

Introduction

Most hunger is caused by a failure to gain access to the locally available food or to the means to produce food directly.

— C. Peter Timmer, Walter P. Falcon, and Scott R. Pearson¹

This Chapter

- 1 Examines the basic dimensions of the world food situation
- 2 Discusses the meaning of economic development
- 3 Considers changes that occur during agricultural and economic development

OVERVIEW of the WORLD FOOD PROBLEM

One of the most urgent needs in the world today is to reduce the pervasive problems of hunger and poverty in developing countries. Despite many efforts and some successes, millions of people remain ill-fed, poorly housed, under-employed, and afflicted by a variety of illnesses. These people regularly suffer the pain of watching loved ones die prematurely, often from preventable causes. In many countries, the natural resource base is also being degraded, with potentially serious implications for the livelihoods of future generations.

Why do these problems persist, how severe are they, and what are their causes? What does the globalization of goods, services, and capital mean for agriculture, poverty, and environment around the world? And, how does the situation in poor countries feed back on industrialized nations, and vice versa? An understanding of the fundamental causes of the many problems in poorer countries is essential if solutions are to be recognized and implemented. What role does agriculture play and how might it be enhanced? What can rich countries do to help? How do the policies in developed countries affect developing

¹ C. Peter Timmer, Walter P. Falcon, and Scott R. Pearson, *Food Policy Analysis* (Baltimore: Johns Hopkins University Press, 1983), p. 7.

countries? These are some of the questions addressed in this book. Globalization will continue, and a key issue is how to manage it to the betterment of developing and developed countries alike.

Much has been learned over the past several years about the roles of technology, education, international trade and capital flows, agricultural and macroeconomic policies, and rural infrastructure in stimulating agricultural and economic development. In some cases, these same factors can be a two-edged sword: they contribute to economic growth on the one hand, but lead to price and income instability or environmental risk on the other. These lessons and other potential solutions to development problems are examined herein from an economic perspective. The need is stressed for improved information flows to help guide institutional change in light of social, cultural, and political disruptions that occur in the development process.

World Food and Income Situation

Are people hungry because the world does not produce enough food? No. In the aggregate, the world produces a surplus of food. If the world's food supply were evenly divided among the world's population, each person would receive substantially more than the minimum amount of nutrients required for survival. The world is not on the brink of starvation. Population has roughly doubled over the past 40 years, and food production has grown even faster.

If total food supplies are plentiful, why do people die every day from hunger-related causes? At its most basic level, hunger is a poverty problem. Only the poor go hungry. They go hungry because they cannot afford food or cannot produce enough of it themselves. The very poorest groups tend to include: families of the unemployed or underemployed landless laborers; the elderly, handicapped, and orphans; and persons experiencing temporary misfortune due to weather, agricultural pests, or political upheaval. Thus, hunger is for some people a chronic problem and for others a periodic or temporary problem. Many of the poorest live in rural areas.

Hunger is an individual problem related to the distribution of food and income within countries and a national and international problem related to the geographic distribution of food, income, and population. Roughly one-fifth of the world's population (about one billion people) lives on less than \$1 per day (about one-half lives on less than \$2 per day). These people are found primarily in Asia and Africa. The largest number of poor and hungry live in Asia, although severe hunger and poverty are found in Sub-Saharan Africa and in parts of Latin America. Good strides have been made in reducing global poverty; over the



Many farm workers in Asia earn between one and two dollars per workday.

past 30 years, the proportion of the world's population living on less than \$1 per day has been cut by more than half and is now less than 20 percent. However, more remains to be done to alleviate poverty-related problems.

While hunger and poverty are found in every region of the world, Sub-Saharan Africa is the only major region where per-capita food production has failed to at least trend upward for the past 30 years. As Figure 1-1 shows, per capita food production in Africa has stagnated since 1980 and had experienced a downward trend for several years before that time. Latin America and particularly Asia have experienced relatively steady increases. The result has been significant progress in reducing hunger and poverty in the latter two regions, while per-capita calorie availability remains below minimum nutritional standards in many Sub-Saharan countries. Low agricultural productivity (farm output divided by farm inputs), wide variations in yields due to natural, economic, and political causes, and rapid population growth have combined to create a precarious food situation in these countries.

Annual variation in food production is a serious problem, particularly in Sub-Saharan Africa (see Figure 1-1). This variation has caused periodic famines in individual countries, particularly when production problems have been compounded by political upheaval or wars that

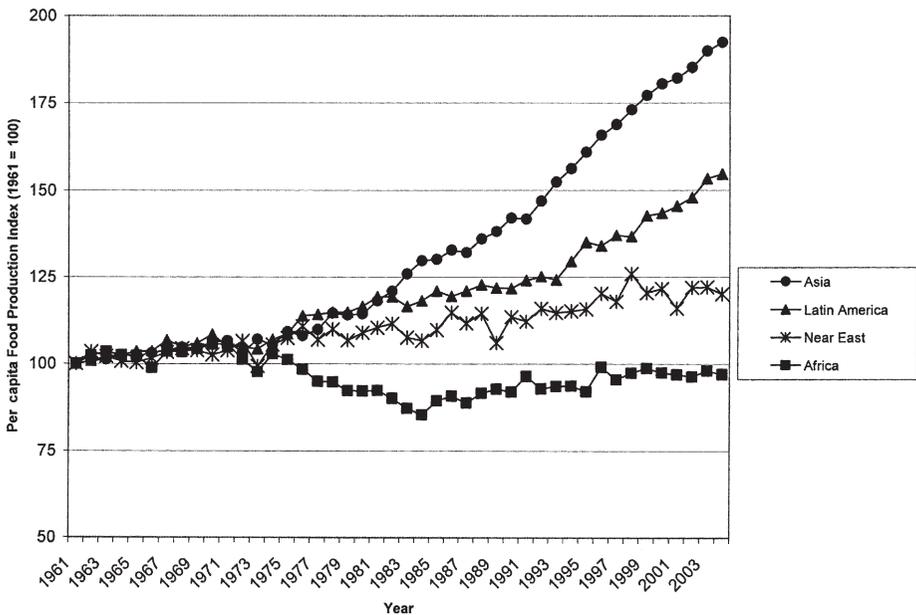


Figure 1-1. Index of per capita food production.
(Source: FAOSTAT data, 2005.)

have hindered international relief efforts. Production variability causes wide price swings that reduce food security for millions who are on the margin of being able to purchase food. If the world is to eliminate hunger, it must distinguish among solutions needed for short-term famine relief, those needed to reduce commodity price instability (or its effects), and those needed to reduce long-term or chronic poverty problems.

Food Prices

For many years, for most people in the world, the real price of food fell relative to the prices of other things. The international prices (in nominal or “current” dollars) of maize, rice, and wheat — the world’s major food grains — are shown in Figure 1-2. Despite peaks in 1974, 1981, 1996, and 2008, the average prices of all three grains have fluctuated without strong trends for several years. The prices of most other things have risen much more steadily with inflation, so for most people the *relative* (or “constant”) price of food has slightly fallen, with exceptions during the peak years. This reduction in the real price of food is both good and bad, because prices affect economic growth and social welfare in a contradictory fashion. Lower food prices benefit consumers and stimulate industrial growth but can lower agricultural producer

incomes and reduce employment of landless workers. To the extent that lower prices reflect lower production costs, impacts on producers may be mitigated. Future food-price trends will depend on the relative importance of *demand* shifts, resulting primarily from changes in population, income, and non-food uses for farm products (such as bio-fuels) compared to *supply* shifts, resulting from a variety of forces, particularly new technologies and climate changes.

Instability in local and world food prices, however, is a serious problem affecting food security and hunger in developing countries. The three grains shown in Figure 1-2 have exhibited sizable year-to-year price variations. This instability was most severe during the 1970s and most recently. Food price fluctuations directly affect the well being of the poor, who spend a high proportion of their income on food. Governments are finding that food price instability increases human suffering and also threatens political stability.

As shown in Figure 1-2, grain prices were higher than normal in 2007–2008. The higher prices were due to a combination of factors that shifted supply and demand, as well as actions by market speculators. Supply factors included such items as adverse weather conditions

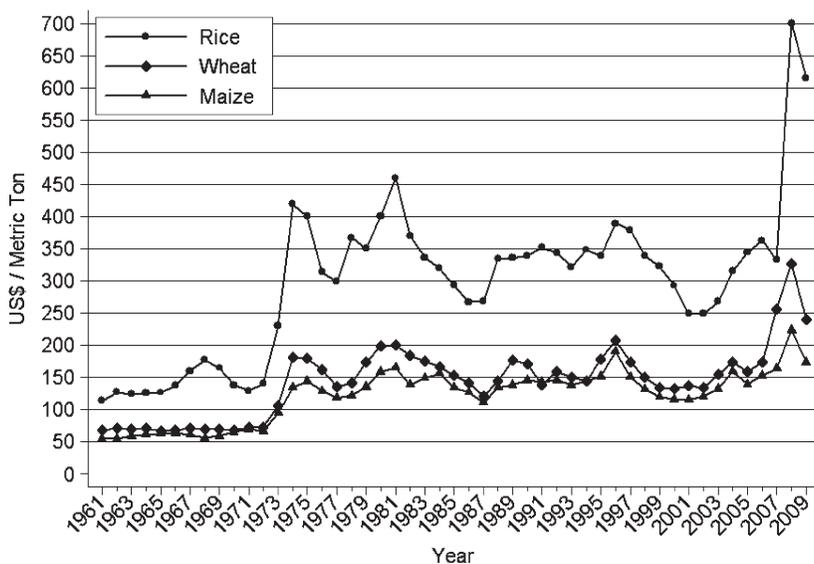


Figure 1-2. World prices of major grains in current dollars. (Source: FAOSTAT 2009, for years through 2006 and IMF International Financial Statistics 2009, for years 2007–09.)

and higher fuel and fertilizer costs, while demand factors included items such as increased demand for grains for bio-fuel use, continued population and income growth in many developing countries, changes in currency values, and policy changes in countries that increased their demand for imported food. Also, speculative investments in commodity markets increased, driving up commodity prices more than basic supply and demand factors alone would have dictated. As the global economy turned down in 2008, speculators eventually reduced these investments, fuel prices dropped, and income growth slowed. Grain supplies also increased, and food prices retreated substantially from their highs of early 2008.

Malnutrition

Hunger is most visible to people in developed countries when a drought or other disaster results in images in the news of children with bloated bellies and bony limbs enduring the pain of extreme hunger. Disturbing as such images are, in a sense they mislead. The less conspicuous but more pernicious problem, in terms of people suffering and dying, is chronic malnutrition. While accurate figures of the number of malnourished in the world are not available, and even good estimates depend on the definition used, a conservative estimate is that roughly 860 million people suffer from chronic or severe malnutrition associated with food deprivation. More than ten million people, many of them young children, die each year from causes related to inadequate food consumption. Increasing per-capita food production has allowed more of the world's population to eat better. But for those in the lower income groups, the situation remains difficult.

Health

People born in developing countries live, on average, 14 years less (in Sub-Saharan Africa, 27 years less) than those born in developed countries. Health problems, often associated with poverty, are responsible for most of the differences in life expectancies. Mortality rates for children under age five are particularly high, often 10–20 times higher than in developed countries (see Figure 1-3). Though countries with high rates of infant mortality are found in all regions, Sub-Saharan African countries are particularly afflicted. The band of high infant mortality stretching from the Atlantic coast across Africa to Somalia on the Indian Ocean covers some of the poorest and most undernourished populations in the world.

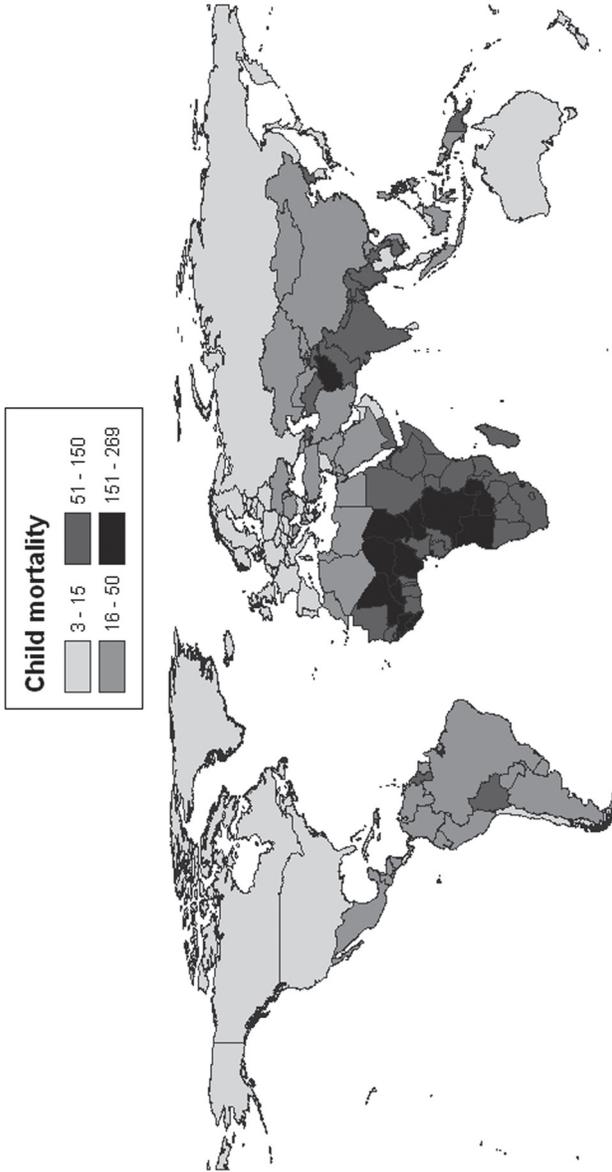


Figure 1-3. Under-five mortality rates (per 1000 live births).
(Source: World Health Organization Statistical Information System, 2006.)

Poverty affects health by limiting people's ability to purchase food, housing, medical services, and even soap and water. Inadequate public sanitation and high prevalence of communicable diseases are also closely linked with poverty. A major health problem, particularly among children, is diarrhea, usually caused by poor water quality. According to the World Bank, 5 to 10 million children die each year from causes related to diarrhea. Respiratory diseases account for an additional 4 to 5 million deaths, and malaria another million. Basic health services are almost totally lacking in many areas; on average, ten times as many people per doctor and per nurse are found in low-income countries as in developed countries.

A major health problem that continues to grow rapidly in the developing world is acquired auto-immune deficiency syndrome (AIDS). The disease is particularly difficult to contain in many African countries because of the ease of its heterosexual spread, lack of education about the disease, limited use of protective birth-control devices, and in some cases absence of government commitment to address the problem. Estimates are that roughly a quarter of the adult populations in certain countries, such as Botswana and Swaziland, are HIV positive. Effects are felt in lost productivity and increased poverty, in addition to its effects on direct human suffering. As serious as the problem currently is in Africa, the region likely to be devastated most by AIDS in the future is Asia. According to the World Health Organization, an estimated 33 million people worldwide were living with HIV/AIDS in 2007.

Population Growth

How important is population growth to the food-poverty-population problem? It is very important, and will continue to be so at least for the next 40–50 years. Population is growing less than 1 percent per year in developed economies, but 2 percent per year in developing countries excluding China, and 3 percent or more in many Sub-Saharan African countries. These higher growth rates place pressure on available food supplies and on the environment in many low-income countries. Population growth and food production are closely linked, and changing either in a major way takes time, as discussed in Chapter 4. It is clear that continual increases in food production are needed, because regardless of how successful are efforts to control population growth, world population will not stabilize for many years. Rapid urbanization is also occurring as populations continue to grow.



Children in Honduras.

Globalization

Food and economic systems in less-developed countries are affected by the international economic environment far more today than they were in years past. Trade and other economic policies abroad and at home, international capital flows, migration, and oil price shocks have combined to increase the instability of and opportunities for improving the food and economic security of developing countries.

International trade in agricultural products (as with other products) has grown rapidly since the 1970s, building on improvements in transportation and information systems. As exports and imports of farm products constitute a higher proportion of agricultural production and consumption, effects of domestic agricultural policies aimed at influencing the agricultural sector are altered. World prices become more important to farmers than they were previously, and possibilities for maintaining a nation's food security at the aggregate level are improved, although price volatility remains an issue. Production and policy changes abroad also tend to have a great effect on domestic agriculture as international trade grows. While the need for national food production self-sufficiency has been reduced, the need to be price competitive with other countries has grown, as has the need to participate in international negotiations to alter the policy environment.

International capital (money) markets, through which currencies flow from country to country in response to differences in interest rates and other factors, have become as important as trade to the food and

economic systems in less-developed countries. The volume of international financial transactions far exceeds the international flows of goods and services. Capital flows affect the values of national currencies in foreign exchange markets. The foreign exchange rate, or the value of one country's currency in terms of another country's currency, is an important determinant of the price a nation receives for exports or pays for imports. Speculation in financial markets has led to rapid inflows and outflows of capital in some countries, resulting sharp changes in asset values and incomes.

Many less-developed countries also have serious foreign debt problems. Many countries have reduced their rate of government spending in efforts to service this debt, and this decrease in turn has lowered the availability of public services, creating further hardships for the poor. The need for foreign exchange to repay external debts has also increased the importance of exports for less-developed countries, forcing some countries to reexamine their trade and exchange-rate policies. At the same time, new technologies have been changing the possibilities that countries have for producing and trading particular products.

Environmental Degradation

As populations grow, environmental problems become more severe. Deforestation, farming of marginal lands, overgrazing, and misuse of pesticides have contributed to soil erosion, desertification, poisoning of water supplies, and climate change. The global climate has become gradually warmer and less stable, while water has become scarcer. Environmental problems exist in every region of the world. Some degradation is intentional, but most is the unintended result of people and governments seeking means of solving immediate food and economic crises, often at the cost of long-term damage to the environment. Some of this damage may compromise the ability of a country to raise incomes in the long run. When people are hungry, it is hard to tell them to save their resources for the future, and environmental conservation represents a form of savings. However, many potential solutions exist that are consistent with both short-term increases in food production and long-term goals of simultaneously sustaining or improving environmental quality while raising incomes.

Risk and Uncertainty

Most of the factors mentioned above are associated with increased exposure to risk and uncertainty. Fluctuating prices, exchange rate instability, certain crop pests, and rapidly changing weather patterns



Slum close to riverbank in Katmandu, Nepal.

represent risk factors. Recent research has shown that risks and risk management imply real costs that may compromise long-run improvements in well being. Risk also lowers welfare in the short run. For example, Hurricane Mitch struck the Central American coastal region during October 1998, causing massive losses in productive capacity and washing out roads, houses, and entire villages. In Honduras alone, it killed more than 8,000 people and injured more than 12,000. Deforestation in hillside areas contributed to the hurricane's damage as landslides and flooding washed out low-lying areas. In December 2004, a large earthquake off the coast of Indonesia caused a tsunami that washed ashore in several countries, especially in Indonesia, Sri Lanka, India, and Thailand, killing more than 228,000 people.

Risk is not necessarily bad. Innovation and entrepreneurship are risky. It is the way that risks are managed that most influences economic growth. Risk management needs to be conducted in an efficient manner; the proper balance must be found between managing risks and pursuing other goals.

The preceding overview provides brief highlights of some of the dimensions of the food-income-population problem. These and other problems are discussed in more depth in subsequent chapters, and alternative solutions are suggested. First, however, it is important to consider what we mean when we talk about development.

MEANING of DEVELOPMENT

The term *development* means a change over time, typically involving growth or expansion. *Economic* development involves changes in people's standard of living. For most of human history there was little such change, but over the past 300 years there has been a rapid and (so far) sustained increase in almost every kind of human activity. Growth occurred first and has been sustained the longest in Northwest Europe and North America, but similar kinds of expansion have occurred all around the world.

Development is a process with many economic and social dimensions. For most observers, *successful* economic development requires, as a minimum, rising per-capita incomes, eradication of absolute poverty, and reduction in inequality over the long term. The process is a dynamic one, including not only changes in the structure and level of economic activity, but also increased opportunities for individual choice and for improved self-esteem.

Development is often a painful process. Adjusting to new circumstances is always difficult: as Mark Twain famously wrote, "I'm all for progress — it's change I can't stand." There is often dramatic social upheaval with traditional ways of life being displaced, existing social norms being challenged, and increasing pressures for institutional and political reform. The physical and cultural landscape of a country can change radically during economic development. And at the individual level, the standard of living for the poorest people in a society does sometimes decline, even as average real incomes increase. More often, the fruits of improvement are unequally distributed. By any measure, poverty and deprivation remain widespread, despite the astonishing improvements in living standards experienced by many all across the globe.

As economic activity continues to expand, there is continuous concern with the constraints imposed by natural resources and environmental factors. The World Commission on Environment and Development has defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."² Thus, the term "development" encompasses not only an economic growth component, but distributional components, both for the current population and for future generations.

² World Commission on Environment and Development, *Our Common Future* (New York: Oxford University Press, 1987), p. 43.

Measures of Development

Although development is difficult to measure, it is often necessary to do so in order to assess the impacts of particular programs, to establish criteria for foreign assistance, and for other purposes. Because of its several dimensions, single indicators of development can be misleading. Measures are needed that are consistent with the objective of raising the standard of living broadly across the population. Average per-capita income is frequently used as a measure (see Figure 1-4). Is it a good measure?

Average per capita income is not a perfect measure of living standards for several reasons, but finding an alternative indicator that can incorporate each dimension of development is impossible. Because development is multidimensional, collapsing it into a single index measure requires placing weights on different dimensions. Average per-capita income is an inadequate measure even of the economic dimensions because it misses the important distributional elements of development and is a crude measure of people's well-being.

Alternative multidimensional development indicators have been suggested. One of the oldest is a level-of-living index proposed by M.K. Bennett that weights 19 indicators for which data were available in 1951.³ Examples of indicators include caloric intake per capita, infant mortality rates, number of physicians per 1000 of total population, and years of schooling. A more recent index is the Human Development Index⁴ (HDI), which weights life expectancy, education, and income. Weighting schemes are subjective, however, and average per-capita income is highly correlated with many of the indicators. Consequently, average per-capita income, measured as gross national product (GNP) or gross domestic product (GDP) per capita is often employed as a first approximation; then measures such as income distribution, literacy rates, life expectancy, and child mortality are examined separately or as part of an index. Even these supplementary indicators can be misleading due to regional disparities within countries.

Some studies have called for the GNP income measure itself to be modified to account for depreciation or appreciation of natural resource-based assets, particularly forests. This modification may be possible once natural resource accounting procedures are further refined.

³ See M. K. Bennett, "International Disposition in Consumption Levels," *American Economic Review*, vol. 41, September 1951, pp. 632–49.

⁴ United Nations Development Program, *Human Development Report* (New York: Palgrave Macmillan, 2007), p. 356.

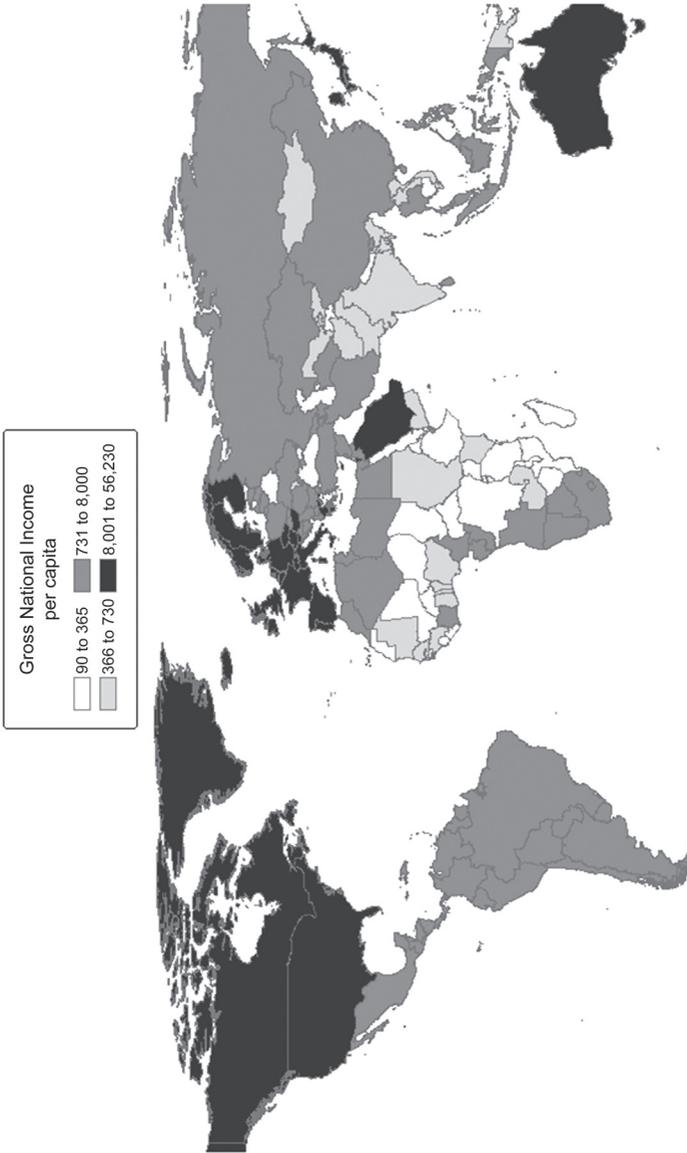


Figure 1-4. GNI per capita, 2004 (Atlas Method).
(Source: World Bank, *World Development Indicators Online Database*.)

BOX 1-1. **POVERTY and INEQUALITY**

Poverty is generally defined as the failure to achieve certain minimum standards of living. By its very nature, poverty refers not just to *averages*, but to *distributions*. Poverty is not, however, synonymous with inequality; countries with perfect equality could contain all rich or all poor people. Measurement of poverty requires three steps: determining an appropriate measure or indicator, deciding on its minimum level, and counting the number or percentage of people falling below it. Alternatively, a measure of degree or intensity of poverty would indicate the amount by which people fall below the poverty line.

While poverty refers to some level or position with respect to a measure such as income, inequality refers to the distribution of that measure among a population. For example, evidence from 21 developing countries indicates that, on average, 6 percent of household income is received by the poorest 20 percent of the households, whereas 48 percent of household income is received by the richest 20 percent. In some countries the extremes are even more dramatic. It is possible for poverty to decrease in a country during the development process, but for inequality to increase, at least for a period of time.

Incomes and Development

Poverty and low incomes are most frequently associated with underdevelopment, while growing per-capita incomes should indicate increasing levels of development. As discussed above, increasing average incomes may not necessarily mean more development, because the distribution of this income often determines whether poverty and inequality are diminished as the mean grows. Some of the relationships between poverty and inequality are discussed in Box 1-1.

Numerous measures of inequality and the extent of poverty exist. For example, the Human Poverty Index (HPI) measures the extent of deprivation with respect to life expectancy, education, and income.⁵ If, as is argued above, the meaning of development contains some element of poverty reduction or increased equality of income distribution, then clearly the incomes of the poor and destitute should be raised during the development process.

Policies undertaken to promote development have diverse effects on the incomes of the poor. Some people benefit, but often some do not,

⁵ United Nations Development Program, *Human Development Report* (New York: Palgrave Macmillan Press, 2007), p. 357.

and, at times, incomes fall for certain population groups. It is important to consider the winners and losers in the development process. Income distributions, and changes in them, are indicators of the impact of development policies on different groups in society.

Values and Development

Value judgments or premises about what is or is not desirable are inextricably related to development economics. Concerns for economic and social equality, poverty eradication, and the need to improve health and education all derive from subjective beliefs about what is good and what is not. Solutions to specific problems often involve tradeoffs, and decisions about public resource allocations always involve tradeoffs. Governments make such tradeoffs every day, as most government actions are costly to some people even as they benefit others. Economics can be a powerful tool for evaluating these tradeoffs, providing insights into the costs and benefits of different actions, winners and losers, and longer-run consequences of savings, investment, and consumption decisions. Economics is, however, less well-suited for making value decisions.

Even if people share the same set of beliefs and values, they may attach different weights to the individual beliefs and values within that set. Because there is no correct set of weights, people may not agree about appropriate solutions to development problems, even if the suggested solutions appear conceptually sound in terms of leading to their intended impacts.

Most policy suggestions would result in both gainers and losers. In some cases, the gainers could compensate the losers, but sometimes they could not, and often they do not. Because affected groups have differing political strengths within society, economic and social development policies cannot be separated from the political process. These realities must be considered if development policies are to succeed.

ROLE of AGRICULTURE

Many alternative development paths or strategies exist. The strategy followed by an individual country at a particular point in time is, or at least should be, influenced in part by its resource endowments and stage of development. Some countries with vast oil and mineral resources have generated capital for development by exporting those resources. Others have emphasized cash-crop exports such as coffee, cocoa, and tea. Some have focused on industrial exports, while others have stressed increases in basic food production. The optimal development path will

vary from country to country, but the choice of an inappropriate path, given the existing resource endowments and stage of development, can result in long-term stagnation of the economy.

Numerous examples can be found of countries choosing the wrong development path and paying the price. Argentina, a country well-endowed with land resources, pursued government policies in the 1940s and 1950s that stressed industrialization and virtually ignored agriculture. The result was that agricultural exports, previously an important component of economic growth, stagnated in the 1950s, and foreign exchange shortages prevented the imports of capital goods needed for industrialization. Economic growth slowed dramatically as a result. India is another country whose potential for agriculture-driven growth was subverted by a disproportionate emphasis on industrialization in the 1950s and 1960s.

Agriculture is not very productive in most low-income countries. Early in the development process much of the population is employed in agriculture, and a high percentage of the national income is derived from that sector⁶ (see Table 1-1). As development proceeds, population grows and per-capita income increases. As incomes grow, more food is demanded; either agricultural production or imports must increase. Because agriculture commands so many of the resources in most low-income countries, few funds are available for importing food or anything else unless agricultural output grows.

The capacity of the agricultural sector to employ an expanding labor force is limited. As incomes continue to rise, the demand for non-food commodities grows as well. Therefore, economic development requires a structural transformation of the economy involving relative expansion of nonagricultural sectors. The agricultural sector must contribute food, labor, and capital to that expansion. It also provides a market for nonagricultural goods.

This economic transformation is illustrated in Table 1-1. Agriculture accounts for a large percentage of total income, and an even larger percentage of total employment for the lower-income countries. The contribution of agriculture to national incomes declines from 30 to 50 percent for the lower-income countries, to 15 to 20 percent for the

⁶A warning about measurement is appropriate: in most countries it is difficult to measure the number of people employed in agriculture. Multiple job holdings, seasonal labor use in agriculture, and unpaid household labor all complicate the measurement problem. Often, data on the number employed in agriculture are obtained by (generally high-quality) census estimates of the rural population. Even in rural areas, many people are employed outside agriculture.

Table 1-1. Relationship among Per-Capita National Income, the Proportion of National Income in Agriculture, and the Proportion of the Labor Force in Agriculture, Selected Countries, 2006

Country	Per capita income (in PPP dollars) ¹	Agriculture GDP as a percentage of total GDP	Percentage of active labor force in agriculture	
			Male	Female
Ethiopia	581	47	84	76
Uganda	848	32	60	77
Mali	1004	37	50	30
Bangladesh	1068	20	50	59
Moldova	2,190	18	41	40
Philippines	2,956	14	45	25
Indonesia	3,209	13	43	41
Colombia	5,867	12	32	8
Ecuador	6,737	7	11	4
Thailand	7,061	11	44	41
Brazil	8,474	5	25	16
Argentina	10,815	8	2	1
Mexico	11,387	4	21	5
South Korea	21,273	3	7	9
Italy	27,750	2	5	3
Greece	29,261	3	12	14
Japan	30,290	2	4	5
France	30,591	2	5	2
Australia	34,160	3	5	3
Canada	34,972	2	4	2
United States	41,812	2	2	1

Source: World Bank, World Development Indicators, 2008.

¹ PPP stands for purchasing power parity and means that the incomes are converted to dollars, taking into account cost-of-living differences between the countries.

middle-income range, and down to 5 percent or below for the highest income countries.

The initial size and low productivity of agriculture in most developing countries suggests an opportunity for raising national income through agricultural development. Because of the initial size of, and low per-capita income in the agricultural sector, there is real scope for improving the distribution of income and enhancing the welfare of a major segment of the population through agricultural development.

One of the keys to agricultural development is to improve information flows. In primitive societies, economic activities are local and information is basically available to all. Inappropriate activities are constrained by social and cultural norms. As development begins to proceed and economies become more complex, information needs increase but traditional forms of information transmission are incapable of meeting these needs. Modern information systems are slow to develop, creating inequalities in access to new information. Those with greater access than others can take advantage of this situation to further their own welfare, often at the expense of overall agricultural and economic development.

Some changes required to foster broad-based and sustainable development require institutional changes and capital investments. Capital investments necessitate savings. Such savings are channeled into private and public investment, the latter to build the infrastructure needed for development. Saving requires striking a balance between present and future levels of living because it requires abstention from current consumption. Means must be sought to reduce this potential short-run versus long-run conflict during the development process. However, certain types of investments necessary for development, such as education, provide both short- and long-run benefits, as do investments in technologies and employment-intensive industries.

Improving Agriculture

How can agriculture be improved to facilitate its role in providing food and contributing to overall development? There are still areas of the world, particularly in parts of Latin America and Africa, where land suited for agricultural production is not being farmed. Most increases in agricultural production will have to come, however, from more intensive use of land currently being farmed. Such intensive use will require improved technologies generated through research as well as improved irrigation systems, roads, market infrastructure, and other investments. It will require education and incentives created through changes in institutions such as land tenure systems, input and credit policies, and pricing policies (see Box 1-2).

Agriculture and Employment Interactions

Agricultural development can provide food, labor, and capital to support increased employment in industry and can stimulate demand in rural areas for employment-intensive consumer goods. Because of their comparative advantage in labor-intensive production, many developing countries will need to import capital-intensive goods, such as steel

BOX 1-2. HISTORICAL PERSPECTIVE on AGRICULTURAL DEVELOPMENT

The historical progression of agricultural development can be broadly broken into four distinct periods, marked by three “revolutions” in production technology and social institutions.

First, from the time that we first appeared on earth, human beings hunted and gathered their food. Hunter-gatherer societies typically lived in small groups, experienced little population growth.

Then, more than 10,000 years ago, a combination of climate changes and other factors created conditions for the development of settled agriculture. In the Middle East and elsewhere, people began to collect and cultivate the seeds of plants that eventually became modern barley, wheat, and rye. This development is known as the *first agricultural revolution*, and permitted a slow but significant increase in human population density.

More recently, a few hundred years ago, rising population density and opportunities for trade led to a *second agricultural revolution*. In North-western Europe and elsewhere, farmers developed crop rotations and live-stock management systems that permitted rapid growth in output per person, fueling the *industrial revolution* and the eventual mechanization of many important tasks.

Finally, in the late nineteenth and early twentieth centuries, scientific breeding, chemical fertilizer, and other innovations allowed rapid increases in output per unit of area. The spread of these biological technologies to developing countries, known as the *green revolution*, has been a powerful engine of economic growth and poverty alleviation, allowing low-income people to produce more food at lower cost than ever before.

These historical trends played out at different speeds and in different ways across the globe. A few people in the poorest countries still devote substantial energy to hunter-gatherer activities, and many millions of farmers still cultivate the same seeds in the same ways as their ancestors. Because of population growth, these techniques and institutional arrangements yield less and less output over time. The development and spread of higher-productivity systems to suit these people’s needs is among the major humanitarian challenges of our time.

and fertilizer, and export labor-intensive consumer goods and certain types of agricultural goods. Countries that do not match an employment-oriented industrial policy with their agricultural development policy will fail to realize the potential income and employment benefits of agricultural development.

SUMMARY

Some of the basic dimensions of the world food-poverty-population problem were examined. The aggregate world food situation was reviewed, and questions such as who the hungry are, and why they are hungry even though the world produces a surplus of food, were addressed. The significance of population growth and a series of forces in the global economy that influence developing countries were stressed.

The meaning and measures of development were discussed and importance of development problems. The desirability of suggested solutions depends on value judgments. While alternative development strategies can be followed, agriculture has an important role to play in overall development in most developing countries. Development will require a complex set of improved technologies, education, and institutions, and an employment-oriented industrial policy.

IMPORTANT TERMS and CONCEPTS

Agricultural productivity	Institutions
Development	International capital markets
Enhanced information flows	International trade
Environmental degradation	Measures of development
Food-poverty-population problem	Population growth
Food price instability	Structural transformation of the economy
Foreign exchange rates	Sustainability
Globalization	Technology
Health problems	

Looking Ahead

In order to visualize more clearly the relationships among food supplies, food demand, population growth, and nutrition, it is important to examine facts, scientific opinion, and economic theory. We make this examination in the remaining chapters of Part One in this book. We turn first in Chapter 2 to the causes and potential solutions to hunger and malnutrition problems.

QUESTIONS for DISCUSSION

- 1 Are people hungry because the world does not produce enough food?
- 2 Has food production in developing countries kept pace with population growth there?
- 3 Is malnutrition more widespread today than in the past?
- 4 Why did food prices rise so dramatically in 2008?