

Global Food Security: Overview

Average per capita food consumption for the 67 low-income countries is projected to increase in the next decade. The number of people with nutritionally adequate food is also projected to rise, providing an improved outlook for global food security. But the gains are not uniform across countries and in many, food insecurity is projected to intensify. Countries with political instability in particular continue to face the threat of growing food insecurity. [Shahla Shapouri]

Food Security Improves Over Time

The lower food prices in recent years were welcome news for highly import-dependent countries, helping to improve food affordability and security. The low prices also did not reduce production incentives for those countries that have managed to improve their productivity and reduce their costs. Even among the lowest income developing countries, there are definite signs of rising living standards. At the forefront are some lower income Asian countries, e.g. Vietnam, that have shown steady increases in their food supplies and several indicators supporting the continuation of this trend. This achievement is very important because of the number of people who are at stake—more than 60 percent of the population of the countries covered in this report. The food situation in the lower income Latin American countries such as Bolivia and Guatemala is also improving, a credit to their improved economic and trade policies that have led to steady increases in their export earnings that finance imports. Similarly in the North African and New Independent States (NIS) countries, several of which are oil exporters, the oil price hike should provide a stronger basis on which to expand food imports.

Sub-Saharan Africa, however, is almost entirely dependent on domestic production, which in most countries is projected to grow at too slow a pace to allow increases in per capita consumption. The region's nutritional food gap is projected to increase 40 percent, exceeding 17 million tons in 2010.

Despite all the reasons for optimism in four of the five regions, the unequal distribution of food, both at the international and national levels, remains a major obstacle to improving food security among the poor. Even among the prosperous regions, some countries are lagging behind. Although some of these countries have inadequate resources, both physical and financial, the most severe food-insecure countries are the ones that have internal political instability. The situations in Haiti and Afghanistan are clear examples of dysfunctional economies and food insecurity.

The future food security position of the 67 developing countries included in this study is evaluated by projecting the gaps between food consumption (domestic production, plus commercial imports, minus nonfood use) and two different consumption targets through the next decade. Food aid,

although a part of the historical food supply, is excluded in the projections presenting the food gaps that countries face when left to their own resources. The two consumption targets are (1) maintaining per capita consumption at the 1997-99 level (also referred to as status quo) and (2) meeting minimum recommended nutritional requirements (see box 1). The estimated nutritional gap only measures the gap in calorie consumption and does not consider other factors such as poor utilization of food due to inadequate consumption of micronutrients and lack of health and sanitary facilities. Because the national level estimates represent the average food gaps and mask the impact of unequal incomes on food security, we also estimate a "distribution gap." This gap is defined as the amount of food needed to raise food consumption for each income group to the level that meets nutritional requirements. This indicator captures the impacts of unequal purchasing power or food access.

What Is New in This Report...

This report is an updated version of the 1999 report, with all historical and projected data updated. The food production estimates for the year 2000 are based on USDA data as of September/October 2000. The financial and macroeconomic data are updated based on the latest World Bank data. The projected macroeconomic variables are either extrapolations based on calculated growth rates for 1980-98 or are World Bank projections/estimations.

In this report, we have included a scenario that examines the impact of slower growth in crop area on food security. In most food insecure countries, increases in food production are mainly due to the expansion of cropland. Our projections confirm that there will be a need for a substantial increase in food production over the next decade to meet nutritional requirements in the lower income countries, mostly in Sub-Saharan Africa. The existing conditions for food production and prospects for expansion vary greatly. However, there are ample studies suggesting that the increased food supply will have to come from the intensification of production. This applies to Asia and to a lesser extent to Latin America and Africa. In the latter regions, opportunities to expand the production area exist, but unrestrained expansion can lead to long-term damage to natural resources and the environment. The analysis of the scenario of slower growth in production area confirms and quantifies

what common sense suggests: without any increase in investment in production intensification, lower income countries tend to become more food insecure.

This report also includes two special articles. The first article is entitled "Factors Affecting Agricultural Productivity of Developing Countries" and concludes that agricultural productivity is important for food security both through its impact on food supplies and prices, and through its impact on the incomes and purchasing power of farmers. In this context, land quality is related to both food availability and food access. Land quality is, on average, lower in low-income food-deficit countries than it is in high-income countries. This has important implications for policymakers concerned with improving food security, both through protection and/or improvement of land quality itself and through recognition of the distinct roles played by more conventional agricultural inputs in areas that differ in land quality.

The second article is entitled "HIV/AIDS and the Sub-Saharan African Food Market." The article concludes that the HIV/AIDS epidemic will reduce labor quality and productivity and will have long-term implications on the performance of the agricultural sector of the highly affected countries. The projected long-term food outlook for these countries shows a steady increase in food gaps in part due to the impact of HIV/AIDS, and indicates that the situation will worsen if productivity declines further. This means that to minimize the impact of HIV/AIDS, policies should combine educational messages to prevent the spread of the disease and economic assistance and investment in areas such as introducing labor-saving technologies.

The Paradox: Growing Food Gaps And the Decline in the Number of Undernourished People

Food gaps based on status quo and nutritional targets and distribution gaps are projected to grow (tables 1 and 2). In contrast, a decline in the number of people failing to meet the nutritional target is estimated. This means that nutritional disparity among and within countries will intensify more than food deficits will spread. In other words, the hunger problem will get more severe in the vulnerable countries and/or among the lower income groups.

The status quo food gaps (or food needed to maintain per capita consumption at the 1997-99 base level) are estimated at 7 million tons for 2000, much lower than the projected 12.7 million tons for 1999 (table 1 and fig. 1). This drop can be attributed to the lower per capita consumption target. This is a moving average, which fell significantly due to last year's drought in North Africa. The food gaps to meet minimum nutritional requirements are estimated at 17 million tons, higher than last year's estimate of 15 million tons.

When the impact of unequal incomes is taken into account, as we do in the distribution gap the estimated results for the 67 countries show that food gaps increased significantly relative to the national average (table 2). In 2000, the distribution gap is estimated to be more than 25 million tons, 33 percent larger than the national average nutritional gap. Based on the estimated distribution gaps, we calculated the number of people (in each income quintile) whose consumption falls short of the minimum nutritional requirement in each country. For the

Table 1--Food availability and food gaps for 67 countries

<i>Year</i>	<i>Grain production</i>	<i>Root production (grain equiv.)</i>	<i>Commercial imports (grain equiv.)</i>	<i>Food aid receipts (grains)</i>	<i>Aggregate availability of all food</i>	<i>Population</i>
			---1,000 tons---			Million
1991	369,198	53,828	30,309	11,123	571,862	2,188
1992	373,263	56,360	42,471	9,916	599,004	2,262
1993	380,772	58,799	43,808	7,975	610,979	2,310
1994	391,859	59,197	46,623	8,003	628,165	2,358
1995	396,966	60,938	54,089	6,212	657,794	2,406
1996	420,083	62,385	50,144	4,695	665,122	2,454
1997	407,457	62,122	59,025	5,337	669,734	2,503
1998	427,151	64,270	61,270	7,847	686,466	2,552
1999	433,093	67,553	61,358	5,068	715,439	2,600
Projections				Food gap*		
				<i>SQ</i>	<i>NR</i>	<i>(w/o food aid)</i>
2000	434,843	67,121	63,868	7,026	17,054	710,448
2005	481,858	73,292	68,397	7,602	16,875	784,538
2010	525,478	79,944	76,710	12,709	22,072	859,932

*SQ stands for status quo and describes the amount of grain equivalent needed to support 1997-99 levels of per capita consumption and NR stands for nutritional requirements and describes the amount needed to support minimum nutritional standards.

Table 2--Number of people with inadequate food and the size of food deficit

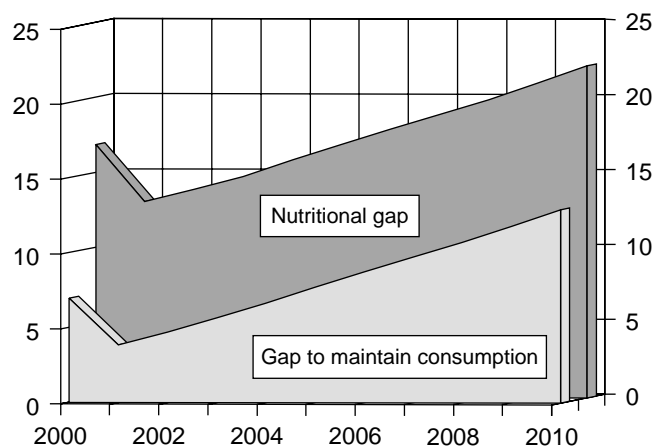
	Number of people with insufficient food		Distribution gap (due to inadequate access to food)	
	2000	2010	2000	2010
	--Million people--		--1,000 tons--	
Total	774	694	25,315	30,874
Asia	307	177	5,489	5,294
Sub-Saharan Africa	344	435	15,294	22,496
Latin America	62	47	1,897	1,813
North Africa	48	31	1,970	1,131
NIS	13	6	664	141

Source: Own calculations using Food Security Assessment model.

Figure 1

Food gaps in all 67 countries, 2000-2010

Mil. tons



67 countries, the number of people failing to meet the nutritional target is projected to decline from 771 million in 2000 to 695 million by 2010.

Overall, the long-term food gaps for the 67 countries are lower than those reported in last year's assessment, principally due to the assumptions of higher economic growth rates for the Asian and Latin American countries. For the same reason, in the *1999 Food Security Assessment* report, we projected the number of people failing to meet the nutritional target to grow and for 2009 our projection was higher than the current projection.

Sub-Saharan Africa Remains the Most Vulnerable Region

Of the 37 countries in Sub-Saharan Africa, per capita consumption is projected to rise in only 7 countries. Even in those countries, the growth is not expected to be particularly strong. In 2010, consumption for 60 percent of the region's population is projected to fall short of nutritional requirements. In addition, the region is projected to account for nearly two-thirds of the hungry people in the 67 countries, but it accounts for only

about one-fourth of the population (fig. 2). The region's nutritional gap is estimated to account for 65 percent of the nutritional gap for the 67 countries in total in 2000. This number is projected to jump to 76 percent in 2010. The region accounts for only 24 percent of the population of the 67 countries, thus indicating the severity of the region's food security situation.

In Sub-Saharan Africa, domestic food production accounts for about 80 percent of consumption. During the next decade, production growth is projected to fall short of historical rates and average 2.1 percent per year versus 2.4 percent during 1980-99. The reason for the expected lower production growth is twofold. First, nearly 90 percent of the region's historical grain production growth stemmed from area expansion. This trend is not expected to continue in the future, as much of the region's remaining land area is marginal for agricultural purposes. Second, the decline in population growth due to spread of HIV/AIDS is expected to reduce labor productivity. Labor remains the essential factor of production and lack of labor-saving technologies will lead to a decline in food production (see "Vulnerability to HIV/AIDS in Sub-Saharan Africa"). In the Food Security model, the marginal productivity of labor is assumed constant over the projection period. For the Sub-Saharan countries, this may be an overestimation because the decline in population growth is in part due to the spread of HIV/AIDS, which affects the most productive segment of the population.

The distribution gap, which incorporates the impact of skewed income distribution, is projected to rise from 15.3 million tons in 2000 to 22.5 million tons in 2010, 10 percent higher than the national average nutrition gap. The number of people in different income quintiles who fail to meet their nutritional requirement is projected to increase from 344 million to 435 million in 2010. Sub-Saharan Africa is the only region where food security, both in terms of the size of the gaps and the number of undernourished people is expected to rise.

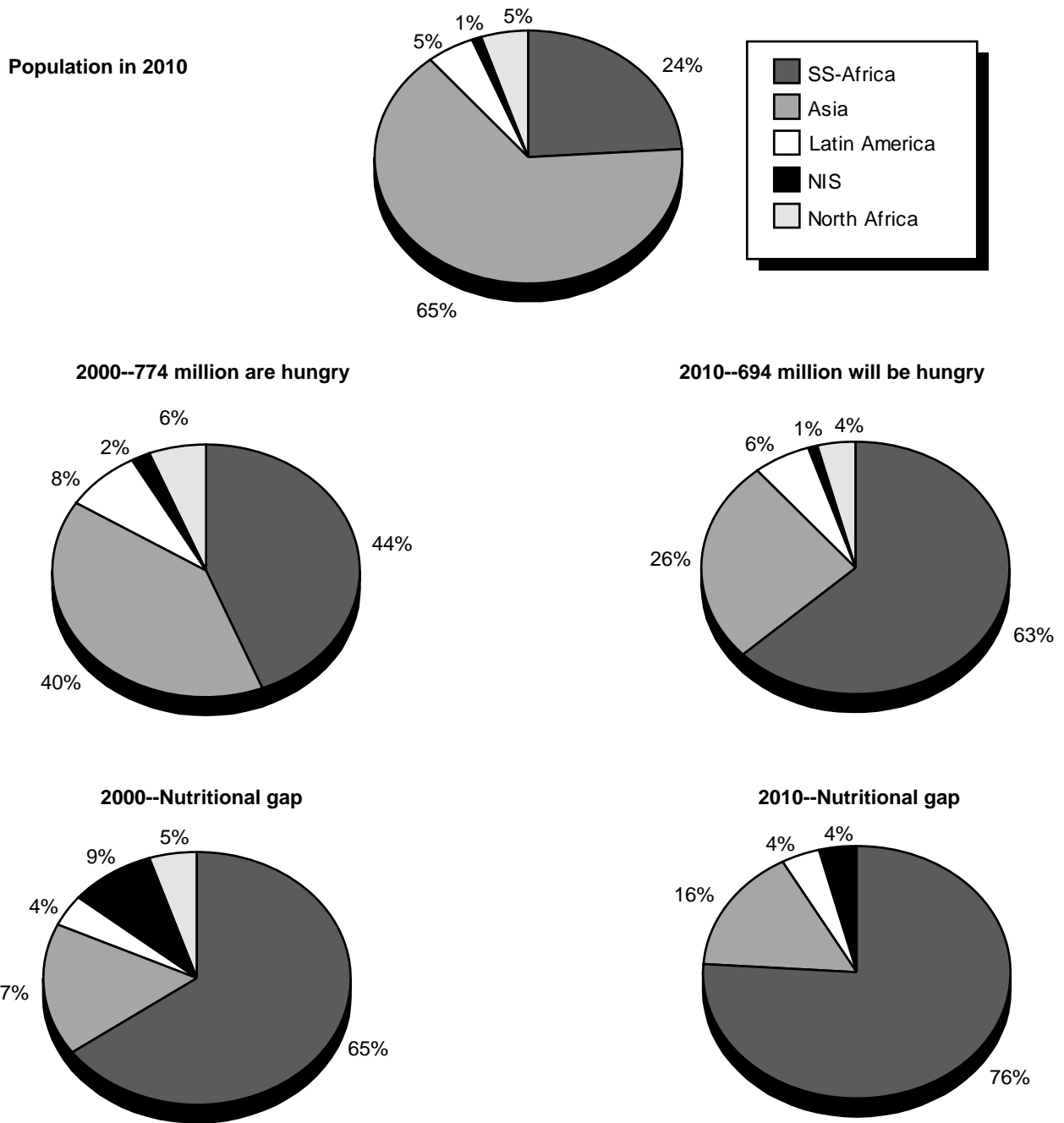
Food Availability will Increase in Most Low Income Asian and Latin American Countries

Per capita consumption in the 10 Asian countries covered in this report is projected to increase, on average, in the next decade. There are problem areas, however. Afghanistan and North Korea, and to a lesser extent, Bangladesh, account for most of the region's nutrition gaps during the projection period. The region's distribution gap is projected to decrease during the next decade, as is the number of people who cannot meet their nutritional requirement. The region has about 65 percent of the population of countries covered in the report, but is projected to account for only 26 percent of the people who cannot meet their nutritional requirement in 2010.

Per capita food consumption in most of the lower income Latin American and Caribbean countries (11 countries) is expected to improve. Even with a relatively slow increase in

Figure 2

While total number of hungry people is projected to decline, Sub-Saharan Africa's share is rising sharply



How Food Security Is Assessed

The commodity coverage in this report includes grains, root crops, and a group called “other.” The three commodity groups in total, account for 100 percent of all calories consumed in the study countries. This report projects food consumption and access in 67 lower income developing countries: 37 in Sub-Saharan Africa, 4 in North Africa, 11 in Latin America and the Caribbean, 10 in Asia, and 5 in the NIS (see app. 1 for a detailed description of the methodology and app. 2 for a list of countries). The projections are based on 1997-99 data. The periods covered are 2000, 2005 (5 years out), and 2010 (10 years out). Projections of food gaps for the countries through 2010 are based on differences between consumption targets and estimates of food availability, which is domestic supply (production plus commercial imports) minus nonfood use. The estimated gaps are used to evaluate food security of the countries.

The food gaps are calculated using two consumption targets: (1) *maintaining base per capita consumption or status quo (SQ)*, which is the amount of food needed to support 1997-99 levels of per capita consumption, and (2) *meeting nutritional requirements (NR)*, which is the gap between available food and food needed to support a minimum per capita nutritional standard (for definitions of terms used see “Methodology” in app. 1). Comparison of the two measures either for countries, regions, or the aggregate, indicates the two different aspects of food security: consumption stability and meeting the nutritional standard.

The aggregate food availability projections do not take into account food insecurity problems due to food distribution difficulties within a country. Although lack of data is a major problem, an attempt was made in this report to project food consumption by different income groups based on income distribution data for each country. The concept of the income-consumption relationship was used to allocate the projected level of food availability among different income groups. The estimated “*distribution gap*” measures the food needed to raise food consumption of each income quintile to the minimum nutritional requirement. Finally, based on the projected population, the number of people who cannot meet their nutritional requirements is projected.

The following common terms are used in the reports: *domestic food supply*, which is the sum of domestic production and commercial imports; *food availability*, which is food supply minus nonfood use such as feed and waste; *import dependency*, which is the ratio of food imports to food supply; and *food consumption*, which is equal to food availability.

food production, strong commercial import growth will raise food supplies sufficiently to keep up with population growth. Another positive sign is the projected decline in the number of people with inadequate food supplies. Despite this bright picture at the aggregate level, food insecurity is growing in a few countries and highly skewed purchasing power aggravates the problem. In 2000, the estimated distribution gap (that captures inequality in food access) is about six fold higher than of the national average nutritional gap. Nutritional gaps both at the national average and disaggregated levels (distribution gap) are projected to increase, indicating growth in intensity of hunger in countries such as Haiti.

North Africa and NIS Face Challenge of Financing Imports

Food imports make up about 42 percent of North Africa’s consumption needs, and this level is projected to continue through 2010. Financing this level of imports in the next decade is the critical element to ensure food security. The region’s two largest food importers, Egypt and Algeria, to varying degrees, depend on oil and gas revenues. With the real prices of oil and gas recovering, these countries should be able to cover their import needs.

Short-term production variability creates a challenge to food security in Algeria, Morocco, and Tunisia. Morocco is the extreme case because it has one of the highest levels of production variability in the world (app. 3). In Algeria, political difficulties are the main threat to food security. This year, because of the expected windfall in oil export revenues, imports are likely to increase to fill these gaps. The long-term food security of the country is threatened because of low investment that has led to slow growth in agricultural production and increased food-import dependency of the country; about 70 percent of grain consumption was imported during 1997-99. The ability to finance imports will be the critical factor to ensure food security.

We project positive growth for agricultural productivity and import capacity of the NIS countries, but political uncertainty remains a major issue. The drought in 2000 has led to food gaps in Armenia, Azerbaijan, Georgia, and Tajikistan. Although Georgia experienced the largest percentage production shock in 2000, the food gaps are expected to be relatively more severe in Armenia and Tajikistan. Tajikistan is the only country where food gaps are expected to continue over the next decade. Access to food by lower income groups in a few of these countries is a problem now, but should improve as the economies of these countries grow.

Food Aid Donations Are Increasing

Depending upon the future availability of food aid, a portion or all of the projected food gaps can be eliminated. For example, in 1999 roughly 11.9 million tons of food aid were distributed globally (fig. 3). If the same amount were provided in 2000, it would fill the entire calculated gap to maintain per capita consumption (status quo) and about 66 percent of the nutritional gap. However, all of the available food aid is not going to low-income, food-deficit countries. In 1999, only 7.5 million tons, or 63 percent of total food aid were given to the countries studied in this report, and the aid would cover about 40 percent of their estimated nutritional gap in 2000.

Food aid shipments for 1999 grew significantly from the 1996 level of 6.6 million tons. The main source of the hike in donations was the United States, while the European

Union and Japan reduced their allocations. Although the amount of food aid donations was virtually unchanged from 1998 to 1999, allocations to the study countries declined by 20 percent. Allocations to Asian and Latin American countries declined, while those to Sub-Saharan countries remained roughly the same at 2.8 million tons.

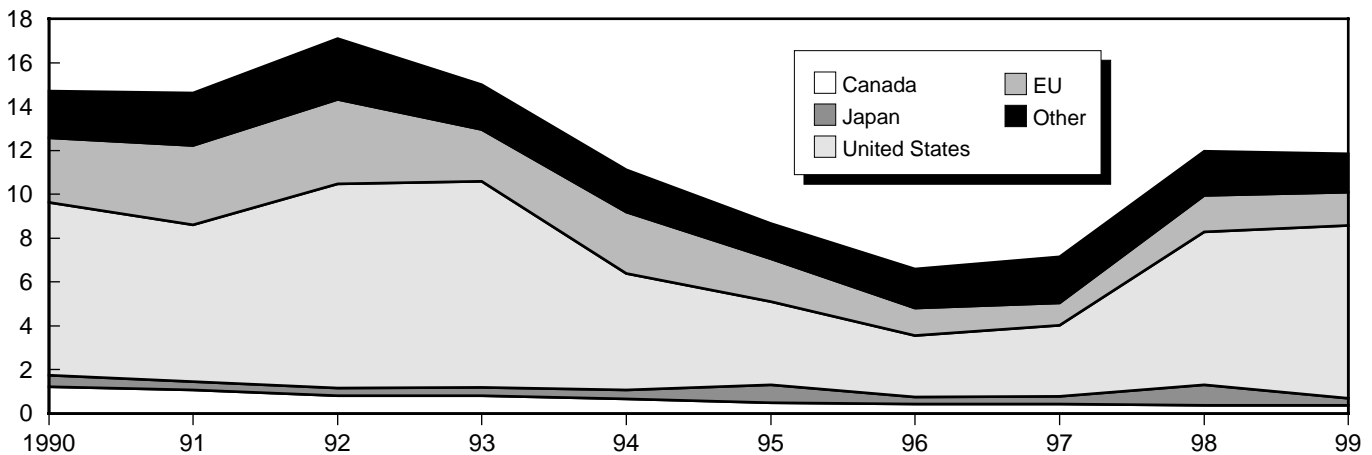
Allocations of available food aid are not necessarily based on nutritional needs. Other factors such as political instability leading to the collapse of internal marketing systems and financial difficulties that disrupt commercial imports can play an important role in food aid allocations among countries. For example, in 1999, the bulk of the increase in U.S. food aid was allocated to Russia. In 1998, Indonesia was the third largest recipient of food aid after Bangladesh because of serious food deficits caused by the financial crisis and internal problems. The share of food aid going to Sub-Saharan Africa—the most food insecure region according to

Figure 3

Food aid: Donors and recipients

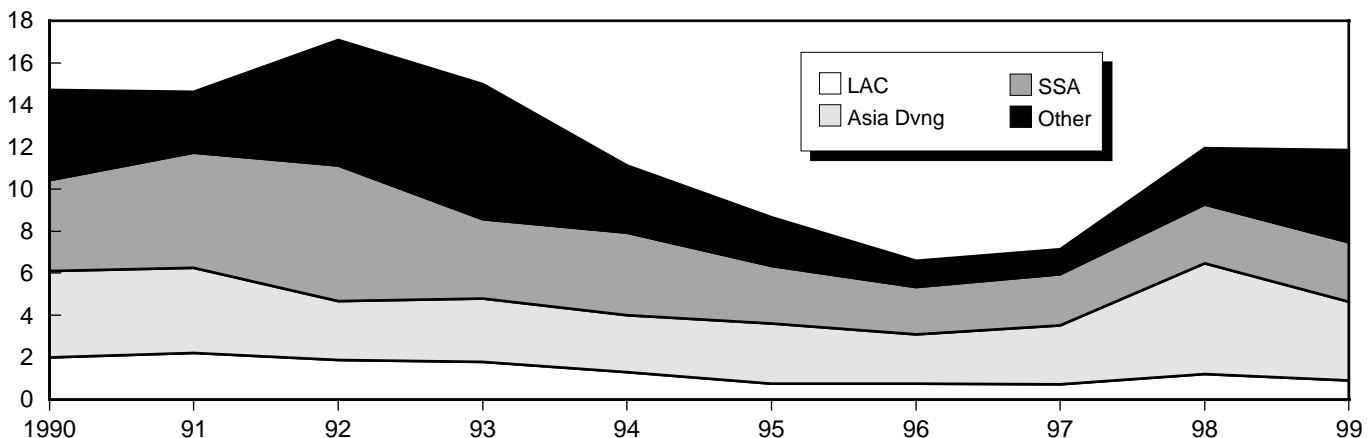
Food aid donors

Million tons



Food aid recipients

Million tons



our estimates—was only 24 percent in 1999. If this level of food aid is continued, it will cover only 23 percent of the estimated nutritional gap for the region in 2000.

Constraints in Expanding Agricultural Area

In many low-income countries, increases in agricultural output mainly have stemmed from area expansion. In Sub-Saharan Africa, area expansion accounted for more than 80 percent of grain output growth between 1980-99. This means that yield growth contributed to less than 20 percent of the growth. In Latin America, area expansion accounted for 68 percent of the growth in grain production. In Asia, the reverse was true—area expansion accounted for less than 5 percent of the growth in grain output.

The long-term prospects for acreage expansion are not bright, because, in most countries, a large part of land that could be used for farming is unfit to cultivate without major

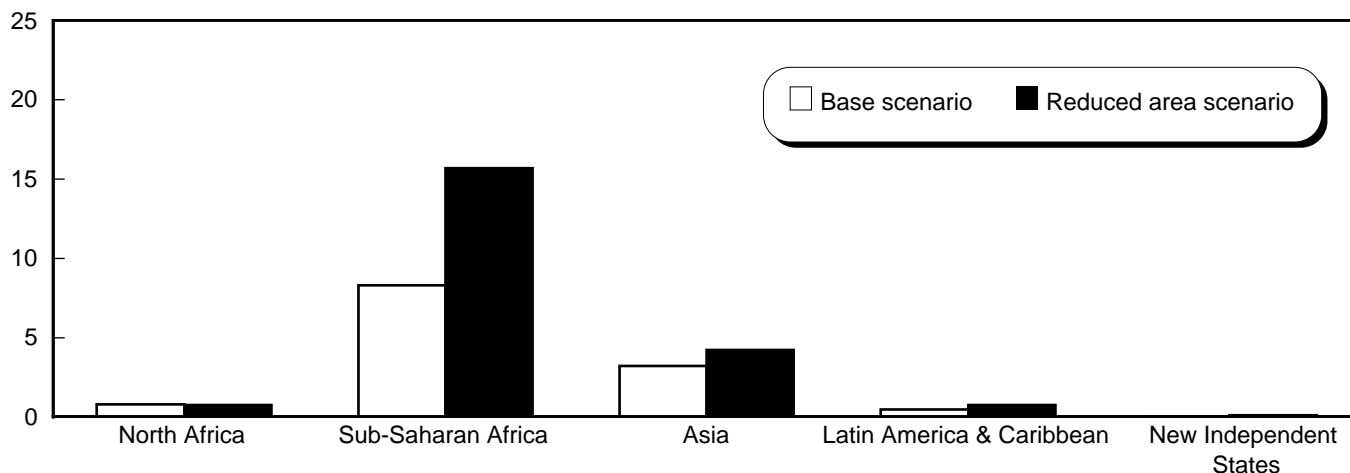
investment. In Latin America and Sub-Saharan Africa, continued expansion of cropland means converting range and forestland to crop production, a process with high economic and environmental costs. According to FAO estimates, about half of the land that could be used to produce food in Sub-Saharan Africa has poor quality soil. Sub-Saharan Africa has a vast and diverse land area, but the region faces a number of resource constraints (such as lack of water) to sustainable agricultural growth.

Land quality as defined by soil quality, climate, and rainfall is a crucial factor determining agricultural productivity, as is discussed in more detail in the special article “Resource Quality, Agricultural Productivity, and Food Security in Developing Countries.” Cross-country analysis confirms that low quality in cropland is significantly associated with low agricultural productivity. Loss of land available to agriculture—due to land degradation or expansion of urban areas—is a reality in many areas, especially in developing coun-

Figure 4
Food gaps by region

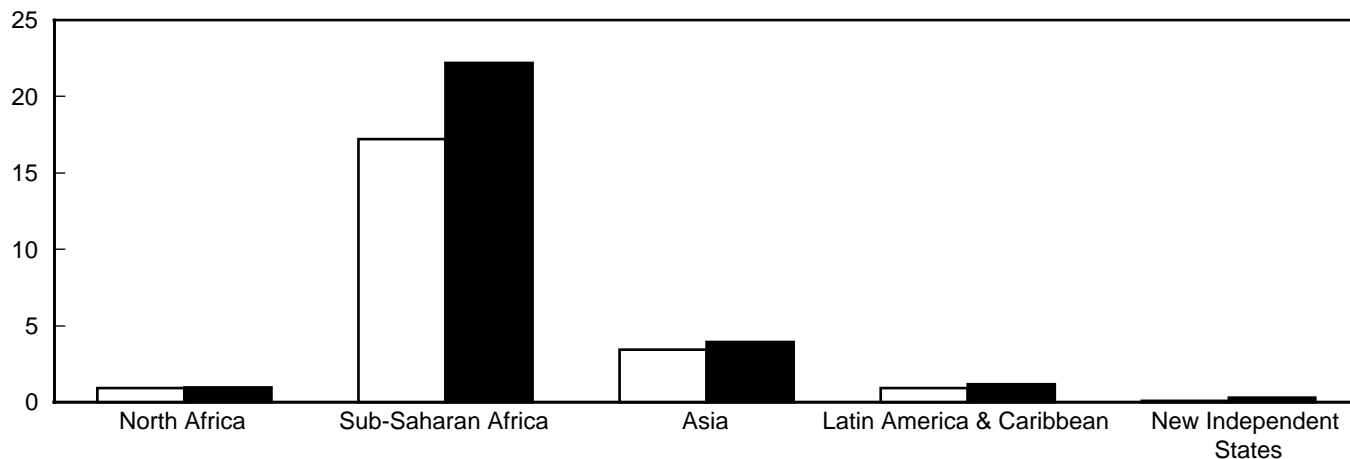
Status quo gap in 2010

Million tons



Nutritional gap in 2010

Million tons



tries. While new technology has been successful in providing data on the existing quality of land, limited data are available on changes of land quality over time. In the absence of precise projections, we analyze a scenario where area expansion is half the rate used in the base model for Sub-Saharan Africa, Latin America, NIS, and North Africa. In Asia, where annual area growth between 1980 and 1999 was less than 0.1 of a percent, we assumed area to remain constant during the entire projection period.

In Sub-Saharan Africa, production in the baseline scenario was projected to grow at a rate of 2.1 percent per year; under the reduced area growth scenario, this rate is projected to fall to 1.7 percent. As a result of the slower production growth, the region's nutritional gap in 2010 jumps by 34 percent to more than 22 million tons (fig. 4). In other regions, the cut in area is much less significant either because of high import capacity such as the case of North Africa or potential for yields to be the main contributor to production growth, i.e. Asia.

The results indicate that for food-insecure countries, in particular countries in Sub-Saharan Africa, the only option to sustain production growth is to increase yields. Yields highly depend on the use of improved inputs. Data show that Sub-Saharan Africa has the lowest labor productivity and that it is declining. Similarly, the region's fertilizer use is the lowest and on a declining trend. Even with an increase in fertilizer use, yields may not increase much. A cross-country estimate for developing countries showed that a 1-percent increase in fertilizer use results only in a 0.1- to 0.3-percent increase in yield. The principal factor limiting yield response to fertilizer use is the inadequate supply of water during the growing season. Irrigation can be a solution, but is too costly and in Sub-Saharan Africa only 4.2 percent of cropland is irrigated. Although water availability varies considerably across regions, it has been a serious problem in many countries. In addition, the agricultural sector consumes over half of the fresh water in most countries and could face increased competing demands from urban consumers and industrial uses in the future.

Overall, farm management practices, in particular improved efficiency in the use of water, can be the first step to improving food security in the vulnerable countries. To increase yields, high-yielding varieties appropriate for specific agroclimatic conditions are essential. The success,

however, depends on the investment in supportive institutions for research and extension to diffuse the new varieties to farmers. For the resource-poor countries, the long-term strategy should aim at diversifying the sources of income of the farmers. In these countries, the agricultural sector alone cannot generate adequate incomes and food to support their growing populations. Policies to promote rural development not only would improve income distribution, they would allow the poor the means to buy the food they need and would also reduce pressure on land.

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