

Most—But Not All—Regions See Food Gains

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Increasing incomes in many countries boosted world average calorie consumption to record levels in 1995-97. Yet not all countries saw significant gains in food consumption, reflecting continued disparity in purchasing power between the poorest countries and most other countries.

Average daily consumption reached 2,754 calories per person in 1995-97, marking a 0.6 percent per year increase from the 1970-72 level of 2,413 calories (table 1). Growth in world calorie consumption between 1986-88 and 1995-97 was somewhat slower relative to the longer term trend, averaging 0.5 percent per year. Calorie consumption does not record actual intake of food, but, rather, is a measure of the calories and food quantities available for human consumption (see box, "Food Balance Sheet Data").

Along with the growth came some notable changes in the composition of the world's diet, which mainly were a reflection of rising incomes worldwide. The share of calories from starchy roots and

pulses fell 30 percent and the share from animal fats dropped 24 percent from 1970-72 to 1995-97. Conversely, the share of calories from vegetable oils jumped 46 percent and the share from meats climbed 33 percent.

However, not all countries shared in this prosperity. In Sub-Saharan Africa, for example, per capita calorie consumption has increased only in the mid-1990's after virtually stagnating since 1970. Despite the recent growth,

Food Balance Sheet Data

Food consumption trends for 1970-97 are based on the United Nations Food and Agriculture Organization (FAO) Agrostat database, which includes annual food production, trade, and consumption estimates for most countries and world regions. Per capita food consumption is estimated at the national level using a type of food balance sheet because conducting individual or household-level food consumption surveys would be too costly for many countries.

Food balance sheets provide information about a country's average per capita daily food supply, based on commodity flows from production to end uses. The total supply of each commodity consists of domestic production, imports, and drawdowns from existing stocks. The food balance sheet is not a measure of actual food consumption because it does not account for losses due to food preparation or waste. The food supply is estimated from the

amount left over after subtracting other uses from available supplies, such as exports, seed use, live-stock feed, food and nonfood manufacturing, farm waste, and marketing waste due to transport and retail losses. Per capita food consumption is then estimated by dividing the total food supply by the resident population of a given country.

Food balance sheets are most useful as a tool for measuring long-term trends in national food availability and food composition, and for comparing food use with nutritional requirements. They are also useful for determining the extent to which countries rely on food imports to meet their nutritional needs. However, the national averages presented in the food balance sheet may mask important deviations from trends in energy and nutrient intake among individuals, households, and population groups within a particular country.

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per capita consumption averaged only 2,176 calories per day in the region in 1995-97, 20 percent below the world average.

Regional Gains Vary

As economies grew and changed, food consumption in different regions changed accordingly (see box, "World Regions"). U.S. consumption accelerated between 1970 and 1997, with yearly growth exceeding 1 percent between 1986-88 and 1995-97. The quantity of calories available for consumption in the United States is by far the highest in the world, averaging 3,654 in 1995-97, surpassing the world average by more than 30 percent. Along with the United States, relative prosperity in the rest of the industrialized countries allowed calorie consumption to grow modestly during the last two and a half decades (0.4 percent per year), averaging 3,364 in 1995-97. In the European Union, consumption held steady during the last decade, averaging just under 3,400 calories per day in 1995-97.

Per capita calorie consumption increased twice as fast in developing countries than in industrialized countries, despite higher population growth in developing countries. In part, this increase was due to the fact that the developing countries started from very low consumption levels. Some developing countries' adoption of high-yielding crop varieties and/or increased use of irrigated land spurred production, which in turn boosted food supplies. For example, Indonesia's more than 50-percent increase in calorie consumption was certainly supported by a doubling of grain yields from 1970 to 1998.

The North African countries—Algeria, Egypt, Libya, Morocco, and Tunisia—led the way with the

most significant increase in calorie consumption between 1970 and 1997, 1.4 percent annually. Most of this growth took place in the 1970's and early 1980's as increased oil revenues raised incomes and boosted consumption in Algeria, Egypt, and Libya. Growth in calorie consumption for the North African countries dropped to less than 0.7 percent per year between 1986-88 and 1995-97.

In Asia's developing countries, calorie consumption jumped more than 1 percent per year between 1970 and 1997 due to strong gains in agricultural output. Unlike in North Africa, growth in calorie consumption in developing countries in Asia has not slowed at all in

recent years and remains, along with the United States, steady at the highest rate in the world. Average calorie consumption in the developing countries of Asia stood at 2,648 calories per person in 1995-97.

Eastern Europe is the only region included in this study where calorie consumption declined during the last two and half decades. Per capita calorie consumption fell from 3,416 calories per day in 1986-88 to 3,119 calories in 1995-97. Declines in calorie consumption, which began in the mid-1980's, can be attributed to stagnating and/or declining incomes triggered by the transition from centrally planned economies to free markets.

World Regions

Countries are grouped according to economic and geographic regions defined by the United Nations Food and Agriculture Organization.

Developed Countries

Industrialized countries—United States, Canada, Japan, the European Union (Austria, Belgium-Luxembourg, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, and United Kingdom), Australia, Iceland, Israel, Malta, New Zealand, Norway, and South Africa.

Eastern Europe—Albania, Bulgaria, Bosnia-Herzegovina, Hungary, Croatia, Macedonia, Czech Republic, Poland, Romania, Yugoslavia, Slovenia, and Slovakia.

Developing Countries

North Africa—Algeria, Egypt, Libya, Morocco, and Tunisia.

Sub-Saharan Africa—Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central Africa Republic, Chad, Comoros, Republic of Congo, Democratic Republic of Congo, Cote d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, The Gambia, Ghana, Guinea,

Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, the Sudan, Swaziland, Tanzania, Togo, Uganda, Yemen, Zambia, and Zimbabwe.

Asia—Afghanistan, Bangladesh, Brunei, Myanmar, Sri Lanka, Cyprus, China, India, Indonesia, Iran, Iraq, Jordan, Cambodia, North Korea, South Korea, Kuwait, Laos, Lebanon, Macau, Malaysia, Maldives, Mongolia, Nepal, Pakistan, the Philippines, Saudi Arabia, Syria, Thailand, Turkey, United Arab Emirates, Vietnam, and Yemen.

Latin America—The Caribbean (including Cuba), Argentina, Bolivia, Brazil, Belize, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Uruguay, and Venezuela.

Other developing countries—Solomon Islands, Fiji Islands, French Polynesia, Kiribati, New Caledonia, Vanuatu, and Papua New Guinea.

While Cereals Remained a Staple, Starchy Roots and Pulses Dropped

Cereals comprise roughly half of the world's diet (in terms of share of calories), virtually unchanged during the last two and half decades. Some noteworthy changes in other components of the world's diet, however, reflect rising world

incomes and, in some cases, heightened awareness of healthier eating habits. The share of starchy roots and pulses in the total diet declined significantly, from more than 10 percent in 1970-72 to just over 7 percent in 1995-97, reflecting higher incomes (table 1, fig. 1). Starchy roots and pulses, such as potatoes and beans, are generally considered inferior foods, and therefore

demand is expected to fall as incomes rise.

Declines in the world average share of calories were smaller in the sugars and sweeteners category as well as animal fats (butter, lard, fish oils, and edible tallow). Conversely, the meat and poultry, vegetable oils, and fruit and vegetable components of the diet increased significantly.

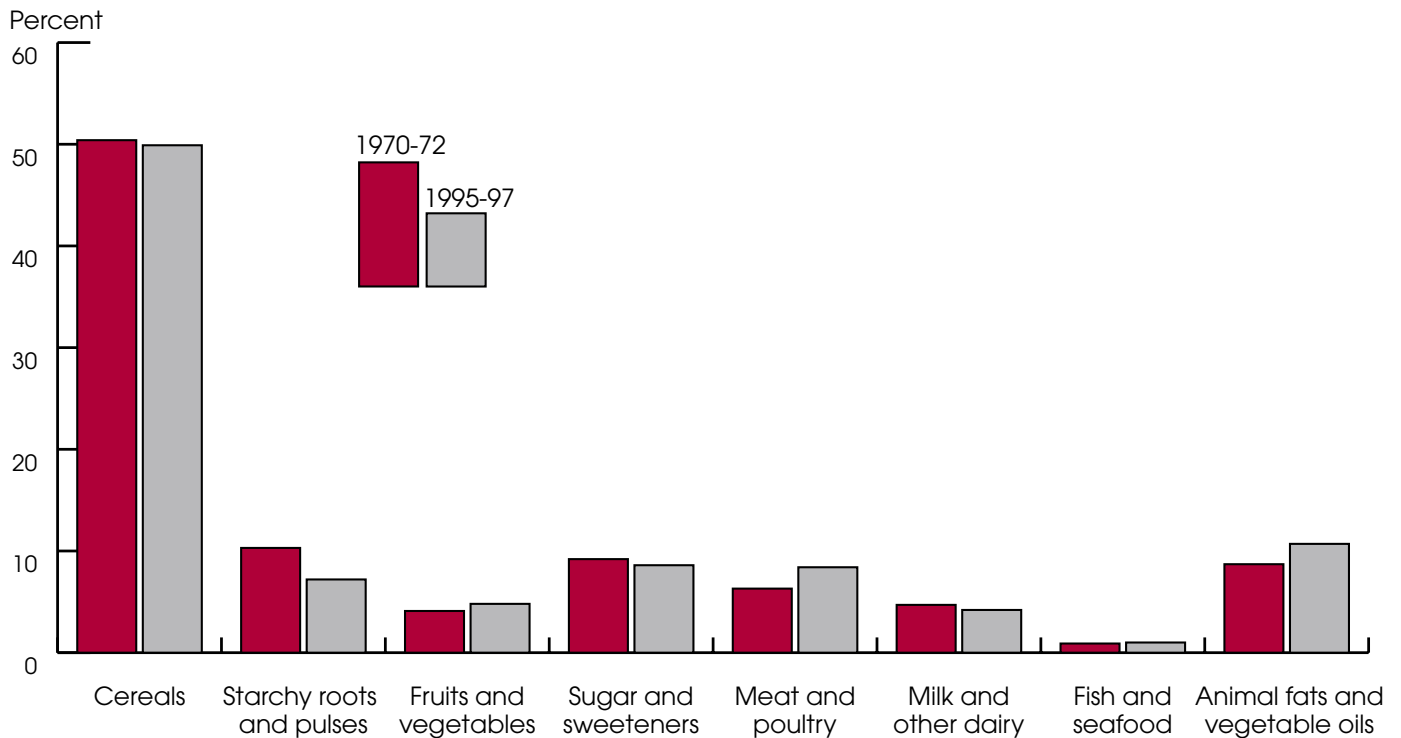
Table 1

Developing Countries' Diets More Varied; Calories From Cereals Lower, Higher From Meat and Vegetable Oils

Region	Average calories per person		Percent of total calories							
	Total foods	Cereals	Starchy roots and pulses	Fruits and vegetables	Sugar and sweeteners	Meat and poultry	Milk and other dairy	Fish and seafood	Vegetable oils	Animal fats
World:										
1970-72	2,413	50.4	10.3	4.1	9.2	6.3	4.7	0.9	5.8	2.9
1995-97	2,754	49.9	7.2	4.8	8.6	8.4	4.2	1.0	8.5	2.2
Industrial:										
1970-72	3,049	27.8	5.1	5.3	14.3	12.0	8.8	1.5	10.2	6.1
1995-97	3,364	27.2	4.4	5.5	13.4	14.0	8.8	1.7	13.5	4.6
U.S.:										
1970-72	3,008	19.5	4.1	4.8	19.2	15.2	11.2	.7	13.0	4.9
1995-97	3,654	23.4	3.9	5.4	18.0	16.4	10.3	.8	15.0	3.2
EU:										
1970-72	3,187	26.4	6.3	5.7	11.9	12.0	8.9	1.0	10.4	7.8
1995-97	3,394	24.5	5.2	6.0	10.9	14.3	9.4	1.2	14.0	6.6
Eastern Europe:										
1970-72	3,322	42.8	7.0	3.8	10.3	8.4	7.8	.5	5.6	8.0
1995-97	3,119	36.8	6.2	4.9	10.8	11.0	8.5	.5	8.9	6.0
Developing countries:										
1970-72	2,118	61.1	12.9	3.8	6.5	3.6	2.3	.6	4.3	1.0
1995-97	2,621	56.3	7.9	4.7	7.2	6.9	2.7	.8	7.4	1.3
North Africa:										
1970-72	2,307	64.3	3.6	5.6	8.6	2.8	2.6	.3	8.5	1.0
1995-97	3,187	62.2	4.0	5.9	9.2	3.6	2.5	.5	9.0	.7
Sub-Saharan Africa:										
1970-72	2,063	43.5	26.0	6.0	3.7	3.0	2.4	.7	6.7	.6
1995-97	2,176	46.2	23.8	5.4	3.9	2.9	2.4	.6	8.4	.5
Asia, developing:										
1970-72	2,068	67.1	11.5	2.9	5.3	3.0	1.7	.6	3.4	.9
1995-97	2,648	60.4	5.8	4.4	6.1	6.9	2.2	.9	6.7	1.3
Latin America and Caribbean:										
1970-72	2,483	39.3	12.5	6.3	15.8	7.7	5.3	.5	6.1	2.2
1995-97	2,791	36.9	8.3	5.5	16.9	10.9	6.1	.6	10.4	2.0

Source: Calculated by USDA's Economic Research Service from UN Food and Agriculture Organization data.

Figure 1
Cereals Still Largest Component of Average World Diet



Source: Calculated by USDA's Economic Research Service from UN Food and Agriculture Organization data.

Animal Fats Declined in Industrialized Countries' Diets

Diets in industrialized countries are much more diversified than the world's diet. The principal difference is the size of the cereals component, a relatively low-cost food item (fig. 2). Cereals comprised about only a quarter of the diet of the industrialized countries, reflecting these countries' higher incomes, while cereals made up half of the average world diet. Per capita incomes worldwide averaged \$5,130 in 1997, compared with nearly \$26,000 in industrialized countries.

Another major difference is the higher composition of fats and oils in the diet of the industrialized

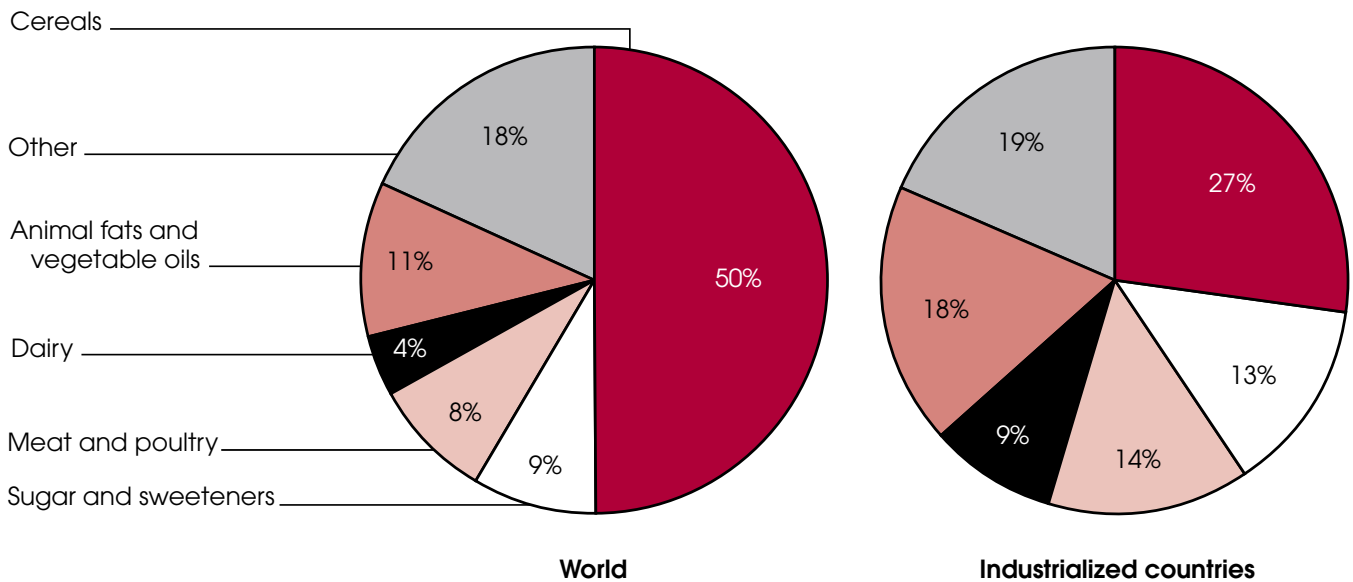
countries as compared with the world's. Animal fats and vegetable oils comprised over 18 percent of industrialized countries' calorie consumption, as opposed to less than 11 percent of the world's diet in 1995-97. This difference can be attributed to the larger quantities of fast food items, particularly french fries (which have a high fat content), consumed in industrialized countries. Meat and poultry's significant difference—14 percent in the industrialized countries in 1995-97 compared with 8.4 percent for the world—was also consistent with higher industrial incomes.

The most notable changes in the consumption patterns of industrialized countries since 1970 were in meat and poultry products, vegetable oils, and animal fats. Meat and poultry in industrialized countries' diets increased steadily from

12 percent in 1970-72 to 14 percent in 1995-97—clearly a reflection of rising incomes. Spurred in part by health concerns, industrialized countries increasingly substituted animal fats with vegetable oils. The animal fat share of calorie consumption declined from 6.1 percent in 1970-72 to 4.6 percent in 1995-97, commensurate with the rise in the vegetable oil share.

While consumption patterns of the United States and the European Union (EU) closely follow those of industrialized countries as a whole, there are some important distinctions. Most notable perhaps is the contrast in cereal consumption. Cereals' share of the U.S. diet grew from 19.5 percent in 1970-72 to 23.4 percent in 1995-97. On the other hand, cereals as a share of the EU diet declined from more than 26

Figure 2
Diet of Industrialized Countries Highly Diversified, 1995-97



Source: Calculated by USDA's Economic Research Service from UN Food and Agriculture Organization data.

percent in 1970-72 to 24.5 percent in 1995-97.

Also significant is the disparity between EU and U.S. consumption of animal fats. The share of dietary calories from animal fats in the EU is double that of the United States—6.6 percent versus 3.2 percent in 1995-97. Moreover, while the share has declined in the both regions, it has declined faster in the United States.

Developing Countries' Diets Becoming More Varied

Cereals and starchy roots and pulses are the most important component of developing countries' diet and, despite declining for 25 years, accounted for nearly two-thirds of the diet in these countries in 1995-97 (fig. 3). The changing composition of the diet in this group reflects rising incomes in many of the countries. As the share of cereals and starchy roots and



Credit: Frederick W. Crook

pulses fell, the share of fruits and vegetables, meat and poultry, and vegetable oils jumped markedly. For example, meat and poultry products accounted for only 3.6 percent of the developing country diet in 1970-72, but had nearly doubled by 1995-97, mostly fueled by changes in the Asian diet.

Consumption patterns and trends vary considerably among developing countries. Per capita incomes in several developing Asian countries have recorded strong growth over the last two and half decades, promoting significant changes in their diets. For these countries, per capita income levels grew from less than \$800 a year to between \$800 and \$3,100, and consumption patterns evolved accordingly. Starchy roots and pulses were cut in half between 1970-72 and 1995-97, while meat and poultry more than doubled,

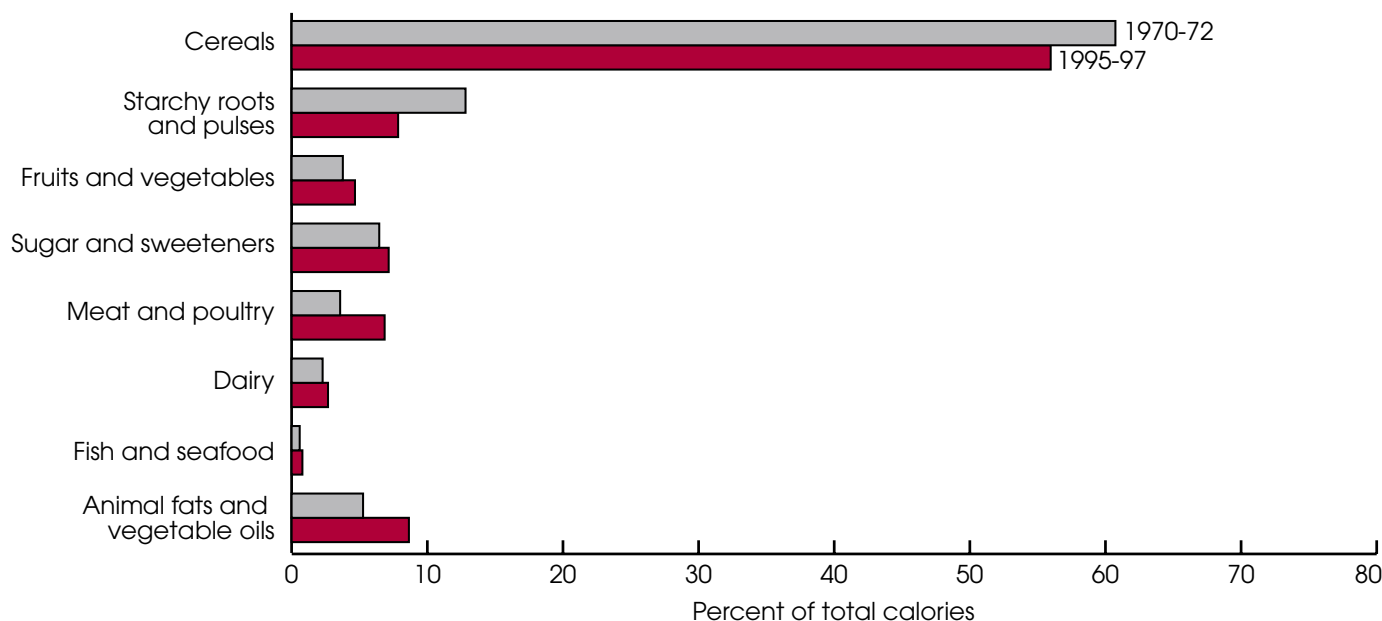
reaching almost 7 percent in 1995-97. Fruit and vegetables' share of the Asian diet increased 50 percent, nearly equaling the world average. The cereal share of the diet, while declining from 67 percent in 1970-72 to just over 60 percent in 1995-97, continues to be nearly the highest in the world. This high share is clearly a reflection of rice as a traditional staple in the Asian diet.

While not as stunning, significant changes transpired in the Latin America and Caribbean diet as well. Again reflecting rising incomes in some of the countries in the region, the share of calories coming from meat and poultry products and vegetable oils jumped between 1970 and 1997. Meat and poultry rose 40 percent to nearly 11 percent of calories consumed, while vegetable oils jumped nearly 70 percent to more than 10 percent of calories consumed.

Gains Not Universal; Food Problems Persist

As opposed to developments in the other regions, composition of the diet in Sub-Saharan Africa changed only marginally since 1970. Cereals and starchy roots and pulses, low-cost foods, comprised 70 percent of the region's calorie consumption in 1995-97, while higher cost foods (meat and dairy products) that are a good source of vitamins and minerals were consumed at the lowest rates in the world. The low incomes that dominate the region prohibit most of the population from purchasing the quantity and types of foods that provide an adequate diet. Thirty-four of the 50 lowest income countries in the world are in Sub-Saharan Africa. In 1997, the average per capita income for the region was about \$500 a year. Skewed income

Figure 3
The Share of Cereals in the Developing Country Diet Fell, While Total Fats and Meat Jumped



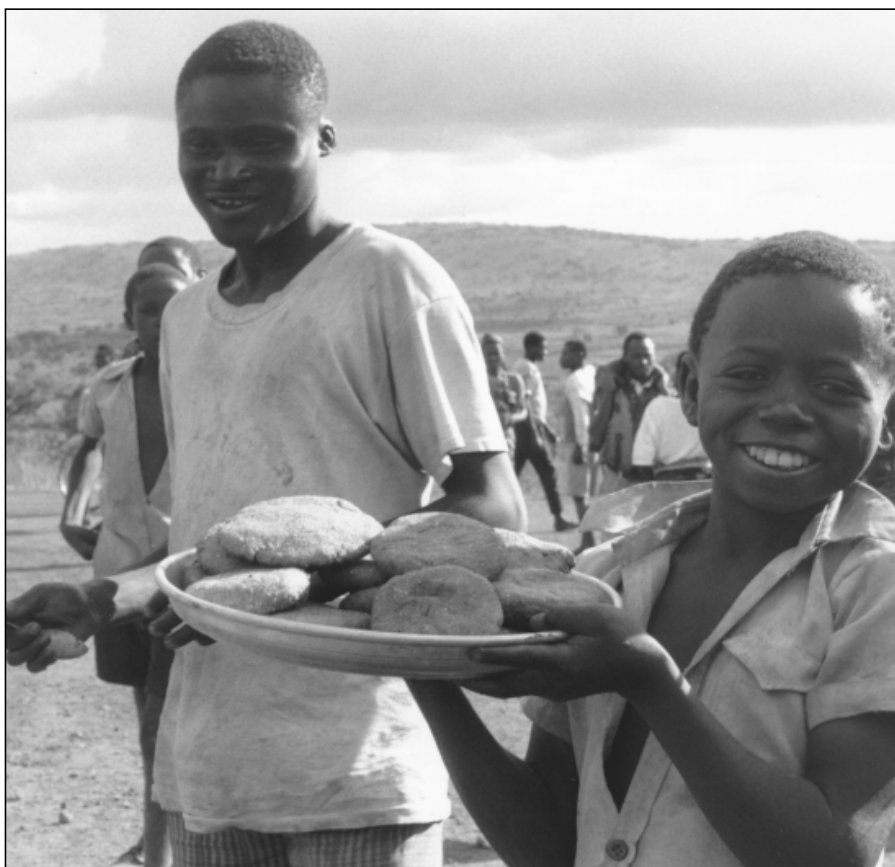
Source: Calculated by USDA's Economic Research Service from UN Food and Agriculture Organization data.

distribution in many countries exacerbates this problem. In most developing countries, the poorest 20 percent of the population holds only 4-8 percent of total national income, while the richest 20 percent holds nearly half. This inequality in purchasing power threatens the food security of the region.

Results from the annual *Food Security Assessment* by USDA's Economic Research Service (ERS) indicate that two-thirds of Sub-Saharan Africans were undernourished in 1998. ERS defines undernourishment as an available daily, per capita food supply of less than 2,100 calories. This calorie amount is the average energy level necessary to sustain life allowing for minimum food-gathering activities, about the activity level of a refugee.

Domestic food production accounts for more than 90 percent of food available for consumption in the poorer developing countries. Commercial imports, which augment food supplies, are constrained by limited foreign exchange in these countries. These poorest developing countries remain largely unsuccessful (principally due to lack of funds and training) in adopting new technologies to raise food crop yields and increase productivity, leaving people reliant on large families as the principal way to increase production. This will lead to little or no growth in per capita food supplies, stagnant or declining caloric consumption, and declining nutritional status.

To raise food consumption, it is essential to promote policies that accelerate agricultural growth. Increases in production would translate into a gradual increase in food supplies and an increase in export earnings to purchase food imports. A significant improvement in agricultural performance, how-



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ever, requires innovative technologies that increase productivity of both land and labor. Such technologies are available in the least developed countries, but only experimentally and on a small scale. Improved production practices, such as mixed cropping, could further increase yields. Therefore, countries must disseminate new technologies to stimulate domestic production and improve consumption trends.

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