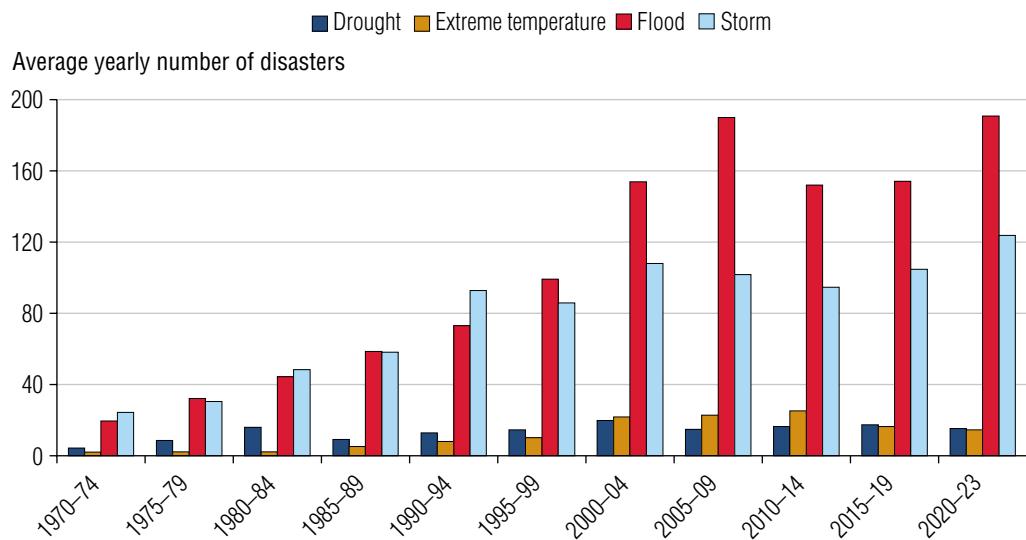
Without faster action, climate-related hazards will likely intensify

In 2022, the three main anthropogenic GHGs—carbon dioxide (CO₂), methane, and nitrous oxide—reached record levels, trapping nearly 50 percent more heat than in 1990.⁴ There is overwhelming scientific consensus that human activities are responsible for increases in GHG emissions, which have led to the warming of the atmosphere, ocean, and land (Cook et al. 2016). The Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) determined that observed global warming over the past 200 years is nearly fully attributable to human activities (Eyring et al. 2021;

Matthews and Wynes 2022).⁵ These rising temperatures are linked to the occurrence and severity of extreme weather events (IPCC 2023c). Since the 1970s, floods and storms, as well as droughts and heat waves, have been occurring more often (figure 3.5). Without reduction in GHG emissions, climate risks will increase.

GHG emission levels and trends vary significantly across regions. Since 2000, total annual GHG emissions in East Asia and Pacific have surpassed annual emissions in Europe and Central Asia, making East Asia and Pacific the highest-emitting region (figure 3.6, panel a). At the other end of the spectrum, Sub-Saharan Africa is responsible for only 5 percent of global emissions. Between 2000 and 2022, only Europe and Central Asia and North America reduced total GHG emissions. GHG emissions in upper-middle-income countries have surpassed those of high-income countries since 2004 (figure 3.6, panel b). In North America, despite maintaining the largest carbon footprint per person, emissions per capita declined by almost 30 percent (figure 3.6, panel c). Emissions per person also dropped in Sub-Saharan Africa (28 percent), Latin America and the Caribbean (21 percent), and Europe and Central Asia (11 percent). In contrast, per capita emissions have almost doubled in East Asia and Pacific (surpassing per capita emissions of all regions except North America), increased by 50 percent in South Asia, and increased by 22 percent in the Middle East and North Africa.

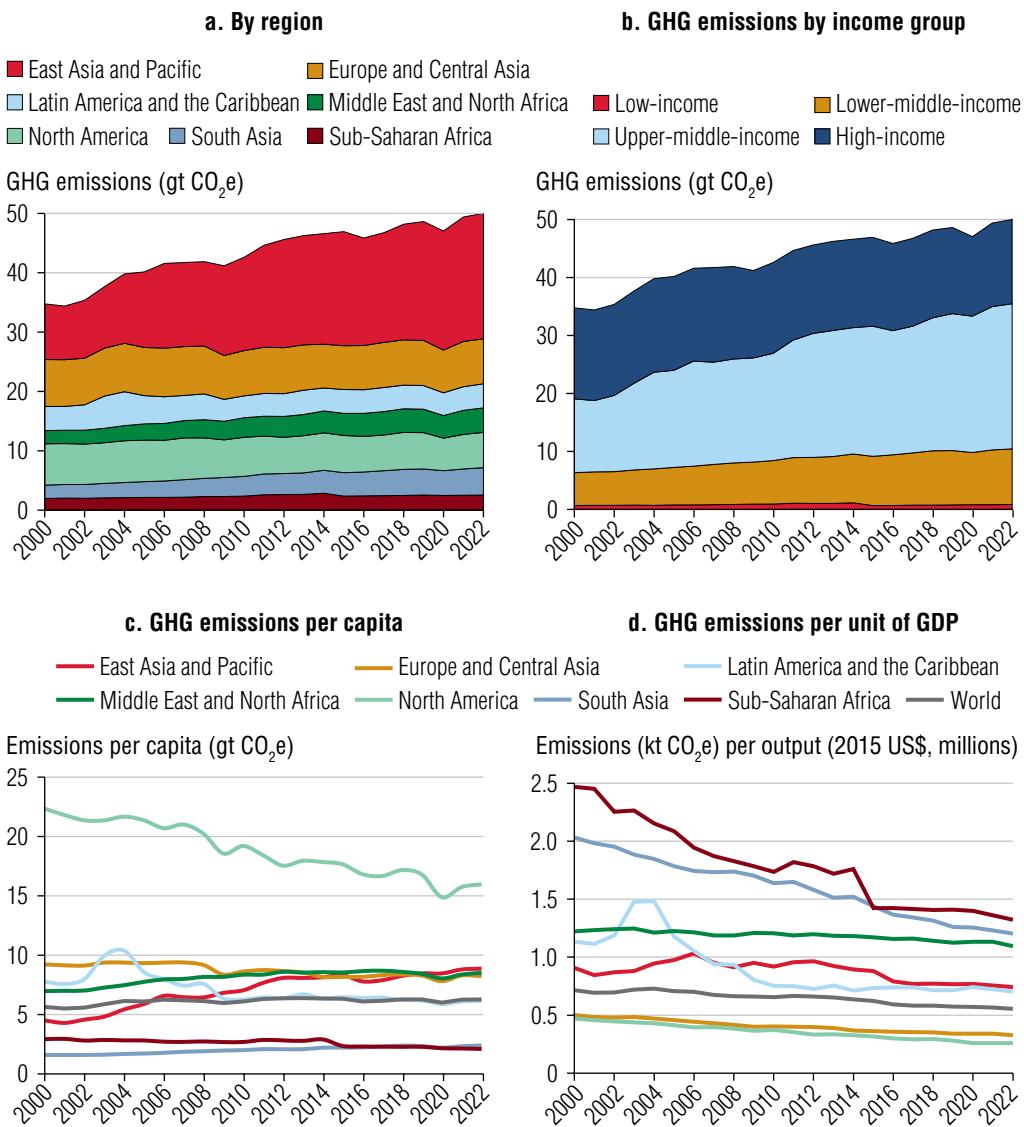
FIGURE 3.5
Extreme weather events are occurring more frequently since 1970



Source: International Disasters Database 2023.

FIGURE 3.6

Growth of total GHG emissions has continued but economic activity has become less emissions intensive over the past two decades



Sources: Emissions Database for Global Atmospheric Research, Grassi et al. 2023, and World Development Indicators, <https://databank.worldbank.org/source/world-development-indicators>.

Note: CO₂e = carbon dioxide equivalent; GDP = gross domestic product; GHG = greenhouse gases. CO₂e values are indicated in gigatons (gt), tons (t), or kilotons (kt) and millions of 2015 US dollars. In panel b, fixed income group classifications from 2022 are used. Increases in GHG emission intensities between 2002 and 2004 in Latin America and the Caribbean are driven by Brazil. The drop in emissions in Sub-Saharan Africa (panels c and d) in 2015 comes from the Democratic Republic of Congo, where land use, land use change, and forestry emissions declined substantially after 2014.

Relating GHG emissions to country-level output gives an approximate measure of emission intensity (figure 3.6, panel d) and speaks to advances in energy efficiency and the adoption of renewable energy sources in making economic growth less carbon intensive. Since 2000, economic growth has become less carbon intensive across all regions, but progress has slowed down recently. The rate of reduction in emissions intensity has plateaued in recent years in Sub-Saharan Africa, the Middle East and North Africa, Latin America and the Caribbean, and East Asia and Pacific.

Protecting people from extreme weather events

Lowering vulnerability by enhancing risk management

Vulnerability depends on two important factors: (a) the physical propensity to experience a severe income, asset, or health loss and (b) the inability to cope with and recover from the shock. By strengthening household coping capacity and access to basic support systems, vulnerability to the same hazard levels can be lowered significantly.

The *World Development Report 2014* (World Bank 2013) and a large body of evidence of risks and development highlight the important role that risk management can play in increasing resilience to negative shocks. Risk management must integrate the ability to prepare for risks with the capacity to respond effectively afterward. Building on the foundational work of Ehrlich and Becker (1972), preparation should encompass three proactive measures: self-insurance, market insurance, and self-protection. In addition to these measures, a comprehensive risk management strategy includes support for sensible coping measures. Better knowledge can lead to more informed decisions about allocating resources between insurance and protection. Similarly, improved insurance and protection can make coping less challenging and less costly. How to best promote resilience to climate risks is discussed in more detail in a forthcoming World Bank Policy Research report. Box 3.4 summarizes the upcoming report's main findings.

BOX 3.4

How to best promote climate resilience

An upcoming World Bank Policy Research report on resilient development aims to contribute to debates about how best to promote climate resilience. The report advocates for a broad perspective, emphasizing that resilience to climate change hinges significantly on the adaptation choices made by millions of individuals, households, farms, and businesses.

The report highlights that government-led top-down approaches are essential, for instance, collective adaptation measures such as protective infrastructure or large-scale irrigation. However, they will struggle to reach all vulnerable populations. Empowering individuals to act and invest in measures suitable

(continued)

BOX 3.4**How to best promote climate resilience (*continued*)**

for improving their resilience given their specific circumstances is crucial. This approach requires well-informed policies grounded in robust evidence.

The report finds that some reasons that households, farmers, and firms are not adapting quickly enough are lack of information, lack of access to finance, no or few markets for adaptation tools or services, or unclear or distorted public policies. These problems can be solved by helping people become adaptation pragmatists, by providing them with proper information and access to the required tools and resources.

The report proposes specific reforms as well as several broad principles to guide policy, such as the following. (a) Adaptation measures with general-purpose benefits such as information provision and/or financial inclusion must be a priority. Promote self-help first, leverage markets where possible, and involve governments where necessary. (b) More broadly, the complexity of the problem suggests bundling adaptation policy instruments (“risk layering”), building on a hierarchy of resilience instruments: improved knowledge and information as a solid base. (c) Better access to savings and credit would improve welfare overall and act as self-insurance. (d) More formal insurance would spread risk and speed up recovery. (e) Social protection would be the insurance of last resort.

Investments in education and infrastructure are fundamental for risk management

Development strategies that bolster households’ productivity and income-generating capacities often concurrently enhance their ability to manage climate risks by enhancing prevention and coping (Doan et al. 2023; Hallegatte and Rozenberg 2017; Pörtner et al. 2022) and should be prioritized in poorer and more vulnerable countries.

Investing in education is fundamental to increasing incomes, but it also allows households to better prepare for and cope with shocks. One important part of risk management is knowledge, and more education helps on that front. There is evidence that households with higher levels of education have a better understanding and ability to process risk information such as weather forecasts and early warnings (Hoffmann and Muttarak 2017; Muttarak and Lutz 2014; Muttarak and Pothisiri 2013). In addition, households with more education are less likely to engage in negative coping strategies (Dimitrova 2021; Hill and Mejía-Mantilla 2017; Le and Nguyen 2023). Recent research by Dobermann (2023) provides robust evidence on the importance of education to adapting to climate change in India.

Improving infrastructure not only increases access to markets and productivity but also supports risk management and resilience. For example, better access to roads in remote areas increases

access to markets, goods, and services. When a drought reduces local food availability, improved access to markets reduces the impact on local food prices (Burgess and Donaldson 2010).

Moreover, better infrastructure can improve access to energy, water, and communication, which can allow households to better cope with shocks when they occur. Infrastructure improvements are beneficial for both economic development and resilience, but unlocking synergies depends on how infrastructure is built. Infrastructure investments need to account for future risks, such as rising occurrences and intensities of flooding (Hallegatte, Bangalore et al. 2016; Hallegatte, Rentschler, and Rozenberg 2019). Stress-testing and simulating how climate shocks propagate through road networks is an example of assessing where improvements to infrastructure are needed to make its functionality resilient (Hallegatte, Rentschler, and Rozenberg 2019). Consider that constructing infrastructure in a resilient manner improves its cost-effectiveness in the long run, and higher up-front investment costs can reduce damages and repair costs in the future (Hallegatte, Rentschler, and Rozenberg 2019).⁶

Expanding insurance is also key

Beyond these foundational investments in human capital and infrastructure, it is important to strengthen insurance mechanisms that protect individuals from severe poverty and prevent deeper hardship during crises (Gill, Revenga, and Zeballos 2016).

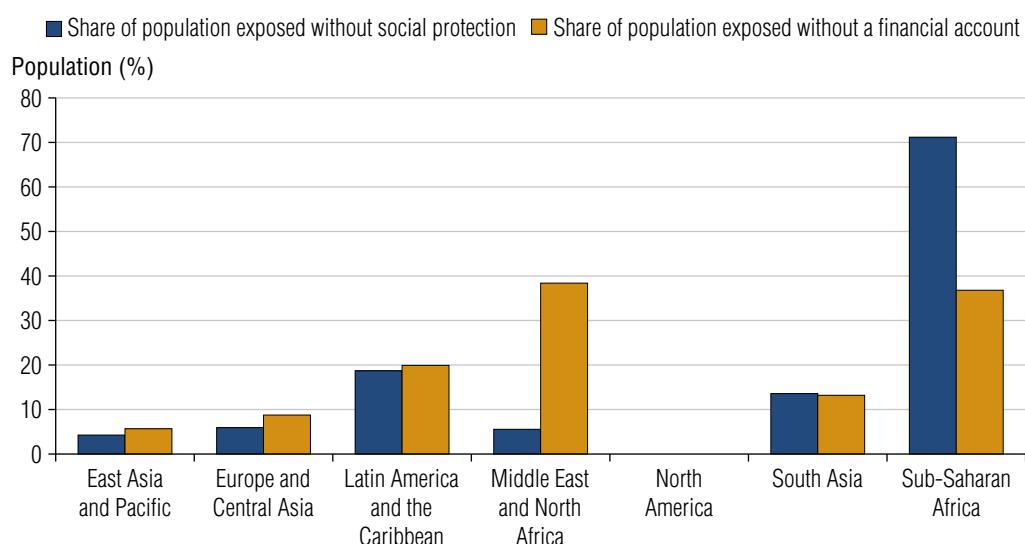
Financial development is important to enable access to credit, formal insurance, and other financial products that can help households and businesses manage climate risk. One of the primary objectives of financial inclusion is to enhance households' capacity to manage common but unpredictable events that entail financial expenses. Mobile money is an example: when a weather crisis strikes, mobile money can allow households to quickly receive transfers or remittances from relatives or migrant family members who live elsewhere (Batista and Vicente 2023; Jack and Suri 2014). For instance, Sub-Saharan Africa has shown significant growth in financial inclusion driven by mobile money account adoption. Yet a large share of adults still conducts transactions in cash, suggesting opportunities to increase financial inclusion through continued payment digitalization (Demirgüç-Kunt et al. 2022). Many people exposed to severe climate risk are not financially included (figure 3.7). These issues are particularly prevalent in Sub-Saharan Africa and the Middle East and North Africa regions, where about one in three people exposed to extreme weather events does not have a financial account (including mobile money).

Developing insurance markets and increasing the demand for insurance is central. In 2023, the estimated global economic losses due to natural disasters were \$380 billion,⁷ only about one-third of which was covered by insurance. In low-income countries, less than 10 percent of losses was covered by insurance, forcing governments to redirect limited development funds toward disaster recovery. Despite its importance for risk management, access to insurance remains insufficient, leaving billions unprotected. For example, household demand for insurance is constrained by a number of factors. One important challenge is affordability, as the demand for insurance is price sensitive (Cai, de Janvry, and Sadoulet 2020; Cole et al. 2013; Hill et al. 2019; Karlan et al. 2014; McIntosh, Sarris, and Papadopoulos 2013). Interventions to reduce prices (for example, reducing reinsurance costs, increasing efficiency of marketing, or reducing taxes on insurance products) can increase demand.

Moreover, insurance is a more complex financial product than savings or credit products. Financial literacy training increases demand for insurance (Cai and Song 2017; Vasilaky et al. 2020). Liquidity constraints also limit its use; moving payment of the insurance to the end of the coverage period can increase demand (Casaburi and Willis 2018; Liu, Chen, and Hill 2020).

Noncontributory social assistance programs, or social safety nets, aimed at those who are chronically or extremely poor also serve as insurance of last resort. The use of adaptive social protection can help vulnerable people to manage risks from climate-related hazards by timely transferring of resources to disaster victims (World Bank Group 2023). Postdisaster transfers have a benefit-cost ratio above 1.3 (Hallegatte, Bangalore et al. 2016). For example, the Philippines supported recipients of its flagship social safety net program, Pantawid Pamilyang Pilipino Program, when they were hit by the Yolanda Typhoon in 2013 (World Bank 2022c). In Kenya, the Hunger Safety Net Programme provided aid to over 100,000 additional households in response to drought during 2015 and issued a special transfer to 200,000 households in anticipation of expected droughts (Hallegatte, Bangalore et al. 2016). Anticipatory cash transfers before the traditional humanitarian response would normally arrive can have a significant additional welfare impact (Pople et al. 2021). Yet in Sub-Saharan Africa, 71.2 percent of the people exposed to severe cyclone, flood, drought, and heat waves are neither covered nor contributing to social protection and are unlikely to receive public support when one of these severe events occurs (figure 3.7). Additionally, not all of those covered will have their climate risk fully covered by public safety nets.

FIGURE 3.7
A large share of the population in Sub-Saharan Africa exposed to extreme weather events does not have access to social protection or a financial account



Source: World Bank Group Scorecard indicator: the percentage of people at high risk of climate-related hazards globally, <https://scorecard.worldbank.org/en/scorecard/home>.

Note: The figure shows the share of population exposed to any hazard who neither receives social protection benefits nor contributes to social insurance and the share of population exposed to any hazard who does not have a financial account (including mobile money). For North America, the share of population exposed to any climate-related hazard and without social protection or access to a financial account is zero. See annex 3B in chapter 3 for more details.

While safety nets serve as insurance of last resort, they need to be complemented by social insurance programs designed to protect a broader segment of the population from falling back into poverty because of individual or systemic shocks. Additionally, global insurance mechanisms are essential to help countries manage the impacts of large-scale natural disasters affecting multiple nations or pandemics.

Basic systems to deliver timely information on climate risk are fundamental

The evidence shows that climate risk management can be enhanced through expanded early warning systems, hazard maps, and climate knowledge. In Bangladesh, Cyclone Bhola caused 300,000 deaths in 1970, and Cyclone April killed 138,000 in 1991. Since then, investments in resilient infrastructure, road networks, and early warning systems have significantly reduced fatalities. Cyclone Sidr in 2007 resulted in 3,363 deaths, while Cyclone Fani in 2019 caused five, and in 2020, Bangladesh evacuated 2.4 million people for Cyclone Amphan, with 20 fatalities. Yet one-fifth of the world's population is not covered by an early warning system, even though these systems save lives and greatly reduce climate-related disaster losses in developing countries (United Nations, n.d.).

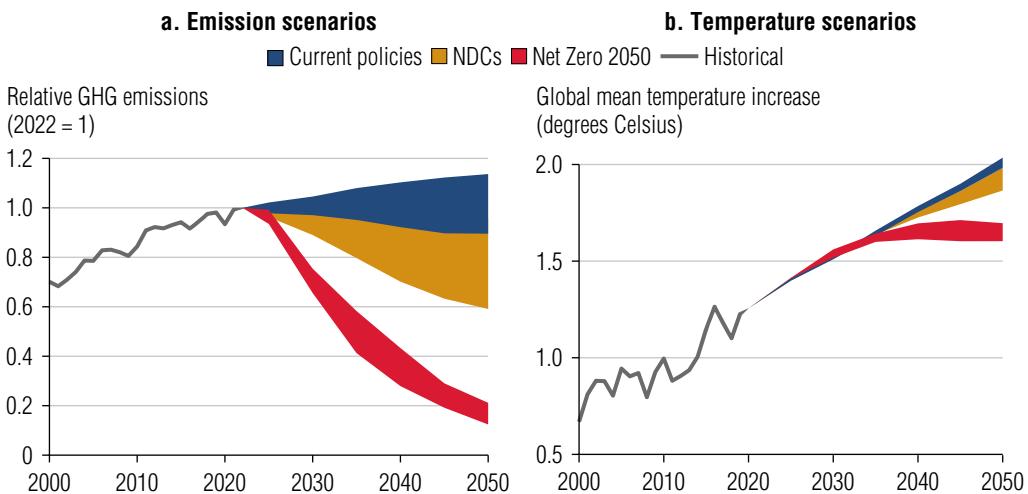
Faster economic transformations to reduce the emissions intensiveness of growth

Faster transformations of the global economy are necessary to limit global warming and reduce climate risks.⁸ Since 2015, when the Paris Agreement was adopted, GHG emissions were expected to rise by 16 percent until 2030 on the basis of existing policies. Today, the expected increase is 3 percent, showcasing that transformations have already occurred over the past years. However, figure 3.8 shows that with current policies, temperatures are projected to increase close to 2°C. Even if currently pledged Nationally Determined Contributions (NDCs)⁹ were to be enacted, emissions would not fall enough to limit global warming to below 1.5°C (IPCC 2023b). Only a Net Zero 2050 scenario, which is shaped by stringent climate policies and innovation, would have the chance to limit warming to around 1.5°C.¹⁰ A net-zero path would require emissions to decline by 80 percent in advanced economies and by 60 percent in emerging-market and developing economies by 2035 compared with the 2022 level (IEA 2023a).¹¹

It is necessary to continue expanding the use of renewable energy and improving energy efficiency. The energy sector produces three-quarters of global emissions. Electricity and heat generation alone accounted for 29 percent of all emissions in 2022; transportation was responsible for 14 percent, followed by manufacturing and construction (13 percent).¹² Despite progress, in 2022, renewable sources added up to just 7 percent of total global energy, up from 4 percent in 1990 (figure 3.9). Petroleum (with other liquid fuels) and coal remain the largest sources of energy (32 percent each), although natural gas is catching up and accounted for one-quarter of energy production in 2022 (figure 3.9, panel b). To reduce GHG emissions, the reliance on coal and oil will need to be brought down substantially. Yet the share of coal in energy production has increased globally and in absolute terms has declined only in today's high-income countries. Doubling the pace of progress in energy efficiency could cut energy bills by one-third and could constitute 50 percent of CO₂ reductions by 2030 (IEA et al. 2023).

FIGURE 3.8

Projections of emissions and temperatures to 2050 show that with current policies, temperatures would increase close to 2°C

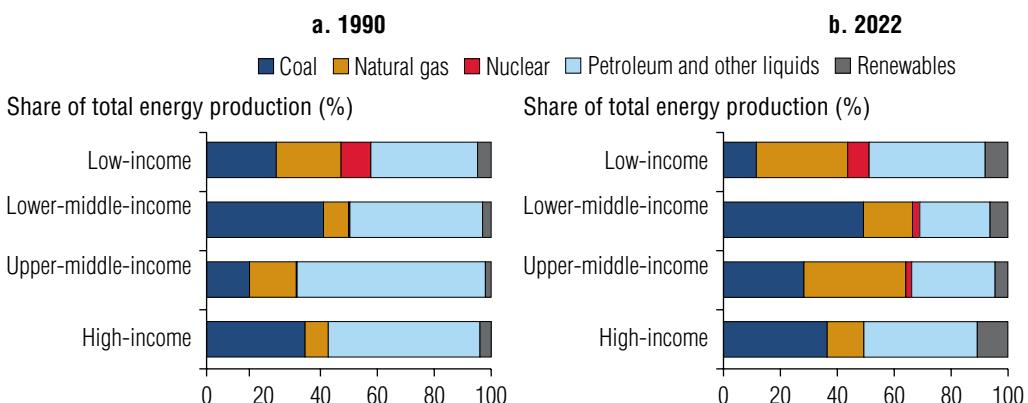


Sources: Panel a: Network for Greening the Financial System (NGFS) 2023, harmonized to historical 2022 emissions estimations from EDGAR data. Panel b: World Bank calculations using projections from NGFS 2023, harmonized to historical 2020 temperature estimations from IPCC 2021.

Note: GHG = greenhouse gas; NDCs = Nationally Determined Contributions. Ranges for each policy scenario are based on four different projection models: GCAM 6.0, MESSAGEix-GLOBIOM 1.1-M-R12, REMIND-MAgPIE 3.2-4.6 Integrated Physical Damages (95th-high), and REMIND-MAgPIE 3.2-4.6 Integrated Physical Damages (median). In panel b, temperature increases are relative to the average global surface temperature of the period 1850–1900 (preindustrial) (IPCC 2021). Temperature projections refer to the AR6 surface temperature increase (50th percentile) from the MAGICC 7.5.3 model.

FIGURE 3.9

Energy production mix by income group remains largely based on coal and petroleum



Source: US Energy Information Administration.

Note: Energy is measured in quadrillion (10^{15}) British thermal units. Income classifications are fixed at 2022 definitions.

Further advancements and adoption of technology have the potential to speed up the necessary transformations (Millward-Hopkins et al. 2020). In many contexts, it is already more economical to use renewable energy than energy from other sources. While the price of generating energy from fossil fuels has been relatively stable and jumped in 2022, the cost of solar photovoltaic energy has fallen by 89 percent and the cost of wind energy dropped by 69 percent between 2010 and 2022. Without the growth of key clean energy technologies since 2019 (for example, solar photovoltaic, wind power, heat pumps, and electric cars), growth in emissions would have been three times larger (IEA 2023b).

Carbon pricing policies are key to incorporate the environmental externalities of GHG emissions, incentivize efficiency gains, reduce the reliance on fossil fuels, and spur innovation in less emission-intense technologies. (World Bank 2024e). The coverage of carbon taxes and emission trading systems has increased from 0.15 percent of global emissions in 1990 to 24 percent in 2024. Despite the progress, three-quarters of global emissions remain unaccounted for, and many emissions have negative effective prices because of pervasive fossil fuel subsidies. Thus, while coverage is increasing, the global total carbon price—which takes into account the additional net effect of indirect pricing from fossil fuel taxes and subsidies—has not increased much since 1994 (Agnolucci et al. 2023). Repurposing fossil fuel subsidies is thus important to remove market distortions and also to help move resources to sustainable projects (Damania, Balseca et al. 2023). Investing in research and development and digitalization is crucial to spur innovation and transitions.

Priorities for advancing on the interlinked goals

Ending extreme poverty and boosting shared prosperity on a livable planet require actions in two areas: delivering faster and inclusive growth (that is, growing labor incomes by delivering more and better jobs and investing in the productive capacity of the poor) and protecting people from climate shocks (namely, enhancing risk management and accelerating climate change mitigation). Solutions to advance on these fronts are not always simple. Fundamental changes in how countries approach their national development strategies and their contribution to global public goods are required.

With limited budgets, high uncertainty, and conflicting interests, policy makers may need to prioritize and make difficult choices. To inform decisions, it is important to understand the trade-off between growing incomes and lowering GHG emissions, find ways to scale up synergistic policies that can help advance on multiple fronts or reduce trade-offs, and manage short-term transition costs of climate mitigation policies to specific groups and communities.

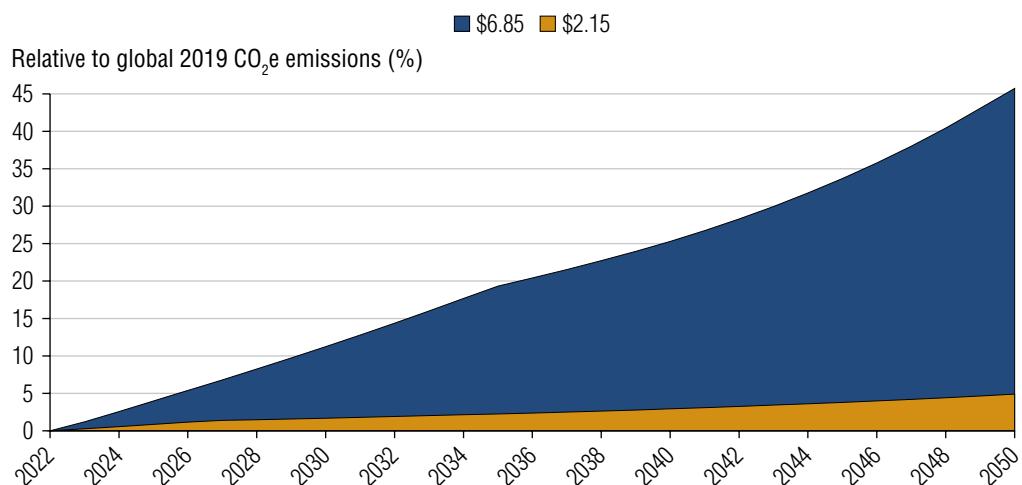
The trade-off between growing incomes and lowering emissions

Past economic growth and poverty reduction have been associated with high GHG emissions. This marks an apparent tension between advancing on poverty reduction and growing people's

incomes and reducing emissions. Unsurprisingly, research suggests that additional emissions attributed to moving individuals out of *extreme* poverty do not counteract climate goals, as emissions of low-income households are minuscule (Bruckner et al. 2022). Wollburg, Hallegatte, and Mahler (2023) calculated the additional economic growth that would be required to eradicate extreme poverty and the additional emissions implied using historical emission intensities (from 2010–19). Eradicating extreme poverty would entail 4.7 percent more emissions than in 2019 (figure 3.10). However, this number becomes larger at higher poverty lines. At \$6.85 per day, additional emissions would reach 46 percent, with historical emission intensities. This trade-off is different across countries depending on their levels of poverty and the sources of economic growth and emission levels. Yet it is clear that the foregone reduction in GHG emissions from extreme poverty eradication is minimal.

FIGURE 3.10

Additional emissions associated with poverty alleviation increase with the level of ambition



Source: Wollburg, Hallegatte, and Mahler 2023.

Note: CO₂e = carbon dioxide equivalent. The figure shows additional emissions relative to 2019 if poverty were to be alleviated at the \$2.15 and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars) using historical emission intensities.

Synergistic policies can ameliorate the trade-offs

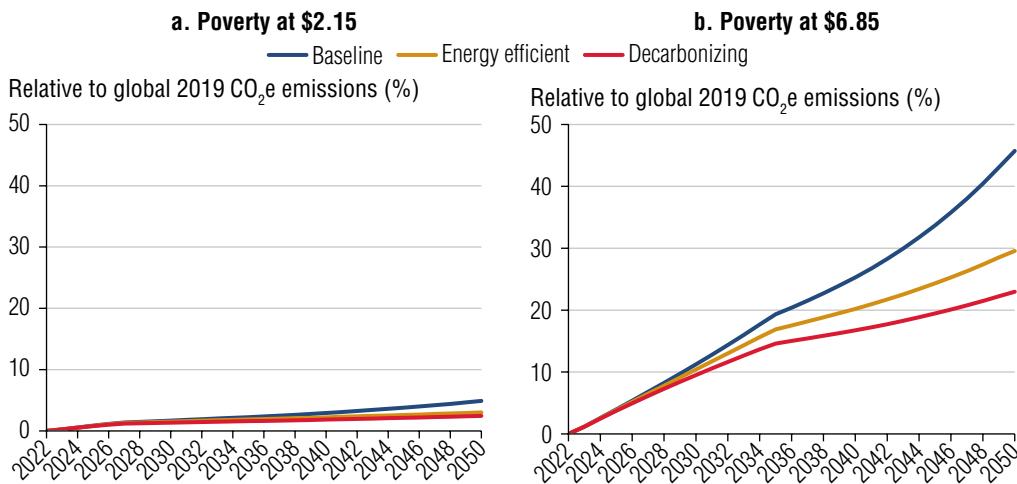
Investing in renewable energy and energy efficiency can offer multiple benefits beyond reducing emissions

Investment in renewable energy and energy efficiency offers multiple benefits beyond reducing emissions. Studies show that renewable energy investments not only help lower emissions but also meet growing energy demands and improve energy security (World Bank Group 2023). For many countries with little energy access in particular, it can be more cost-effective

to develop renewable energy infrastructure than to expand fossil fuel generation (World Bank Group 2023).¹³ Solar and wind energy are particularly efficient for connecting sparsely populated areas, from which lower-income regions can benefit directly. For example, in countries such as Côte d'Ivoire and Uzbekistan, where gas supplies are decreasing and electricity demand is rising, transforming power systems to renewable energy is the most cost-efficient solution (World Bank Group 2023).

These investments are also synergistic in the sense that they can ease the trade-off between economic growth, poverty reduction, and emissions. Simulations indicate that investing in renewable energy and energy efficiency combined would in fact lower the additional emissions that accompany the economic growth needed to reduce poverty by more than half (figure 3.11) (Wollburg, Hallegatte, and Mahler 2023).

FIGURE 3.11
Lower emissions from poverty alleviation projected with energy efficiency and decarbonization



Source: Wollburg, Hallegatte, and Mahler 2023.

Note: CO₂e = carbon dioxide equivalent. The figure shows additional emissions relative to 2019 if poverty were to be alleviated at the \$2.15 and \$6.85 per person per day poverty lines (expressed in 2017 purchasing power parity dollars). The baseline scenario uses historical emission intensities. Energy-efficient and decarbonizing scenarios assume that all countries achieve the top 10 percent historical performance in energy efficiency and decarbonization.

Relatedly, electrified heating presents another synergy between climate change mitigation and rising incomes by significantly enhancing energy efficiency. For instance, heat pumps are three to five times more energy efficient than gas boilers (IEA 2022). Their usage can reduce running and maintenance costs, as well as exposure to fluctuating fuel prices. Which heating solution ultimately has the lowest cost for households is highly context specific, depending on existing infrastructure, the cost of energy fuels, and the availability of affordable renewable resources (World Bank and ESMAP 2023).

Tackling air pollution is a clear win-win strategy and should be prioritized

Air pollution is a leading environmental risk to people's health (World Bank 2022f). Air pollution is estimated to be responsible for a staggering 6.7 million deaths¹⁴ annually worldwide, almost the total number of deaths due to COVID-19 (Coronavirus) to date¹⁵ or an amount roughly equivalent to one-third of the combined deaths due to communicable, maternal, neonatal, and nutritional diseases in 2021.¹⁶ Air pollution carried a global health cost representing 6.1 percent of the global GDP in 2019 (World Bank 2022f). Besides the enormous impact that the lack of clean air has on health, air pollution can also harm productivity, cognitive performance, decision-making, and human capital accumulation (Aguilar-Gomez et al. 2022).

Most people breathe air polluted above World Health Organization (WHO) maximum recommended levels.¹⁷ As of 2019, all countries experienced (on average) unhealthy air quality. This does not imply that everyone is exposed to harmful pollution levels, since exposure can be heterogeneous, but it does indicate that a lack of clean air is a problem affecting all countries. From 1960 to 2009, global mean population-weighted air pollution concentrations rose by 38 percent, driven largely by increases in China and India. Consequently, attributable deaths surged globally by 89 percent to 124 percent during this period (Butt et al. 2017).

For some countries, particularly those in South Asia and Sub-Saharan Africa, annual exposure levels are particularly high, exceeding 10 times the recommended levels. Indeed, South Asia is home to 37 of the 40 most polluted cities in the world (World Bank 2023g). While the population-weighted air pollution exposure is 2.8 times the recommended levels in high-income countries, in upper-middle-, lower-middle-, and low-income countries the exposure rates are 6.8, 12.5, and 8.1 times the recommended levels, respectively. In South Asia, air pollution causes an estimated 2 million premature deaths each year and imposes significant economic costs.

Cleaner air is a large co-benefit of lowering GHG emissions. The burning of fuels that feeds climate change is also a source of some of the ultrafine particles that degrade air quality. Methane emissions, for example, are one of the main precursors to ground-level ozone, a major source of premature death. The solid fuels that pollute the indoor air of many homes also significantly contribute to global human-made black carbon emissions (Klimont et al. 2017). While some air pollutants also contribute to climate *cooling* (Fuller et al. 2022), synergies between the reduction of air pollutants and the mitigation of GHG emissions exist and should be promoted. In cities such as Tbilisi, where the impact of vehicle traffic and industrial emissions on outdoor air pollution is substantial, policies enacted to curb such emissions would have considerable co-benefits in the form of public health and economic outcomes. In such a context, a carbon tax could lead to significant reductions of particulate matter (PM) (Baquié et al. 2024). Urban development that focuses on mass transit systems can lower both CO₂ emissions and air pollution levels (Mukim and Roberts 2023).

World Bank (2023g) has shown that cost-effective strategies to lower air pollution in South Asia not only can save lives but also can bring important climate benefits. For example, reduction

of concentrations to WHO Interim Target 1 on air pollution by 2030 would reduce CO₂ by 22 percent and methane by 21 percent.¹⁸

Several other actions can help, depending on the context

Another area with sizable synergies between lowering emissions, increasing resilience, and increasing incomes is improvement of agricultural productivity through climate-smart practices, especially for low-income countries (Sutton, Lotsch, and Prasann 2024). These practices, such as crop diversification and soil conservation, not only mitigate risks from climate-related hazards but also enhance crop yields and farmer incomes, especially in vulnerable regions (Aker and Jack 2021; World Bank 2012).

In regions where agriculture is an important contributor to emissions, such as Latin America and the Caribbean and Sub-Saharan Africa, such practices will be crucial. For instance, in Colombia, agriculture accounts for 22 percent of the country's GHG emissions, and agricultural expansion over the past two decades has occurred primarily at the expense of forests and natural ecosystems. Climate-smart agriculture increases agricultural productivity, spurring economic growth without deforestation. However, only 15 percent of farms in Colombia use innovative technologies, and most climate-smart agricultural initiatives have remained in the pilot stage. Public policy is crucial in promoting these practices more widely. This can be achieved by redirecting agricultural support, strengthening innovation systems, facilitating financing services, and improving land information systems and administration (World Bank 2023c). In Cambodia, which could suffer one of the largest losses in rice yields in Southeast Asia due to climate change, analysis indicates that the negative impacts of droughts can be entirely mitigated through irrigation or crop rotation practices (World Bank 2023b).

Repurposing agricultural subsidies to climate-smart and productivity-enhancing practices can reduce overall agricultural emissions by more than 40 percent and the land footprint of agriculture by 2.2 percent, and greater productivity could reduce global extreme poverty by about 1 percent (Laborde et al. 2022). This is relevant not only for lower-income countries—removing inefficient subsidies alleviates market distortions and reduces deforestation and biodiversity loss in high-income countries as well (Damania, Balseca et al. 2023). Agricultural and energy subsidies constitute around 3 percent of GDP in lower-middle-income and low-income countries, but only 20 percent of spending on subsidies reaches the bottom 40 percent of the populations (World Bank 2022e).

Sustainable forest management initiatives not only protect biodiversity and reduce emissions but also provide livelihood opportunities for local communities, thereby reducing poverty and enhancing resilience to climate-related disasters (Barbier 2010; Damania, Polasky et al. 2023; Grosset, Papp, and Taylor 2023). In Peru, transitioning to a zero-carbon forest sector could generate employment opportunities, yield \$3.5 billion in benefits from restored ecosystem services, and increase the sector's value added sevenfold by 2050 (World Bank 2022b). More efficient land use could sequester an additional 85.6 billion metric tons of CO₂ equivalent without adverse economic impacts—an amount equivalent to approximately 1.7 years' worth of global emissions (Damania, Polasky et al. 2023).¹⁹ Land degradation affects an estimated 3.2 billion people worldwide, and the poorest are

most often exposed (IPBES 2019). Forest loss also has important ramifications for public health. More than 30 percent of new diseases reported since 1960 have been linked to land use change, including deforestation (FAO 2022). These diseases (for example, Ebola and severe acute respiratory syndrome) often emerge when wildlife habitats are altered or destroyed, which can force wildlife closer to humans and increase the likelihood of disease transmission (FAO 2022). This underscores the importance of maintaining healthy forest ecosystems to reduce the risk of future pandemics and protect both environmental and human health.²⁰ Annex 3D summarizes some elements related to healthy ecosystems focused on forests.

It is important to identify and remove constraints to scale up synergistic policies

While synergistic strategies exist across different geographical contexts and sectors, challenges may still arise in their implementation. For instance, agroforestry may require a fundamental shift in traditional farming techniques, necessitating new skills or knowledge that farmers may not initially possess. Risk aversion can also be a challenge; farmers might be hesitant to adopt new practices because of uncertainty about the outcomes or fear of initial yield reductions. Financial constraints are another common barrier, as up-front costs for resources or training can be prohibitive for lower-income households. Moreover, cultural and social norms can influence the willingness to adopt new methods, as practices deeply ingrained in community identity may not be easily altered. Lastly, the lack of supportive policies or incentives from governments can impede widespread adoption, as can inadequate access to markets or resources necessary to implement these new practices effectively. Addressing these barriers through finance, comprehensive support systems, education, and community engagement is essential for successful adoption and long-term sustainability of synergic strategies.

Managing transition costs is important for the poor and vulnerable

Transitioning toward a low-carbon, climate-resilient economy may involve a trade-off between a cost today and benefits in the future, as well as opportunity costs between different priorities. These transitions bring future climate benefits by altering the probability distribution of climate-related hazards, but they can be costly for specific people now.

Transitioning to green industries may lead to or accelerate job displacement in traditional industries that rely heavily on fossil fuels. Reductions in coal production are likely to not have substantial impacts on national employment and output in many economies because of the industry's low labor share. For example, in Indonesia, the world's second-largest coal exporter, the coal industry's share of the GDP is less than 2 percent and it employs only 0.2 percent of the workforce (World Bank Group 2023). However, impacts on local communities can be substantial in some instances (World Bank Group 2023). Challenges arise as displaced workers may face difficulties transitioning to alternative employment because of differences in skills, wages, and geographic locations (World Bank 2023a). For instance, in six South Asian countries (Bangladesh, India, Maldives, Nepal, Pakistan, and Sri Lanka), workers in pollution-intensive jobs

are systematically less educated and are often informally employed; the opposite applies to workers in green jobs. Going beyond educational levels to consider foundational skills, analysis in Poland shows that people in green jobs on average have higher numeracy, literacy, and problem-solving skills. There are also major gender differences in green employment across all major occupation groups, with women tending to have browner jobs (World Bank 2022d). As noted above, with renewable energy becoming cheaper than coal and other energy sources in many contexts, it is not only through climate policies that solutions for changes in employment demand will be needed.

Workers in carbon-intensive sectors can be affected not only by local energy transition policies but also by the global consequences of carbon mitigation policies on trade flows. Changes in goods and labor demand may originate from abroad. Take, for example, the Carbon Border Adjustment Mechanism (CBAM), a carbon tariff that penalizes high-carbon exports to the European Union. If industries in certain countries fail to decarbonize, such systems may redirect demand to producers elsewhere (Haddad, Hansl, and Pechevy 2024). While CBAM is not likely to have a large impact on countries' GDP or trade balances, it may negatively impact workers in some sectors in lower-income countries (World Bank Group 2022).

Consumers, especially those with less purchasing power or who allocate a significant portion of their budget to food and energy, may encounter challenges from policies aimed at reducing emissions that affect prices. For example, carbon pricing schemes and the removal of fossil fuel subsidies could lead to short-term increases in poverty in several low- and middle-income countries if the policies are not carefully designed (World Bank Group 2022).

Removing and repurposing inefficient subsidies are key to reduce emissions and free up significant fiscal space for many countries, which can be repurposed (Damanra, Balseca et al. 2023). Abolishing inefficient and emission-inducing policies such as fossil fuel subsidies would result in a larger decrease in consumption among the wealthiest households than among the poorest ones in absolute terms (Klaiber, Rentschler, and Dorband 2023). However, indirect subsidies, like those for energy, often constitute a greater share of the market income for poorer households (World Bank Group 2022). Energy costs can also comprise a large share of the budget of poor and vulnerable households, as they tend to be inefficient users of energy because of outdated appliances and poorly insulated housing. This is particularly the case for poor households in high- and upper-middle-income countries. In contrast, in low- and lower-middle-income countries, poor households use very little energy and therefore they may not be strongly exposed to fuel price changes (Hallegatte et al. 2023).

For example, evidence shows that a fuel tax would disproportionately affect low-income households in Cape Town, South Africa, as they lack the means to change their modes of transportation or housing. In Kinshasa, the Democratic Republic of Congo, the lower-middle-income class is more affected because the poorest people are excluded from energy-intensive services and have limited access to areas with a high concentration of jobs (Hallegatte et al. 2023; Liotta, Avner, and Hallegatte 2023). Research by Steckel et al. (2021) demonstrates that the impact of carbon pricing varies importantly across the income distribution among eight low- and middle-income Asian economies.

The short-term costs of climate mitigation policies and how to manage them will vary depending on each country's context. These challenges will also depend on how policies are implemented and how political and economic institutions align to support a just transition (Lankes et al. 2024; Rizk and Slimane 2018). Short-term costs, such as higher energy prices or job losses in carbon-intensive sectors, can be particularly hard for poorer people to manage. Therefore, assessing how the green transition affects poor and vulnerable people and designing policies to reduce negative impacts are essential.

Policies that invest in skills and reskilling can play a vital role in facilitating the transition of workers affected by industry changes. Active labor market programs, for instance, not only help workers acquire the skills needed for this transition but also ensure a workforce ready to meet the demand in green industries. Programs supporting internal migration can be particularly valuable (Rigolini 2021). To support communities most affected by job losses, targeted policies are essential. These include initiatives to promote job creation, especially in areas facing employment challenges, and support for climate-smart agricultural practices, job training, and skills development. Such measures are crucial for facilitating the transition to low-carbon and sustainable livelihoods.

It is also important to implement compensatory measures in order to not disproportionately affect poor households. Well-designed redistribution measures can mitigate the impacts on households, especially those with lower incomes (Blanchard, Gollier, and Tirole 2023). According to the findings of Steckel et al. (2021), even redistributing revenues generated from carbon pricing to all individuals, not just the poor, results in a net income gain for poor households. Similarly, redistributing domestic carbon revenues as an equal-per-capita climate dividend more than offsets the negative effects of higher prices, lifting approximately 6 million people out of poverty globally.

To counteract the adverse effects of fuel price hikes on the poor, governments have various policy tools beyond cash transfers at their disposal. For instance, in urban areas, making public transportation more affordable or providing subsidies to assist low-income households in securing housing closer to job opportunities can help mitigate these impacts (Liotta, Avner, and Hallegatte 2023). Such incentives also align with emission reduction objectives.

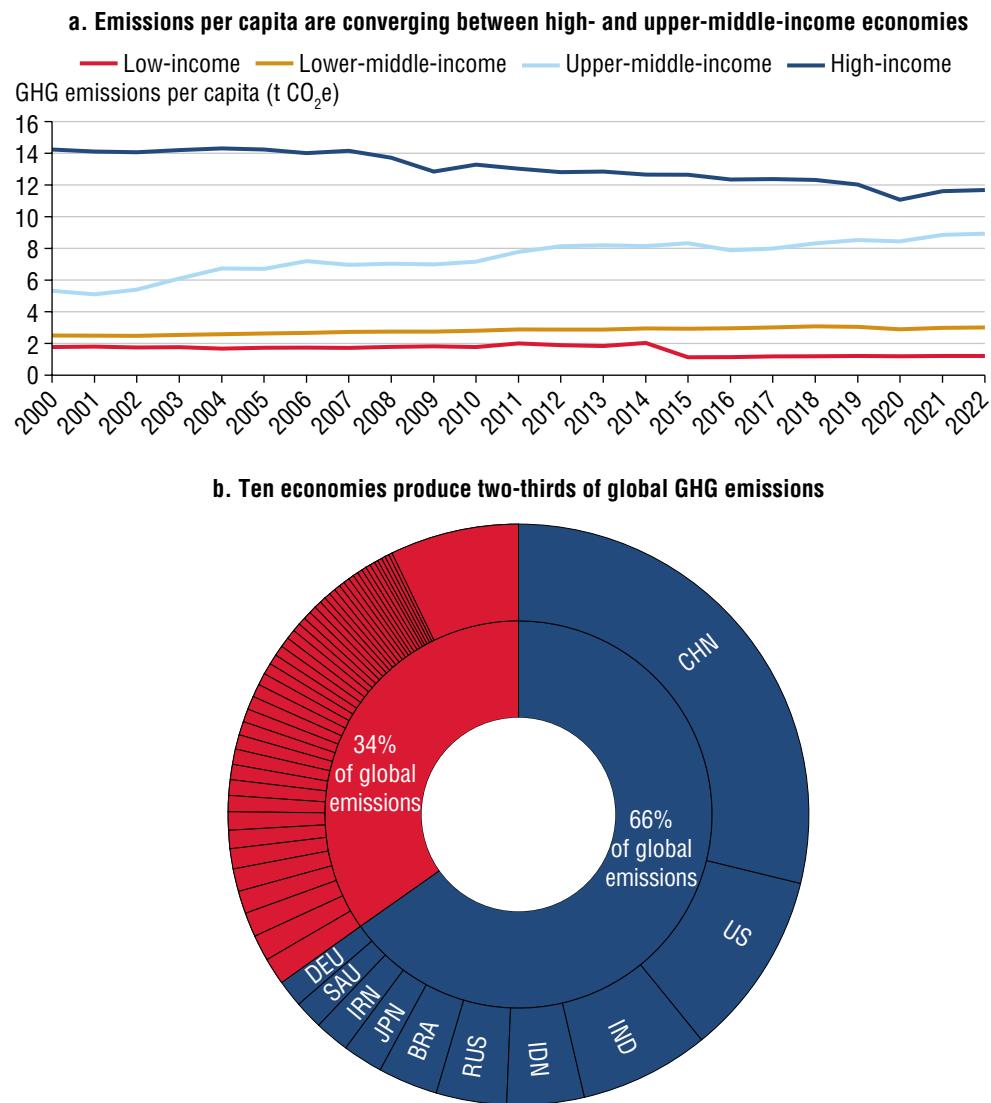
Doing what matters where it matters most

The pathways presented above involve difficult trade-offs in objectives and transition costs. It is important to recognize that low growth, high debt servicing and limited financing, and high uncertainty severely constrain the ability of many countries to act. In this polycrisis, there is an urgent need to focus on and prioritize the actions that will have the highest return for development and that can allow the world to make significant progress on the interlinked goals.

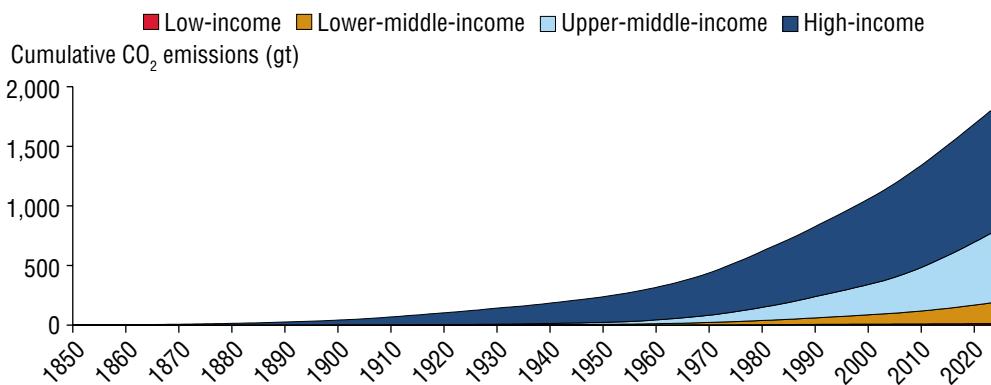
A key guiding element to setting priorities is where the poor and vulnerable live and where the emissions are generated. Going forward, as shown in chapter 1, extreme poverty will be concentrated increasingly in Sub-Saharan Africa and in fragile and conflict-affected countries (in Sub-Saharan Africa and elsewhere). The poorest countries are also the most at risk from climate hazards.

Yet, emissions are generated largely by high-income and upper-middle-income countries. High-income and upper-middle-income countries account for 32 percent and 52 percent of global CO₂ emissions, while constituting only 15 percent and 35 percent of the global population, respectively. Ten economies emit two-thirds of global emissions annually (figure 3.12, panel b). The next 30 economies by total emissions contribute 24 percent of global emissions. The 140 least-emitting economies, which comprise 12 percent of the total population, produce less than 5 percent of GHG emissions.²¹

FIGURE 3.12
Positive relationship between income levels and GHG emissions



(continued)

FIGURE 3.12**Positive relationship between income levels and GHG emissions (continued)****c. High-income and upper-middle-income countries are responsible for 90 percent of historical emissions**

Sources: Emissions Database for Global Atmospheric Research, Grassi et al. 2023, and World Development Indicators (panels a and b); and PRIMAP-hist data from Güttschow, Pflüger, and Busch 2024 (panel c).

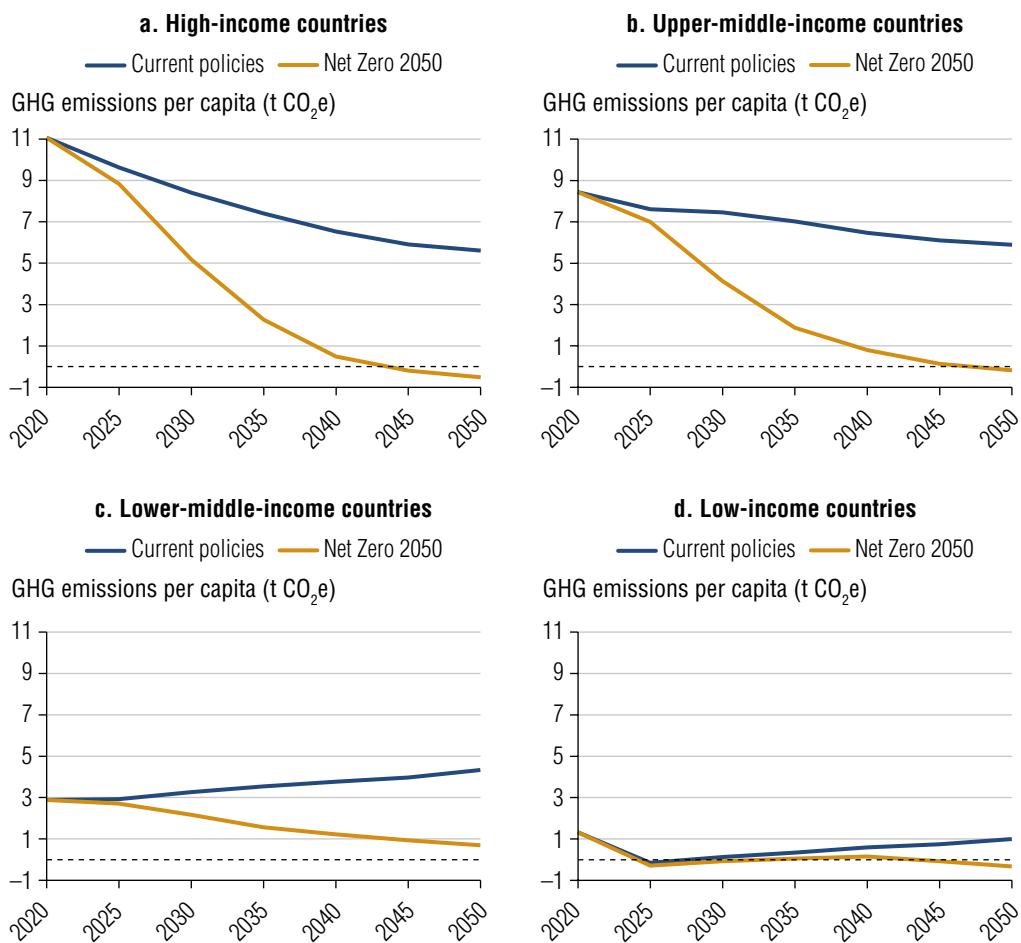
Note: CO₂e = carbon dioxide equivalent; GHG = greenhouse gas; LULUCF = land use, land use change, and forestry. Panel a: Emissions per capita are in tons of CO₂e. Panel b: The 10 economies are Brazil (BRA), China (CHN), Germany (DEU), India (IND), Indonesia (IDN), the Islamic Republic of Iran (IRN), Japan (JPN), the Russian Federation (RUS), Saudi Arabia (SAU), and the United States (US). Data are from 2022. Panel c: CO₂ emissions are cumulative, in gigatons (gt), and do not include emissions from LULUCF. Panels a and c: Country income groups are fixed at 2022 definitions. In panel a, the drop in emissions from low-income countries in 2015 comes from the Democratic Republic of Congo, where LULUCF emissions declined substantially after 2014.

The stock of GHG emissions in the atmosphere is what matters for warming (Eyring et al. 2021; IPCC 2023a). Considering cumulative historical emissions, the differences between income groups become even more apparent. Today's high-income countries have emitted large amounts of CO₂ since the mid-19th century, and upper-middle-income countries have been catching up quickly over the last 40 years (figure 3.12, panel c). As of 2022, high-income and upper-middle-income countries were responsible for 90 percent of all historical CO₂ emissions, of which roughly two-thirds came from high-income countries. On the other hand, low-income countries have contributed less than 1 percent of historical CO₂ emissions.

In prioritizing mitigating emissions, how emissions are evolving should also be considered. Figure 3.13 shows how emissions per capita are projected to evolve under current policies and under the Net Zero 2050 scenario between income groups (NGFS 2023). GHG emissions from high- and upper-middle-income countries emissions are projected to decline under current policies, but not nearly fast enough to limit warming to around 1.5°C. To reach this goal, additional CO₂ emissions will need to fall to practically zero in these countries. In addition, lower-middle-income countries do not contribute much to emissions today but without action, they will have a significant role in total emissions in a few decades.

FIGURE 3.13

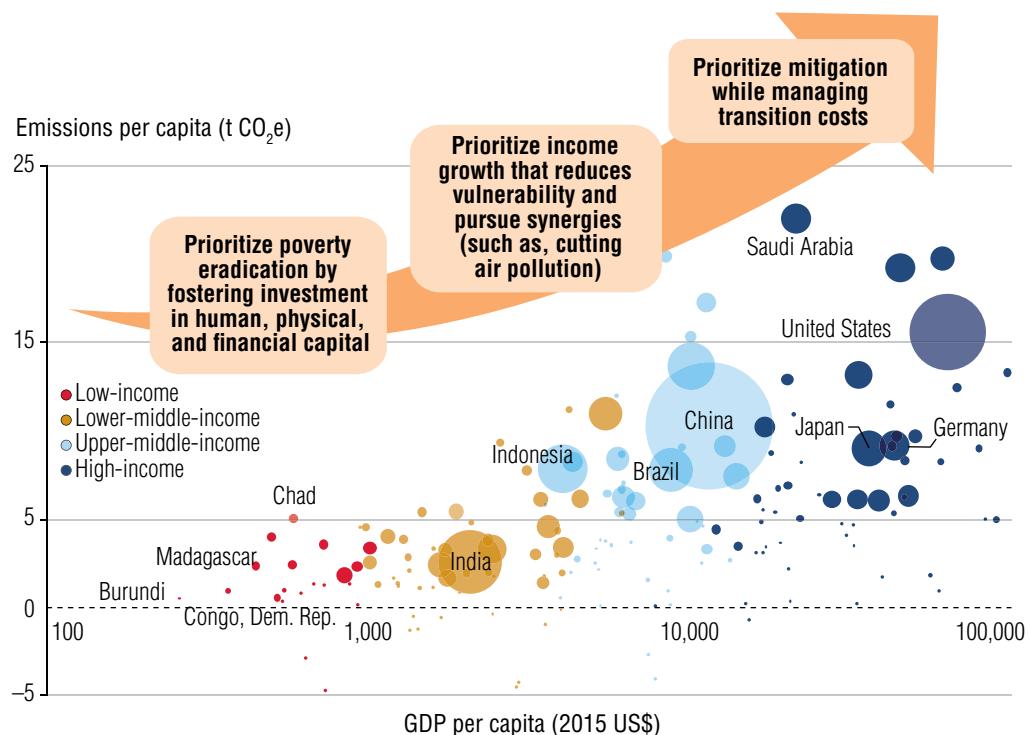
Projected movement toward Net Zero 2050 by country income groups shows that high-income and upper-middle-income countries must lead the transition



Source: NGFS 2023.

Note: GHG = greenhouse gas; NGFS = Network for Greening the Financial System; t CO₂e = tons of carbon dioxide equivalent. Emissions per capita are shown in tons (t) of CO₂e. Emissions from NGFS (2023) are adjusted to match levels in 2020 in figure 3.6. Emissions come from the NGFS Net Zero 2050 scenario.

Figure 3.14 brings these considerations together and illustrates a simplified way to identify priorities. Importantly, each unique situation requires its own tailored solutions, and the results from this report do not aim to be prescriptive for a specific country. Country-specific studies are recommended to guide prioritization at that level (for example, World Bank Country Climate and Development reports). The following discussion aims to shed light on where attention should be placed from a broader global perspective.

FIGURE 3.14**Priorities to advance on the interlinked goals**

Source: Emissions Database for Global Atmospheric Research, Grassi et al. 2023, and World Development Indicators, <https://databank.worldbank.org/source/world-development-indicators>.

Note: GDP = gross domestic product; GHG = greenhouse gas; t CO₂e = tons of carbon dioxide equivalent. The sizes of the bubbles indicate total GHG emissions. Negative emissions occur when ecosystems absorb more carbon than the country emits. A few small countries with very high per capita emissions (Bahrain, Guyana, Iceland, Kuwait, Oman, Palau, Qatar, Trinidad and Tobago, and the United Arab Emirates) and countries with very low per capita emissions (the Central African Republic and Vanuatu) are omitted for visual purposes. The horizontal axis uses a logarithmic scale.

Low-income settings: Prioritize poverty reduction by fostering investments in human, physical, and financial capital

Economic growth has been neither large enough nor inclusive enough to reduce poverty significantly in low-income settings, as discussed in chapter 1. In these settings, greater economic growth is an essential foundation to support poverty reduction and build resilience. To successfully translate growth into gains in poverty reduction, efforts need to be focused on creating opportunities for those at the bottom of the income distribution and reducing high inequality. It is also important to reduce vulnerability to shocks by enhancing risk management (knowledge, protection, insurance, and coping; discussed in part 1 of this chapter). Fast growth that creates jobs and improves the productive capacity of poorer households (for instance, investing in human capital) is important to serve the dual function of increasing

incomes and improving resilience. Yet investments in education in low-income countries remain very low.²² Supporting stability, economic and spatial transformation, and the well-functioning of urban labor markets will be key.

For low-income countries, this process should not come with high GHG emissions. Low-income countries barely contribute to emissions, and emissions are not expected to grow significantly under current policies (figures 3.6, panel b, and 3.13, panel d). Still, low-income countries must be careful to avoid locking into carbon-intensive technologies and growth paths that will become more costly and less efficient in the future, and they must aim to pursue synergic polices (Hallegatte, Rentschler, and Rozenberg 2019). As discussed above, today low carbon is most often also the lowest cost option, and there are synergies between renewable energy and economic growth. The initial financing costs of infrastructure and electrical grids and limited regulatory environments remain the largest barriers for a green energy transition in low-income countries (World Bank 2023f). This is where international financing plays a key role in enabling such countries to invest in future-oriented technologies now and to not lock in on a pathway that will leave them with inefficient and stranded assets in the future (Hallegatte, Rentschler, and Rozenberg 2019).

Middle-income countries: Prioritize income growth that reduces vulnerability and synergies such as cutting air pollution

Growth in middle-income countries needs to continue and accelerate to lift people above the poverty lines of \$3.65 and \$6.85 per day, but many countries in this group are stuck in a middle-income trap (World Bank 2024g). As for low-income countries, fast growth that creates jobs and investments to increase the productive capacity of the poorer households are important. This needs to be complemented with measures to improve risk management.

At the same time, the GHG emissions of many middle-income countries cannot be neglected. Even though lower-middle-income countries contribute less than higher-income countries to GHG emissions now (19 percent of total emissions in 2022), with current policies their emissions will increase over the next decades (figure 3.13, panel c) and will surpass those of upper-middle-income countries in the 2040s and higher-income countries by 2030 in absolute terms. Therefore, it is essential that lower-middle-income countries start transitioning to a less carbon-intensive pathway soon (figure 3.15 shows primary energy and electricity generation pathways under the NGFS Net Zero 2050 scenario).

Since growth needs to be less carbon intensive, it is vital to identify some synergistic policies that can make a significant contribution to all goals and scale them up. For example, tackling air pollution is a clear area with multiple gains. In countries where agriculture is important, climate-smart agriculture and repurposing agricultural subsidies could be important areas of action. Investing early in renewable energy investments, which would significantly reduce emissions going forward, reduce transition costs in the future, and help meet the growing energy demand and energy security needs, is also key.

High-income and upper-middle-income countries: Accelerate mitigation while managing transition costs

The quickest way to reduce future climate risks is for high-income and upper-middle-income countries with high emissions to drastically cut their emissions while managing transition costs. Wealthier nations accelerating actions to reduce current emissions could significantly affect global emissions and alter the distribution of future environmental risks worldwide. Upper-middle-income countries also have significant populations at risk from extreme weather events, so it is in their own populations' interest to act on reducing GHG emissions.

High-income and upper-middle-income countries need to prioritize and accelerate the shift away from primary energy generated by fossil fuels, which would have to fall by around 60 percent by 2035 and by 90 percent by 2050 in comparison to 2020 levels (figure 3.15, panel a). The use of energy will also need to become more efficient.²³ Recent evidence indicates that countries with significant renewable potential, such as Brazil, can fully decarbonize their power systems without higher costs or compromising resilience.

In contrast to lower-income countries, high- and upper-middle-income countries are in a better position to leverage funds and technology to transition to net zero. Research and development are needed to spur technological innovation to accelerate progress in fully decoupling economic growth from GHG emissions. Several countries have already managed to decouple growth from emissions, and more need to follow. Fostering technology infusion and innovation in upper-middle-income countries will be decisive for those countries to raise incomes while lowering emissions and to transition to high-income status (see World Bank 2024g). These processes can catalyze a widespread adoption of renewable energy, the deployment of which requires a higher level of technological sophistication. Furthermore, middle-income countries need to reduce barriers to the expansion of renewables, for instance, by ensuring that power dispatch follows the lowest marginal cost, which is not the case in many countries (World Bank 2024g). However, it will be important to manage transition costs to protect their more vulnerable populations.

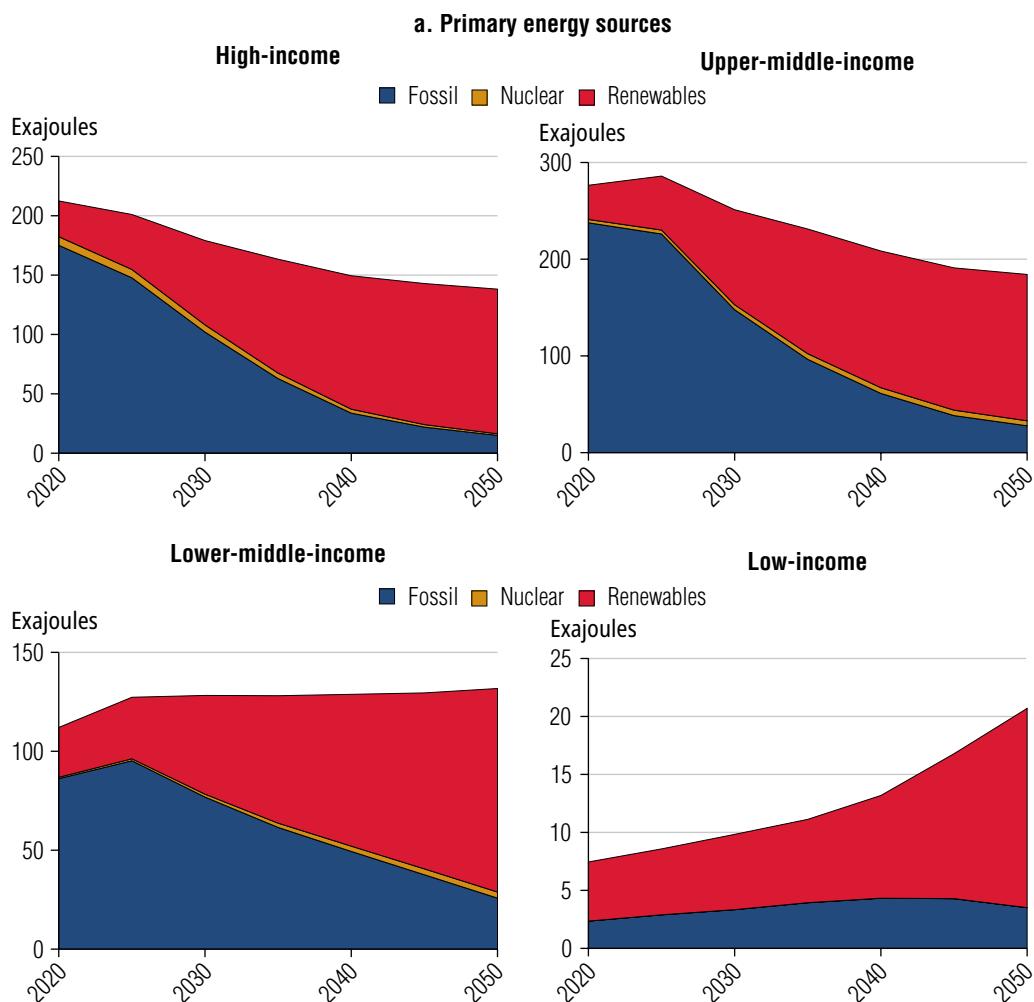
Swift and coordinated global action is essential to meet these critical goals

There are pressing needs for more and better alignment of funding and stronger international cooperation to meet the escalating challenges posed by climate change and development goals. International cooperation to achieve the Sustainable Development Goals (SDGs) and climate goals is ongoing but faces significant challenges and requires urgent action and increased investment. The United Nations *World Economic Situation and Prospects 2024* report highlights the need for robust global cooperation to tackle economic vulnerabilities, rising interest rates, and climate disasters. The report stresses that without significant investments in sustainable development and climate action, achieving the SDGs will remain elusive (United Nations 2024; United Nations and Inter-Agency Task Force on Financing for Development 2024).

The financing gap for sustainable development is growing, with many developing countries lacking access to affordable finance and facing high debt burdens, which hinder their ability to invest in both development and climate resilience (United Nations and Inter-Agency Task Force on Financing for Development 2024; World Bank 2024b). Estimates suggest that an additional annual investment of \$4 trillion is needed to meet the SDGs by 2030 (United Nations and Inter-Agency Task Force on Financing for Development 2024). Despite reaching the \$100 billion climate finance goal in 2022, significant gaps remain. More financing is needed for adaptation and building resilient infrastructure in the first place. Climate adaptation costs alone for developing countries are expected to be between \$160 billion and \$340 billion annually by 2030 (UNEP 2022).

FIGURE 3.15

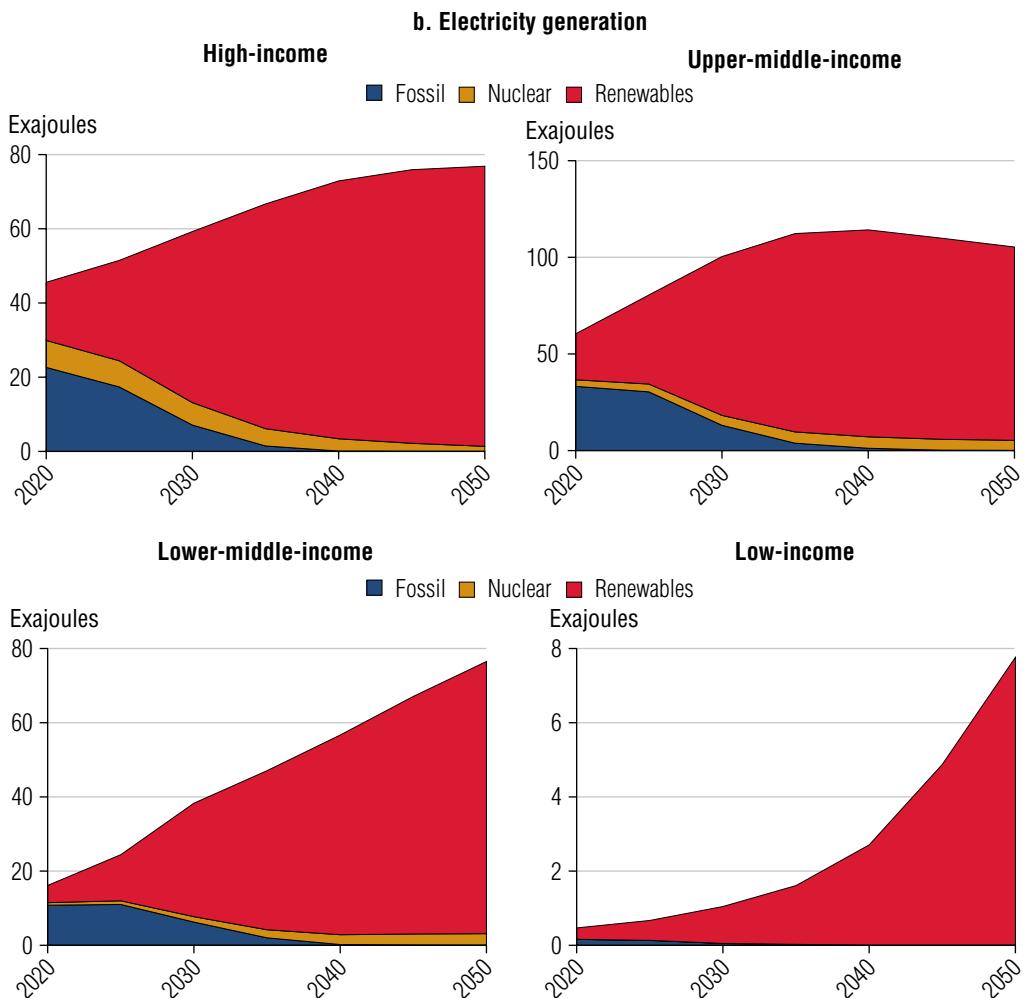
Amounts of primary energy and generation of electricity from fossil sources need to decline massively to reach net zero by 2050



(continued)

FIGURE 3.15

Amounts of primary energy and generation of electricity from fossil sources need to decline massively to reach net zero by 2050 (continued)



Source: NGFS 2023.

Note: NGFS = Network for Greening the Financial System. Primary energy and the generating of electricity (in exajoules) are plotted and come from the NGFS Net Zero 2050 scenario.

In particular, lower-income countries will need substantial and immediate investment in both adaptation and mitigation actions (World Bank 2024b). For instance, there is a significant gap between the required and actual funding for climate adaptation and mitigation in Sub-Saharan Africa. Current international adaptation finance flows are estimated to be 5 to 10 times below the needed levels. Current adaptation costs in Africa are estimated to be in the range of \$7 billion to \$15 billion per year, with projections suggesting that this could rise to \$35 billion annually by the 2040s and up to \$200 billion per year by the 2070s if warming exceeds 2°C. If no adaptation measures are implemented, costs could escalate to 7 percent of Africa's GDP by 2100 (UNEP 2022).

The implementation of development and climate policy solutions requires a robust financial framework capable of navigating the fragmented global aid landscape—effectively incorporating domestic resource mobilization with external funding sources, including concessional funding. In particular, it is crucial to promote a greater balance and complementarity between leveraged and unleveraged approaches to aid delivery (see box 3.5 for a discussion of the current challenges in the aid ecosystem). Scaling up both public and private financing for SDGs and climate investments also entails closing policy gaps, enhancing international cooperation, and reforming financial institutions to provide more substantial and sustainable support.

BOX 3.5
The increased fragmentation of aid

The global aid system has evolved significantly in the last two decades, leading to challenges for recipient countries. The difficulties include increased complexity due to more than 200 donor agencies, fragmentation of financial flows, limited direct funding through national budgets (only 40 percent), and ineffective leveraging of resources. These trends, driven by donor preferences and geopolitical factors, complicate the alignment of national development goals with global challenges, with no clear framework for resource allocation. The impact is most severe in the poorest countries, which struggle with institutional capacity and face inefficiencies in managing multiple donor relationships (World Bank 2024f).

The increased fragmentation of aid is evident in the growing number of donor-funded transactions and the financial scale of aid commitments. From 2000 to 2021, official financial flows (OFFs) grew by 218 percent in real terms, with transactions surging 427 percent. During this period, the average size of official development assistance grants decreased by half, from \$1.7 million to \$0.8 million, which disproportionately burdens countries with weaker capacities because of higher transaction costs (World Bank 2024f).

Despite a more than threefold increase in OFFs to developing countries, there has been a notable shift away from channeling funds through recipient government budgets. By 2021, 80 percent of projects were implemented by nongovernmental entities, primarily through project-type interventions, with about one-fourth of transactions in the last decade channeled through nongovernmental organizations (NGOs). Over two-thirds of these transactions were executed by donor-based NGOs. More than half of the funds bypass country budgets, using channels such as donor governments, multilateral organizations, and NGOs, challenging the effectiveness of aid. Conversely, the International Development Association (IDA) directly allocated 92 percent of its funds to government agencies (World Bank 2024f).

(continued)

BOX 3.5**The increased fragmentation of aid (*continued*)**

There has been significant growth in aid earmarked for specific sectors or themes, especially through vertical platforms. These funding approaches have both benefits and drawbacks. Vertical approaches, effective in addressing specific issues such as human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS) or climate change, achieve economies of scale but typically pass donor funds directly to recipients, limiting resource mobilization. In contrast, horizontal platforms such as IDA amplify every donor dollar into four times the financing, enabling greater resource mobilization and potentially larger long-term impacts (World Bank 2024f).

To address these challenges, a balance between leveraged and unleveraged approaches to aid delivery is essential. This involves combining the advantages of both approaches through cofinancing and partnerships between vertical funds and multilateral development banks (MDBs). Collaboration and partnerships are crucial in an increasingly fragmented global aid landscape to mobilize scarce concessional funds. One potential solution is to optimize earmarked funds through the country-based model of MDBs, such as IDA, which can leverage each donor dollar by a multiple of three or four, expanding the resources available to developing countries (World Bank 2024f).

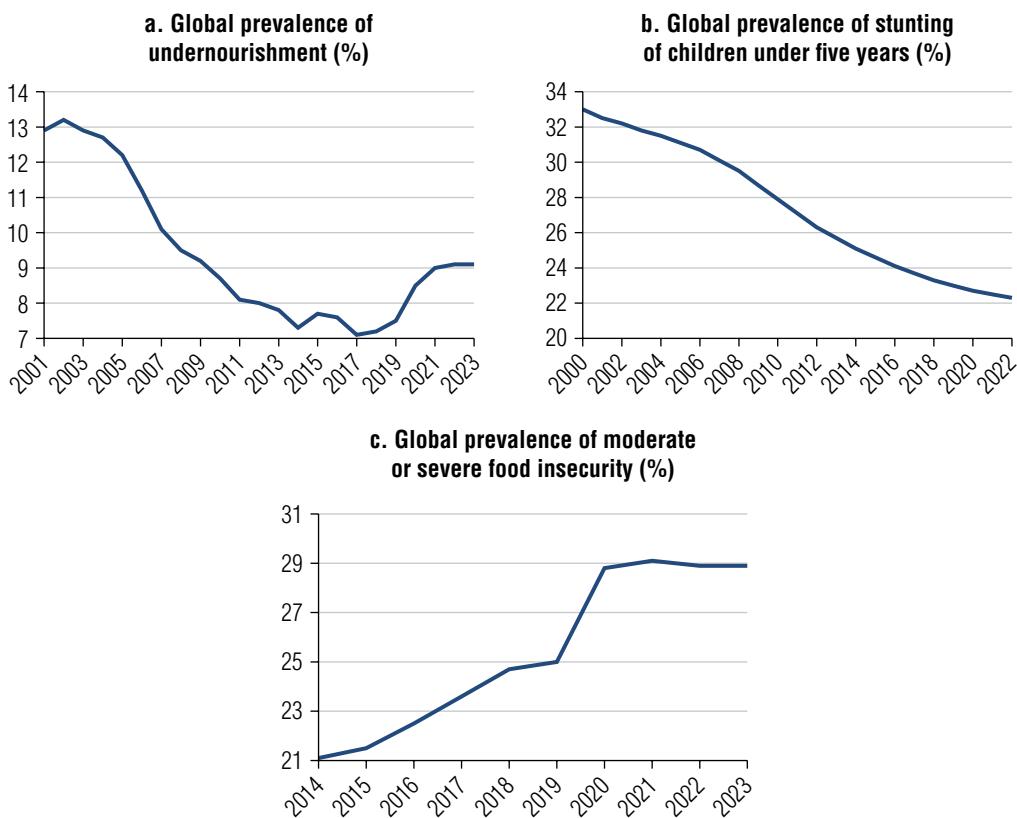
Annex 3A. Progress on food and nutrition security

There have been remarkable gains in food and nutrition security (FNS) over the past decades. Figure 3A.1, panel a, illustrates that the global prevalence of undernourishment was reduced by more than one-third, dropping from 13 percent in 2000 to below 8 percent in 2018 (FAO et al. 2023). Between 2000 and 2022, global stunting rates have improved by similar amounts (figure 3A.1, panel b), in part driven by improvements in the quantity and quality of calories consumed, as monetary poverty has rapidly declined over the same period (see chapter 1 of this report). These gains in FNS have made important contributions to improving immediate and lifelong outcomes for both children and adults (UNICEF 2022b).

However, global events over the past decade threaten the sustainability of those gains and illustrate the urgency with which FNS needs to be supported globally. Increasing numbers of prolonged conflicts across the world have increased the number of people living in food emergencies (FSIN and Global Network Against Food Crises 2024); countries across the world have not fully recovered from the significant job losses associated with the COVID-19 pandemic (World Bank 2022a); high global food price inflation has adversely affected net consumers of food, particularly those in urban areas (FAO et al. 2023); conflicts—including Russia’s invasion of Ukraine—have affected significant producers of food on which much of the world relies (FAO et al. 2023); and incomes of poor agricultural producers worldwide are already in decline because of a changing climate and are stretched in the short term by the need to invest in more sustainable production techniques (Barrett, Ortiz-Bobea, and Pham 2023).

Figure 3A.1, panel a, illustrates that the prevalence of undernourishment is already on the rise globally and has been close to 10 percent since 2021. There is a stark regional imbalance in undernourishment. Of the countries with available data, the prevalence is particularly high in Sub-Saharan Africa (22 percent) and South Asia (16 percent). Fragility and conflict aggravate limited access to food and nutrition, with 21 percent of the population in fragile and conflict-affected situations being undernourished. Similarly, the global prevalence of the population that is either moderately or severely food insecure has risen from 22 percent in 2015 to 29 percent in 2023 (figure 3A.1, panel c). Chapter 4 discusses the measurement of food and nutrition insecurity in more detail.

Governments across the world and international organizations recognize this challenge and are working together to increase momentum to support FNS and to achieve SDG 2 (no hunger). For example, between April 2022 and June 2023, the World Bank Group Global Crisis Response Framework made available \$45 billion to respond to the global FNS crisis, striking a balance between emergency needs and long-term investments in resilience across multiple sectors for lower- and middle-income client countries (World Bank 2022a). Building on this experience, FNS is also one of the six newly announced World Bank Global Challenge Programs, which will leverage existing and new financing and partnerships, amplify knowledge and learning, and streamline processes (World Bank 2023h). Continued action across the world is needed to achieve SDG 2, where achieving the goal was unlikely even before recent setbacks (FAO et al. 2023).

FIGURE 3A.1**The evolution of World Bank Vision and Scorecard indicators for food and nutrition security**

Sources: Panels a and c are reported by the Food and Agriculture Organization (FAO); panel b is reported by the United Nations Children's Fund, the World Health Organization, and the World Bank, all accessed through the FAOSTAT database.

Annex 3B. Measuring climate risks: The percentage of people at high risk from climate-related hazards globally

Measuring risk from climate hazards is a complex and data-intensive endeavor. Background work by Doan et al. (2023) developed a methodology to estimate the *percentage of people at high risk from climate-related hazards globally*. This indicator builds on the IPCC (2023b) framework in which risk is the combination of hazard, exposure, and vulnerability. People are considered at high risk from climate-related hazards if they are exposed to at least one of four hazards (floods, droughts, heat waves, and cyclones) and are identified as highly vulnerable on at least one of seven dimensions of vulnerability (that is, if they have a propensity to be adversely affected or unable to cope with the impacts). See figure B3.1.1 in this chapter for an overview of the indicator. Chapter 4 discusses in more detail measurement challenges with respect to the indicator and some areas in which the indicator will be updated in future rounds.

Measuring hazards and exposure

A hazard is the potential occurrence of an extreme event. Evidence shows that weather hazards are key for determining climate risk (Hallegatte, Fay, and Barbier 2018; Hallegatte, Vogt-Schilb et al. 2016). While this measure does not cover all climate-related events, the four hazards considered have been documented to significantly affect livelihoods and hinder economic growth and people's welfare in the past (Azzarri and Signorelli 2020; Dang, Cong Nguyen, and Trinh 2023; Hill and Porter 2017; Hsiang 2010). Climate change will exacerbate the frequency and severity of hazardous events, increasing climate risks to people going forward. Focusing on these hazards enables the combination of data from 168 economies to produce a global indicator.

Defining the population exposed to climate-related hazards requires specifying an intensity threshold and return period for each type of event. The first threshold specifies an intensity (in physical units) that must be exceeded for a particular location to be considered exposed. The return period specifies a minimum frequency of above-threshold events for a location to be considered exposed. The intensity threshold helps focus the indicator on the population exposed to events that have the potential to cause significant impacts. The return period focuses the indicator on exposure to events that are relatively likely to occur.

Table 3B.1 lists the intensity thresholds used to define the exposed population. The return period used is 100 years (except for droughts; see chapter 4), which means that people have a greater than 50 percent chance of experiencing the respective shock in their lifetime (using average global life expectancy).

TABLE 3B.1
Hazard thresholds

Hazard	Intensity threshold
Agricultural drought	> 30% cropland or grassland affected by severe drought
Flood	> 50-cm maximum inundation depth
Heat wave	> 33°C maximum 5-day average of daily maximum WBGT
Tropical cyclone	> 37.6-m/s 10-minute average sustained wind speed or equivalent ≥ Category 2 on the Saffir-Simpson scale

Source: World Bank Group Scorecard indicator: the percentage of people at high risk of climate-related hazards globally, <https://scorecard.worldbank.org/en/scorecard/home>.

Note: C = Celsius; cm = centimeter; m/s = meters per second; WBGT = wet bulb globe temperature.

The selected intensity levels are based on the literature and are levels above which an event is considered to have severe effects on people. In the case of drought, the cutoff used follows the severe drought definition by the FAO. In the case of flood, inundation depths of at least 50 centimeters indicate a high risk that bring disruptions to livelihoods and economic activity,

as well as risk to life for select locations and vulnerable groups (Rentschler, Salhab, and Jafino 2022). For a fluvial and marine flood depth of 0.5 meters, Huizinga, de Moel, and Szewczyk (2017) estimate that the average share of residential assets lost ranges from 0.22 to 0.49. Cyclone damage functions also indicate direct economic damage in the range of 0.2 to 0.5 for category 2 wind speeds for most regions, which defines the cutoff used for cyclones (Eberenz, Lüthi, and Bresch 2021). A wet bulb globe temperature threshold of 33°C corresponds to the reference upper limit for healthy, acclimatized humans at rest to keep a normal core temperature, based on international standard ISO 7243 used to assess heat stress on workers (ISO 2017). Heat-related mortality and hospital visits increase significantly around this level.

Measuring vulnerability

Vulnerability is the propensity or predisposition of people to be adversely affected by hazards. Here, vulnerability is proxied by seven indicators measuring (a) the physical propensity to experience severe losses (proxied by the lack of mobility and access to basic infrastructure services, such as water and electricity) and (b) the inability to cope with and recover from losses (proxied by low income, not having education, not having access to financial services, and not having access to social protection). Table 3B.2 summarizes the different dimensions.

TABLE 3B.2

Extreme vulnerability definitions and sources

Vulnerability dimension	Extreme vulnerability cutoff	Source
Inability to cope with losses	Income	People who live below \$2.15/day
	Education	No adults in the households have completed primary education
	Social protection	Household neither receives social transfers nor contributes to social insurance
	Financial inclusion	Household does not have an account (bank, other financial institution, mobile money)
Physical propensity to experience severe loss	Water	Do not have access to improved water
	Energy	Do not have access to electricity
	Transport	Do not live within 2 km of an all-season road (if in a rural area)

Source: World Bank Group Scorecard indicator: the percentage of people at high risk of climate-related hazards globally, <https://scorecard.worldbank.org/en/scorecard/home>.

Note: ASPIRE = Atlas of Social Protection Indicators of Resilience and Equity; GED = Global Electrification Database; GMD = Global Monitoring Database; GSAP = Global Subnational Atlas of Poverty; km = kilometers; JMP = Joint Monitoring Programme; RAI = Rural Access Index.

Proxying ability to cope

The first dimension of inability to cope is not having income to manage the impact of shocks. The aim of this measure is to identify individuals who have incomes that are too low to be able to meet basic needs if a shock to incomes occurs. The second dimension is educational attainment. This measure captures both a household's ability to understand and respond to risk information such as weather forecasts and early warnings and their ability to switch livelihoods when facing climate-related shocks. The third dimension is access to public support, or social protection. There is considerable evidence that cash transfers help households manage shocks. For this dimension, households are identified as highly vulnerable if they neither receive social transfers nor contribute to social insurance. The final dimension of the ability to cope is access to financial services. There is a strong body of evidence showing that households borrow after a disaster to meet basic consumption needs, and transfers of money between family and friends in the aftermath of a disaster are also central to household risk management. Access to a bank account is used to indicate whether households have access to financial services to smooth consumption in the face of a shock.

Physical propensity to experience severe losses

The first dimension of physical propensity to experience severe losses is a lack of access to an improved water source. When shocks hit, access to improved drinking water can protect households from contaminated water due to flooding and storms, as well as lessen the impact of droughts. The second dimension is access to electricity. During shocks such as heat waves, households with electricity are much more likely to have assets such as fans that can alleviate the impact. The third dimension is access to services and markets. Access to transport networks plays a pivotal role in enhancing resilience, increasing access to health and other services, and ensuring that households can access alternate employment opportunities and markets for goods.

Combining hazards, exposure, and vulnerability

First, gridded population data (GHS-POP) are overlaid with urbanization data (GHSL) and the hazard data as defined in table 3B.1. Hazard data are resampled to match the population grids, so that each cell is classified exclusively as rural or urban and exposed or not exposed. Agricultural drought is defined to occur only in rural areas. Similarly, the transport indicator is considered to be relevant only for rural areas. Second, most of the vulnerability indicators are representative at subnational units, such as regions. The grids with exposed populations are aggregated to these subnational boundaries. The final indicator of the population at high risk from extreme hazards is calculated by multiplying the share of vulnerable people with the population exposed in the subnational unit, which is aggregated to the national level (see chapter 4 for more details on the imputation process).

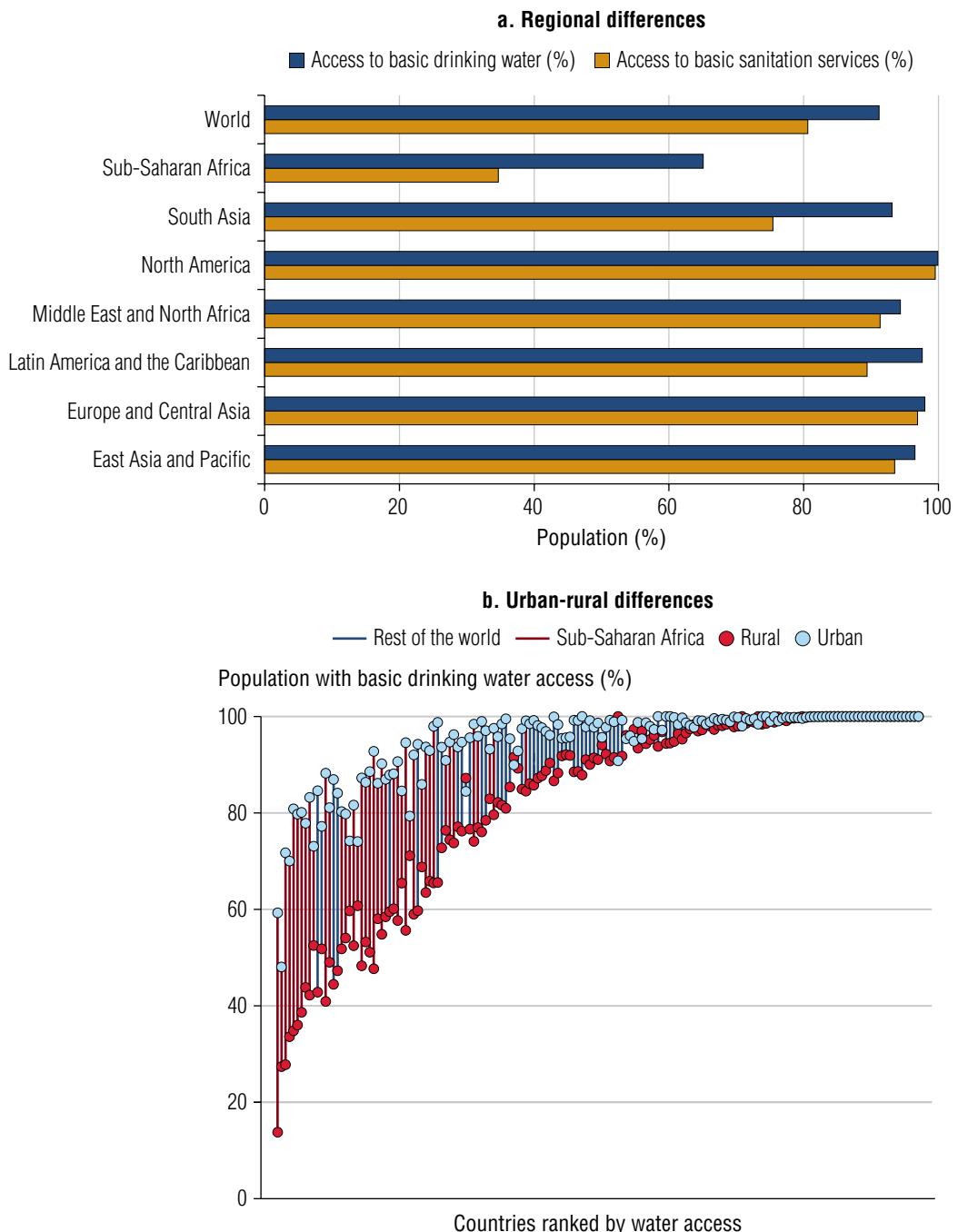
Annex 3C. Enabling access to safe water and sanitation is crucial for well-being and helps reduce vulnerability

Unsafe water and sanitation are leading risk factors for child mortality (Global Burden of Disease Collaborative Network 2022) and early-childhood stunting worldwide (Danaei et al. 2016), affecting human capital and economic growth. Climate change is shifting rainfall patterns and increasing the frequency and intensity of floods and droughts. Without radical change, problems of too much, too little, or too polluted water will only increase.

There are still important gaps in access to safe drinking water, with rural areas and Sub-Saharan Africa lagging behind. While 9 in 10 people across the world have access to basic drinking water, only 7 in 10 people have access to safely managed drinking water. In particular, Sub-Saharan Africa lags behind other regions, with only two-thirds of people having access to at least basic drinking water (figure 3C.1, panel a) and only one-fifth of people having access to safely managed drinking water services.²⁴ For almost 30 percent of the region's population, it takes more than 30 minutes to fetch water (limited water access), or water comes from unprotected wells or springs (unimproved water access). For 6 percent of the region's population, surface water is the only source of drinking water (WHO/UNICEF Joint Monitoring Programme 2024). Gaps in access to basic drinking water are significantly larger in rural areas (figure 3C.1, panel b).

Regional differences in access to basic sanitation are even starker than for drinking water. In Sub-Saharan Africa, only one-third of the population has an improved sanitation facility not shared with other households, while 18 percent uses shared facilities, 31 percent relies on unimproved sanitation facilities, and 17 percent does not have access to any sanitation facility. In the other regions, at least three-quarters of the population is able to access improved sanitation facilities not shared with other households. In South Asia, 9 percent has no facilities and 12 percent shares facilities.

About 450 million people globally live in areas where poverty is high and water access is low, and about 1 billion people live in areas where poverty is high and sanitation access is low (Zhang and Borja-Vega 2024). Water for everyone can help reduce poverty and improve well-being while making populations more able to cope with negative climate effects. Drinking water is vital for human survival, and that water must be clean for a healthy and productive life. Clean water and safe sanitation have an impact on all phases of human development, especially for children's health and education, which shape their future economic prospects (Andres et al. 2018; Gould, Lavy, and Paserman 2011). Safe water and sanitation are also important for fostering gender equality and social inclusion, as it is often women and girls who bear the responsibility of collecting water, and lack of clean water and safe sanitation facilities reduces girls' school attendance (Adukia 2017; Koolwal and van de Walle 2013).

FIGURE 3C.1**Regional and urban-rural differences in access to water**

Source: WHO/UNICEF Joint Monitoring Programme 2024 data, accessed through the World Development Indicators, <https://databank.worldbank.org/source/world-development-indicators>.

Note: Panel a shows the population with access to basic drinking water and basic sanitation services. Panel b shows the share of urban and rural populations with access to basic drinking water by country. Solid red lines indicate that the country is located in Sub-Saharan Africa. Blue lines indicate that the country is outside Sub-Saharan Africa.

Actions on water and sanitation also need to consider impacts on GHG emissions. Wastewater accounts for 5 percent to 8 percent of human-caused methane emissions, and modern sanitation infrastructure and wastewater treatment can help reduce overall GHG emissions (Ocko et al. 2021; Song et al. 2023). A recent study in Kampala, Uganda, showed that high emissions from on-site sanitation systems (used extensively throughout cities in lower-middle-income countries) constituted more than half the city's total emissions (Johnson et al. 2022). Moreover, prioritizing climate action, demand management strategies, reductions in nonrevenue water,²⁵ and a circular economy while transitioning toward energy-efficient water utilities alongside sustainable and effective water management can substantially contribute to climate change mitigation and adaptation.

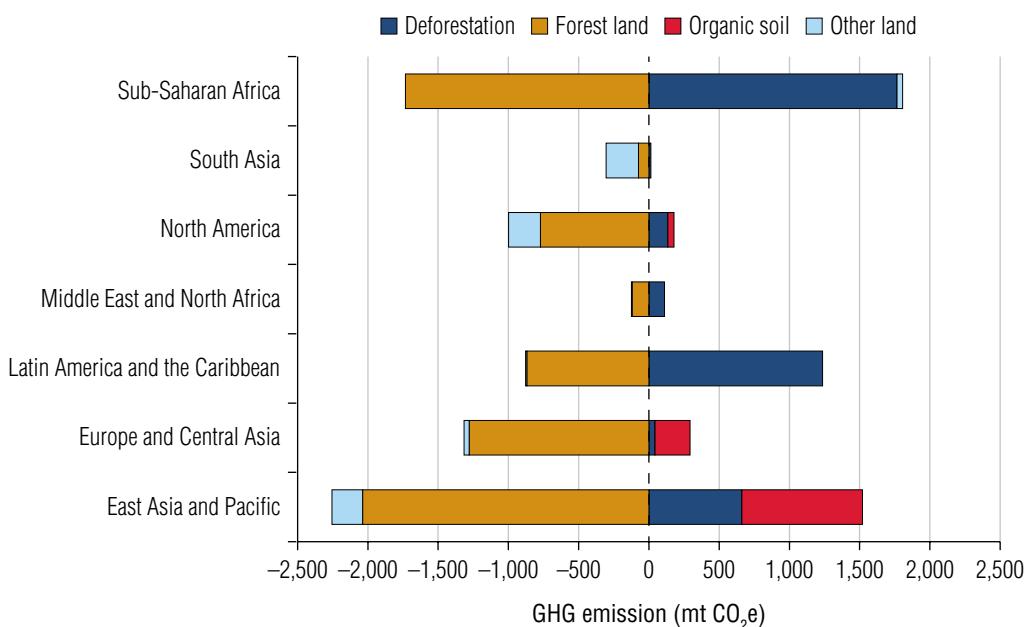
Annex 3D. Healthy ecosystems—zooming in on the importance of forests

Healthy ecosystems are crucial for mitigating climate change by absorbing CO₂ and acting as carbon sinks. Terrestrial ecosystems not only reduce annual anthropogenic CO₂ emissions by around one-third (IPCC 2023b), but also provide numerous economic opportunities and reduce vulnerability. Forests support food and nutrition security and materials that are essential to sustain livelihoods (Razafindratsima et al. 2021). Grasslands aid water consumption and agricultural activity by helping filter and purify water and by contributing to soil health by preventing erosion, enhancing soil fertility, and supporting nutrient cycling; furthermore, forested watersheds and wetlands supply 75 percent of the world's accessible freshwater (FAO 2019). Mangroves act as natural barriers against coastal storms and flooding, reducing the impact of natural disasters on vulnerable communities (Menéndez et al. 2020). At the same time, poor populations are also more concentrated in ecologically fragile areas, underscoring the importance of ending environmental deterioration and preserving a healthy ecosystem (Angelsen et al. 2014; Barbier 2010).

Land use change, especially when forest related, can cause significant GHG emissions. Forests are important in absorbing CO₂ emissions from the atmosphere. On the flip side, deforestation is a key cause of GHG emissions and can contribute to climatic risks locally. In the Amazon, for example, deforestation reduces the amount of moisture released into the air by trees and plants, which increases temperatures, and it decreases overall rainfall (World Bank 2023a). Deforestation and forest degradation currently account for 12 percent of global GHG emissions (IPCC 2019).

The world lost 2.6 percent of its forest cover between 2000 and 2021, but there are considerable differences between countries, with 100 of them having *increased* and 91 having *decreased* their net forest cover.²⁶ Sub-Saharan Africa and Latin America and the Caribbean had larger forest area loss rates during this period. Côte d'Ivoire, for example, suffered the largest decline of forest cover (46 percent), and Brazil, while losing a relatively smaller share (10 percent),

experienced the largest decline in total area, given its large forest cover. On the other hand, some countries have managed to partially reverse past deforestation. China has made significant progress, increasing its forest land area by 25 percent, and Europe and Central Asia as a region also increased tree cover. Deforestation is particularly problematic in Sub-Saharan Africa, in Latin America and the Caribbean, and in East Asia and Pacific, where deforestation significantly hinders the positive effect that forests have on emissions (figure 3D.1).

FIGURE 3D.1**Greenhouse gas emissions and capture from LULUCF, 2022**

Source: Emissions Database for Global Atmospheric Research and Grassi et al. 2023.

Note: Values shown are from 2022. CO₂e = carbon dioxide equivalent; GHG = greenhouse gas; LULUCF = land use, land use change, and forestry; mt = megaton.

Tree cover loss results largely from commodity-driven agriculture, shifting agriculture, forestry, and wildfires. Commodity-driven agriculture refers to the permanent removal of forests to produce agricultural commodities or to extract minerals, and it is responsible for 21 percent of tree cover loss. In comparison, urbanization contributes to only 1 percent of tree cover loss. Temporary clearing of trees accounts for three-quarters of total tree cover loss. Wildfires, which are categorized as temporary clearing, alone are responsible for 28 percent of tree cover loss. Despite trees regrowing, this releases significant GHG emissions. Wildfires also significantly contribute to pollution, mortality, and negative health effects (Qiu et al. 2024). Protecting ecosystems will require limiting of land degradation and more efficient agricultural production to secure sustainable food production (Benke and Tomkins 2017; Smith et al. 2014).

Healthy ecosystems are foundational for healthy economies, yet economic growth in the past has come at the cost of declining natural capital. Low-income countries have many opportunities to improve both economic output and environmental outcomes (Damania, Polasky et al. 2023). This balance is important, as the poor rely much more on natural capital for income generation and food security, making them more vulnerable to extreme weather events, rising temperatures, and environmental degradation (Angelsen et al. 2014; Azzarri and Signorelli 2020; Castaneda et al. 2016; Damania et al. 2017; Dang, Hallegatte, and Trinh 2024; Fedele et al. 2021; Ortiz-Bobea et al. 2021).

Notes

1. The other livable planet dimensions are presented as part of the narrative linked to special annexes and will be explored in more detail in upcoming World Bank flagship reports.
2. Differences also exist in the quality of assets, such as housing material, making poorer households more vulnerable to asset loss even at exposure levels similar to those of richer households (Hallegatte, Vogt-Schilb et al. 2016).
3. In addition, slow-onset changes such as sea level rise, desertification, and water scarcity are making some regions less habitable and will also intensify migration. For instance, shrinking freshwater supplies and advancing deserts are pushing communities in regions like the Sahel and the dry corridor of Central America to migrate in search of better living conditions (Clement et al. 2021; Rigaud et al. 2018). However, climate hazards take a toll on household income, which makes it difficult for poor populations to find the means to migrate (Martínez Flores et al. 2024; Zaveri et al. 2021).
4. See World Meteorological Organization (2022); NOAA (2022).
5. The main GHGs that are emitted from human activities and have spurred global warming are CO₂, methane, nitrous oxide, and fluorinated gases. GHGs contribute to warming in different ways. CO₂ has a long lifetime, remaining in the atmosphere on average for hundreds of years. Emissions of CO₂ have historically been the main driver of current temperature rise; hence, reducing CO₂ emissions is essential for the long-term mitigation of global warming (Eyring et al. 2021). Methane is the second largest driver of global warming. Methane does not remain in the atmosphere as long as CO₂ (around 12 years), but it is more potent in absorbing energy and causing warming per unit of mass. The global warming potential enables comparison of the emissions of the different gases and their expression in CO₂ equivalent (CO₂e) terms. CO₂ emissions contribute almost three-quarters of the total annual GHG emissions, and methane contributes about one-sixth.
6. Hallegatte, Rentschler, and Rozenberg (2019) estimated that improving infrastructure resilience of assets exposed to hazards would cost less than 0.1 percent of the GDP of low- and middle-income countries.
7. Please see the following website for more information on losses due to natural disasters: <https://www.statista.com/statistics/612561/natural-disaster-losses-cost-worldwide-by-type-of-loss/#:~:text=In%202023%2C%20there%20was%20a,to%20118%20billion%20U.S.%20dollars>.
8. Warming beyond 1.5°C will increase the magnitude and the share of people substantially exposed to climate hazards (IPCC 2023c).
9. NDCs are climate action plans to cut emissions and adapt to climate change. All parties to the Paris Agreement are required to establish one and update it every five years (<https://www.un.org/en/climatechange/all-about-ndcs#:~:text=Simply%20put%2C%20an%20NDC%2C%20or,update%20it%20every%20five%20years>).
10. Note that some, but not all, Network for Greening the Financial System (NGFS) countries are projected to have no GHG emissions in 2050 in the Net Zero 2050 scenario. Moreover, the Net Zero 2050 scenario refers to net-zero CO₂ emissions only, while total GHG emissions are not net zero across all countries. There is also heterogeneity between the models used by NGFS as to when net-zero emissions need to be reached in order to limit warming to 1.5°C.

11. The emission figures presented in this chapter are production based. Looking only at produced emissions neglects the fact that while some countries may not produce a lot of emissions, they may well consume products that are very emission intensive. East Asia and Pacific, the Middle East and North Africa, and Sub-Saharan Africa produce more emissions than they consume, while North America and Europe and Central Asia have bigger carbon footprints in consumption than in production. Despite richer countries importing slightly more emission-intensive goods, there is little empirical evidence for widespread global outsourcing of carbon production and carbon leakage resulting from climate regulations to date (Franzen and Mader 2018; Friedlingstein et al. 2020; Levinson 2023). Over time, the composition of imports from higher-income countries has shifted toward industries that are less air polluting, while the CO₂ intensity of these industries has remained at roughly same levels (Levinson 2023).
12. The nonenergy sectors, particularly agriculture, emit mostly methane and contribute about 13 percent of total GHG emissions. Land use, land use change, and forestry (LULUCF) reduced global GHG emissions by 5 percent in 2022. While deforestation causes massive GHG emissions, existing forest area and reforestation lead to a net withdrawal of GHG (emissions from LULUCF are discussed in further detail in annex 3D). While the energy sector is key, the focus of actions should depend on the region and country. In Sub-Saharan Africa and Latin America and the Caribbean, for example, agriculture and land use change contribute more to emissions than in other regions, making up almost 40 percent of total emissions. Agriculture produces a large part of methane and nitrous oxide emissions, coming mostly from cattle and other livestock (Poore and Nemecek 2018), and these gases make up 36 percent of emissions in Latin America and the Caribbean and half of emissions in Sub-Saharan Africa. The transportation sector is responsible for one-third of emissions in North America but less than 20 percent in all other regions, while manufacturing and construction are strong factors in East Asia and Pacific, with a share of 18 percent of emissions. Fugitive emissions—GHGs that are unintentionally released into the atmosphere because of leaks or evaporation during the exploration, processing, storage, or transportation of oil, gas, and coal—are comparably high in the Middle East and North Africa. These leaks are often methane emissions, leading to an overall contribution of 26 percent of CO₂ equivalent emissions in the region.
13. See, for example, World Bank Climate Change and Development reports for Benin, Brazil, Cameroon, or Tunisia.
14. For more information, see the World Health Organization website at <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>.
15. As of May 17, 2024, data obtained from <https://data.who.int/dashboards/covid19/deaths?n=0>.
16. Data from Institute for Health Metrics and Evaluation (<https://vizhub.healthdata.org/gbd-results/>).
17. Air pollution here refers to finer PM (less than 2.5 micrometers in aerodynamic diameter), hence PM2.5, which is particularly damaging to health as it can remain airborne for longer, can lodge deep in the respiratory tract, and is hard to avoid since it can easily travel from outdoors to indoors (Aguilar-Gomez et al. 2022). WHO established that PM2.5 annual exposure above 5 micrograms per cubic meter is harmful (Bruce et al. 2015).
18. WHO Interim Target 1 refers to a PM2.5 level of 35 micrograms per cubic meter.
19. The mitigation potential estimates indicate total amount mitigated over time (with a 20-year time horizon) through changes in land use and land management.
20. Ecosystems play many other important roles in reducing climate-related risks. For example, Beck et al. (2018) estimate that annual worldwide damage from coastal flooding would double without coral reefs.
21. Emissions are unequal not only between countries, but also between individuals. Estimates suggest that the richest 10 percent of the population is responsible for about half of world emissions. Furthermore, the richest 1 percent accounts for about 17 percent of global emissions (Chancel 2022). Conversely, the bottom half of the world's population contributes only 12 percent of global emissions. Within-country inequality in emissions is estimated to be larger than between-country inequality (Chancel, Bothe, and Voituriez 2023). By reducing their emissions, wealthier people could ease the burden on the rest of society to curb total emissions.

22. Though there is a consensus of spending at least 4 percent to 6 percent of GDP or 15 percent to 20 percent of public expenditure on education, only 1 in 10 countries and territories meets the 20 percent benchmark, and only 4 in 10 meet the 15 percent benchmark (UNICEF 2022a). In 2021, the average low-income country spent \$56 per student, compared with around \$1,000 in upper-middle-income and around \$8,500 in high-income countries (Bend et al. 2023).
23. The availability of technology for carbon capture and storage is also assumed to increase under the Net Zero 2050 scenario of NGFS, though only at a limited scale. See, for example, the NGFS scenarios portal: <https://www.ngfs.net/ngfs-scenarios-portal/explore/>.
24. These indicators are published by the WHO/UNICEF Joint Monitoring Programme. Definitions of drinking water, sanitation, and hygiene indicators are based on the WHO/UNICEF Joint Monitoring Programme. Access to drinking water considers the following degrees of access: (a) safely managed access: improved water source is accessible on premise, available when needed, and free from contamination; (b) basic access: does not meet improved access criteria, but round trip to collect water from an improved water source takes 30 minutes or less; (c) limited access: improved water source that is more than 30 minutes away (round trip); (d) unimproved access: water source is not “safe,” that is unprotected wells or springs; (e) surface water: the only water source is surface water from a river, dam, lake, stream, or irrigation canal. Access to basic sanitation refers to improved facilities that are not shared with other households.
25. Nonrevenue water refers to water that has been produced and is lost before reaching the consumers.
26. Based on the Forest Extent Indicator from the Global Forest Review. This indicator aims to monitor the total area of forest worldwide, including unmanaged and managed natural forests. The most recently available indicator currently measures tree cover extent in the year 2020 as a best-available proxy for forest. Note that tree cover extent includes planted forests, such as orchards, agricultural tree crops, and monoculture pulp or timber plantations—forms of tree cover that are not considered forests under some definitions. There are hundreds of definitions of “forest” based on factors including land use, patch size, species composition, legal designation, canopy density, height, and more. This indicator relies on the biophysical indicator of tree cover as measured by tree height and canopy density because it can be measured consistently with satellite imagery at a global scale. The tree height data used in this report are based on Potapov et al. (2022), which define tree cover as woody vegetation with a height of at least five meters and a canopy density of at least 20 to 25 percent at 30-meter resolution. This definition includes unmanaged and managed natural forests, tree plantations, and urban forests. A minimum patch size, such as excluding tree cover of less than 0.5 hectares, is also included in many forest definitions but is not applied in this indicator. For more information, see <https://research.wri.org/gfr/data-methods>.

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POVERTY, PROSPERITY, AND PLANET REPORT 2024

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Monitoring the Interlinked Goals

Summary

- *Data are the infrastructure for policy and should therefore be prioritized. Eradicating poverty and boosting shared prosperity on a livable planet requires a solid foundation of evidence.*
- *The analysis presented in this report relies to a large extent on household survey data. While data availability has improved in many countries, less than one-half of the countries in the world had a household survey available for poverty monitoring in 2020 or later. This reflects issues of coverage and accessibility.*
- *The expanded vision of the World Bank, with a new measure on shared prosperity and the inclusion of a livable planet, calls for substantial improvements to the quality of data. New indicators require good coverage of the entire global distribution of income and consumption, granular exposure to climate-related risks, and multidimensional poverty.*
- *In light of the data revolution, significant investments are needed to modernize surveys and accelerate the integration and standardization of various sources of data. At the same time, efforts should focus on leveraging machine learning and artificial intelligence (AI) models to close data gaps and enable more timely monitoring.*

Advancing on these global challenges requires a solid foundation of evidence

Eradicating poverty and boosting shared prosperity on a livable planet requires decisive actions informed by solid evidence. Decisions must be made with a clear understanding of both the trade-offs and the complementarities across objectives. Across the board, more and better data are needed to design solutions to address these complex policy goals and to monitor and manage the impacts on vulnerable populations.

A reproducibility package is available for this book in the Reproducible Research Repository at <https://reproducibility@worldbank.org>.

This chapter summarizes key points regarding data availability and measurement challenges to properly monitor the World Bank's vision. Table 4.1 presents the set of indicators selected to track this progress, encompassing three key dimensions: poverty, prosperity, and a livable planet. The first part of the chapter focuses broadly on household surveys, stressing the value that they have for the monitoring of the Sustainable Development Goals (SDGs) and highlighting ways to modernize and enhance these surveys in light of the fast-changing ecosystem. The second part of the chapter focuses on measurement challenges related to the indicators presented in this report.

TABLE 4.1
World Bank's Vision indicators

Chapter	Vision indicators
1. Poverty	Percentage of global population living in poverty (measured at two poverty lines: less than \$2.15 per day and less than \$6.85 per day)
2. Prosperity	Global average income shortfall from a prosperity standard of \$25 per day Number of economies with high inequality
3. Livable Planet	Global greenhouse gas emissions (gigatons of carbon dioxide equivalent [CO ₂ e]) Percentage of people at high risk from climate-related hazards globally Millions of hectares of key ecosystems globally Percentage of people facing food and nutrition insecurity globally Percentage of people with access to basic drinking water, sanitation services, or hygiene globally

Source: World Bank, n.d.

Note: \$ = 2017 purchasing power parity dollars.

Household surveys are at the core of SDG monitoring but need to be adapted to a new data ecosystem

Household survey data continue to be at the core of the monitoring of the SDGs, as well as the World Bank's vision. Several SDGs rely heavily on survey data to monitor progress, assess needs, and evaluate the effectiveness of policies and interventions.¹ These surveys are behind the construction of more than one-third of the 234 SDG indicators (Carletto et al. 2022).

For this report, household income and expenditure survey data are needed to track poverty, multidimensional poverty, shared prosperity, and high inequality and are also the basis for quantifying the share of people at risk to extreme weather events. In addition, these data are foundational for modeling and projecting the potential impacts of climate change on welfare and for understanding trade-offs and short-term costs related to climate policies for people.

Despite progress in the availability of household survey data, challenges remain, particularly for the poorest countries

Although significant strides have been made in improving the availability and quality of household surveys over the past decade, challenges remain. They include persistent issues

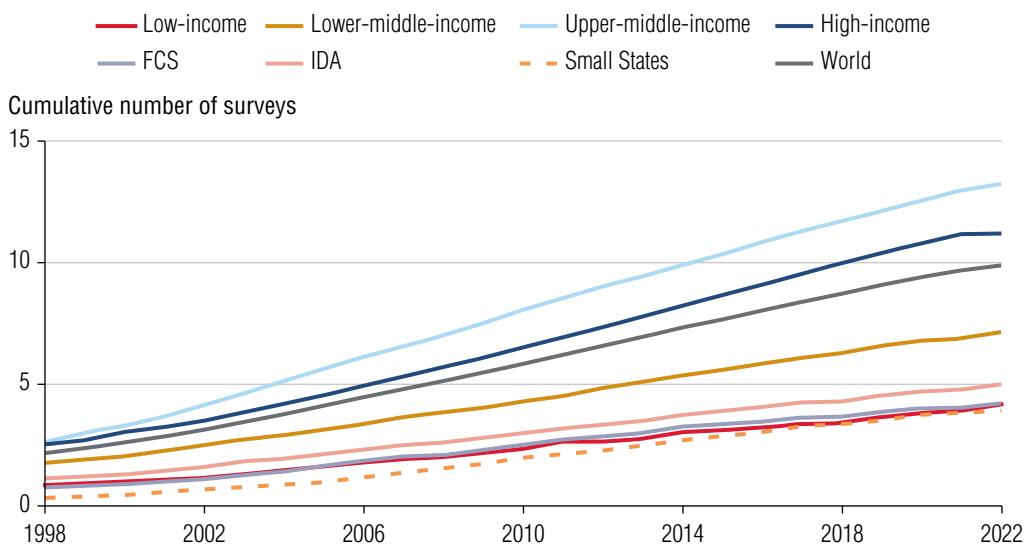
MONITORING THE INTERLINKED GOALS

with availability, coverage, accuracy, timeliness, affordability, policy relevance, and usability, particularly in low-income countries that would gain the most from enhanced survey data (Carletto et al. 2022).

One clear example relevant to this report is household income and expenditure surveys. Overall, there has been substantial progress in the availability of household survey data containing information on income, consumption, or both that allows tracking of SDG 1 (no poverty) and SDG 10 (reduced inequalities). Globally, between 1998 and 2022, the average number of available survey data sets per country increased from 2.1 to 9.9, almost a fivefold increase (figure 4.1). Upper-middle- and high-income countries drove this progress. However, more survey data have also become available for lower-income countries, with improvements in data quality, frequency, and processing time.²

This progress is manifested in the reduction in the time lag in survey-based global poverty figures (SDG 1). For example, this report has only a two-year lag in reporting baseline global estimates, compared with three years for previous editions.³ Despite the COVID-19 (Coronavirus) pandemic, there has been sufficient survey data coverage for the world for this report to present baseline poverty data and shared prosperity data through 2022.

FIGURE 4.1
The number of household budget surveys has increased in all regions, 1998–2022

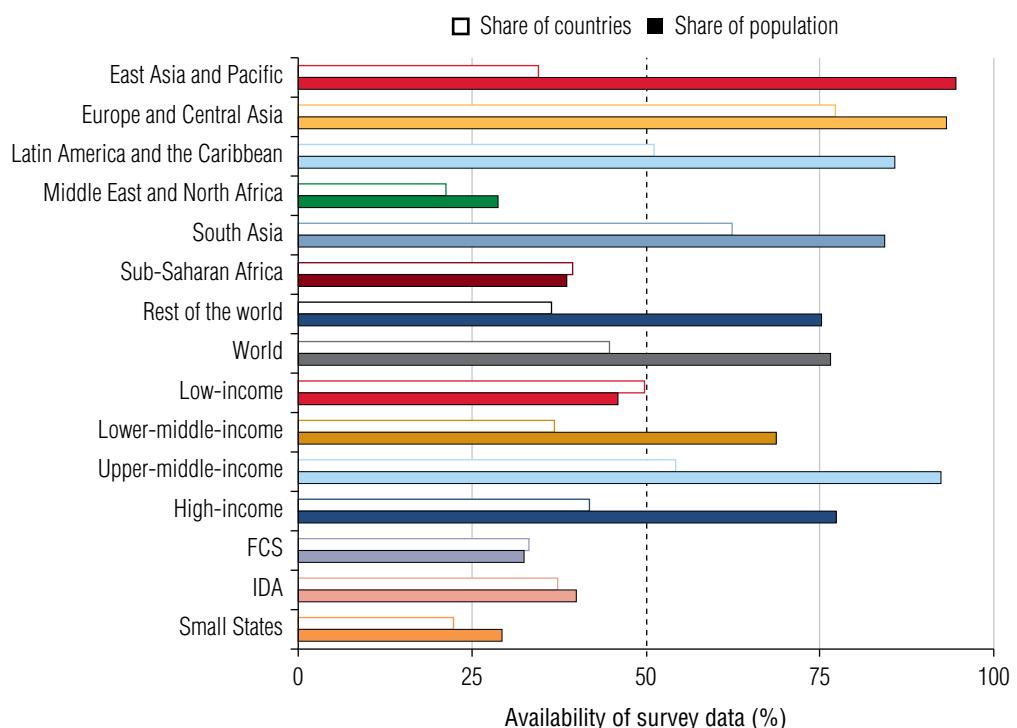


Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: FCS = fragile and conflict-affected situations; IDA = International Development Association. The classification of countries by FCS, by inclusion in the World Bank's IDA, and by income status is based on the data for 2022. IDA countries are those eligible for grants and concessionary loans from the IDA, which provides support to the poorest countries in the world (consisting of low-income countries and some countries in other income groups).

Despite progress, fewer than one-half of the countries around the world had a survey available for 2020 or later for global SDG 1 monitoring (figure 4.2). This limited availability of data reflects issues of limited or infrequent data collection, the lack of statistical capacity, fragility, or reluctance and delay in sharing data because such data are politically sensitive. Less than one-half of low-income or fragile countries and Small States have a survey since 2020 available. These countries have consistently had the least amount of survey data since 1998, and the pace of progress is slow compared with that of richer countries.⁴ For this report, two key regions (Sub-Saharan Africa and the Middle East and North Africa) do not have sufficient data coverage for global poverty monitoring and therefore rely on nowcasts based largely on data from before the COVID-19 pandemic. For the most populated countries (for example, the Arab Republic of Egypt, Ethiopia, Mozambique, and Nigeria), survey microdata are available but have not been released in time for this report. The limited number of recent survey data has important implications for the reliability of global poverty estimates, especially for these data-deprived regions and country groups.

FIGURE 4.2
Less than one-half of the countries in the world have data available for global monitoring of poverty in 2020 or later



Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: FCS = fragile and conflict-affected situations; IDA = International Development Association. The figure shows the share of countries and share of population that is covered by a survey for 2020 or later. The classification of countries by FCS, by inclusion in the World Bank's IDA, and by income status is based on the data for 2022. IDA countries are those eligible for grants and concessionary loans from the IDA, which provides support to the poorest countries in the world (consisting of low-income countries and some countries in other income groups).

Surveys need to be modernized and adapted to a new data ecosystem

The data ecosystem has dramatically changed, and household surveys need to be adapted. Urbanization and higher income levels tend to make data collection harder and reduce response rates (Carletto et al. 2022). The COVID-19 pandemic also disrupted statistical systems. Between 2020 and 2022, data openness improved only marginally and data availability did not grow for the first time in six years (Open Data Watch 2023). These developments reflect the impact of the pandemic disruptions, particularly in countries without experience in remote data collection, signaling a strong need for increased investment to build resilient data systems. Moreover, the world is undergoing a data revolution with an increasing number of data sources, big data, and more powerful modeling, as well as new technologies to engage users and producers of data. Keeping current with these trends requires thinking about how surveys can be modernized to respond to challenges and leverage new opportunities.

At the technical level, an assessment done by the World Bank's Living Standards Measurement Study and the United Nations Statistics Division, under the guidance of the Inter-Secretariat Working Group on Household Surveys, identified eight key technical priorities for household surveys in the coming decade. These priorities were selected on the basis of three main criteria: (a) areas that have demonstrated success or hold significant potential for medium-term impact, (b) areas that strengthen the data foundation while advancing research and development, and (c) areas most likely to benefit low- and middle-income countries, where improvements are most urgently needed. The priorities are as follows: (a) enhancing the interoperability and integration of household surveys; (b) designing and implementing more inclusive, respondent-focused surveys; (c) improving sampling efficiency and coverage; (d) expanding the use of objective measurement technologies; (e) building capacity for computer-assisted personal interviewing, phone, web, and mixed-mode surveys; (f) systematizing the collection, storage, and use of paradata and metadata; (g) incorporating machine learning and AI for data quality control and analysis; and (h) improving data access, discoverability, and dissemination (Carletto et al. 2022).

While increased funding for data is essential, surveys must also become more efficient and nimbler, with a strong emphasis on data integration

Collecting traditional survey data can be very expensive, which is one reason why these surveys are usually undersupplied (Chin 2021).⁵ With constrained budgets, it is hard to prioritize data investments vis-à-vis other development needs.⁶ Lower-income countries experience a funding gap, which is partially filled by multilateral and bilateral donors. In 2021, the annual funding required by countries eligible for International Development Association (IDA) or International Bank for Reconstruction and Development financing to produce core statistics was estimated at \$6.2 billion, with \$1.4 billion sourced externally.⁷

The Atkinson Commission report on global poverty recommends greater financial investments in data and data systems, as well as international coordination and accountability for data (World Bank 2017).

However, as budgets are always tight, investing in making data collection more efficient and nimbler is also key. With the ongoing data revolution, enhancing the interoperability and integration of household surveys with censuses, geospatial data, administrative records, and nontraditional sources, such as satellite data and call-detail records, can increase the cost-effectiveness and relevance of survey data. This interoperability can improve accuracy and granularity in both spatial and temporal resolution, but it is possible only through data integration. One successful application is the linkage of survey data and census data with geospatial data for poverty mapping (Corral et al. 2022; Corral, Henderson, and Segovia 2023; Elbers, Lanjouw, and Lanjouw 2003; Hentschel et al. 2000).⁸

For example, georeferencing is key for integrating data with spatial features and enhancing the granularity of information. Georeferenced survey data can help validate and calibrate machine learning models that combine these data with satellite imagery and geospatial data to derive estimates of poverty, asset wealth, and agricultural outcomes at high spatial resolution. This integration allows for more detailed analyses, which are crucial for policy making and resource allocation. Georeferencing is crucial for measuring vulnerability to climate hazards where hazard information needs to be linked with household surveys to identify populations at risk. This is discussed in more detail below.

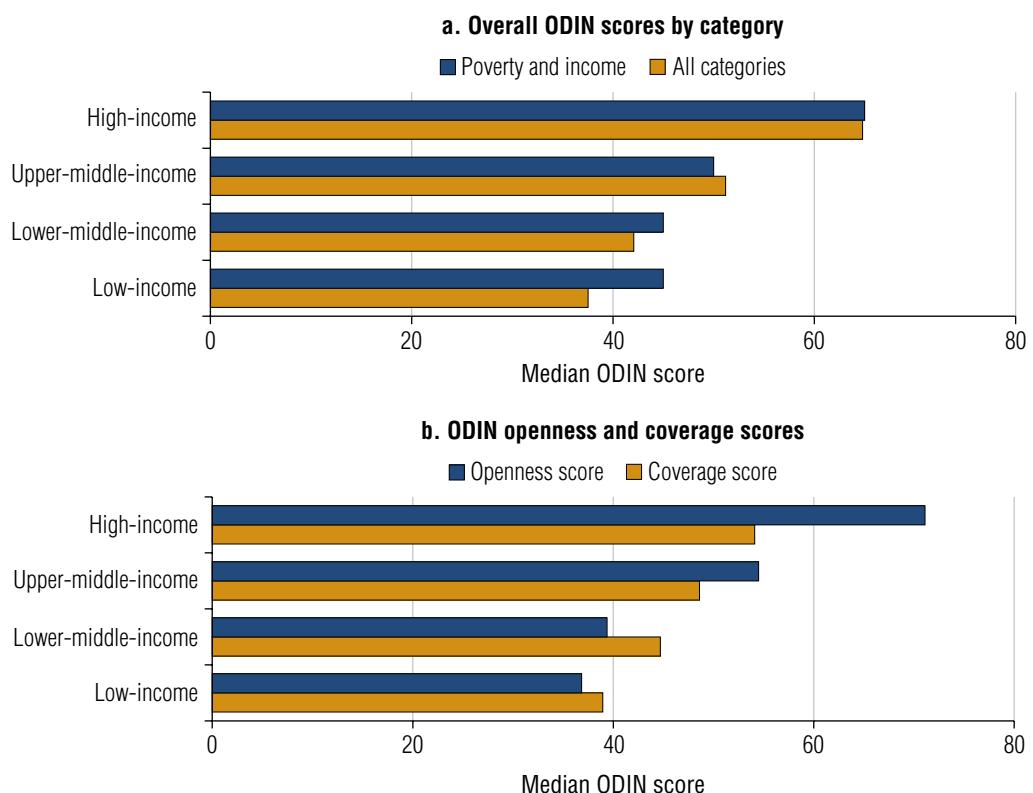
Another important step for improving data integration is to standardize key variables across core surveys, which enhances the ability to bridge information between various surveys effectively. For example, one of the challenges of the World Bank's current Multidimensional Poverty Measure (MPM) is precisely the difficulty in combining poverty data with nonmonetary dimensions of well-being, such as basic services, collected in other surveys. As a result of these difficulties, the global population covered by the MPM lags behind the monetary poverty measures (see chapter 1). Similarly, the livable planet indicator (in table 4.1) of the percentage of people with access to basic drinking water, sanitation services, or hygiene globally is not comparable with the indicator of water and sanitation in the MPM because of differences in definitions of these variables across surveys. By standardizing key variables, such as demographic information (for example, age, gender, and income), geographic location, and basic services indicators, it becomes easier to link and compare data from various surveys. This enables more comprehensive analyses and facilitates the combination of data sets to generate richer, more detailed insights.

Furthermore, including common variables facilitates the use of advanced analytical techniques, such as machine learning and AI, to identify patterns and correlations across larger, more diverse data sets. This can lead to more accurate predictive models and better-informed decision-making.

Beyond funding and technical improvements, the challenge in many settings is to make data available more broadly and in a timely manner

Development data that have been collected are not always shared or made available to others in a timely fashion and at low cost. The Open Data Inventory (ODIN) provides a way for monitoring global progress on the availability and accessibility of official statistics. The ODIN overall score on the state of official statistics for 2022 was lowest for low-income countries, with significant gaps between upper-middle- and high-income countries (figure 4.3, panel a). The differences are smaller for poverty and income data, marking progress made in data collection in these areas. Data openness is a pressing concern for low-income and lower-middle-income countries (figure 4.3, panel b). The gap relative to upper-middle- and high-income countries in data openness is significantly larger than for data coverage, indicating that in several countries data exist but are not accessible. In the Middle East and North Africa, openness looks worse than suggested by the ODIN scores when assessed by microdata access (Ekhator-Mobayode and Hoogeveen 2022).

FIGURE 4.3
Data accessibility scores for countries by income categories



Source: Open Data Watch 2023.

Note: ODIN = Open Data Inventory. Panel a shows the median ODIN overall scores for all categories and the poverty and income categories. Panel b shows the median ODIN openness and coverage scores for all categories. ODIN score goes from 0 to 100. Fixed income group classifications from 2022 are used.

Improving access requires actions on several fronts. More effective data governance is key to creating an environment where data can be produced, made available for use, and shared safely, while ensuring that the benefits of data are shared equitably (World Bank 2021). Within the wide range of competing policy interests, strengthening the independence and technical capacity of national statistical systems should be prioritized more than ever before.

Household surveys should also leverage modeling to fill information gaps and support more timely monitoring

Welfare monitoring provides a clear illustration of the need for more data. Because official measures of poverty are derived from household surveys that are costly and time-intensive, the information is not produced frequently enough to meet the needs of many policy makers, especially in low-income and FCS settings.

Modeling approaches, including recent AI and machine learning models, could help overcome this limited availability of survey data to provide more timely information. This could be done by integrating additional big data sources, such as geospatial data or call detail record data, to estimate and predict poverty more frequently. In essence, these types of models explore patterns between poverty estimates from survey data and covariates from nonsurvey data (such as satellite imagery) to predict poverty rates in nonsurvey years. Note that the accuracy of such models hinges on the availability and quality of recent survey data. These approaches cannot substitute for investment in traditional surveys (such as household budget surveys or censuses). When no recent survey data are available, using these models is not feasible or will produce low-quality estimates.

At the same time, evidence suggests that predicting welfare changes over time using these models is still difficult, especially on a global scale, and therefore more research is needed. For instance, Marty and Duhaut (2024) compared various models and data sources to predict poverty and found that models explain only 4 percent to 6 percent of the variation in asset wealth over time (26 percent being the maximum in one country). So far, predicting nonmonetary welfare indicators such as food security over time has been found to be more feasible than predicting monetary or asset-based welfare indicators (see, for example, Andree et al. [2020] and Tang, Liu, and Matteson [2022]). Mahler, Castañeda Aguilar, and Newhouse (2022) found that on the country level, using data from national accounts to nowcast poverty outperforms more complex models using a variety of geospatial variables. More research on how to enhance the accuracy of machine learning models in estimating changes in monetary poverty and other welfare metrics using big data sources is needed.

Household surveys need to be improved to support the growth of more advanced analytics for monitoring. This would require investments in comprehensive metadata documentation and the adoption of standardized, interoperable data practices. Detailed descriptions for all variables, along with clear documentation of data collection methodologies, are essential for ensuring that AI algorithms understand the context and nature of the data.

Provenance information, including data sources and processing history, helps maintain reliability and allows for replicable studies. Standardized data formats and metadata, as well as application programming interfaces (APIs) for seamless data access, enhance interoperability with various AI tools and platforms. Using ontologies and taxonomies to classify and relate data elements further aids AI systems in interpreting and analyzing the data.

A broadened World Bank vision calls for a more holistic and multifaceted approach to measuring well-being and risks

The rest of this chapter shifts the focus from data to measurement across four areas that pertain to the indicators discussed in this report. The first area deals with measuring inequality—discussing challenges such as differences between consumption and income data, the underreporting of top incomes in household surveys, and discrepancies between household surveys and national accounts data. The second area concerns nonmonetary measures and delves into the measurement of food insecurity, given the complexity of the concept and measurement challenges of the selected indicator. The third area focuses on capturing vulnerability and climate risks more accurately. The final area reflects on the challenges in forecasting the impacts of global warming on poverty, given the discussions presented in chapter 3.

These selected measurement areas are prioritized because of the content of this report, yet other measurement topics remain important. For instance, within-household inequality, although not discussed here, is crucial for capturing individual-level poverty and accurately disaggregating poverty by gender. In addition, this report does not discuss in detail measurement challenges related to water, sanitation, and hygiene (WASH) or healthy ecosystems. For WASH, the indicator is clear, and the main challenge is advancing coverage of the hygiene dimension. For key ecosystems, at the time this report was being completed, the World Bank's vision indicator was not yet finalized. Therefore, this indicator will be discussed in future editions of this report as well as in other upcoming World Bank reports on the planet indicators.

The added focus on inequality and the Prosperity Gap requires better measurement of the entire distribution of income or consumption

The World Bank's current methods for assessing monetary well-being have been designed over the years to measure primarily poverty. With the added focus on inequality and the Prosperity Gap, the World Bank's methods need to evolve and expand from focusing on the bottom of the distribution to considering the entire distribution (Haddad et al. 2024; Kraay et al. 2023).

The difference between using income or consumption is a challenge for monitoring inequality

Chapter 2 discussed the rationale for monitoring inequality and described the indicators.

While inequality is a broad concept and should be studied with a wide range of measures to capture its multiple dimensions, this report focuses on indicators of inequality based on income (or consumption) using household surveys.⁹ One key challenge is how to deal with the fact that some surveys collect income data and others collect consumption data.

The temporal smoothing behavior of consumption, particularly for the poorest households, tends to make it the preferred aggregate for measuring poverty.¹⁰ This is especially the case in developing economies, which typically depend more on agriculture and have a larger informal sector—both factors that can make income hard to measure and seasonal. In advanced countries, however, it is much easier to capture individuals' incomes, so income surveys are more common.¹¹ The upshot is that most countries in Latin America and the Caribbean and all high-income countries report income surveys, while most other countries report consumption surveys. Of 170 countries with survey data in the World Bank's Poverty and Inequality Platform (PIP), the latest survey for 103 was based on consumption.

Despite these differences, the two aggregates are currently used interchangeably in the measurement of progress toward the World Bank goals; this is done to maximize the number of countries monitored. Although this creates issues of comparability in the measurement of poverty, it allows the coverage of the global goals to be expanded. The distinction becomes more problematic, however, in the analysis of prosperity and inequality where larger parts of the income distribution matter. A clear issue is that countries in Latin America and the Caribbean typically use income data, while in Sub-Saharan Africa consumption data are more readily available. These two regions stand out as having high levels of inequality, but the differences in their underlying welfare measures make it difficult to compare their levels of inequality.

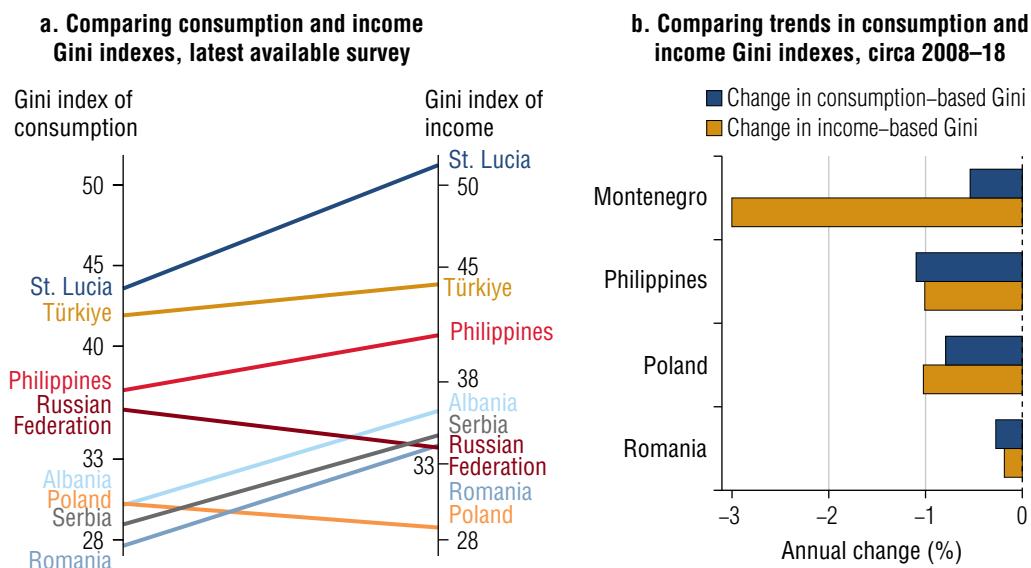
Earlier studies indicate that while levels of inequality may differ, the changes in inequality and country rankings are relatively consistent regardless of whether income or consumption measures are used.¹² Figure B4.4.1 of World Bank (2016) compares income- and consumption-based Gini indexes across several countries in Eastern Europe and Central Asia for the same years. Figure 4.4, panel a, replicates this exercise with updated data. It plots the income Gini value (right axis) against the consumption Gini value (left axis) for all the countries where such a comparison is possible using the latest survey available. For readability, data are limited to surveys conducted after 2015. It is evident that consumption-based Gini indexes are almost always considerably lower than income-based Gini indexes. However, the country rankings remain relatively similar. Figure 4.4, panel b, examines whether inequality trends differ when consumption is used instead of income. For economies with data spanning the decade 2008

to 2018, inequality changes go in the same direction for the two measures, although the magnitudes vary (figure B4.4.2 of World Bank [2016] depicts similar results for the 2008 to 2013 period).

Even so, significantly more work in collecting both income and consumption data and assessing the implications of using one or the other to monitor shared prosperity and inequality is needed. In particular, the comparison in figure 4.4 is currently possible for only a limited set of countries covering selected regions.

FIGURE 4.4

Using income and consumption does not change rankings and trends dramatically for countries where both measures exist



Source: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>.

Note: Panel a shows the Gini indexes of consumption and income for all countries using the latest available survey between 2015 and 2022. Panel b shows the annual percent change in the Gini index between circa 2008 (± 4 years) and circa 2018 (± 4 years) for countries that have both types of surveys that are comparable. See also figures B4.4.1 and B4.4.2 in *Poverty and Shared Prosperity 2016: Taking on Inequality* (World Bank 2016).

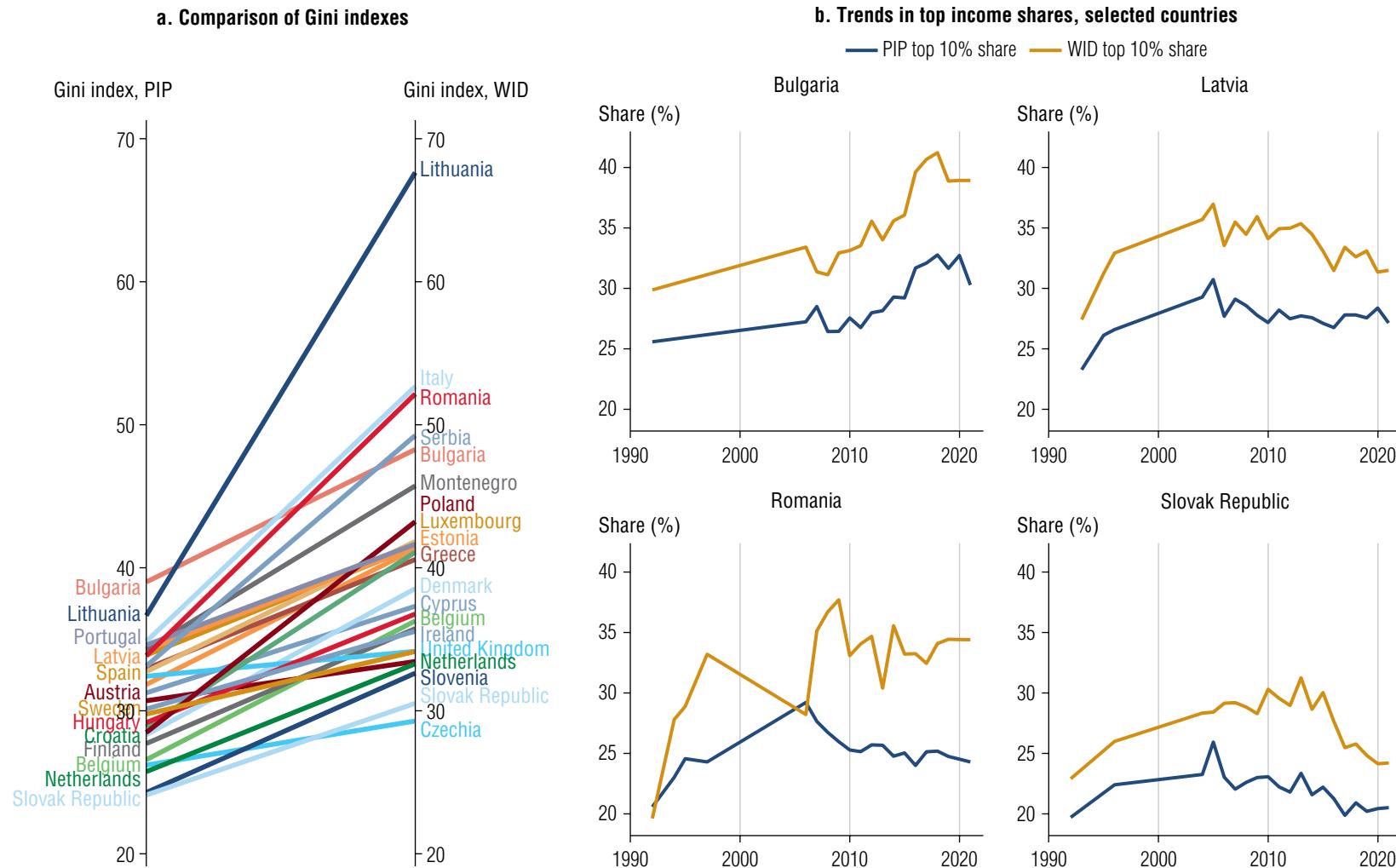
Another challenge for measuring inequality is capturing top incomes

The World Bank indicator for high inequality is derived from household surveys, which often underrepresent the richest individuals because of issues such as underreporting and

nonresponse (Atkinson and Piketty 2007; Haddad et al. 2024). The small sample size of the very rich combined with their large income, which can affect measured aggregates, exacerbates this problem. Additionally, surveys typically fail to adequately capture entrepreneurial and capital income (Burkhauser, Hahn, and Wilkins 2015; Flachaire, Lustig, and Vigorito 2023; Piketty, Yang, and Zucman 2019; Yonzan et al. 2022).¹³ As a result, inequality measured by using survey data is generally lower than when data that includes the very top income earners, such as administrative tax records, are used (Piketty and Saez 2006; Saez and Zucman 2016).

While tax data are not specifically designed to measure inequality, they better capture the incomes of the rich in countries where there is a comprehensive taxation of personal income. This leads to inequality estimates higher than those derived from surveys alone. Efforts to “correct” the top end of survey data have been made for many countries (for example, see Burkhauser, Hahn, and Wilkins 2015; Flachaire, Lustig, and Vigorito 2023; Jenkins 2017; and Piketty, Yang, and Zucman 2019). However, outside high-income countries, tax data are limited and often provide an incomplete picture because of the lack of comprehensive personal income taxes (van der Weide, Lakner, and Ianovichina 2018). Moreover, the best method to combine survey data with administrative records remains unclear. The approach taken to merge these data sources can significantly affect inequality estimates (Alvaredo et al. 2023; Auten and Splinter 2024; Flachaire, Lustig, and Vigorito 2023; Lustig 2020). Recently, Ferreira (2023) summarized the current state of the research by suggesting that there are “inequality bands,” with true inequality falling somewhere between the survey-based estimates and the more extreme upward-correction methods.

Hence, a comprehensive adjustment to data from all countries around the world for underreporting at the top is still not feasible. The World Inequality Database (WID) systematically adjusts survey data for missing top incomes, using a range of sources, including tax data where available but also national accounts (Blanchet and Chancel 2016; World Inequality Lab 2024). As expected, the adjusted Gini index (taken from WID) is greater than the survey-based Gini index (using World Bank’s PIP data), as indicated by the upward sloping lines in figure 4.5, panel a. One reason for the higher Gini index in WID is better measurement of incomes at the top. This is also clear from figure 4.5, panel b, which shows the income share captured by the top 10 percent of income earners in PIP and WID. The shares reported in WID are almost always larger than those reported in PIP, indicating that an adjustment for underreporting at the top would have direct implications for measuring the number of economies with high inequality. However, it is important to bear in mind that the threshold value for high inequality would also have to be adjusted if adjusted Gini indexes were used. The threshold of 40 was set at approximately the top one-third of economies, using survey-based Gini indexes (for details, see chapter 2 and Haddad et al. 2024).

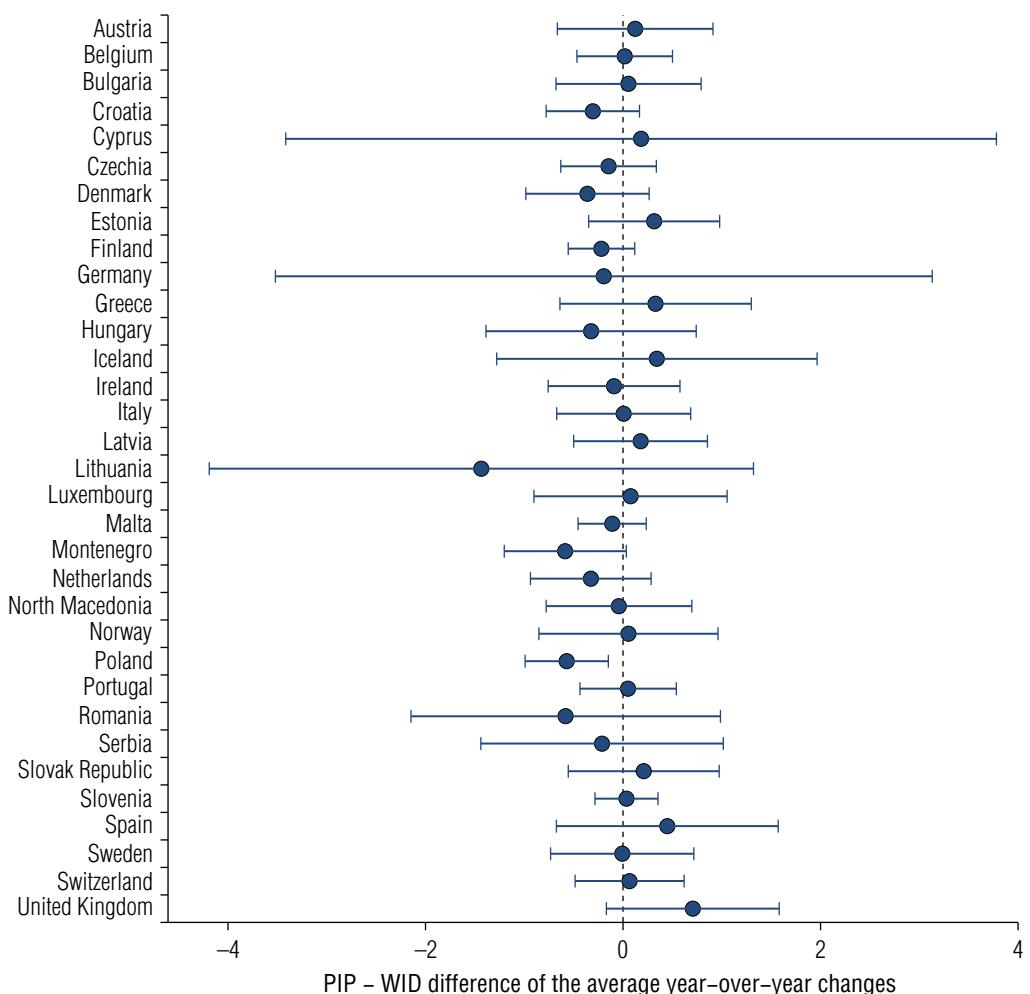
FIGURE 4.5**Comparison of inequality estimates derived from household surveys and other methods**

Sources: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>; World Inequality Database.

Note: PIP = Poverty and Inequality Platform; WID = World Inequality Database. Panel a compares Gini indexes between PIP and WID for 2021, which is the latest year with comparable sets for countries in both databases. Panel b compares income shares of the top 10 percent earners for select countries in Europe and Central Asia. The income concept used in PIP is per capita household income, and that used in WID is equal-split adult post-tax disposable income. See also Atkinson and Piketty (2007) for rich countries.

Direct comparisons between PIP and WID are difficult, given the differences in data sources. PIP uses data based exclusively on household surveys, while WID combines data from household surveys, administrative sources (like tax records), and national accounts.¹⁴ Beyond this, the income concept used and the unit of measurement considered—individuals, households, or tax unit—potentially complicate comparisons (Yonzan et al. 2022). PIP uses *per capita household income or consumption* equivalent to the disposable (or after tax and transfer) income concept. To make it as comparable as possible, figure 4.5 uses the *post-tax disposable income* concept available in WID. However, PIP uses *per capita household* as the unit of analysis, whereas WID uses *income split equally among adults age 20 or over*. This discrepancy in definitions is not easily remedied and thus is not corrected for in figure 4.5, which adds to the differences. The income concepts used here also mean that comparisons between PIP and WID are possible only for rich countries and some Eastern European countries.¹⁵ Furthermore, comparability between countries (and over time) is an important focus for these databases. PIP harmonizes data across countries and identifies cases in which surveys within a country might not be comparable across time.¹⁶ On the other hand, given the mixture of sources used for WID, cross-country and time comparisons can be problematic. WID acknowledges that the data are not the same quality in all countries (World Inequality Lab 2024).¹⁷ Even in well-established cases, there is an ongoing debate on which factors have driven changes across time, such as real changes in incomes at the top or changes in tax reporting rules.¹⁸

Regardless of the level differences, it is reassuring to know that the trends in inequality across time remain largely similar when data from PIP and WID are compared. Figure 4.5, panel b, shows that the two series, especially in the more recent period, track reasonably well. Another way to summarize this difference in trends across countries is to systematically test for any differences in year-over-year changes, that is, whether the two series report similar year-over-year changes on average. Figure 4.6 compares the year-over-year changes in the two databases for all the countries and years where such a comparison is possible.¹⁹ The first step is to estimate the year-over-year changes in the Gini index for the list of countries with an observation in both databases. Then the difference between these annual changes is computed across the two databases. Figure 4.6 shows that the difference between the two series is close to zero on average, suggesting that the two databases track fairly closely. For all countries in the sample, the difference in annual changes between PIP and WID is not statistically significantly different from zero. In other words, the levels might be different (as indicated in figure 4.5), but the changes in the trends are comparable, whether or not top incomes are incorporated. In a recent review of the evidence for Latin America and the Caribbean, Alvaredo et al. (2023) similarly found wide differences in levels of inequality but a broadly robust dynamic pattern.

FIGURE 4.6**Differences in trends of the Gini index between PIP and WID**

Sources: World Bank, Poverty and Inequality Platform (version September 2024), <https://pip.worldbank.org>; World Inequality Database.

Note: PIP = Poverty and Inequality Platform; WID = World Inequality Database. This figure illustrates the percentage points difference between the average year-over-year percent change in the Gini index in PIP and WID. The average differences (dots) and the 95 percent confidence intervals (bars) are shown. The income concept used in PIP is per capita household income, and that in WID is equal-split adult post-tax disposable income.

Rescaling using national accounts can be problematic

Income and consumption measurement challenges are not limited to the top of the distribution. Household surveys routinely omit certain spending, such as spending on durable goods or housing, and at times do not capture all relevant food consumption because of limitations in the questionnaires or because of poor data quality (Foster and Daylan 2024). Partly for these reasons, large gaps between mean income and consumption

from household surveys and national accounts have been observed (Deaton 2005; Prydz et al. 2022; Ravallion 2003).

Some researchers have responded to this misalignment between surveys and national accounts by arguing that mean income or consumption in household surveys should be scaled up to match mean national income or household expenditure as measured in national accounts (Sala-i-Martin and Pinkovskiy 2016). More sophisticated methods such as the WID approach (figures 4.4 and 4.5) also distribute national accounts aggregates to create a distribution of income or consumption (Piketty et al. 2018).

This rescaling can be problematic, and more research on this area is needed. National accounts are not immune to measurement error themselves (Ravallion 2003). National accounts data have been found to change dramatically when the base year is changed (*The Economist* 2014), to be overestimated by autocrats (Martinez 2022), underestimated to get more foreign assistance (Kerner, Jerven, and Beatty 2017), or to have ample room for improvement in developing countries (Angrist et al. 2021). Furthermore, the literature that scales up to national accounts typically ignores the issue of how to adjust the poverty lines, which have been set with a survey-based distribution in mind. In addition, national accounts and household surveys do not measure identical concepts. For example, some spending from consumption aggregates is deliberately excluded because it is deemed less relevant for households' welfare (Mancini and Vecchi 2022).

For these reasons, the Atkinson Commission report on global poverty argued that a more nuanced approach to deal with measurement challenges in household survey data is to adjust for these concerns rather than to introduce new ones with national accounts data (World Bank 2017).

It is also key to broaden the scope of multidimensional poverty and expand the use of nonmonetary measures of well-being

Monetary measures alone do not capture all dimensions of welfare that are relevant to inform policies. This report presents results from the MPM in chapter 1. The MPM aims to understand poverty beyond just monetary deprivations by also considering access to education and basic infrastructure, in addition to the monetary headcount ratio at the \$2.15 per person per day international poverty line. This measure draws inspiration from prominent global multidimensional indexes, particularly the Multidimensional Poverty Index developed by the United Nations Development Programme and Oxford University.²⁰ Unlike the Multidimensional Poverty Index, the MPM includes monetary poverty (less than \$2.15 per person per day at 2017 purchasing power parity) as one of its dimensions.

To construct a global MPM, data have to be harmonized across various dimensions. Unfortunately, not all countries have current and comparable data for all relevant dimensions. The requirement of a global MPM for standardized household indicators across

MONITORING THE INTERLINKED GOALS

many countries necessarily limits indicator choice to the relatively few that are consistently measured. As noted in the 2018 *Poverty and Shared Prosperity* report, the MPM could be expanded with additional dimensions (such as health and security), but, importantly, this depends on the availability of such data (World Bank 2018). Improvements in data quality, data standardization, and data integration can significantly help enhance multidimensional poverty monitoring across time and regions.

The inclusion of the planet indicators brings more explicit recognition of these nonmonetary dimensions, and many of the same variables are also used to construct the climate risk indicator. The work behind the climate risk indicator highlights the challenges and potential of data integration for constructing a comprehensive multidimensional vulnerability measure. This is discussed later in this chapter.

In addition, the World Bank's new vision monitors progress on food and nutrition security. While food security is not discussed at length in this report, annex 4A discusses some key measurement challenges to keep in mind to inform follow-up work in this area.

Food security is described through four dimensions: (a) food availability, or the existence of enough food for people to eat; (b) food access, or the ability of individuals to financially afford and physically access food that is available to eat; (c) food utilization, or the ability of individuals to properly absorb the micro- and macronutrients in the foods that they eat; and (d) stability, or individuals being food secure in all dimensions at all times (Barrett 2010). Therefore, ideally it would be good to track the four dimensions to obtain a complete picture of food security.

The new World Bank Corporate Scorecard (World Bank, n.d.) proposes to measure food and nutrition security with the Food Insecurity Experience Scale (FIES) and highlights another critical food security outcome to be tracked separately: the share of children under age five who are stunted. These two measures correspond to measures of food access and food utilization. Although best practices suggest using multiple food access metrics at the household level to validate changes in food access, the FIES is the only household-level indicator that is currently available globally. The only other indicator available is the Prevalence of Undernourishment (PoU), which is calculated from a combination of national accounts data, food balance sheets, and household surveys (FAO et al. 2023).

In interpreting changes in the FIES, it is important to consider that it captures one aspect of food security and to complement findings by looking at changes in the PoU. It is also advisable to corroborate changes using closely aligned measures, including extreme poverty (Lain, Tandon, and Vishwanath 2023).²¹ Annex 4A describes in more detail the complexity of the concept of food and nutrition security, how the approach proposed in the World Bank Scorecard might align with best measurement practices, and ongoing efforts to improve global measurement.

Measuring climate risks for people also involves integrating multiple dimensions of hazards and vulnerabilities

The new World Bank livable planet indicator for the percentage of people at high risk from climate-related hazards globally is defined as the share of the world's population that is both exposed to a set of key climate-related hazards (floods, droughts, cyclones, and heat waves) and highly vulnerable (that is, has a propensity to be adversely affected or unable to cope with the impacts). Specifically, people are counted as at high risk from climate-related hazards if they are exposed to at least one hazard and are identified as highly vulnerable in at least one dimension of vulnerability. Annex 4B summarizes key data sources related to hazards and ongoing work to improve the estimates. More information can be found in Doan et al. (2023).

Measuring the risk from climate-related hazards is a complex task. Each of the three components of the indicator—hazards, exposure, and vulnerability—has multiple dimensions, and the combination of the three further adds to the complexity. This section discusses some key limitations and areas for future improvement.

Effective measurement of climate risks requires focusing on hazards and dimensions of vulnerability that are relevant to people and can be measured globally

The hazards selected for the indicator are based on evidence that they are highly likely to affect people. With this in mind, the indicator produced by Doan et al. (2023) used in this report considers four climate-related hazard events that have significant impacts on livelihoods: floods, droughts, heat waves, and cyclones (IPCC 2023).²² On the other hand, the indicator does not consider geophysical hazards and environmental factors (such as earthquakes or air pollution) or climate trends such as sea level rise. It also omits some climate-related hazards such as wildfires, which rising temperatures make more devastating (IPCC 2023).²³ Furthermore, the measurement of hazard distributions is based on historical data and does not account for increasing occurrences and geographic ranges of hazards in the future. Thus, the resulting measure is a lower bound of the population at risk from climate hazards.

The same applies for the selection of vulnerability dimensions. Vulnerability captures household deprivations along seven dimensions (see annex 3B of chapter 3 for more details).²⁴ For a variety of reasons, a range of additional factors that could matter for households' coping and adaptive capacity—such as the type of assets that households hold, insurance (for example, health or home insurance), or gender—is currently not included in the vulnerability index.²⁵ In some cases, these variables are not available or comparable for a large enough global sample, and in other cases variables are not considered to add sufficient information on vulnerability.

Measuring risk of and vulnerability to climate hazards needs further investments in data coverage for vulnerable regions and data integration of various relevant dimensions

To derive populations that are exposed to hazards, Doan et al. (2023) overlaid and resampled urbanization data (Global Human Settlement Layer) with gridded population data. Hazard intensities and probabilities were then matched with these cells to define the shares of urban and rural populations exposed to various hazard types. A key constraint is the different spatial resolution of indicators. Hazard data are resampled to match the population grids, so that each cell is classified exclusively as rural or urban and exposed or not exposed.²⁶

Resampling different spatial resolutions can introduce measurement error. For instance, floods are measured with a resolution close to 90 meters, whereas the spatial resolution is about 11 kilometers for cyclones and 30 kilometers for heat waves. Work is under way to develop a more fine-grained spatial resolution for heat waves, which, however, tend to be less localized than floods, for example.

In contrast to the availability of global gridded data on hazards, data on vulnerability come mostly from household surveys and are (a) much more spatially aggregated for several of the dimensions and (b) not available in surveys for all countries. As data on vulnerability are typically only representative or available at subnational administrative regions, assumptions on the distribution of characteristics along exposed and nonexposed grids within the region need to be made. For the risk indicator, it is assumed that populations in exposed and nonexposed areas do not differ along vulnerability characteristics. While this might be a strong assumption, Doan et al. (2023) tested assigning different vulnerability characteristics to exposed and nonexposed areas, and found that this approach would lead to a difference in results of less than one percentage point in most areas.

A person is considered vulnerable if they belong to a household deprived in any of the vulnerability dimensions. If all vulnerability indicators were collected for all countries in one survey, it is reasonable to directly infer whether a person is vulnerable along at least one dimension. While most data are available in the Global Monitoring Database (GMD), data on social protection, financial inclusion, and some of the nonincome dimensions missing in GMD for a particular country are based on other surveys, censuses, or administrative data sets.²⁷ Data from other sources are fused into the data from the GMD by randomly assigning households as vulnerable or nonvulnerable on the basis of the rate of vulnerability observed in the strata that the household belongs to (strata are based on information on rural versus urban area, welfare quintile, and subnational level, if available).²⁸ The share of vulnerable people (at least one dimension) is then calculated for the region for which the data are representative. These steps are repeated 100 times to account for household heterogeneity within each subgroup, and the final number is the average share of vulnerable households among these repetitions. This approach preserves the share of those who are vulnerable across data sets; however, inevitably, this imputation approach introduces some inaccuracy. The population at high risk

from extreme hazards is then calculated by multiplying the share of vulnerable people by the population exposed.²⁹ Another important area for future research is whether being at risk already changes populations' behavior and welfare without the materialization of shocks.

A further caveat is that survey data are not available for every year across all countries, which affects this indicator as well as the monetary and nonmonetary poverty indicators. For instance, only 4 of the 40 countries that the World Bank classifies as Small States have all data required to construct the risk indicator, which mirrors their low survey data coverage mentioned above. Therefore, most Small Island States are not included in the sample, despite being at high risk from climate change (Thomas et al. 2020; Voudoukas et al. 2023). In addition, within one country, data sources can be from different years, which could introduce measurement error into the imputation process. For some countries, the last available survey is too old to be included in the indicator. For income and consumption, there are well-founded methods of extrapolating and interpolating across years, but such methods are not available for the other indicators. Therefore, countries for which surveys are too old are excluded from the vulnerability indicator.

The best option to improve the measurement of vulnerability is to have better and more frequent household surveys. Including all indicators in comparable manners in household surveys across countries would reduce biases from the imputation process. Consultations on such harmonization are under way. More frequent surveys would offer a more accurate and up-to-date picture of vulnerability.

There is a trade-off between global and context-specific numbers, and the indicator does not capture indirect effects

One essential part of the measurement process of the risk indicator involves addressing the intensity and probability of hazards. For each hazard, an intensity level that corresponds to an extreme event and the probability that such an event occurs need to be selected to define the population exposed. The choice of intensity thresholds draws on literature to define what constitutes a severe event with potential to cause significant impacts to the welfare of the exposed population (World Bank 2024a). A limitation may be that there is a trade-off between global and context-specific numbers, because the impact of intensity levels can vary between contexts. The probability of occurrence for events is given by its return period, which reflects the likelihood that a hazard occurs at or above a specific intensity in a year. For all hazards except drought, a return period of 100 years is used. That period reflects a greater than 50 percent chance of experiencing an event during a person's lifetime.³⁰ For droughts, data go back only 39 years, and there is ongoing work to generate probabilistic scenarios.

In addition, the final measure of risk currently does not differentiate between populations that are more or less frequently affected by hazard events above respective thresholds or by various levels of intensity above the threshold. Furthermore, the cumulative effects of

low-intensity but high-frequency events can also be sizable for people's welfare (Hallegatte et al. 2020). The effects of some hazards (for example, flooding and cyclones) are immediate, whereas others are slower (for instance, heat waves), and the costs of different types of hazards are likely to differ. The indicator thus reflects the extensive rather than intensive margin of impacts. Furthermore, probability distributions of hazards will likely change in the future because of climate change, and the most significant hazards for human welfare today are not necessarily the same as those that will matter most in the future. Doan et al. (2023) provide analyses of choosing different return periods for hazards. How climate change will affect return periods and how this will determine exposure rates of populations are areas of ongoing research.

A globally comparable indicator also implies that it may not be relevant to the same extent in all countries. For example, in the current measure, a household is considered vulnerable if no adult has primary education. Outside low-income countries, this threshold may not be relevant. Furthermore, some vulnerability dimensions may be more relevant to certain hazards than to others. Access to electricity makes the use of fans more likely, which reduces the impacts of heat waves (Carleton et al. 2022), but floods or storms may destroy electricity infrastructure. These interconnections between hazards and vulnerability remain an area for future work.

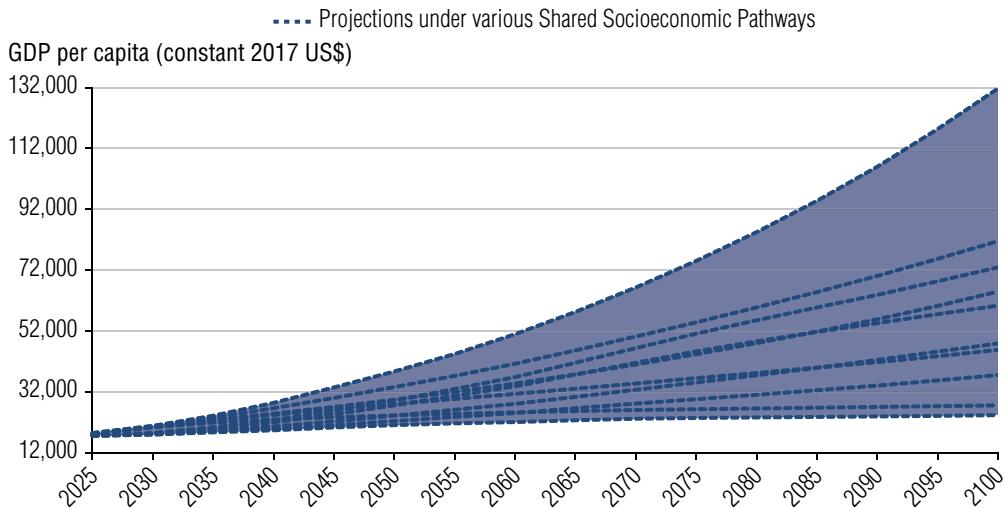
Also note that the indicator considers only the localized impact of the hazards. It does not reflect the indirect effects and spillovers of hazards, such as changes in prices or demand spurred by shocks in other regions (Cevik and Gwon 2024; Hallegatte et al. 2016). Capturing these indirect effects and transmission channels would require vast data, including localized input-output data. Exposure to extreme weather events through location can also be endogenous to hazards, as people affected by a weather shock once or multiple times will likely try to move (World Bank 2023).³¹ Accounting for indirect effects is not feasible at this stage for a global indicator because of data requirements and the fact that they vary across settings (Cevik and Gwon 2024; Somanathan et al. 2021).

The measurement challenges for poverty, prosperity, and planetary indicators are amplified when future outcomes are projected

Challenges when future outcomes are projected can be broadly grouped into two categories. The first is the uncertainty of modeling what will happen to future poverty and planetary indicators when considered in isolation. Figure 4.7 shows projections of gross domestic product (GDP) per capita from five scenarios of the Shared Socioeconomic Pathways (SSPs) and the models of the Organisation for Economic Co-operation and Development (OECD) and the International Institute of Applied Systems Analysis (IIASA) (Crespo Cuaresma 2017; Dellink et al. 2017). These scenarios are used extensively, for instance, by the Intergovernmental Panel on Climate Change (IPCC) and are useful in depicting various scenarios of how the world could evolve in the future and how the scenarios could lead to different emission and

global warming paths (IPCC 2023). As can be seen in figure 4.7, projected GDP per capita varies substantially across scenarios and models, depending on assumptions about how the global economy will evolve and the model used. If countries' incomes grow in accordance with the most optimistic scenarios, then global extreme poverty, and even poverty at higher lines, will be eliminated within decades.³² These projections have been criticized for being misaligned from historical experiences (Welch 2024). This is most relevant for low-income countries, where projected growth rates in the next decades exceed experienced growth rates by several orders of magnitude. If historical growth performances continue in the coming decades, then extreme poverty is unlikely to fall drastically in the coming decades (see chapter 1). Global emissions may likewise evolve on very different paths, depending on the use of fossil fuels and the adoption of mitigation policies. See annex 4C for more details on how greenhouse gas (GHG) emissions are tracked.

FIGURE 4.7
Projections of GDP per capita vary significantly between Shared Socioeconomic Pathways



Source: Shared Socioeconomic Pathways (SSPs projection data, accessed through the IIASA SSP Scenario Explorer 3.0.1).

Note: GDP = gross domestic product; IIASA = International Institute of Applied Systems Analysis; OECD = Organisation for Economic Co-operation and Development; SSPs = Shared Socioeconomic Pathways. Each line represents GDP per capita projection from one of the five SSPs from either the IIASA model (Crespo Cuaresma 2017) or the OECD model (Dellink et al. 2017).

The second category of uncertainty emerges when the interdependence of poverty, prosperity, and planetary indicators is analyzed. There is broad consensus that global warming (due to anthropogenic [human-caused] emissions) will have negative consequences for economic growth and poverty reduction in the future and that rising temperatures and climate hazards are already affecting large populations (Dang,

Cong Nguyen, and Trinh 2023; Hallegatte and Walsh 2021). However, there is considerable uncertainty around the exact extent of future economic damages caused by climate change. Burke, Hsiang, and Miguel (2015) found that global GDP could be reduced by 20 to 30 percent by the end of the century, while Nordhaus (1992) suggests a reduction of 2 to 3 percent in a no-abatement scenario. Newell et al. (2021) ran 800 plausible models linking temperature to GDP and found that in the best-performing models, global GDP changes due to warming at the end of the century range from 84 percent losses to 359 percent gains. To these uncertainties should be added the uncertainties regarding the within-country distributional impact of temperature changes, as well as the many other impacts of climate change related to extreme weather events, such as tipping points and sea level rise. Predicting human behavior and adaptation, as well as changes in policies, is nearly impossible but will have a crucial impact on planetary outcomes and on how these planetary factors translate into poverty or prosperity.

When these two uncertainties are compounded—the uncertainties related to what will happen to poverty and emissions in the future and uncertainty in modeling the interaction between them—the range of possible future outcomes is massive. According to one paper that addressed parts of these uncertainties, the additional number of people in extreme poverty in 2070 due to the impacts of climate change could be anywhere from 4 million to 306 million (Moyer et al. 2023). A direct result of this uncertainty is a large variance in the social cost of carbon, which is a frequent input to loss and damage calculations and cost-benefit analysis of current mitigation policies. Work must continue to reduce the range of these uncertainties.

Data underpin the development process and should be prioritized

Data are the foundation for impactful, evidence-based policy making. Without data, understanding and acting to improve the welfare of people are impossible. Policy makers working to alleviate poverty, build resilience, and promote sustainable well-being need accurate data to make informed decisions, particularly in an environment with increasing uncertainty, misinformation, and limited budgets.

The value of data to facilitate development and ensure that no one is left behind—as encapsulated in the SDGs—can be enhanced if data are reliable and timely and can be disaggregated by key demographic characteristics. Data not only help governments with service delivery, preparing for and responding to emergencies, and prioritizing marginalized, underserved population subgroups, but also provide the populace with the information they need to hold governments accountable and to make better political decisions, for example, during elections (Jolliffe et al. 2023; World Bank 2015, 2021).

The good news is that the world is facing a data revolution brought about by the explosion of data generation and the advancement of technologies to collect, store, process, and analyze

large volumes of data. This revolution has been fueled by the proliferation of digital devices, social media, sensors, and other technologies that generate vast amounts of data in real time. The key is to determine how to turn data into information and information into insights that can enable better decision-making and ultimately help people.

While data availability has improved in many countries, less than one-half of the poorest countries in the world had a household survey from 2020 or later available for global monitoring. More investment is needed to produce reliable, granular, and timely information. This requires foundational efforts to strengthen national statistical systems and innovative approaches to advance the frontier of data and modeling for welfare analysis. Collaborative efforts to develop and promote best practices and AI-driven solutions that enhance every stage of the entire data life cycle are essential. As the lived experience of poverty goes well beyond what can be captured by monetary measures, it is important to ensure that data efforts are also invested in understanding other dimensions of well-being, such as deprivations in access to and the quality of services, health, or food security.

Annex 4A. Measuring food security

The most commonly used definition of food security was agreed upon by stakeholders at the 1996 World Food Summit, with the original formulation stating that food security is “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” (FAO 1996). In practice, food security is described through four dimensions: (a) food availability, or the existence of enough food for people to eat; (b) food access, or the ability of individuals to financially afford and physically access food that is available to eat; (c) food utilization, or the ability of individuals to properly absorb the micro- and macronutrients in the foods that they eat; and (d) stability, or individuals being food secure in all dimensions at all times (Barrett 2010).

The dimensions of food security are hierarchical in the order listed above, where adequacy in a food security dimension requires adequacy in the previous dimension. For example, adequate food availability is necessary, but not sufficient, for adequate food access. The chain continues all the way through food stability. Furthermore, each dimension of food security is itself multidimensional. For example, food access includes both the consumption of an adequate number of calories and a sufficient quality of food consumed (Barrett 2010).

As described above, the food security outcomes tracked in the Corporate Scorecard—the FIES and the share of children under age five who are stunted—correspond to measures of food access and food utilization, respectively. Although these are important indicators, a more complete assessment of changes in food and nutrition security requires measures of the four separate dimensions of food and nutrition security.

MONITORING THE INTERLINKED GOALS

Food access dimensions are particularly difficult to measure precisely. There are two separate sources of measurement error introduced in the measurement of food access. First, it is difficult to precisely measure the caloric and nutritional content of all food consumed. Although there are several ways to estimate these figures, the methods that produce the most precise estimates involve individual-level surveys that are complex, expensive, difficult to analyze, and nearly impossible to perform on a large scale (Fiedler, Martin-Prével, and Moursi 2013; Gibson 2005).³³ In the absence of these difficult-to-collect and expensive data, researchers often turn to household consumption and expenditure surveys (HCESSs) to measure the quantity and quality of foods consumed (Wiesmann et al. 2009).

Using HCESSs provides a solution, but it brings challenges in measuring the caloric and nutritional content of each food item consumed (Haytowitz et al. 2019). It is also difficult with these surveys to identify the nutritional content of many processed foods and food consumed outside the household that are becoming increasingly important to modern diets (Subramanian and Deaton 1996). These issues compound other traditional sources of measurement error that affect the measurement of expenditure in HCESSs, such as recall biases, impacts of different questionnaire formats, and a wide variety of other concerns (Beegle et al. 2012). The variance in estimates of the quantity and quality of food consumption is therefore large and is potentially increasing over time as households consume more processed foods and meals outside the household (Tandon and Landes 2011, 2014).³⁴

Given these difficulties and the need to obtain estimates of food access in real time and in data-poor environments, practitioners and researchers have increasingly relied on metrics that are relatively easy to implement, while also approximating the degree of food access in its many dimensions (Maxwell and Caldwell 2008; Swindale and Bilinsky 2006; World Food Programme 2009). Two common approaches include (a) measuring dietary diversity and the frequency with which individuals and households consume certain food groups, such as with the Food Consumption Score and the Household Dietary Diversity Score (Swindale and Bilinsky 2006; World Food Programme 2009), and (b) measuring food coping strategies often associated with consuming too little or consuming a poor-quality diet, such as the Coping Strategies Index and the Reduced Coping Strategies Index (Maxwell and Caldwell 2008).

Others have argued that additional psychological aspects related to food access should be captured in standard metrics (Webb et al. 2006). An additional set of experiential measures of food access—such as the Food Insecurity Experience Scale, the Latin America and Caribbean Food Security Scale, and the Household Food Insecurity Access Scale—extend food access measurement to these dimensions by asking about food coping strategies and anxiety over insufficient food access (Maxwell, Vaitla, and Coates 2014). However, there are significant additional challenges to incorporating anxiety regarding poor food access and other subjective measures. In particular, answers to subjective welfare questions depend on respondent-specific scales that (a) may not be comparable across individuals or stable over time, (b) are potentially subject to frame-of-reference effects, and (c) suffer from measurement errors, over and above those affecting traditional welfare metrics (Benjamin et al. 2023; Ravallion 2012; Tandon 2024).

Using multiple measures can be useful for obtaining a more complete picture. There is a growing body of literature illustrating that many of the food access metrics described above lead to different conclusions when collected from the same household (Broussard and Tandon 2016; Maxwell, Vaitla, and Coates 2014). Because of these factors, it is often recommended that food access be captured using more than one measure and that improvement in food access should be validated across each broad category of food access metrics, using at least one dietary diversity-based indicator and at least one coping-strategy-based indicator (IPC 2023; Vaitla et al. 2017). Using evidence from 10 West African countries, Lain, Tandon, and Vishwanath (2023) illustrated that there are similar prevalences of food insecurity among segments of the population that are likely undernourished and segments that are likely not undernourished in 4 of 10 countries, according to the FIES. Furthermore, they found that there is a relatively large prevalence of food insecurity in the segments of the population that are least likely to be undernourished in 5 of the 10 countries according to the FIES. Although the work cannot identify exactly why these differences exist between the FIES and other food access metrics for several countries, one possibility highlighted is the difficulty in interpreting the subjective questions on food access that are a significant component of the measure.

Although best practices suggest using multiple food access metrics at the household level to validate changes in food access, the FIES is the only household-level indicator that is currently available globally. The only other indicator available is the PoU, which is calculated from a combination of national accounts data, food balance sheets, and household surveys (FAO et al. 2023). Thus, it is important to interpret changes in the FIES along with changes in the PoU and to corroborate changes by using closely aligned measures, including extreme poverty (Lain, Tandon, and Vishwanath 2023).³⁵

These challenges of using multiple food access metrics also exist at the country level, so it is important to aim to collect multiple measures. A recent stock-taking exercise of the statistical system across regions found significant gaps in the types of information available for measuring progress in improving food access (Maxwell, Vishwanath, and Tandon 2024). For example, in the East Asia and Pacific region, of 16 countries covered by World Bank global poverty databases,³⁶ only one collected more than a single food access metric in the most recent household survey from which monetary poverty was estimated. Furthermore, of these countries, eight collected only the FIES and six collected no food security information at all (Maxwell, Vishwanath, and Tandon 2024). Given the difficulties in following best practices within individual countries regarding the measurement of changes in food access, the same caveats that apply at the global level also apply to the vast majority of individual countries.

Efforts are under way to improve global and country monitoring of food access. In particular, Maxwell, Vishwanath, and Tandon (2024) identified how existing information contained in the detailed food consumption modules in the extensive collection of household consumption surveys from across the world can be used. Their work illustrates for a set of West African countries that existing data can be used to construct measures of calorie consumption, undernourishment, and diet quality and that these indicators all align well with more standard

and existing food access metrics. Their work further offers guidance on how best to improve food access measurement in national statistical systems going forward, including multiple food access metrics in each survey, use of more of the consumption data to refine existing food security statistics, and ways that might reduce some of the noise in trying to infer the calorie content of consumption quantified using nonstandard units.

Annex 4B. Data used for climate hazards

The new World Bank livable planet indicator on the percentage of people at high risk from climate-related hazards globally is defined as the share of the world's population that is both exposed to a set of key climate-related hazards (floods, droughts, cyclones, and heat waves) and highly vulnerable (that is, have a propensity to be adversely affected or unable to cope with the impacts). Specifically, people are counted as at high risk from climate-related hazards if they are exposed to at least one hazard and are identified as highly vulnerable in at least one dimension of vulnerability. The remainder of this section summarizes key data sources related to hazards and ongoing work to improve the estimates. More information can be found in Doan et al. (2023).

Droughts

The new indicator uses historic agricultural drought frequency data from the Food and Agriculture Organization depicting the annual frequency of severe drought events from 1984 to 2022. These events are defined according to the Agricultural Stress Index (ASI), based on remote sensing vegetation (Landsat Normalized Difference Vegetation Index) and land surface temperature (BT4) data, combined with historical agricultural cropping cycles. Severe drought is identified when a Vegetation Health Index falls below 35 percent over a growing season. The ASI value represents the percentage of affected crop or grassland pixels within each administrative unit. Annual frequencies are converted into approximate return periods, with any location recording at least one severe drought from 1984 to 2022 considered exposed to a 39-year return period event.³⁷ The data set, restricted to rural areas, maps regions where more than 30 percent or 50 percent of cropland or grassland was affected in any growing season, with return periods ranging from 5 years to 39 years based on historical frequency. An area of ongoing work is to generate probabilistic estimates of drought using this data, to derive 100-year return periods which are used for the other hazards.

Floods

The indicator uses modeled pluvial and fluvial flood maps from the 2019 Fathom Global 2.0 flood hazard data set. Fluvial floods result from rivers overflowing because of intense precipitation or snowmelt, while pluvial floods occur from heavy rainfall leading to saturated soil or overwhelmed drainage systems. The Fathom data set provides maximum inundation depths for these floods at a resolution of approximately 90 meters, covering return periods from 5 years to 1,000 years. Note that the data assume no flood defenses, which might overestimate exposure in some regions, particularly those with effective flood protection.

For coastal flooding, the indicator uses a separate data set by Deltares (2021), which models flooding caused by tides and storm surges at the same resolution and using the same digital elevation model as Fathom 2.0. The coastal flood data depict maximum depths for return periods from 0 to 250 years. The Fathom flood maps for 231 countries were merged to create global fluvial and pluvial maps for each return period, which were then combined with the global coastal flood maps to produce a comprehensive global flood hazard map. This map, covering return periods from 5 years to 100 years, shows the maximum inundation depth of any flood type. An update to Fathom 3.0 is planned for the coming year.

Heat waves

The indicator uses modeled five-day heat wave maps from the World Bank Climate Change Knowledge Portal. This probabilistic data set shows the maximum five-day average of the daily maximum Environmental Stress Index (ESI) at a resolution of approximately 30 kilometers for return periods between 5 years and 100 years. The ESI approximates the wet bulb globe temperature using temperature, relative humidity, and solar radiation, adjusted for systematic underestimation from solar radiation. Derived from hourly ERA5³⁸ climate reanalysis data, the maximum five-day average was calculated for each year from 1950 through 2022, detrended, and fit to generalized extreme value distributions to estimate return levels for a five-day heat wave event. Ongoing work aims to develop a more spatially detailed measure of heat, to increase measurement accuracy and align with other indicators.

Cyclones

The indicator uses global modeled tropical cyclone maps from Bloemendaal et al. (2020). The tropical cyclone data set is created using the Synthetic Tropical cyclOne geneRation Model (STORM), which resamples 38 years of historical cyclone track data from the International Best Track Archive for Climate Stewardship (IBTrACS). This extends the data set to represent 10,000 years of cyclone activity, covering all tropical cyclone basins except the South Atlantic (because of insufficient historical data). The results were validated against historical observations and previous studies. The STORM data set shows the maximum 10-minute average sustained wind speed at a resolution of approximately 11 kilometers for return periods from 10 years to 10,000 years. While it does not include storm surge and heavy precipitation, these factors are considered in modeled flood maps and included in the multihazard analysis.

Annex 4C. Tracking GHG emissions

Greenhouse gas (GHG) emissions from stationary sources, such as power plants and industrial processes, can be estimated with a high degree of precision by using Continuous Emissions Monitoring Systems (CEMS), automated tools to constantly track and analyze various pollutants. Specialized satellites equipped with imaging spectrometers designed to measure vertical-column abundances of GHGs also play a crucial role in providing GHG data from

MONITORING THE INTERLINKED GOALS

stationary sources. Modern satellite systems can achieve spatial resolutions of approximately 30 meters, allowing for detailed mapping of emissions sources, including from specific emission facilities and individual gas fields and oil wells. Yet they can also cover large areas, with some systems having a field of up to 35 square kilometers. Data gaps in coverage due to infrequent passes, insufficient spatial resolution, and atmospheric interference introduce challenges, however. Data from satellite systems such as GHGSat and the National Aeronautic and Space Administration's EMIT mission, when combined with airborne and ground-based measurements, can create a comprehensive GHG monitoring picture.

Emissions of CO₂ from combustion activities (representing 71 percent of global emissions in 2022) are estimated by using CEMS and, where such systems are absent, supplemented with Fuel Analysis Methods (FAM) and Emission Factors and Default Values Methods (EFDVM). These methods combine estimates of (a) the quantities of fuels that are combusted to support human activities and (b) the pollutant content of those fuels, per the 2006 IPCC guidelines for GHG inventories (IPCC 2006), to arrive at volumes of GHGs emitted. While FAM and EFDVM are less accurate than CEMS, the estimated accuracy of emissions from fossil fuel combustion and industrial processes combined is deemed high, since the quantities of fossil fuels and other emissive materials produced (such as cement and steel) are well known (Crippa et al. 2023). Global total GHG emissions are estimated with an accuracy of approximately ±10 percent and at the country level are estimated with an accuracy of between ±4 and ±35 percent (Crippa et al. 2023).

Estimating noncombustion GHG emissions, including methane (22 percent of global emissions in 2022), nitrous oxide (5 percent of global emissions in 2022), and fluorinated gases (F-gases) (3 percent of global emissions in 2022), requires more nuanced methods. For non-land use sectors, emission estimates are generally based on estimates of specific activities, the mixture of technologies used to support the activities, country-specific emissions factors, and reduction factors that reflect levels of abatement equipment installed.

Estimating GHG emissions from land use, land use change, and forestry (LULUCF) is challenging because of the complexity of terrestrial ecosystems and the difficulties of disentangling natural from anthropogenic fluxes. Net emissions from managed lands can vary substantially, depending on the type and age of vegetation and human activities, and uniform global data for these components are not available. There are also often discrepancies between measurement approaches (Friedlingstein et al. 2020; Grassi et al. 2023). Differences arise from the definition of land use (change): for instance, whether absorbed carbon from managed forests is counted in national emissions. See Crippa et al. (2023), European Commission (n.d.), IPCC (2006), and National Academies of Sciences, Engineering, and Medicine (2022).

The primary sources of GHG emissions data include national inventories, national statistical offices, satellite observations, country reports, and sector-specific measurements. National activities and inventories, compiled and submitted to international bodies such as the United

Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Food and Agricultural Organization, directly provide country-and sector-level emissions data or activity data that may be used to impute emissions. However, there are different GHG reporting requirements set for Annex I (industrialized) and non-Annex I (nonindustrialized) economies under the Kyoto protocol, which has led to different qualities and reliabilities of data between these countries.³⁹ Sector-specific measurements focus on key emission sources such as energy production, transportation, and agriculture.

Secondary providers synthesize data from original providers such as the UNFCCC and national statistical offices, using standardized IPCC methodologies to present GHG data that can be useful to the research community and analysts and for rapid visualization. These organizations, which include Climate Watch, Global Carbon Budget, Our World in Data, the Joint Research Center's Emissions Database for Global Atmospheric Research (EDGAR), and the Pacific Northwest National Laboratory Community Emissions Data System, among others, often count sources differently, which may lead to some divergence in imputed emissions, but which often is not of concern since the source of discrepancy is typically known or can be identified.

Despite advancements in technology and data integration, challenges in achieving comprehensive real-time global coverage of emissions, standardizing measurement methodologies, and ensuring data accuracy and transparency remain. Ongoing efforts aim to address these challenges and improve the timeliness, precision, and reliability of GHG emissions data.

The World Bank's new indicator of global GHG emissions is based on EDGAR, augmented by preliminary estimates for LULUCF using a hybrid-inventory approach developed for the Joint Research Center's annual report, *GHG Emissions of All World Countries: 2023* (Crippa et al. 2023). For more highly disaggregated, country-level non-LULUCF emissions, the new indicator uses a more granular EDGAR data set (EDGAR v8.0), which includes national estimates of annual emissions disaggregated by 37 subsectors and all GHGs included in the Kyoto protocol—CO₂, methane, and nitrous oxide, as well as 25 different fluorinated gases—from 1970 to 2022.⁴⁰ These data, when aggregated to the global level, are nearly identical to the EDGAR Report data. To account for the discrepancy in global EDGAR values and the aggregation of national LULUCF data from Grassi et al. (2023), the new indicator includes a small residual factor by sector and gas.

While GHG emissions started to accelerate during the nineteenth century, when industrialization began, this report depicts more recent trends in emissions because disaggregated data—for example, data disaggregated by type of GHG or economic sector (including LULUCF)—are available only since 1990; for all sectors for most countries, they have been available only since 2000. Some GHG emissions remain in the atmosphere for centuries.⁴¹ Reducing emissions going forward is essential to limit future impacts of climate change (Eyring et al. 2021; IPCC 2023).⁴² Recent scientific evidence points to a linear relationship between cumulative emissions and average global temperatures, underscoring the importance of tracking countries' efforts to lower GHG emissions.

Notes

1. Several SDGs rely on survey data, including SDGs 1 (no poverty), 2 (zero hunger), 3 (good health and well-being), 4 (quality education), 5 (gender equality), 6 (clean water and sanitation), 7 (affordable and clean energy), 8 (decent work and economic growth), 10 (reduced inequalities), 11 (sustainable cities and communities), 16 (peace, justice, and strong institutions), and 17 (partnerships for the goals).
2. For example, the World Bank, in collaboration with the West African Economic and Monetary Union Commission, has contributed to two rounds of comparable and high-quality survey data sets for member countries in 2018/19 and 2021/22 (Castañeda Aguilar et al. 2022, 2024).
3. Previous versions of this report—which were called *Poverty and Shared Prosperity Reports*—typically had a three-year lag in reporting baseline (based on surveys) global poverty and shared prosperity estimates. More recent data ensure that at least one-half of the population globally, and in low- and lower-middle-income countries, is covered by a recent survey, which is the coverage threshold required for reporting the global poverty aggregate (World Bank 2024b).
4. For example, about one-half of the 26 economies in East Asia and Pacific are islands with small populations and have infrequent surveys. A similar reason explains the difference in country- and population-coverage for high-income countries, although survey data are also unavailable for some large high-income countries, such as Japan. Hence, population-weighted coverage rates in high-income countries are less than those of upper-middle-income countries.
5. The potential benefits of data are almost limitless. There are direct benefits to individuals and indirect benefits or spillovers to society. Data can be used, reused, shared, and reshared for several purposes, both intended and unintended (World Bank 2021). However, like all public goods, because data are nonrivalrous and nonexcludable in consumption, private producers are unable to charge commensurate prices to cover the huge cost of production and reflect the marginal benefits accruing to all consumers. As a result, unless governments intervene, data will remain scarce.
6. Since the introduction of the Data for Policy initiative in 2020, the World Bank has loaned \$2 billion to 40 countries for related work, mostly in Sub-Saharan Africa (Dabalén, Himelein, and Castelan 2020).
7. For more information, see the investment case “Multiplying Progress through Data Ecosystems” at https://www.data4sdgs.org/sites/default/files/file_uploads/Investment%2Bcase_Multiplying%2Bprogress%2Bthrough%2Bdata%2Becosystems_vFINAL.pdf.
8. Poverty mapping tries to overcome the limited sample size of household surveys by combining their data with other data sets that allow for a finer spatial disaggregation, such as census data (for example, see Elbers et al. [2003]).
9. While harmonized income and consumption distributions are available for the majority of countries, wealth distributions are not. Understanding the distribution of wealth is critical to get a comprehensive picture of material inequality. See box 2.3 in chapter 2 for further details.
10. Consumption typically fluctuates less than income across time, since individuals borrow or draw from their savings when income is lower and save when income is higher, making consumption less volatile.
11. Conceptually, income is a measure of the potential purchasing power for all goods and services, while consumption is a direct measure of the goods and services that the individual or household has actually obtained. Richer households tend to save more than poorer households. This means that, on average, the inequality of consumption (realized outcomes) is usually lower than the inequality of income for the same set of households. In addition, while consumption tends to fluctuate less over time, income is generally more volatile in the sense that it may be influenced greatly by seasonal factors or by interruptions in employment—particularly in the agricultural and informal sectors. Households can also declare zero and even negative income on a survey but exhibit a positive consumption level by drawing from savings. Sudden losses of employment can reduce income dramatically, but changes in consumption depend on the availability of factors such as safety nets and

within- and between-household transfers and on whether shocks are transitory or permanent (Jappelli and Pistaferri 2010). Other issues, such as consumption of home-produced foods, also tend to be difficult to capture in surveys, leading to low measured income.

12. All comparisons of consumption and income in PIP are based on separate surveys conducted using income and consumption. Hence, even in the same year, they may not use the same survey design and most likely capture results for different households.
13. While most of the literature has focused on income data, there is also evidence that expenditure surveys underestimate the top because of incomplete coverage of spending on durables (Aguiar and Bils 2015).
14. Note that for many high-income countries, PIP uses European Union Statistics on Income and Living Conditions surveys, which in some cases make adjustments to the survey data using administrative data.
15. For countries in Latin America and the Caribbean, the post-tax disposable income series is not available in WID. Other regions in PIP primarily use consumption surveys.
16. Survey comparability depends on various characteristics such as the sampling process, questionnaire, methodological changes in the construction of welfare aggregates, consistent price deflation over time and space, and so on. PIP contains metadata on the comparability of poverty estimates within countries over time. For further details on the comparability assessment, see Atamanov et al. (2019) and the PIP *Methodological Handbook* (<https://datanalytics.worldbank.org/PIP-Methodology/>).
17. For details, refer to <https://wid.world/transparency/>.
18. For a summary of the recent debate on the top income shares in the United States, see Gale et al. (2023).
19. The comparison includes data for all years that are available in both sources. To maximize the sample, comparability breaks in PIP are not accounted for. WID does not report comparability breaks.
20. For details, refer to <https://ophi.org.uk/>.
21. Under plausible and empirically supported assumptions, undernourishment is concentrated among the extreme poor. Thus, the degree of overlap between the FIES and extreme poverty is informative on whether those who are moderately or severely food insecure are most likely to be undernourished.
22. See World Bank (n.d.) for further details on data sources and measurement for the included hazards and vulnerability indicators (<https://scorecard.worldbank.org/en/scorecard/home>).
23. Wildfires are also direct consequences of human activity, such as arson or negligence, and global data availability limits the accuracy of predictions, for instance, because effects can be felt in different locations than where fires themselves are (think of smoke and air pollution) (Qiu et al. 2024).
24. The dimensions are income, education, social protection, financial inclusion, water, energy, and transport.
25. Natural disasters disproportionately affect women in terms of income, employment, and life expectancy (Erman et al. 2021). Power dynamics and traditional gender roles influence how women are affected by natural disasters and how they are able to cope in the aftermath (Lankes et al. 2024). Extreme weather events have been shown to increase domestic violence against women (Abiona and Koppensteiner 2018; Sekhri and Storeygard 2014). Access to assets and control of them are important determinants of vulnerability to climate change, according to which women are highly disadvantaged within households. Women still shoulder the majority of domestic work—a situation that becomes even more pronounced after disasters, hindering their ability to pursue or resume employment (Eastin 2018; Erman et al. 2021). Not being able to engage in income-generating activities further reduces long-run opportunities and exacerbates vulnerabilities. Eastin (2018) showed that climate shocks and natural disasters are associated with declines in women's economic and social rights and that this decline is more pronounced in poorer and more agricultural societies.
26. Note that the urban versus rural distinction is relevant for drought hazards and transport as a physical propensity to experience severe loss (vulnerability). Both are measured only for rural areas.
27. Other data sources include World Bank ASPIRE (Atlas of Social Protection Indicators of Resilience and Equity) (social protection), World Bank Finindex (financial inclusion), World Bank Global

MONITORING THE INTERLINKED GOALS

Electrification Database (energy), the WHO/UNICEF (World Health Organization/United Nations Children's Fund) Joint Monitoring Programme (water), and the United Nations Sustainable Development Center indicator (transport).

28. For countries that have some missing data but near-universal values for certain variables (such as electricity, water, or social protection access), the near-universal value is assumed for the whole population.

The definition of variables can vary across surveys. For example, surveys in the GMD typically include a variable for “improved water access.” The relevant variable for the SDGs and for the World Bank Scorecard indicator, however, is access to “basic drinking water, sanitation services, or hygiene,” which could make comparisons between indicators difficult. Please see World Bank (n.d.) for further details.
29. Note that to aggregate grid-level exposure to subnational regions, the population count in grid cells that are partially covered by administrative units is weighted by the fraction of the grid cell covered by the statistical region.
30. A 100-year return period means that, on average, a specific event occurs once every 100 years. Naturally, this means that it can occur more often than once in 100 years. With an average global life expectancy of around 70 years, the probability of experiencing an extreme weather event with a 100-year return period is about 50 percent.
31. The effect of climate shocks on migration is complex where household responses depend on levels of assets and risks of staying and where rapid-onset shocks (such as floods) have stronger effects than slow-onset changes (Kaczan and Orgill-Meyer 2020).
32. The SSPs are a set of five scenarios developed by the climate research community that depict various pathways of how global society, demographics, and economics might change over the next century and how these changes could affect GHG emissions and global warming (Riahi et al. 2017).
33. For example, one method is observed-weighted food record data. See Gibson (2005) for details.
34. In addition to the difficulty of measuring the nutritional content of food consumed, the second source of measurement error in measuring food access is driven by the fact that many of the dietary needs of individuals are unobservable and based on individual choices and activities (Institute of Medicine 2006). Although many studies make assumptions regarding caloric needs of individuals based on their age, sex, and assumed activity level (FAO et al. 2023), such uncertainties further add to the extensive measurement error in food access metrics.
35. Under plausible and empirically supported assumptions, undernourishment is concentrated among the extreme poor. Thus, the degree of overlap between the FIES and extreme poverty is informative concerning whether those who are moderately or severely food insecure are most likely to be undernourished.
36. These figures omit countries in which the most recent household survey was fielded before the FIES was developed in 2014.
37. A return period refers to the average time it takes for an event at a specific intensity level to occur or, put differently, the probability of an event occurring every year.
38. ERA5 is the fifth generation of the European Centre for Medium-Range Weather Forecasts atmospheric reanalysis of the global climate (covering 1940 to the present).
39. See, for example, reporting requirements for Annex I countries (<https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/reporting-requirements>), and for a classification of countries under the Kyoto protocol, see <https://unfccc.int/parties-observers#:~:text=Non%2DAnnex%20I%20Parties%20are,prone%20to%20desertification%20and%20drought>.
40. EDGAR v8.0’s GHG estimates for combustion and industrial processes are based on the application of IPCC GHG accounting methodology across all countries. EDGAR uses data from the IEA, Energy Institute, UNFCCC, Food and Agriculture Organization, and other reputable sources to derive GHG emissions at subnational and subsectoral levels based on activity and emission factors. (European Commission. n.d.)

41. CO₂ remains in the atmosphere on average for hundreds of years, whereas methane remains in the atmosphere for around 12 years, but methane is more potent in absorbing energy and causing warming per unit of mass.
42. Cumulative historical emissions are shown in chapter 3 with data from PRIMAP-hist (Gütschow, Pflüger, and Busch 2024).

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More information about the Bank's environmental philosophy can be found at <http://www.worldbank.org/corporateresponsibility>.



The Poverty, Prosperity, and Planet Report 2024 is the latest edition of the series formerly known as *Poverty and Shared Prosperity*. The report emphasizes that reducing poverty and increasing shared prosperity must be achieved in ways that do not come at unacceptably high costs to the environment. The current “polycrisis”—where the multiple crises of slow economic growth, increased fragility, climate risks, and heightened uncertainty have come together at the same time—makes national development strategies and international cooperation difficult.

Offering the first post-Coronavirus (COVID)-19 pandemic assessment of global progress on this interlinked agenda, the report finds that global poverty reduction has resumed but at a pace slower than before the COVID-19 crisis. Nearly 700 million people worldwide live in extreme poverty with less than US\$2.15 per person per day. Progress has essentially plateaued amid lower economic growth and the impacts of COVID-19 and other crises. Today, extreme poverty is concentrated mostly in Sub-Saharan Africa and fragile settings. At a higher standard more typical of upper-middle-income countries—US\$6.85 per person per day—almost one-half of the world is living in poverty.

The report also provides evidence that the number of countries that have high levels of income inequality has declined considerably during the past two decades, but the pace of improvements in shared prosperity has slowed, and that inequality remains high in Latin America and the Caribbean and Sub-Saharan Africa. Worldwide, people’s incomes today would need to increase fivefold on average to reach a minimum prosperity threshold of US\$25 per person per day.

Where there has been progress in poverty reduction and shared prosperity, there is evidence of an increasing ability of countries to manage natural hazards, but climate risks are significantly higher in the poorest settings. Nearly one in five people globally is at risk of experiencing welfare losses due to an extreme weather event from which they will struggle to recover.

The interconnected issues of climate change and poverty call for a united and inclusive effort from the global community. Development cooperation stakeholders—from governments, nongovernmental organizations, and the private sector to communities and citizens acting locally in every corner of the globe—hold pivotal roles in promoting fair and sustainable transitions. By emphasizing strategies that yield multiple benefits and diligently monitoring and addressing trade-offs, we can strive toward a future that is prosperous, equitable, and resilient.



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