

Meeting Food Needs in the 21st Century

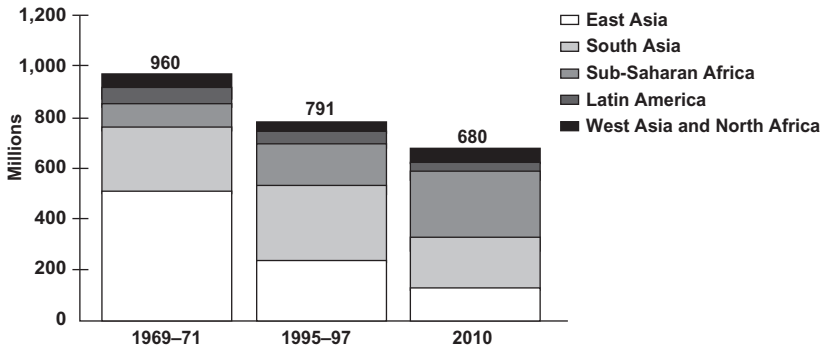
How Many and Who Will Be at Risk?

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Any attempt to address the world's food needs in the 21st century must begin with an accounting of the challenge ahead. Although the number of food-insecure people in the developing world has declined in recent years, lack of access to enough nutritious food remains a persistent problem with devastating human costs. Whereas malnutrition is falling in some areas, it is rapidly on the rise in others. Recent projections show that in the absence of any concerted action to avoid this outcome, many millions of people will still suffer from food insecurity in the first several decades of the 21st century.

About 791 million people in the developing world—18 percent of the population—are currently food insecure¹ (Figure 1.1). South Asia is home to about 36 percent of the food-insecure population, followed by East and Southeast Asia with 31 percent, and Sub-Saharan Africa with 23 percent. However, the incidence of food insecurity is highest in Sub-Saharan Africa, where one out of every three people are food insecure, followed by South Asia, where one-quarter of the population is food insecure. The number of food-insecure people has declined in recent years from 960 million, or 37 percent of the population, in 1969–71 to 938 million in 1979–81, 831 million in 1990–92, and 791 million in 1995–97 (FAO 2000). The largest reduction has occurred in East and Southeast Asia, where the number of food-insecure people has shrunk by half since 1969–71. More modest reductions have occurred in South Asia and in West Asia and

Figure 1.1 Number of food-secure people 1969–71, 1995–97, and 2010



SOURCES: FAO 1996a, 1999a, 1996b.

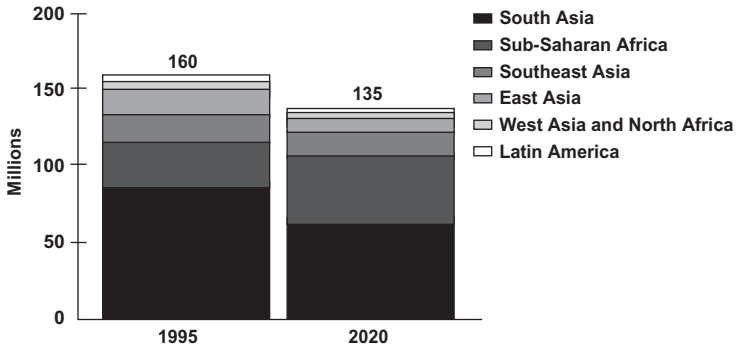
North Africa. In Sub-Saharan Africa, however, the number of food-insecure people has doubled during this period to reach 180 million.

As to the future, the Food and Agriculture Organization of the United Nations (FAO) projects that 680 million people, 12 percent of the developing world's population, could be food insecure in 2010 (Figure 1.1). Similarly, USDA's Economic Research Service projects that 694 million people in 67 low-income countries will fail to meet their nutritional requirements in 2010 (ERS 2000). Food insecurity is expected to diminish rapidly in East Asia and, to a lesser extent, in South Asia and Latin America, but it could accelerate substantially in Sub-Saharan Africa and West Asia and North Africa. Sub-Saharan Africa and South Asia, projected to be home to 70 percent of the world's food-insecure people in 2010, will be the locus of hunger in the developing world. In fact, Sub-Saharan Africa's share of the world's food-insecure population is projected to quadruple between 1969–71 and 2010, from 9 to 39 percent (FAO 1996a). By 2010, every 3rd person in Sub-Saharan Africa is likely to be food insecure compared with every 8th person in South Asia and every 20th person in East Asia.

Child malnutrition is an important indicator of who and how many will be at risk of food insecurity in the future. If they survive childhood, many malnourished children will suffer from impaired immune systems, poorer cognitive development, and lower productivity. As adults, their ability to ensure good nutrition for their children could be compromised, perpetuating a vicious cycle. About 160 million children under five years of age in the developing world are malnourished (Figure 1.2). A little more than 51 percent of them live in South Asia, 22 percent in East Asia, and about 20 percent in Sub-Saharan Africa.

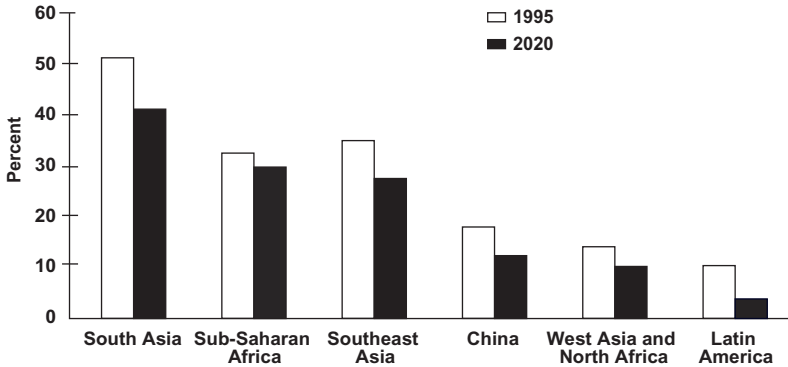
The International Food Policy Research Institute (IFPRI) projects that,

Figure 1.2 Number of malnourished children, 1995 and 2020



SOURCE: IFPRI IMPACT simulations, July 1999.

Figure 1.3 Percentage of malnourished children, 1995 and 2020



SOURCE: IFPRI IMPACT simulations, July 1999.

under the most likely or baseline scenario,² 135 million children will be malnourished in 2020, just 15 percent fewer than in 1995 (Figure 1.2).³ One out of every four children in developing countries will still be malnourished in 2020, compared with every third child in 1995 (Pinstrup-Andersen, Pandya-Lorch, and Rosegrant 1999). Child malnutrition is expected to decline in all major developing regions except Sub-Saharan Africa, where the number of malnourished children is forecast to increase by about 30 percent to reach 40 million by 2020. In South Asia, home to half of the world's malnourished children, the number of malnourished children is projected to decline by 18 million between 1995 and 2020, but the incidence of malnutrition is so high that, even with this reduction, two out of five children could remain malnourished in 2020 (Figure

1.3). With more than 77 percent of the world's malnourished children in 2020, up from 70 percent in 1995, Sub-Saharan Africa and South Asia are expected to remain "hot spots" of child malnutrition in 2020. Many of the countries in these two regions are among the least-developed countries in the world; they will require special assistance to avert widespread hunger and malnutrition in the years to come.

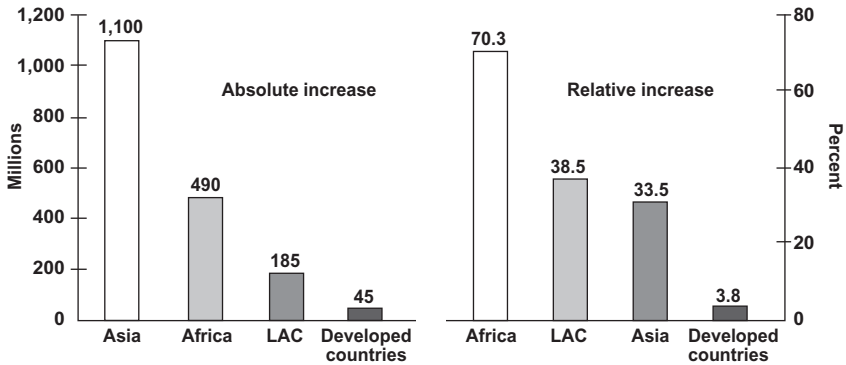
Prospects for Food Demand

Demand for food is influenced by a number of forces, including population growth and movements, income levels and economic growth, human resource development, and lifestyles and preferences. In the next several decades, population growth will contribute to increased demand for food. The United Nations recently scaled back its population projections, but even with these reduced estimates about 73 million people, equivalent to the current population of the Philippines, will be added to the world's population on average every year between 1995 and 2020, increasing it by 32 percent to reach 7.5 billion in 2020. An overwhelming 97.5 percent of the increase in population is expected to occur in the developing world, whose share of global population will increase from 79 percent in 1995 to 84 percent in 2020. Whereas the absolute population increase will be largest in Asia, 1.1 billion, the relative increase will be greatest in Africa, where the population is expected to increase by 70 percent (Figure 1.4). This rate of increase, however, is less than had been projected in the past, partly because of HIV/AIDS, which is ravaging the African population. The world's growing population will continue to exert pressure on food supplies.

Much of the population growth is expected to take place in the cities of the developing world. While its rural population is expected to increase by less than 300 million between 1995 and 2020, the developing world's urban population is projected to double from 1.7 billion to reach 3.4 billion in 2020 (Figure 1.5). By 2020, about 52 percent of the developing world's population will be living in urban areas, up from 38 percent in 1995 (United Nations 1996). The rapid urbanization of the developing world and associated changes in lifestyles will have significant effects on food preferences and hence on demand. As people move from rural to urban areas, they tend to adopt more diverse diets, shifting away from coarse grains such as sorghum and millet to rice, and sometimes making secondary shifts from rice to wheat. They also tend to consume more livestock products, fruits, vegetables, and processed foods.

People's access to food depends on income. Currently, more than 1.3 billion people are absolutely poor, with incomes of a U.S. dollar a day or less per person, while another 2 billion people are only marginally better off (World Bank

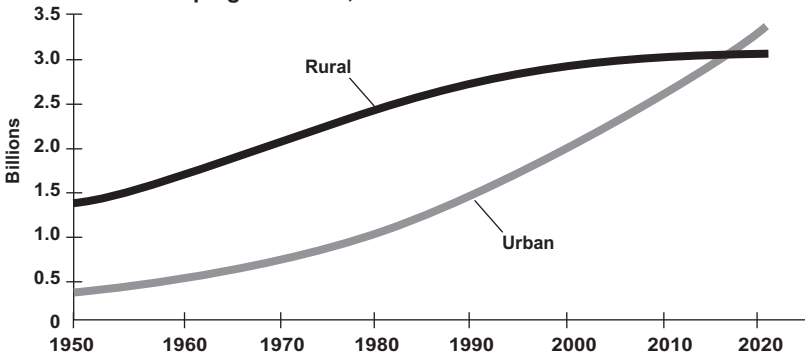
Figure 1.4 Absolute and relative population increases, 1995–2020



SOURCE: United Nations 1999.

NOTE: Medium-variant projections. LAC = Latin America and the Caribbean.

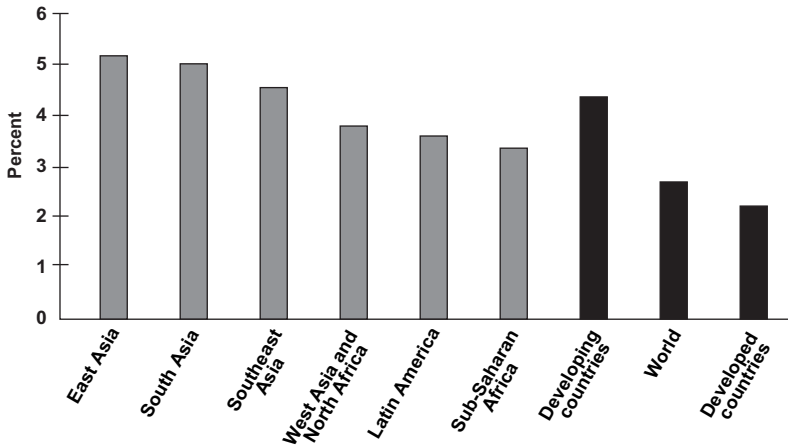
Figure 1.5 Urban and rural population levels in developing countries, 1950–2020



SOURCE: United Nations 1996.

1997). Prospects for economic growth appear favorable in the developing world, and like urbanization, rising incomes will push people toward more diversified diets. IFPRI projects total income in the developing world to increase at an average of 4.3 percent annually between 1995 and 2020, which would double per capita incomes to more than US\$2,200 (Figure 1.6). Per capita incomes in all major developing regions are expected to increase over this period. The increase in Sub-Saharan Africa is projected to be very small, however; even by 2020 the region's per capita income will remain less than a U.S. dollar a day, and poverty will continue to condemn many of the region's people to food insecurity.

Figure 1.6 Projected average annual income growth rates, 1995–2020



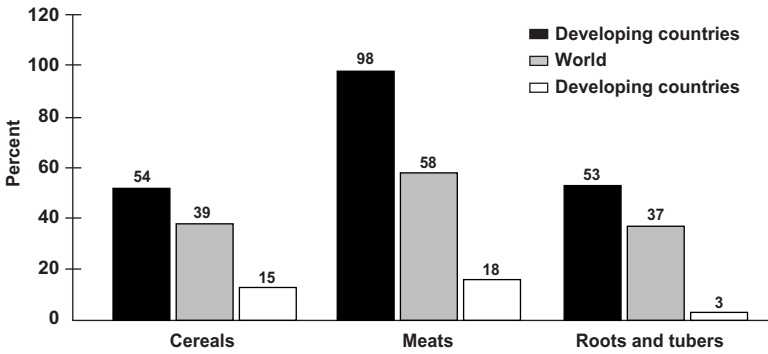
SOURCES: IFPRI IMPACT simulations, July 1999.

Although many millions of people could remain mired in absolute poverty, meeting the food needs of a growing and urbanizing population with rising incomes will have profound implications for the global agricultural production and trading system in coming decades.

IFPRI projects global demand for cereals to increase by 39 percent between 1995 and 2020 to reach 2,466 million metric tons; for meat, by 58 percent, to 313 million tons; and for roots and tubers, by 37 percent, to 864 million tons (Figure 1.7). Developing countries will account for about 85 percent of the 690 million ton increase in the global demand for cereals between 1995 and 2020. Surprisingly, they will account for a similarly large share of the 115 million ton increase in the global demand for meat products over the same period. China alone is forecast to account for one-quarter of the global increase in demand for cereals and for two-fifths of the increase in demand for meat. By 2020, developing countries as a group are forecast to demand twice as much cereals and meat products as developed countries.

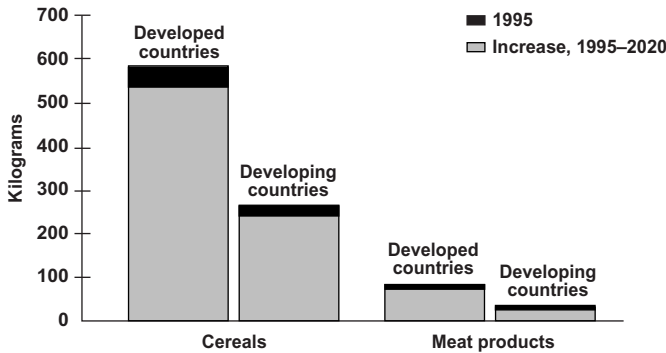
However, a person in a developing country in 2020 will consume less than half the amount of cereals consumed by a person in a developed country and slightly more than one-third of the meat products. Per capita demand for cereals and meat products in developing countries will continue to lag far behind that in developed countries, although the gap will begin to narrow in the case of meat products (Figure 1.8). The disparities in demand can be explained partly by lower incomes and greater dependence on roots and tubers for sustenance in develop-

Figure 1.7 Increase in total demand for cereals, meats, and roots and tubers, 1995–2020



SOURCES: IFPRI IMPACT simulations, July 1999.

Figure 1.8 Per capita demand for cereals and meat products, 1995–2020

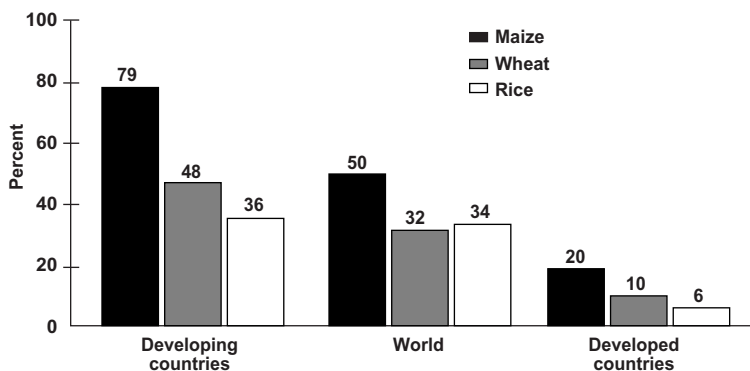


SOURCE: IFPRI IMPACT simulations, July 1999.

ing countries and by much heavier use of cereals for feeding livestock in developed countries. Within the developing world, increases in per capita demand for cereals (food and feed) and meat products in East Asia will far outstrip those in other regions. This is not surprising given that income levels are already relatively high in East Asia and are projected to continue to grow rapidly in the next two decades, triggering massive increase in demand. In the case of cereals, for instance, while per capita demand in East Asia is projected to increase by 66 kilograms, to reach 373 kilograms in 2020, in Sub-Saharan Africa it is projected to increase by only 13 kilograms between 1995 and 2020, to reach 156 kilograms in 2020.

Demand for cereals for feeding livestock will increase considerably in impor-

Figure 1.9 Increase in total demand for major cereal commodities, 1995–2020



SOURCE: IFPRI IMPACT simulations, July 1999.

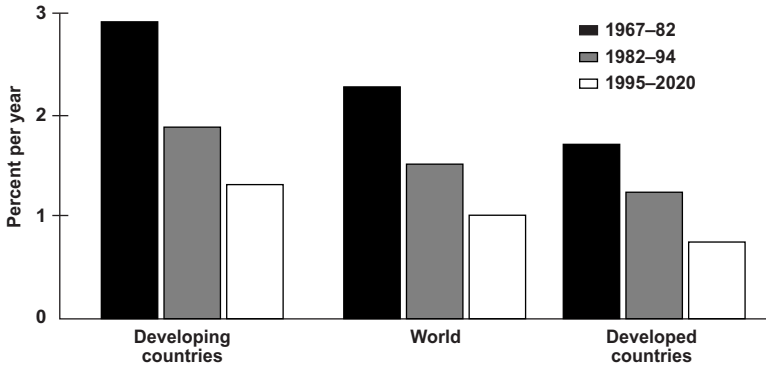
tance in coming decades, especially in developing countries, in response to strong demand for livestock products. Between 1995 and 2020, developing countries' demand for cereals for animal feed is projected to double to 445 million tons, while demand for cereals for food for direct human consumption is projected to increase by 40 percent, to 1,013 million tons. By 2020, 27 percent of the cereal demand in developing countries will be directed to animal feed, compared with 21 percent in 1995. In developed countries, the increase in cereal demand for feed will far outstrip the increase in cereal demand for food in both absolute and relative terms.

Because of substantial increases in demand for livestock products, especially in developing countries where primarily maize and other coarse grains are used for animal feed, demand for maize is projected to increase faster than for other cereals in both developed and developing countries (Figure 1.9). Global demand for maize is projected to grow at an annual rate of 1.6 percent between 1995 and 2020, followed by rice at 1.2 percent and wheat at 1.1 percent. In China, where total demand for meat is projected to double between 1995 and 2020, demand for maize is forecast to increase by around 2.7 percent per year, whereas demand for rice, the most important staple for human consumption, is projected to increase by only 0.6 percent per year.

Prospects for Food Supply

How will the expected increases in cereal demand be met? Not by expansion in cultivated area. IFPRI projections indicate that the area under cereals will

Figure 1.10 Annual growth in cereal yields, 1967–82, 1982–94, and 1995–2020



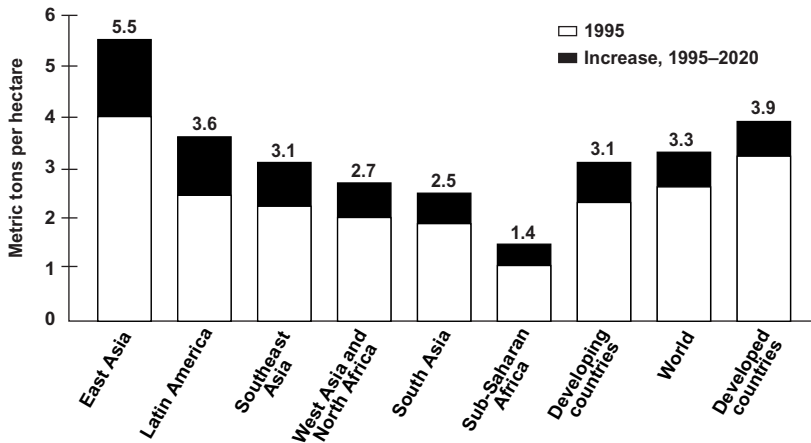
SOURCE: 1967–82 and 1982–94: FAO 1997;
1995–2020: IFPRI IMPACT simulations, July 1999.

increase by only 7.4 percent, or 51 million hectares, between 1995 and 2020, with much of the growth concentrated in the relatively low-yielding cereals of Sub-Saharan Africa. A modest expansion in cereal area is forecast for Latin America, but virtually no growth is projected for Asia or the developed countries. Since growth in cultivated area is unlikely to contribute much to future production growth, the burden of meeting increased demand for cereal rests on improvements in crop yields. However, growth in farmers' cereal yields is slowing (Figure 1.10). This is due partly to reduced use of inputs like fertilizer, reflecting low and falling cereal prices, and partly to low levels of investment in agricultural research and technology. Poorly functioning markets and lack of appropriate infrastructure and credit are also contributing factors. Without substantial and sustained additional investment in agricultural research and associated factors, maintaining, let alone increasing, cereal yields will become more and more difficult in the longer term. The gap in average cereal yields between the developed and developing countries is slowly beginning to narrow. The gap is widening considerably, however, within the developing world, as Sub-Saharan Africa lags further and further behind the other regions, particularly East Asia (Figure 1.11).

With the projected slowdowns in area expansion and yield growth, cereal production in developing countries as a group is also forecast to slow to an annual rate of 1.7 percent during 1995–2020, compared with 2.3 percent during 1982–94. This figure is still higher, however, than the 0.9 percent annual rate of growth projected for developed countries during 1995–2020.

Despite large increases, cereal production in developing countries will be

Figure 1.11 Cereal yields, 1995–2020

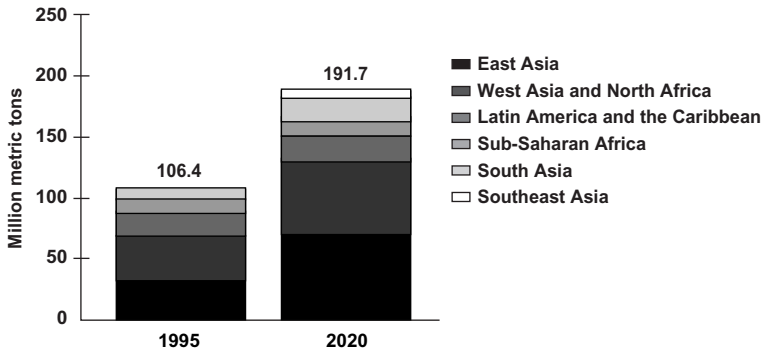


insufficient to meet the expected increase in demand. As a group, developing countries are projected to increase their net imports of cereals (the difference between demand and production) by 80 percent between 1995 and 2020, to reach 191.7 million tons (Figure 1.12). With the exception of Latin America, all major regions are forecast to increase their net cereal imports. The massive increase forecast in South Asia's net cereal imports from 0.3 million tons in 1995 to 20.8 million tons in 2020 will arise because domestic production in the region will not keep up with income and population growth. Sub-Saharan Africa's net cereal imports are expected to remain low because of lack of foreign exchange and entrenched poverty.

Wheat will constitute more than half of the developing world's net cereal imports, but the share of maize is projected to rise from 28 to 33 percent between 1995 and 2020. Trade in rice is forecast to remain small. About 12 percent of the developing world's cereal demand is projected to be met though net imports from the developed world, up from 10 percent in 1995.

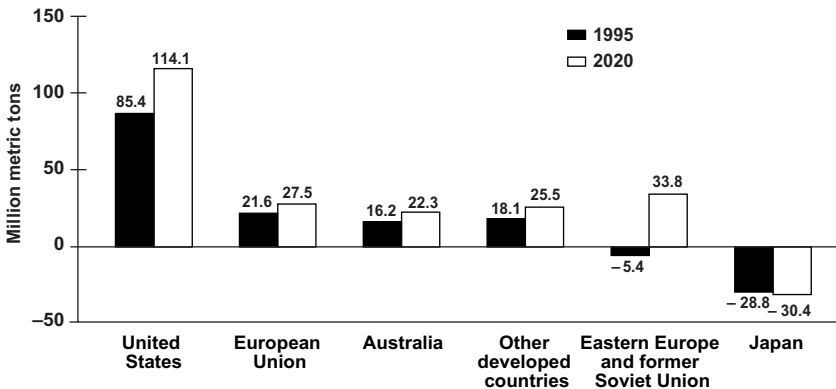
About 60 percent of the developing world's net cereal imports in 2020 will come from the United States. With a 34 percent increase projected in its net cereal exports between 1995 and 2020, the United States will continue to capture a large share of the increased export market for cereals (Figure 1.13). However, with the projected emergence of Eastern Europe and the former Soviet Union as major net exporters of cereals and the increase in net exports forecast for the European Union and Australia, the market share of the United States in the net cereal exports of the developed world is projected to decline from 80 percent in 1995 to 60 percent in 2020.

Figure 1.12 Net cereal imports of major developing regions, 1995 and 2020



SOURCE: IFPRI IMPACT simulations, July 1999.

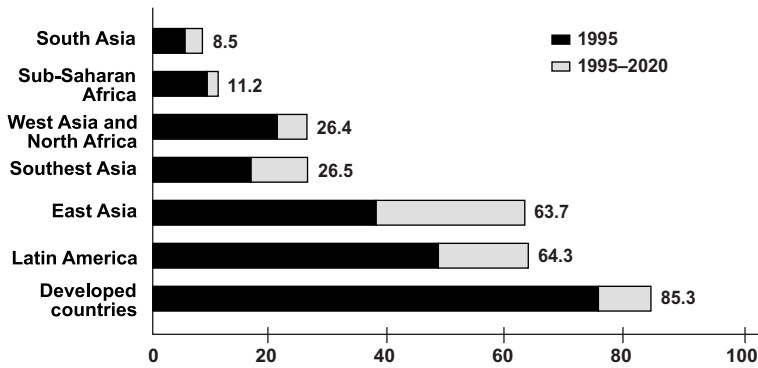
Figure 1.13 Net trade in cereal of developed countries, 1995 and 2020



SOURCE: IFPRI IMPACT simulations, July 1999.

With continued population growth, urbanization, rapid income growth, and changes in lifestyles and food preferences, demand for meat is expected to rise rapidly in developing countries. IFPRI projects that meat demand in the developing world will double between 1995 and 2020, to 190 million tons, and increase by 25 percent in developed countries, to 122 million tons. Demand for meat will grow much faster than for cereals in the developing world, by 2.8 percent per year for meat compared with 1.8 percent for cereals. In per capita terms, demand for meat in developing countries will increase by 40 percent between 1995 and 2020, whereas it will increase by only 10 percent for cereals. East Asia's per capita demand is projected to increase most, and Sub-Saharan Africa's and

Figure 1.14 Per capita demand for meat products, 1995–2020



SOURCE: IFPRI IMPACT simulations, July 1999.

South Asia's least; by 2020, East Asia's per capita demand for meat could be as much as seven times that of South Asia (Figure 1.14). It is crucial that governments and industries prepare for this ongoing livestock revolution to meet consumer demand while alleviating stresses on public health and natural resources.

Despite high rates of production growth, developing countries as a group are projected to increase their net meat imports 8-fold, from 0.8 million tons in 1995 to 6.6 million tons in 2020. Latin America will continue to be a net exporter of meat, but South Asia will switch from being a net exporter to a net importer. East Asia is projected to increase its net meat imports 28-fold, albeit from very low levels, primarily because of the massive increases expected in meat demand in China.

Net imports are a reflection of the gap between production and market demand. For many of the poor, the gap between food production and human needs is likely to be even wider than that between production and demand, because many of these people are priced out of the market, even at low food prices, and their market demand fails to fully reflect their food needs. The higher-income developing countries will be able to fill the gap between production and demand through commercial imports, but the poorer countries may have insufficient foreign exchange to be able to import food in needed quantities. It is the latter group of countries, including most of those in Sub-Saharan Africa and some in Asia, that will remain a challenge and require special assistance to avert widespread hunger and malnutrition in the 21st century.