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978-0-521-58984-0 - The World Food Outlook

Donald O. Mitchell, Merlinda D. Ingco and Ronald C. Duncan

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The world food problem

Since Malthus wrote his *Essay on Population* in 1798, many have been concerned that with growing population the world would be less and less able to feed itself. This has not occurred, but modern-day Malthusians warn that Malthus will ultimately be right. The evidence to support this view is scant but the arguments are compelling: population keeps expanding, no new land is being created, crop yields have increased considerably and may have peaked, and the environment may not tolerate the pressure of more intensive agriculture. Yet the evidence to the contrary is also compelling: prices of agricultural commodities are at their lowest level in history, crop yields continue to rise faster than population, and world cereal yields grew more rapidly during the 1980s than during the 1960s or the 1970s.

Despite the concerns expressed, the food situation has improved dramatically for most of the world's consumers. World output of cereals, the main food source for the majority of consumers, has increased by 2.7 per cent per annum since 1950 while population has grown by about 1.9 per cent per annum. Cereal yields (i.e., output per unit of land cropped) alone have increased more rapidly than world population since 1950 – at 2.25 per cent per annum. This has allowed per capita calorie consumption in developing economies to increase by about 27 per cent since the early 1960s. These gains offer the hope that access to food will cease to be a problem for most people.

This does not mean that all people have adequate diets, but rather that the diets for most of the world's consumers have improved dramatically in recent years and should continue to improve. Moreover, it is likely that food will be available at prices which are lower than today's. The proportion of the population lacking the necessary income to purchase food should become smaller. Periodic food shortages caused by weather disturbances will still occur, but the problem of inadequate world food production over extended periods seems to have passed.

Sub-Saharan Africa remains the main exception to these general developments, with stagnant or even declining per capita consumption

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levels. Population growth in this region has increased to 3 per cent per annum while historically food production has grown by 2 per cent per annum. Serious problems of hunger and malnutrition have developed. Food consumption growth in excess of production growth is not, in itself, a problem as countries can exchange exports of other goods and services for food imports. But many sub-Saharan countries have not been able to generate the necessary exports to purchase their food needs. The problems, therefore, extend well beyond agriculture and the solutions require more than improved agricultural performance.

Future growth in world food demand will probably be less than in the past and continued productivity gains appear likely. Population growth rates are falling and diets have improved to levels which are adequate for most consumers. In contrast, during the early 1960s many consumers in developing economies had inadequate diets. Having attained better dietary levels, the task ahead is to maintain the current consumption levels while providing sufficient increases in production to meet population growth and the diversity in diets that increasing incomes will demand.

Assessing the world food situation

Food is the largest expenditure item for most consumers in developing economies, sometimes accounting for more than one-half of total expenditure. In assessing the food situation, one important measure is the level of food prices relative to other consumer prices and relative to incomes. If per capita incomes are rising faster than food prices, consumers can spend a declining share of incomes on food and maintain the same level of consumption.

The World Bank index of food commodity prices fell by 78 per cent from 1950 to 1993 in constant 1990 prices and has been falling over a much longer time span (figure 1.1). The period of rising prices during the 1970s was the exception to the general decline in food prices. It was caused by a combination of factors including a sharp increase in crude oil prices, rising imports by the former Soviet Union as well as many developing economies, several years of poor harvests, and government policies which reduced stock levels during the late 1960s and early 1970s. Retail food prices have not declined as much as food commodity prices because of increased marketing costs and increased processing of food items; however, when measured relative to incomes, retail food prices have declined in most economies.

Real per capita GDP increased by an average of 162 per cent for consumers in developing economies from 1960 to 1990, while food costs

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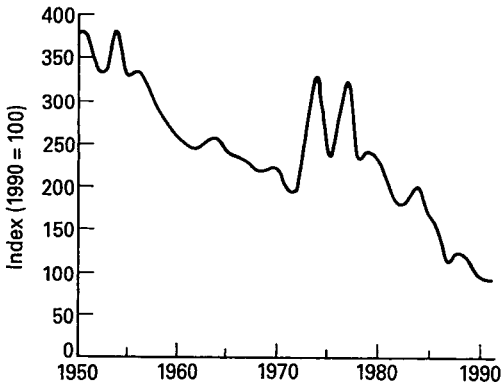
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Fig. 1.1. World food price index, 1950 to 1992. (Source: World Bank.)

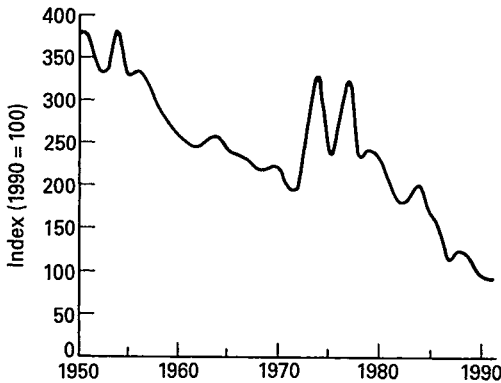


Fig. 1.2. Per capita daily calorie supplies and requirements of developing economies, 1961 to 1992. (Source: FAO.)

remained relatively stable in most economies. This meant significantly reduced food costs in relative terms. In India, for example, real food prices rose at about the same rate as all consumer prices while real per capita GDP nearly doubled.

A second important measure of the food situation is the level of nutrition relative to dietary requirements. By this measure, the food situation has improved dramatically in developing economies, although hunger and malnutrition are still serious problems for many. The average per capita calorie supplies in developing economies have increased steadily since the early 1960s (figure 1.2). The increase was especially rapid during the 1970s as production increased in many developing economies because

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	Calories per day		Per cent change	1989 population (millions)
	Average 1961–3	Average 1987–9		
East Asia and Pacific	1,725	2,594	50.4	1,640
Latin America and Caribbean	2,370	2,725	15.0	443
South Asia	1,970	2,194	11.3	1,132
Sub-Saharan Africa	2,031	2,121	4.4	485

Source: Data from FAO balance sheet; computations by World Bank.

of the release of high-yielding wheat and rice varieties. This increase in calorie supplies has meant that the proportion of the population in developing countries suffering from chronic undernutrition has declined significantly – from 36 per cent during the late 1960s to 20 per cent during the late 1980s according to the Food and Agriculture Organization of the United Nations (FAO). An estimated 60 per cent of the world's population now live in countries which have average calorie supplies of 2,600 or more per day, considered to be a relatively comfortable level by the FAO.

The improvements in calorie supplies have not been shared equally (table 1.1). The East Asia and Pacific region has recorded the largest increase in calories from 1961 to 1989 (50.4 per cent) and this is also the region with the largest population. The other developing regions had smaller increases, with sub-Saharan Africa showing an increase of only 4.4 per cent during the same period. Latin America increased per capita calorie supplies by 15 per cent and also reached the highest average level of calorie supplies of the developing regions shown.

Diets vary greatly owing to such factors as culture, income levels, prices and food availability. Diets of consumers in developing economies have a higher proportion of vegetable products than diets of consumers in industrial economies and on average only 72 per cent of the calories. Cereals are the largest source of calories in developing economies, accounting for 61 per cent of total calorie supplies during 1986–8. The share of total calories supplied by cereals has remained nearly constant since the 1960s. But the situation varies by country with consumers in many sub-Saharan African economies relying more on starchy roots than do consumers in Asia or Latin America.

A third useful measure of the food situation is the level of per capita food production. This measure is particularly useful for most developing

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economies since domestic production provides the largest part of total food supplies. As income levels increase, domestic food production becomes less useful as a measure of the food situation since consumers can more easily turn to imports for increased quantities and varieties of food. Per capita total food production increased by 19.3 per cent in developing economies from the 1960s to the late 1980s.

Consumption

The focus of discussion of the world food situation is often the ability of production to maintain past trends, but it is as important to understand the trends in consumption. During the 1970s, world cereals consumption increased by an average of 2.7 per cent per annum despite increasing world cereals prices during most of the decade. During the 1980s, world cereals consumption growth slowed to an average of 1.7 per cent per annum, despite a decline in deflated world cereal prices of more than 40 per cent. Part of the slower growth during the 1980s can be credited to slower economic growth in many developing countries; however, consumption growth also slowed in many Asian economies which did not have slower income growth during that period. In China, for example, real GDP grew substantially faster during the 1980s than during the 1970s, yet consumption of cereals grew by an average of 2.3 per cent per annum during the 1980s compared to 5.2 per cent per annum during the 1970s.

There are strong indications that the stage of most rapid increase in total food demand is past because per capita consumption has risen to levels which are adequate for most consumers and population growth rates are declining. The world's average per capita cereals consumption has not increased appreciably since 1978 (figure 1.3), and in developing economies the average has not increased since 1984 (figure 1.4). Shifts from cereals consumption to other foods such as meats, vegetables and fruits will continue but the rate of growth of total food demand is expected to decline.

Indeed, challenges to the world food situation appear to have changed considerably. Now that most consumers have achieved adequate quantities of food, they are demanding a greater variety and more tasty foods. Consumers who a decade ago consumed most of their cereals as rice now demand wheat products such as bread and noodles as well as more meat, fruits and vegetables. In Thailand, rice now comprises about 70 per cent of total consumption of cereals compared to 99 per cent in 1960. Further growth in per capita consumption of foodstuffs is expected to be associated with a shift away from direct cereals consumption. In industrial economies, the dietary emphasis is on less red meat and more fruits and

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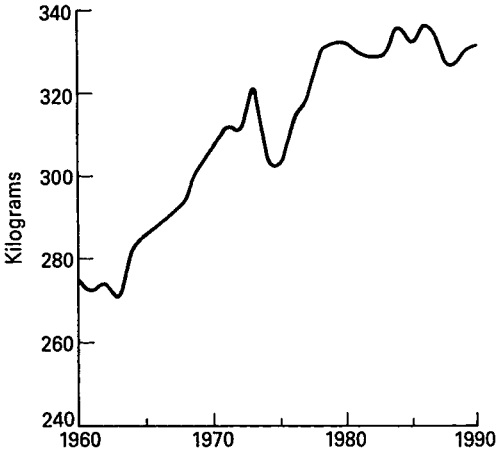


Fig. 1.3. World per capita cereals consumption, 1960 to 1990. (Source: Based on USDA data.)

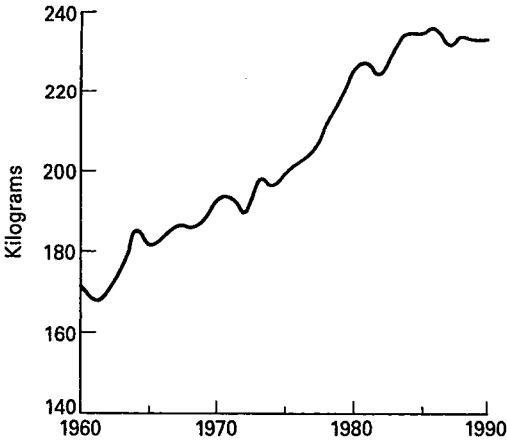


Fig. 1.4. Developing economies per capita cereals consumption, 1960 to 1990 (Source: Based on USDA data.)

vegetables for a healthier diet. These trends have important implications for the mix of food production.

Population growth is now the most important determinant of the growth of food demand in most economies. World population growth rates are projected to fall 40 per cent by 2025 to less than 1 per cent per annum according to United Nations and World Bank estimates. The projected decline is the net result of rapidly declining birth rates and slowly

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declining death rates. The decline should substantially reduce demands on the world food system.

Production

World food production has more than kept pace with population growth, and rates of food production growth show few signs of slowing. Cereals yields continue to increase along a trend which extends back to the 1950s. During the 1980s, world cereals production increased by 2.1 per cent per annum while population grew by 1.7 per cent. World cereals yields increased by about 2.5 per cent from 1980 to 1990 while land used for cereals production declined by 4 per cent. Since 1950, about 90 per cent of the increase in cereals production has come from yield increases (figures 1.5, 1.6).

The pressure on the land resource to increase production is now less in many countries than it was ten years ago when high prices brought marginal land into production. Total land used for world cereals production rose sharply during the 1970s as cereals prices rose. During the 1980s, land used for cereals fell in industrial economies and the former centrally planned economies and remained constant in developing economies. This decline in cereals cropland from the peak of the 1970s and early 1980s represents a large potential reserve which could be used for production if required. Some of the land removed from cereals production went into less intensive agricultural uses such as pasture, some was left idle, and some went to other uses such as industrial or residential areas. The production potential of the land taken out of cereal production, relative to the peak, is about 125 million tons at 1990 yield levels. This compares with world trade in cereals of 200 million tons in 1990.

Whether past trends in productivity will be maintained in the future depends largely on attaining higher crop yields. The impact of the first generation of high-yielding rice and wheat varieties, developed during the 1960s, has largely been realized and scientists are now working on the next generation. Higher crop yields originate in investments in research and in factors of agricultural production such as irrigation systems, as well as in education of the rural workforce. Continued investments in these areas are essential to continue improvements in the food situation, especially in developing economies.

Sustainability

The sustainability of agricultural production has become a major concern during the past decade. This concern is often expressed in the form of

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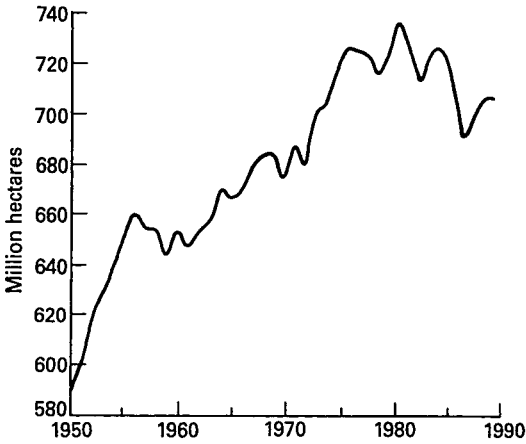
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Fig. 1.5. World cereals area harvested, 1951 to 1990. (Source: Based on FAO data.)

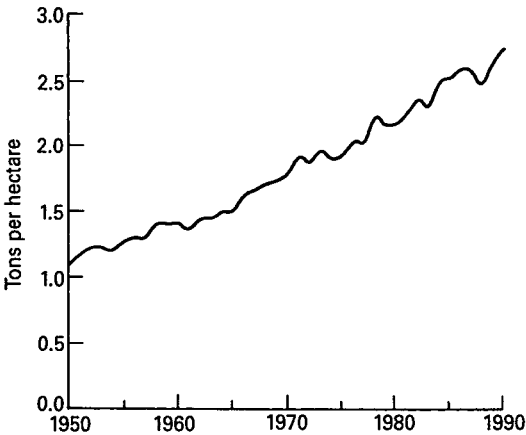


Fig. 1.6. World cereals yield, 1951 to 1990. (Source: Based on FAO data.)

doubts about whether or not agricultural production can continue to grow because of changes in the quality of the resource base. Because the resource base can adjust to economic incentives, the land resource can be made more productive by clearing, contouring, levelling, and adding organic matter and chemical fertilizers. Water can be stored in irrigation dams, pumped from wells and transported to more fertile areas. Both land and water are abundant according to most estimates and the primary issue concerns making the most efficient use of these resources.

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Only 11 per cent of the world's land surface is currently used for agricultural crops, and by one commonly accepted estimate, the world's land and water used for agriculture could more than double – although the economic incentives do not justify such an effort (Buringh, van Heemst and Staring 1975).

Soil degradation is often cited as a major concern despite ever increasing yields, but the extent of soil erosion and degradation is very much disputed. According to some studies, as much as 15 per cent of the world's cropland is degraded owing to human-induced activities. Water erosion is estimated to account for 56 per cent of the degradation, wind erosion is said to account for an additional 28 per cent, and the remainder is due to chemical and physical degradation. The consequences of this degradation are variously judged to be either great or minor, depending upon the study.

Much-disputed environmental effects such as global warming are also cited as a threat to the production potential of agriculture. The greatest concern is that these changes might occur quickly, before new crop varieties which would thrive in a warmer climate could be developed. Very gradual changes seem to pose less of a threat and may even increase agricultural production by extending the frost-free growing season in some regions. The potential effects of global warming on world agriculture are not yet properly understood, but at this time they do not appear to constitute a short-term threat.

The food crisis of the early 1970s

It is important to understand the world food crisis of the early 1970s because it has left many with vivid memories of a world of shortages, memories which could shape their perception of future crises – yet the combination of factors which caused it was very unusual. Some of the factors involved were unique, and unlikely to recur simultaneously.

The most important was probably the sharp increase in crude oil prices. The average price of a barrel of crude oil rose from US\$1.90 in 1972 to US\$11.20 in 1974 (World Bank 1992c) with many consequences. It caused a large redistribution of wealth. Oil-exporting economies, including a number of non-OPEC countries such as Mexico and the former Soviet Union, became substantially wealthier. Increased wealth provided the wherewithal for these economies to change substantially their consumption patterns and to increase significantly their food imports. Oil-exporting economies which were previously small participants in the world food market, including Indonesia, Mexico, Nigeria and the former Soviet Union, became major grain importers.

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Rapid income growth of oil-importing, middle-income developing economies such as Brazil, China, the Republic of Korea, Hong Kong and Singapore occurred at the same time. Economic growth in these countries was tied to manufacturing rather than petroleum, but the consequences were the same – demand for imported grain increased sharply.

Higher crude oil prices also contributed to the food crisis by sharply increasing fertilizer prices. For example, urea fertilizer prices rose from US\$59 per ton in 1972 to US\$316 per ton in 1974 (World Bank 1992c). This led to lower fertilizer use, lower grain yields, and increased demand for grain imports to replace the reduced production. Other important economic changes during the 1970s included the movement away from the fixed exchange rate system and the closer integration of world capital markets.

Besides these fundamental economic changes, other factors such as production shortfalls caused by poor weather in the former Soviet Union (grain production declined 7.4 per cent in 1972) were also credited with causing the initial price increases. Subsequent production behaviour in the former Soviet Union included a sharp decline in 1975, but it is difficult to determine whether this shortfall was caused by changes in economic variables such as fertilizer prices, by government policy changes, or by weather-related shocks – all concurrent events.

Government policy also played a role in creating the world food crisis. World grain stocks reached what were considered to be burdensome levels during the 1967–9 period and several major grain-exporting economies implemented policies to reduce stocks quickly. The United States, Canada and Australia all reduced the area of grain production through a combination of government policies and producer responses to low prices. The immediate effect was to lower world grain stocks and to render production capacity idle. Consequently, the market was vulnerable to any shock either from a supply disruption caused by poor yields or a demand shock due to rising incomes. The first such shock occurred in 1972 when the former Soviet Union imported large amounts of wheat and caused world stocks to drop sharply. Prices rose, causing a shift in government policies from restricting to encouraging production by reducing restrictions on plantings. Producers responded by increasing the area planted and inputs such as fertilizer. In this particular case, the high level of fertilizer prices due to the high energy prices dampened the response and slowed the increase in production.

Supply did increase, but not fast enough to keep up with demand which grew rapidly. The former Soviet Union, China and many other developing economies increased imports and kept up the pressure on prices. By 1981,