2 Poverty, hunger, and health

THIS CHAPTER

1 Describes the world food situation
2 Examines different forms of poverty, hunger, and malnutrition: their magnitudes, consequences, and how they are measured
3 Identifies principal causes of and potential solutions to problems with poverty, hunger, and malnutrition in developing countries

THE WORLD FOOD SITUATION

World food demand and supply

On a global level, sufficient food is produced to feed everyone on earth. And the overall food situation has improved significantly over the last 50 years. Cereals are the most important sources of food, and since the mid-1960s, world cereal production has risen by roughly 1 billion tons per year. It is likely that an additional billion tons of production per year will be needed by 2040 to meet food needs of a world population expanding in numbers and in income. It is also likely that cereal imports by many developing countries will continue to grow.

Until recently, overall numbers and projections had suggested gradual improvement in reducing undernutrition in the world. However, several countries, mostly in sub-Saharan Africa, have seen per capita food production and consumption stagnate for decades, or not increase enough to significantly reduce the number of malnourished. According to data from the Food and Agriculture Organization of the United Nations (FAO), the index of per capita food production in Africa has grown only about 10 percent since 1970, with most of the increase coming in

the period between 2000 and 2014. In some countries, per capita food production and consumption has declined since 1970. For example, the Democratic Republic of the Congo has experienced a 50 percent decline in per capita food production since 1970, due in part to conflict-related disruptions.

Even in countries with growing average food consumption, some groups may not see their consumption levels increase: household food consumption is closely related to household incomes, and the most disadvantaged are afflicted by low and uncertain incomes. In addition, the rate of growth in agricultural output for the world as a whole has slowed since the 1980s, and the use of cereals and sugar to produce bio-fuel products has created competition for use of these products as food. For people in many countries, the struggle for food will continue. Therefore, we turn now to how poverty and access to food manifest themselves in terms of hunger, malnutrition, and, in some cases, famine.

POVERTY

Poverty has many faces and is one of the major challenges facing the development community. Poverty is widely understood to be an inability to meet basic needs, and the poor tend to be hungry, lack adequate shelter, and have limited access to health care. The poor lack opportunity, and their powerlessness often leads to hopelessness and despair. To most people reading this book, poverty is an invisible and abstract problem, somewhere out there. We seldom think about it, and when we do, we often don't know what to do about it. Global poverty has been cut roughly in half since 1990, but stark challenges remain. In 2019, almost 700 million people – about 9 percent or a sixth of the world's population – lived in extreme poverty, as defined by making less than $1.90 per day. About 1.3 billion people in developing countries are "multidimensionally poor", according to a survey by the UN Development Program. However, for the first time since 1998, the number of extremely poor rose rapidly in 2020 due to jobs lost during the COVID-19 pandemic, likely by more than 100 million people and perhaps by hundreds of millions.

Measuring poverty

Since poverty is multidimensional, efforts to measure it can be complicated by attention to its different dimensions. Two broad types of measurement schemes exist: monetary and non-monetary. Monetary

measures consolidate the different dimensions of poverty into a single unit of measure – money. Their strengths include the ability to make comparisons in a common unit, a non-arbitrary measurement scheme, and ability to quantify the extent, depth, and severity of poverty (see Box 2.1). However, monetary approaches often fail to capture dimensions of poverty that may be especially important and intractable, such as social exclusion and political powerlessness.

BOX 2.1 MONETARY MEASUREMENT OF POVERTY[1]

Three primary challenges in measuring poverty are: (1) deciding what to measure, (2) identifying a value, below which a household is deemed to be poor, and (3) adding it up for the population. Poverty involves an inability to control sufficient resources to meet a minimum level of well-being, and analysts use household income or consumption expenditure to measure it. Consumption is generally preferred because income, particularly in rural areas, is seasonal and variable, while consumption is smoother and often easier to measure. The poverty line is the value of income or expenditures on a daily, monthly, or annual basis below which a person is deemed to be poor. This poverty line can be determined many ways. In the United States, the poverty line was created in 1963 using the minimum cost of achieving an adequate diet based on U.S. Department of Agriculture food plans. Non-food expenditures were accounted for by observing that poor households generally spend about a third of their total budget on food: the food poverty line was multiplied by 3 to obtain the total poverty line. This line has been updated over time by adjusting for changes in the cost of living. A commonly used international poverty line is the World Bank's use of $1.90 person per day (in 2011 prices) to reflect extreme poverty and $3.20 per day (2011 prices) to reflect moderate poverty.

With a household survey, incomes or expenditures can be compared to the poverty line: households with values below the line are poor. Policymakers are not only interested in which households are poor, but also in where the poor are located, what they do, and how poverty has changed over time. Monetary indices of poverty are used to address these concerns, and the most commonly used

poverty index, called the Foster, Greer, Thorbecke (FGT) Index,[2] is one that reflects the prevalence (proportion of the total population that is poor), depth (the degree of shortfall below the poverty line), and severity of poverty (the degree of inequality among the poor). This index gives policymakers a nuanced view of the total poverty picture: for example, a policy may increase the depth of poverty among some while reducing the total proportion of the population that is poor. For example, 40 percent of the population in South Asia was poor in 2005 compared to 51 percent in sub-Saharan Africa. In contrast, the poverty severity measures were 3 percent for South Asia compared to over 10 percent for sub-Saharan Africa, indicating a far more serious problem in poverty severity in sub-Saharan Africa than in South Asia at the time.

[1] For more information, see: www.worldbank.org/en/topic/poverty.
[2] J. Foster, J. Greer, and E. Thorbecke, A Class of Decomposable Poverty Measures, *Econometrica*, Vol. 52, 1984, pp. 761–766.

Non-monetary measures include qualitative assessments and indices that combine different dimensions, such as the Human Development Index (HDI) and Human Poverty Index (HPI) described in Chapter 1. These indices often face the criticism that the weights used are arbitrary, and measures vary significantly when the weights are changed. They also fail to capture dimensions such as social exclusion and powerlessness.

The different approaches complement each other, and their combination has allowed a deeper understanding of poverty. For example, qualitative participatory poverty assessments that engage in discussions with groups of poor people about their conditions and the unique challenges they face often accompany monetary assessments, and the combination can help in understanding how policies can be formulated to reduce poverty.

Vulnerability: transitory and chronic poverty

Poverty is not a constant state for many developing-country households. Weather, pests, diseases, and policies cause fluctuations in income that translate into movement in and out of poverty – households are vulnerable to becoming poor. This in-and-out of poverty situation is important because different policies may be needed to address transitory compared

to chronic poverty. Evidence shows that transitory poverty – movement in and out of poverty over time – accounts for a substantial portion of overall poverty. As a result, means of protecting people from transitory income shortfalls may substantially improve the global poverty picture. Formal and informal insurance schemes, social safety nets, and other means of reducing or managing risks can help achieve this aim. Rural public work programs, such as dam-building, irrigation and water supply schemes, road construction, and maintenance programs are examples of social safety nets that may reduce vulnerability to poverty and build infrastructure for agricultural development. Pension programs, cash transfers, and feeding programs are examples of social protection schemes that affect food demand.

Chronic poverty is often caused by very different factors: households do not have access to enough human, physical, natural, and other assets to earn sufficient incomes for minimum levels of well-being. Poverty traps caused by insufficient assets, severely degraded natural resources, and other factors are difficult to escape and often require long-term investments in asset building, access to new factors of production, and improved institutions.

Agricultural development and the poor

A common misconception about poverty is that it is largely an urban problem. Pictures of teeming slums with inadequate sanitation and rotting infrastructure help bolster this perception. In contrast, rural residents are thought to live in relatively spacious conditions and to be able to rely on their own production of foods in times of dire need. In fact, on a global level, the rural poor make up about 70 percent of the total poor, and rural poverty is twice as prevalent as urban poverty. Rural poverty is a major problem and, as we will see throughout this book, agricultural development can play a significant role in its reduction, but agricultural development can also alleviate urban poverty.

Agricultural technology has direct impacts on the rural poor by increasing incomes of farmers, many of whom may be poor. Care must be taken during development and subsequent release of new technologies to ensure that they are accessible to poor producers. Indirect benefits to the poor from growth in agriculture come from two primary sources: increased demand for labor on farms and increased supply of food, causing food prices to drop. In many countries, especially in South Asia, landless laborers comprise a large proportion of the rural poor, and increased demand for agricultural labor benefits this group. The latter benefit can be substantial and is an important reason why global poverty

fell from the early 1980s until recently. Food price declines have led to higher levels of living even for people who do not depend directly on agriculture. When global food markets tighten, as they have for brief periods, poverty rises due to the indirect effect of higher food prices.

HUNGER, MALNUTRITION, AND FAMINE

Hunger is a silent crisis in the world. In times of famine, it can tear at the heartstrings as media attention focuses on its dramatic effects. The most extreme type of hunger is severe calorie and protein undernutrition during a famine. However, more pervasive is chronic undernutrition and malnutrition associated with poverty, illness, ignorance, maldistribution of food within the family, and seasonal fluctuations in access to food. Low-quality diets can cause many forms of malnutrition, contributing to cardiovascular and metabolic disease through obesity, diabetes, and other conditions, but in this chapter, we focus on hunger and undernutrition. We begin our discussion with the contrast between famine and chronic malnutrition.

Famine

Famine is marked by an acute decline in access to food that occurs in a definable area and has a finite duration. Access to food usually falls due to crop failures, often in successive years, due to drought, flood, insect infestation, or war. During a famine, food may actually be present in the affected area, but its price is so high that only the wealthy can afford it. Food distribution systems may break down so that food cannot reach those who need it.

Famines have occurred throughout history. In recent years, their prevalence has been highest in sub-Saharan Africa, such as the ones in Yemen in 2019–20, South Sudan in 2017, and Somalia in 2011. All of these were caused to some degree by political problems and conflict. Famines also occurred in North Korea in the mid-1990s, Cambodia in 1979, Bangladesh in 1974, India in 1966 to 1967, and China in 1959 to 1961. The latter was the worst famine of the 20th century and resulted in the deaths of more than 16 million people.

Famine is the extreme on the hunger scale because it causes loss of life and concurrent social and economic chaos over a relatively short period of time. As access to food falls, people begin by borrowing money and then selling their assets to acquire money to purchase foods. Subsistence farmers sell their seed stocks, livestock, plows, and even land. Landless

laborers and other poor groups lose their jobs, or face steeply higher prices for food at constant wages. As the famine intensifies, whole families and villages migrate in search of relief. The telltale signs of acute malnutrition and, eventually, sickness and death appear.

Fortunately, progress is being made against famine. Although large variations occur in annual food production in individual countries and world population continues to grow, the frequency and intensity of famines has decreased due to improved information and transportation networks, increased food production and reserves, and dedicated relief organizations. Much of the starvation we see during famines now occurs in areas where transportation systems are deficient and where conflict thwarts relief efforts, such as in Yemen. The relatively recent famines in Yemen, South Sudan, and Somalia were all due to a combination of natural disasters, conflict, and lack of political will to alleviate the problem.

Chronic hunger and malnutrition

As devastating as famines are, they account for only a small fraction of hunger-related deaths. Famines can be attacked in a relatively short period of time if political conflict in the affected country does not hamper relief efforts. Chronic hunger and malnutrition affect a much greater number of people and are more difficult to combat (Table 2.1).

Table 2.1 Estimated Number of People Affected by Preventable Malnutrition Worldwide

Deficiency	*Morbidity*	*Estimated Prevalence*	*Population Group Most Affected*
Protein + energy[1]	Wasting (underweight)	49,500,000	Children under 5
Protein + energy[1]	Stunted growth	149,000,000	Children
Iron[2]	Anemia	613,200,000	Women 15 to 49
Vitamin A[3]	Blindness/ Measles/Diarrhea	105,700 (deaths)	Children under 5
Iodine[4]	Brain damage	18,000,000	Infants

Sources:

1 UNICEF-WHO-World Bank, Joint Child Malnutrition Estimates, regional and global joint estimates, 2019

2 2018 Global Nutrition Report – Chapter 2

3 *Lancet Global Health*, Vol. 3, Issue 9, 528–536

4 WHO, Investing in the future: A united call to action on vitamin and mineral deficiencies, Table 3: Human toll of vitamin and mineral deficiencies. Global Report 2009

According to FAO, nearly 690 million people were undernourished in 2019, or about 8.9 percent of the world population. An estimated 2 billion people did not have regular access to safe and nutritious food that included sufficient intake of macronutrients and micronutrients. Preschool children and pregnant and nursing women are particularly vulnerable to the dangers of malnutrition.

Serious macronutrient malnutrition in developing countries reflects primarily undernourishment – a shortage of food in the diet – not an imbalance between total calories and protein. The availability of calories per capita by country is illustrated in Figure 2.1. Many of the countries with very low per capita calorie availability are found in sub-Saharan Africa. A close, but not perfect, correspondence exists between low calorie availability and the low-income countries identified in the previous chapter. When commonly consumed cereal-based diets meet energy (calorie) requirements, it is likely that most protein needs will also be satisfied for people older than about 2 years of age. Thus, for everyone except infants, the greatest concerns are the total quantity of food available to eat and micronutrient consumption. In settings where overall energy intake meets minimum needs, remaining protein or micronutrient deficiencies can often be improved with rather small investments to improve the quality of the diet. However, for millions of people, especially women and children, these investments are not being made (Table 2.1).

Iodine deficiency is common in regions far from the sea, for example parts of the Andes in South America. Iron deficiency is a particularly serious problem among women of childbearing age all over the world, and vitamin A deficiency is a widespread concern, especially among children.

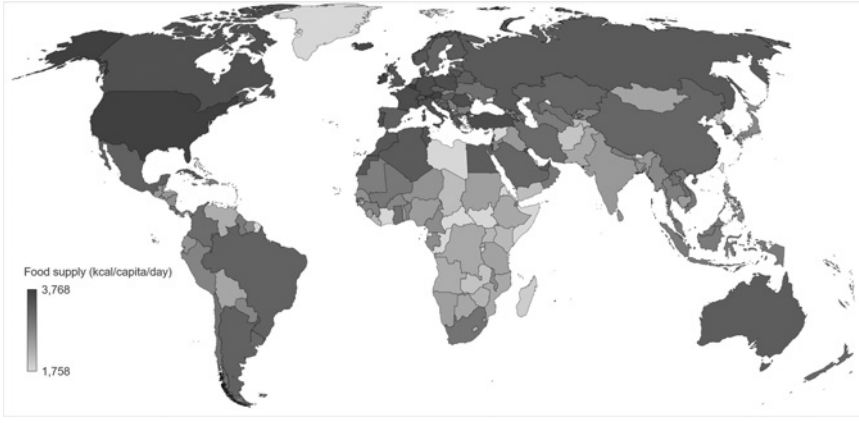


Figure 2.1 Daily calorie availability per capita, 2017
***Source*: FAOSTAT data**

Consequences of hunger and malnutrition

Stunted growth, reduced physical and mental activity, muscle wasting, increased vulnerability to infections and other diseases, and, in severe cases, death are the most common consequences of calorie deficiencies. Death most frequently results from dehydration caused by diarrhea, whose severity is closely linked to malnutrition. Chronic protein malnutrition results in stunted growth, skin rash, edema, and change of hair color. A diet relatively high in calories but low in protein can result in an illness known as kwashiorkor, while a diet low in both calories and protein can result in an illness known as marasmus. People can live about a month with kwashiorkor, three months with marasmus; 7–10 million people die each year from the two diseases.

Iron deficiency anemia affects muscle function and worker productivity. Vitamin A deficiency is a leading cause of childhood blindness and often results in death due to reduced disease resistance. Iodine deficiencies cause goiter and brain damage.

There is little doubt that hunger and malnutrition result in severe physical and mental distress, even for those who survive the infections and diseases. Malnourished children are more likely to not attend school, and when they do, they learn less than their well-nourished counterparts. Malnutrition can affect the ability of a person to work and earn a decent livelihood, as mental development, educational achievement, and physical productivity are reduced. People with smaller bodies because of inadequate childhood nutrition are paid less in agricultural jobs in many countries. Lower earnings perpetuate the problem across generations, leading to a vicious cycle of malnutrition and poverty.

Measuring hunger and malnutrition

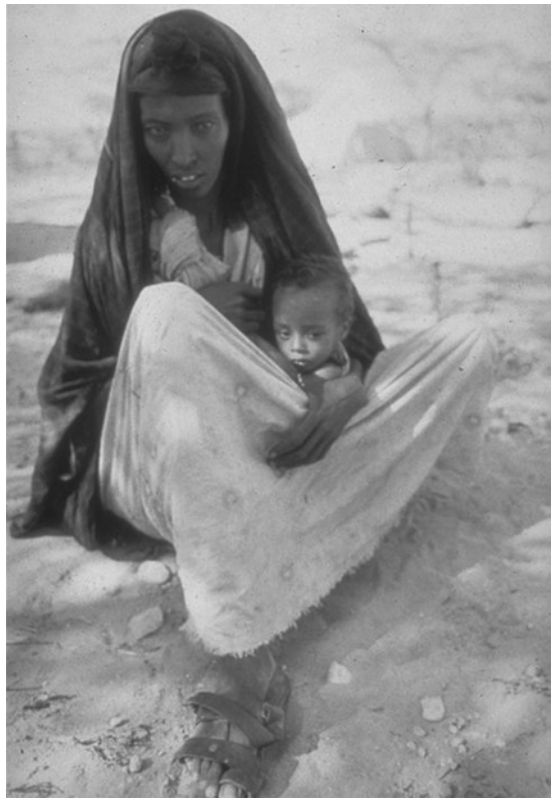
Measuring the extent of hunger and malnutrition in the world is difficult. Disagreement surrounds definitions of adequate caloric and protein requirements, while data on morbidity and mortality reflect the combined effects of sickness and malnutrition.

Nutritional assessments are usually attempted through food balance sheets, dietary surveys, anthropometric (body measurement) surveys, clinical examinations, and administrative records. Food balance sheets place agricultural output, stocks, and imports on the supply side and seed for next year's crops, exports, animal feed, and wastage on the demand side. Demand is subtracted from supply to derive an estimate of the balance of food left for human consumption. That amount left can be balanced against the Food and Agricultural Organization of the United Nations' (FAO) tables of nutritional requirements to estimate

the adequacy of the diet. This method provides rough estimates at best, due to difficulties in estimating agricultural production and wastage in developing countries.

Food balance sheets provide only a picture of average food availability. Malnutrition, like poverty, is better measured if the distribution of food intake or of other indicators is also considered. Average national food availability can be adequate, while malnutrition is common in certain areas, or among particular population groups. Even within families, some members may be malnourished while others are not. To measure malnutrition accurately, information on households or individuals is required.

Household and individual information can be obtained from dietary or expenditure surveys and from clinical or field measurements of height, weight, body fat, and blood tests. These methods are expensive and seldom administered on a consistent and widespread basis for an



Women and child in Ethiopia
Source: **Photo by Mesfin Bezuneh**

entire country. They can be effective, however, in estimating malnutrition among population sub-groups. Since preschool children are most vulnerable to nutritional deficiencies, random surveys to measure either their food intakes or anthropometry can provide a good picture of the extent of malnutrition. Another means of estimating the extent of malnutrition is to utilize existing data in hospital, health service, and school records. Unfortunately, these statistics can be biased because the records for rural areas are scarce, the poor are the least likely to have sought medical attention, and the quality of the information in the records is uneven. For example, many countries record the heights, weights, and ages of first-year elementary school children. Unfortunately, some members of the poorest population groups do not attend school. Because of these biases, estimates of malnutrition among school-aged children generally understate the true problem. One reason why malnutrition is misunderstood is that its measurement is so difficult.

CAUSES OF POVERTY, HUNGER, AND MALNUTRITION

A variety of factors contribute to poverty, hunger, and malnutrition, but inadequate income is certainly the most important underlying cause. If people, for whatever reason, produce too few goods and services and lack income to buy food, they go hungry. Even in times of famine, decreased purchasing power rather than absolute food shortage is often the major problem, as food may be available in nearby regions. Incomes in the affected area have declined so that people cannot afford to buy food from unaffected areas.

Figure 2.2 contains a schematic diagram of the determinants of household well-being and individual nutritional status. Access to productive assets such as land, labor, natural resources, and the policy regime (prices and other factors) determine household income and well-being. Income, including the value of own production and in-kind transfers determine how much food can be purchased or consumed by the family. Total food purchases and consumption do not, however, tell the entire story. Health status and family food preparation, along with how food is distributed among members of the family, help determine how food available to a family is related to individual nutritional status.

Health and malnutrition

Poverty's interaction with malnutrition is often compounded by infectious diseases and parasites that reduce appetites, cause malabsorption

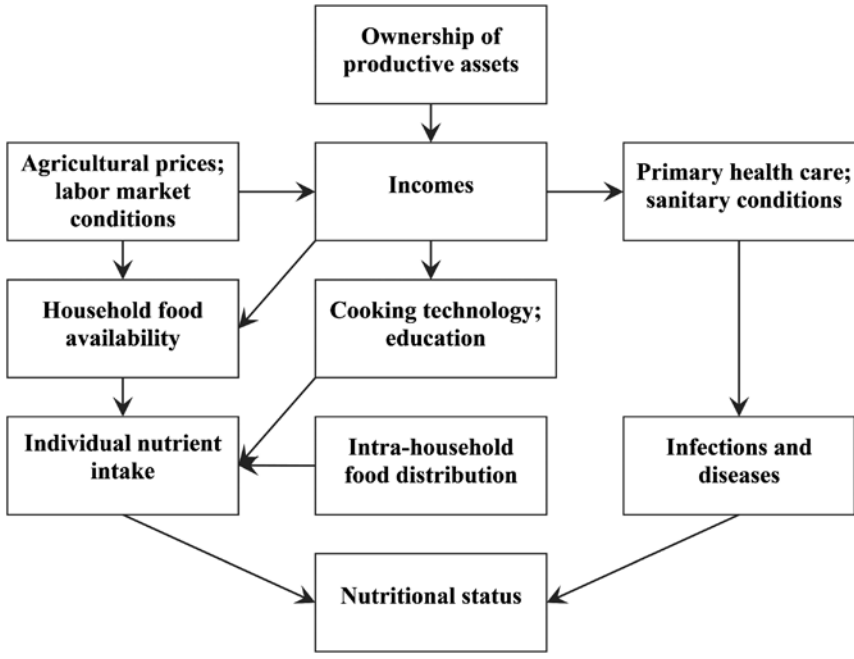


Figure 2.2 Determinants of household well-being and individual nutritional status

of food, or result in nutrient wastage due to fever and other metabolic processes. Health problems and malnutrition exhibit a synergistic relationship: infections and parasites lead to malnutrition while malnutrition can impair the immune system, increasing the risk of infection and the severity of illness. Measles, parasites, intestinal infections, and numerous other health problems are prevalent in developing countries. Many health and sanitation problems lead to diarrhea, which in turn can cause dehydration and death. Health is determined by, among other things, household sanitary conditions, which are influenced by household assets and income, and by government programs. There is room for optimism related to many childhood diseases. The World Health Organization reports that because of sustained efforts to vaccinate children, the majority of the world's children under 1 year old are now vaccinated against six common childhood diseases. However, the last 30 years has seen HIV/AIDS become a persistent problem, especially in Africa and Asia. Thirty-eight million people were HIV positive in 2018 and about 770,000 people died from AIDS-related illnesses. Malaria also remains a serious problem in many countries, with more than 200 million cases per year and 435,000 deaths. Seventeen countries, mostly in Africa, account

for 80 percent of those deaths.[1] Fortunately, programs to combat malaria are broadly successful. The distribution of bed nets and efforts to reduce the malaria-transmitting insect – the female Anopheles mosquito – have reduced rates of infection in many countries.

Poor nutritional practices

Insufficient knowledge of good nutritional practices, maldistribution of food within the family, and excessive demands on women's time can all contribute to malnutrition and perpetuate poverty. The results of studies that have examined each of these factors provide conflicting evidence as to their importance. Each factor is undoubtedly significant in some areas of the world but not in others. In parts of South Asia, evidence indicates that adult males often receive a disproportionate share of food in the family compared to young females, but this is not universally the case.

Evidence shows that whether the male or female controls income within a family helps determine how food is distributed. When women earn incomes, the extra resources are more likely to be spent on food for the family.[2] There also is strong evidence that increased educational opportunities for women are linked to improved nutritional practices and more equitable distribution within the family.

Seasonal and cyclical hunger

As with poverty, many people in developing countries move in and out of a state of malnutrition. There are hungry seasons, hungry years, and hungry parts of the life cycle. Given individuals may or may not survive these periods and can experience lasting physical, mental, and emotional impacts even if they do survive.

Hungry seasons occur because of agricultural cycles. In the weeks preceding a harvest, food can be in short supply. This normal seasonality can be exacerbated if crops in a particular year are short or households are unable to effectively store food. In certain seasons, particularly the rainy seasons, disease and infection are more common. Likewise, droughts, floods, and insect infestations happen in some years but not in others. Young children are vulnerable, in part due to dangers associated with diarrhea. Pregnant and lactating women experience extra nutritional demands on their bodies, while the elderly suffer disproportionately as well, particularly if they lack the support of their children.

Ugandan children with seasonal hunger

SOLUTIONS TO POVERTY, HUNGER, AND MALNUTRITION PROBLEMS

Solutions to hunger and malnutrition problems depend on the types and causes of problems, but poverty alleviation is needed for a long-term solution. Famine relief strategies differ from solutions to chronic hunger and malnutrition, but even in famines, the poor are most vulnerable to starvation. Unfortunately, there is no single solution to reducing poverty. Fortunately, certain interventions can help reduce hunger and malnutrition even in the presence of poverty, and a concerted effort across many fronts is required.

Raising incomes

Lifting vulnerable people out of poverty is central to any long-term strategy to alleviate malnutrition in the world. For small-scale farmers, this implies raising productivity, increasing access to land, or creating off-farm employment opportunities. For the population in general, it

implies a need for increased employment opportunities combined with higher productivity per person. The latter requires growth in jobs and in the amount of capital per job in the non-farm sector. Enhanced education, an investment in human capital, will also increase productivity and incomes. Equal access to jobs and expanded economic opportunities in impoverished regions can also help reduce poverty. Economic growth without increased employment for the poorest segments of the population will do little to reduce hunger. Programs to increase employment and earnings opportunities for women are particularly important, partly because these opportunities help accelerate the transition to lower birth rates (for reasons discussed in Chapter 4) and contribute to women's empowerment.

Agricultural productivity

Agricultural productivity is important for the incomes and nutritional status of the poor because in developing countries many low-income people have no choice but to farm and to feed themselves and their families using their own labor and available land. Increased productivity for farmers raises incomes and purchasing power, and resulting production may lower the price of food for those who must buy it to feed their families. Increased investments in agricultural research and education, improved access to purchased inputs, marketing, and credit, improved agricultural policies, and investment in infrastructure such as roads, storage, and irrigation systems can each help generate agricultural production and productivity growth.

Safety nets

As noted above, much poverty is transitory and caused by fluctuations in income. These fluctuations, in turn, can have dramatic impacts on nutrition, and they can lead to longer-term poverty because households often invoke harmful coping mechanisms to deal with them. For example, in the face of income downturns, some families remove their children from school to reduce outlays on school-related items and provide additional workers to generate income. Safety net programs, such as cash and in-kind transfers, public works programs, and fee waivers for health and education, can assist people in need and provide insurance against risks. By protecting vulnerable farmers against the adverse consequences of risk, safety nets allow them to make better investment decisions and to adopt new technologies and production practices (such as new seeds and

fertilizers) that increase incomes. Safety nets need to be properly targeted and efficiently administered to avoid waste, but much has been learned in recent years about their design and implementation. Many countries have successfully implemented a variety of safety net programs, including cash transfers, unemployment insurance, and old age pensions.[3]

Food intervention programs

Food price subsidies, supplementary feeding programs, and food fortification can each help reduce nutritional deficiencies. Few developing countries have come close to eliminating malnutrition without some combination of these practices. However, these programs alone cannot solve problems of chronic malnutrition.

Several countries have instituted supplementary feeding programs for vulnerable groups such as children and pregnant and nursing mothers. In some cases, these programs provide food to be consumed in a specific location, such as in schools or health centers, while in others food may be consumed at home. In either case, while total family food consumption rises, that of the food recipient usually grows by less than the total donation. Some food is shared with family members. The evidence on supplementary feeding programs indicates that they often are associated with measurable improvements in nutritional status, but they tend to be expensive for the benefits received. Some of these programs have been supported with food aid from other countries.

Another food intervention program involves fortification by adding specific nutrients during processing. The most successful fortification example is iodine fortification of salt to prevent goiter. Vitamin A also has proven relatively inexpensive to add to foods such as tea, sugar, margarine, monosodium glutamate, and cereal products. Attempts have been made to fortify food with iron to prevent anemia, but reducing iron deficiency anemia has proven to be a complex problem. In general, the effectiveness of adding nutrients to food is reduced by the fact that the poor buy few processed foods, there is often cultural resistance to the fortified product, and the cost of fortification is prohibitive. In many cases, the "fortified" food has been shown to have no more nutrients than unfortified foods; quality control can be prohibitively expensive in developing countries. Recent success in incorporating vitamins and minerals such as vitamin A, vitamin B, iron, and zinc into food crops such as rice, sweet potatoes, and cassava through biofortification provides an alternative avenue for reducing these micronutrient problems.

Health improvements

Efforts to improve sanitation, reduce parasite infections, and prevent dehydration caused by diarrhea can reduce malnutrition and mortality substantially. For example, oral rehydration therapy, involving the use of water, salt, and sugar in specified proportions to replace fluid lost during diarrhea, can significantly reduce diarrhea-related deaths. Investments in sanitation services, such as potable water and latrines, when combined with effective education programs, can improve nutritional status by reducing diarrhea. The percentage of the world with access to clean water has grown dramatically since 1990, but even some countries with good indicators of potable water availability face stresses related to water shortages. Better health services like immunization and deworming programs can reduce the incidence and intensity of diseases and parasites that contribute to malnutrition.

Political, social, and educational changes

Political stability can help alleviate both famine conditions and chronic hunger. Famines in Ethiopia in 1983–84, Somalia in 2011, South Sudan in 2017, and Yemen in 2019–20 were exacerbated by political upheaval that hampered relief efforts. Hunger in North Korea also has political roots. Because programs to curb chronic hunger and malnutrition require long-term commitments, they are necessarily rendered less effective by political instability. Responsible political action can improve income distribution in a country, thereby reducing poverty and malnutrition.

Social, cultural, and educational factors also come into play. For example, low rates of breastfeeding in some countries have contributed to malnutrition as substitutes can be less nutritionally complete, are often watered down, and in some cases are even unsanitary. In other cases, breastfeeding may continue too long without the addition of needed solid foods. While social and cultural factors change slowly, and economic factors influence decisions, education can help. In fact, few consumption practices are totally unaffected by education. Nutrition education programs, especially when combined with income-generating projects or efforts to increase a family's access to nutrients, such as home gardening, have been shown to lead to improved nutritional status.

International actions

International actions can help alleviate poverty, famine, and chronic malnutrition. Because increased incomes are so important to improved nutrition, opening of markets in more-developed countries and debt

Rural health center in Colombia

relief are actions that can help, especially in the long run. Foreign assistance can provide short-run relief and, when properly designed, facilitate long-run development.

Reduced barriers by developed countries to imports from developing countries will enable low-income nations to gain greater access to world markets. The foreign exchange earned can be used for development efforts and food imports when needed.

Foreign assistance includes food aid as well as technical and financial assistance. Gifts and loans of food at low interest rates can help solve part of the hunger problem if the food assistance is properly administered. Food aid can save lives during short-term famines and be used over longer periods in supplementary feeding programs and in food-for-work programs to help generate wealth in developing countries. Financial and technical assistance can help developing countries expand their capital bases and improve methods for producing food and other products, allowing them to import or develop the new technologies they need to break out of poverty.

SUMMARY

In this chapter, the types and consequences of poverty, hunger, and malnutrition were examined. We now have much better information on the

distribution and extent of poverty than we did a few years ago. Even though it is difficult to measure accurately the extent of hunger and malnutrition in the world, it is known that chronic malnutrition affects more people than do famines. Malnutrition results in reduced physical and mental activity, stunted growth, blindness, anemia, goiter, brain damage, mental anguish, and death.

The causes of hunger are many, but virtually all causes are related to poverty. Infections, diseases and parasites, poor nutritional practices, and variability in food supplies all contribute to the severity of malnutrition. Solutions to hunger and malnutrition include raising incomes, increasing agricultural productivity in developing countries, food intervention programs, improving health systems; political, social, and educational changes; international programs such as food aid and other foreign assistance; opening of foreign markets; and price stabilization.

IMPORTANT TERMS AND CONCEPTS

Anthropometry
Chronic malnutrition
Debt relief
Dietary surveys
Famine
Food aid
Food balance sheets
Food fortification
Food price subsidies
Foreign assistance
Kwashiorkor, marasmus, goiter, anemia
Maldistribution of food
Micronutrients
Oral rehydration therapy
Political upheaval
Poverty
Price stabilization
Protein and calorie deficiency
Safety nets
Seasonal and cyclical hunger
Supplementary feeding programs
Transitory poverty
Vitamin and mineral deficiency
Vulnerability

LOOKING AHEAD

Hunger and malnutrition imply a need for food but not necessarily a demand for food unless that need is backed by purchasing power. Food demand is influenced by income, prices, population, and tastes and preferences. In the next chapter, we will examine tools that can help measure or project the extent to which various demand factors affect food consumption. We will explore how demand interacts with supply to determine prices. The tools discussed are the first of a set of theories and

methods presented in this book that can improve your ability to analyze and not just observe food and development problems and policies.

QUESTIONS FOR DISCUSSION

1 What are the causes of transitory poverty? What can be done to alleviate the problem?
2 Why is it important to have information on the depth and severity of poverty in addition to the poverty prevalence?
3 Has poverty gone down globally over time?
4 Is famine more common today than in the past?
5 If people in the United States moved to a diet in which they consumed more grain and less meat, would there be more food for people in poor countries of the world? Why or why not?
6 What are the principal causes and consequences of hunger?
7 How do we measure the adequacy of food availability in a country?
8 What are some solutions to hunger and malnutrition problems?
9 How might safety net programs contribute to long-term development?
10 Why and how does political upheaval contribute to famine?
11 What are the major interactions between health and nutritional problems?

NOTES

1 World Health Organization, 2020, www.who.int/gho/malaria/en/.
2 See Abhijit Banerjee and Esther Duflo, *Poor Economics: A Radical Re-thinking of the Way to Fight Global Poverty* (New York: Public Affairs, 2011).
3 See Margaret Grosh, Carlo del Ninno, Emil Tesliuc, and Azedine Ouerghi, *For Protection and Promotion: The Design and Implementation of Effective Safety Nets* (Washington, DC: The World Bank, 2008).

RECOMMENDED READINGS

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