

# World Food Insecurity: A Policy Dilemma

by

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**Abstract:** Almost 1 billion people live in a state of food insecurity. The income earned by them is only slightly more than 1 percent of world GDP. Even though the resources required to feed these people adequately are small, their food deficit is persistent and difficult to solve. Solutions must involve a radical restructuring of government away from interventionist policies and towards being a facilitator of economic growth and development focusing on overcoming market failures. Resources in support of agricultural research and development (R&D) have been declining worldwide and are undermining the growth in productivity that is required in order to have further declines in real agricultural prices. These lower prices would be one important step towards improving food security by increasing purchasing power of low-income households. Reducing the number of food insecure by half as recommended by the World Food Summit requires serious commitments from both the world food exporters as well as the food-insecure countries themselves.

## Introduction

There are almost 1 billion people living in a state of food insecurity, most of them living on less than \$2 a day. A small share of world GDP, less than 1 percent, would go a long way towards removing this insecurity. Yet transfers of food, income, or wealth do not appear to provide a permanent solution. Long-term solutions must come from inside the food-insecure countries and result in increased productivity and income for the food insecure.

To accomplish this, a fundamental restructuring of the incentives to save and invest, as well as a reordering of priorities for public investments away from control of markets toward overcoming inadequacies in physical and social infrastructure must be undertaken. Given the radical transformation of thinking required on the part of the leadership of these countries, it is hard to see how this transformation can take place. That is the dilemma. The problem involving a small share of world GDP is so difficult to solve because the root of the problem is not resource availability, but the approach to development of many officials in less developed countries (LDC's).

Public support for agriculture has been declining worldwide. Public R&D expenditures, which were growing by 7 percent a year in the 1970's, have stagnated in the 1990's. This, in spite of the fact that it was public R&D expenditures that caused the productivity growth and led to increased agricultural output over much of the past 25 years. While agricul-

tural output grew more rapidly than population over the past 25 years, the "surplus" was highly precarious. Of the more than tripling of output over that period, almost 90 percent went to feeding increasing populations while only slightly more than 10 percent went to increasing food availability per capita. A small change in productivity growth or other factors affecting supply would have led to a different outcome. In fact, since 1985, world agricultural production has been growing at the same rate as population.

For policy makers, the dilemma rests in a conflict between humanitarian concerns and scarce aid resources. The OECD countries want to assist countries in need, but the conventional remedies of food assistance and policy reform in the most severely affected countries appear inadequate to turn around this situation. Only new thinking and dramatic policy reform will yield positive results in the longer term. How then are we to achieve the pledge by the World Food Summit to reduce the number of food insecure by half?

## ***Food Insecurity and the World Income Distribution***

The world's income distribution is highly concentrated at low income levels. More than 4 billion people have incomes of less than \$16 per day.<sup>2</sup> More than 3 billion live on less than \$8 per day. More than 1 billion live on less than \$2 per day and more than 500 million live on less than \$1 per day.<sup>3</sup>

<sup>2</sup>For the purposes of this paper, our international comparisons are conducted in 1994 purchasing power parity (PPP) dollars. A purchasing power dollar is an international currency that was created to compare how much of the same basket of goods can be purchased in different countries. <sup>3</sup>In the OECD countries, less than 20 percent of the population live on \$16 per day or less.

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Although it is not clear exactly at what income a person becomes food insecure, few individuals who earn \$16 per day or more are food insecure. On the other hand, individuals living on \$1 per day or less are almost certainly food insecure. Almost 10 percent of the world's population live on \$1 per day or less and almost 20 percent on \$2 per day or less. FAO's estimate of the world's food insecure population, at 860 million (FAO, 1997), puts the income of food insecure people at almost \$2 per day.

While populations are concentrated at low-income levels, income earned is equally concentrated at the highest income levels. Thus 70 percent of the world's GDP is earned by less than one third of all individuals—those who earn \$16 per day or more. The poorest 1 billion only earn 1.3 percent of the world's income and the poorest 500 million only earn 0.3 percent of the world's income.

Since the poor only spend a part of their income on food, the food expenditures of the poorest 1 billion represent only 0.8 percent of the world's GDP while the food spending of the poorest 500 million represents 0.2 percent of the world's GDP.

While the solution to the food insecurity problem appears to be to transfer food, income, or wealth, we argue that this is not the correct solution in the long run.

### The World Food Situation

Total world food production grew 2.6 percent per year between 1961 and 1985. On a per capita basis, food production grew only 0.6 percent per year. Between 1985 and 1995, both population and food production growth declined so that they were in approximate balance at 1.7 percent per year. This slowdown in production growth, if it continues, suggests the potential for supply shortages and a worsening of the food insecurity problem.

### Factors Influencing Demand

The United Nations projects that population growth will decline from the current 1.5 percent per year to 1.25 percent by 2010. At this rate, total food supplies can keep pace with population growth at current prices and incomes. However, it is not sufficient for production to grow at the same rate as population for the market to equilibrate at constant prices. Income growth generates additional demand pressures. The excess of demand growth over supply is likely to place some upward pressures on real food prices.

A variety of factors could accelerate the movement toward higher world food prices: declines in population growth rates could decline less than projected, income growth in populous countries with high relative food expenditures could be faster than expected, and world agricultural production could slow from present rates.

Of the world's poorest 1 billion people, about 42 percent reside in South Asia, about 24 percent in Sub-Saharan Africa and 16 percent in China, North Korea, and Mongolia. South Asia and Sub-Saharan Africa are the two regions with

the largest number of people at considerable nutritional risk. Twenty-five percent of South Asia's population and 51 percent of Sub-Saharan Africa's population live on less than \$2 per day. These are also regions with the lowest per capita income growth and the highest population growth rates.

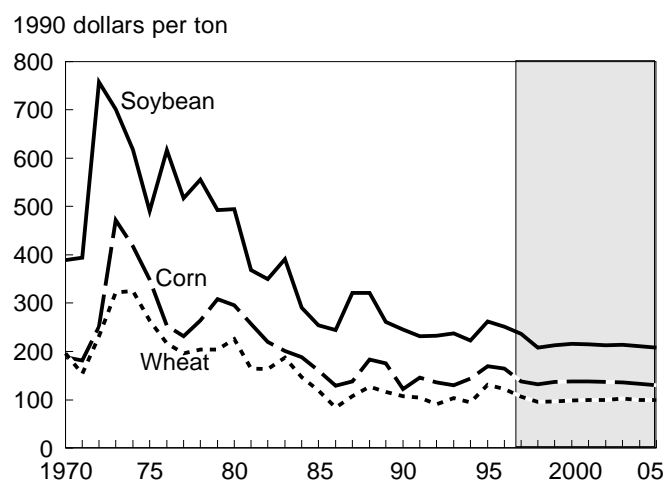
### Food Prices and Capacity To Import Food

Rising incomes, stagnant per capita agricultural production, and declining stocks would lead us to expect a trend of increasing real prices. However, price trends have continued to suggest that food has become relatively less scarce over time (figure A-1, Borensztein et al., 1994).<sup>4</sup> A decline in the real price of food in world markets is not sufficient to ensure that food consumption per capita in low-income countries will increase. An increase in food consumption per capita depends on a number of factors, including a country's terms of trade, population growth, and growth in total factor productivity. All of these factors contribute to income and the country's ability to pay. We discuss the implications of these factors next.

### Terms of Trade

Suppose a country is a net importer of food. Then, if the price of imported food falls relative to the price of a country's exports (terms of trade), earnings from a constant volume of exports can buy a larger volume of food imports. Unfortunately, this has not been the case for those countries that are at the highest nutritional risk. Many low-income countries rely heavily on exports of primary commodities (if anything at all). The price of some of these commodities has fallen even faster than that of food. Given the ultimate price insensitivity of demand for primary commodities export earnings decreased.<sup>5</sup>

**Figure A-1--The pattern of declining real prices is slowing**



Source: USDA.

<sup>4</sup>Grilli and Yang (1988) show that the price index of cereals exhibited a downward trend between 1900 and 1987. <sup>5</sup>According to the IMF (1995), non-fuel exports of primary commodities experienced large negative terms of trade effects during the early 1990's. On a regional basis, Sub-Saharan Africa experienced negative terms of trade during the late 1980's and early 1990's.

Compounding the problem for countries with the highest nutritional risk is that growth of exports per capita has not kept pace with the decline in their terms of trade so that foreign exchange earnings per capita have fallen. Burundi, Cote d'Ivoire, Kenya, and Tanzania are among the countries in Africa that have experienced a decline, not only in per capita export earnings, but in total export earnings (IMF, 1995). Thus, not only are the poor growing more dependent on food imports, their governments are less able to provide the foreign exchange to import food.

### Population

Population growth has been declining worldwide and is projected to continue to decline. Between 1960 and 1977, populations grew almost 2 percent per year. Between 1978 and 1995, the growth rate had declined to 1.5 percent. Projections are always somewhat hazardous, but the UN and Bureau of the Census project the world population growth rate will decline to slightly more than 1.2 percent by 2010.

The decline in population is not uniform throughout the regions of the world. In Sub-Saharan Africa, population growth rates increased from 2.5 percent a year between 1960 and 1977 to almost 3 percent between 1978 and 1995. Projections for the region suggest continuing high population growth rates of 2.5 percent a year through 2010. Unfortunately, the regions with the highest population growth rates are also the ones with the largest food insecure populations. It is also the case that the lowest income groups within any country are also those with the highest population growth rates.

### Growth in Factor Productivity

The deceleration in the growth rate of agriculture's total factor productivity (TFP) is international in nature, and associated with a decline in public and private R&D and the decline in real agricultural prices. The declining growth in TFP will cause agriculture to lose resources to the rest of the economy and will likely lead to a reduction of output growth. In the face of rising populations, world agricultural production per capita will fall, and may lead to rising world food prices. Increasing real food prices are unlikely to be a problem for the approximately 1 billion people with the majority of the world's income. However, for the remaining population, a rise in food prices can lead to considerable nutritional risk.

Changes in the rate of growth in agriculture's TFP has contributed to the slowdown in agricultural production growth. Recent evidence suggests that the productivity advantage of agriculture in major food exporting countries is declining relative to nonagricultural sectors (Gopinath, Roe, and Shane, 1996). Furthermore, the growth rate for total factor productivity has fallen in recent years. Evidence from the United States and other OECD countries suggests that agricultural R&D influences agriculture's total factor productivity growth. Declines in the growth of expenditures on R&D may thus slow agricultural productivity growth.

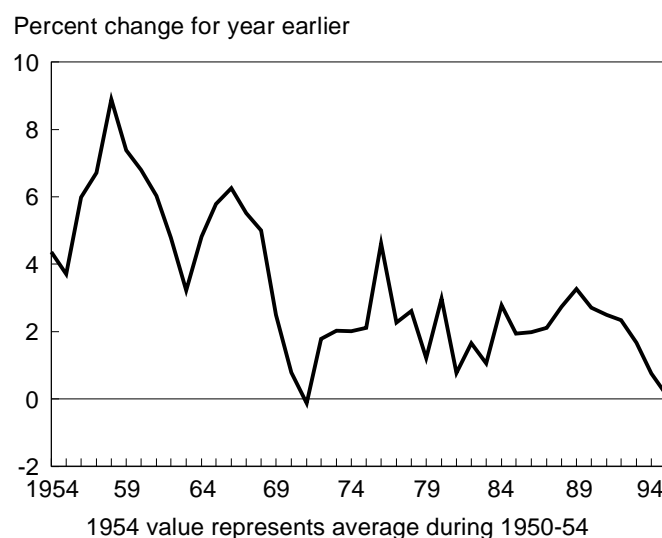
While there is considerable annual variation, annual rates of growth in TFP in the United States, France, Germany, and the UK appear to be falling. U.S. agriculture's TFP grew rapidly during 1949-1968 (figure A-3). Since then, the rate of growth in TFP flattened out. If these declining patterns continue, the long-term decline in real agricultural prices is likely to turn around.

U.S. TFP is explained by investments in public and private R&D, rural infrastructure, and by the embodied technological advances in material inputs (Gopinath and Roe, 1996, figure A-2 and A-3). In the 1950's and 1960's, investments in rural infrastructure played a dominant role in TFP growth while public and private R&D played a larger role in later years.

While detailed estimates are not available for other exporting countries, it appears likely that they follow a similar pattern. The decline in TFP growth is associated with a decline in the growth of public R&D expenditures. Alston and Pardey (1966, p. 47) state: "During the 1980's, research expenditures in developed countries grew at only one-quarter the rate experienced during the 1960's; for developing countries the rate of growth slowed to around 2.7 percent per annum during the 1980's, as compared with 7.0 percent during the 1960's." Private sector R&D spending has increased in proportion to public sector spending. In the 1990's, the public sector spent \$0.79 for every dollar spent by the private sector, while in earlier periods the public sector spent \$1.06 for every dollar of private R&D (Alston and Pardey, p. 56).

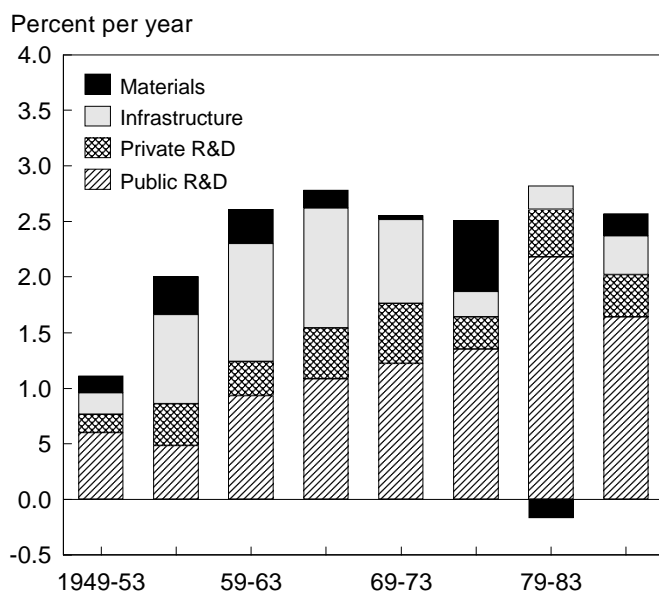
If the efficiency gains in the non-agriculture sector of the major food exporting countries do not spill over to the least developing countries, the rise in real prices of food are unlikely to be matched by a rise in their real incomes, further exacerbating the nutritional status of the poor.

**Figure A-2--Growth in U.S. public expenditures on agricultural R&D has declined since the 1950's\***



\*Public expenditure on agricultural R&D is measured in 1992 dollars. Five-year moving average. Source: Alston and Pardey (1996) and USDA.

**Figure A-3--Contributions to agricultural TFP growth in the United States**



Source: Gopinath and Roe, 1996.

### What Can Policy Do?

We can characterize the lowest income countries of Africa and Asia where food insecurity is concentrated in the following way: overall income and agricultural production have been growing, but at a slower rate than population growth. Thus per capita incomes and per capital agricultural production have been falling. Furthermore, these countries have been highly inward-oriented so that total trade as a share of GDP has been falling. This pattern is dramatically different than that of the OECD countries and the fast growing newly industrialized countries, where per capita incomes and trade as a share of GDP grew rapidly, and agricultural production per capita increased. The real issue is what explains these differences and what can be done in the low-income, food insecure countries to reverse this long term pattern of decline. Although no short answer will suffice, there are some broad characterizations that point at a solution. Indeed, the economic history of countries such as South Korea, China, and Chile imply that solutions are possible.

In the short term, providing food, income or wealth transfers is possible and plausible. However, food insecurity and poverty are a sign that the economic system is not working well. Providing transfers can help overcome inadequacies in the short run, but cannot overcome the fundamental problems of poor and food insecure economies. Indeed, no externally imposed solutions can accomplish this. Only radical transformations of these systems can alter the negative path that these economies have been on for the past 25 years or more.

Let us focus on Sub-Saharan Africa. Over the past 25 years, per capita income and per capita agricultural production declined at the same time agricultural output and GDP increased by almost 2 percent per year. Can trade and investment policies raise economic growth rates in Sub-Saharan

Africa enough to affect the individuals at nutritional risk? Using a dynamic computable general equilibrium framework for Sub-Saharan Africa, we show that trade liberalization and removing the bias in investment policies alone are not enough to turn around the situation in Sub-Saharan Africa.

Based on the simulations, trade liberalization adds 0.6 percent to per capita income growth rates. This policy change causes resources to move toward export sectors such as cocoa and nuts. The combination of trade liberalization and pro-agricultural investment in rural public goods adds 1.0 percent to the base growth rate of real income per capita. Real per capita income growth of only 1 percent a year helps the situation from getting worse, but is not sufficient to significantly reverse the nutritional situation. More fundamental remedies are required. What might these be?

Countries such as South Korea, China, and Chile, which have gone from low rates of economic growth to high rates, underwent a fundamental transformation in the approach of government to economic development. Government policy went from one of intervening in markets to create rent-seeking opportunities to facilitating development by creating institutions and reversing market failures. Measures included formation of specialized financial institutions, organized commodity and futures markets, and government organizations to provide marketing information to purchasers. These countries also went through a transformation from being inward oriented to being outward or even export oriented. The net effect of this transformation was to dramatically increase investment opportunities. The response to those opportunities was an approximate doubling of domestic savings rates from less than 15 percent of GDP to more than 30 percent of GDP (table A-1). In addition, the government's change from being a bottleneck to being a facilitator of economic activity opened the domestic economy to large amounts of direct foreign investments. Thus from both domestic and foreign sources, there was a huge increase in investable resources. The opening of the economy to international forces also opened the domestic economy to technological transfer and increasing productivity growth. The total effect of these changes has created 5 to 10 percent extra growth in GDP per year. It is this kind of a growth change that is needed to overcome the food insecurity problem in low-income countries.

### Implications for Food Security

Given this perspective, what is the likelihood of dramatic changes in food insecurity as proposed by the World Food Summit? Trade liberalization is already a major and complicated step. It necessitates numerous and often politically unpopular changes in policy: the removal of protection of inefficient industries, short-run increases in food prices, and refocusing the tax system on income, value-added, or sales taxes and away from foreign trade taxes. This places pressure on the wealthy and politically influential. Yet, trade liberalization alone will not provide food security to those nutritionally deprived in the 1990's especially if the long-term downward trend in real food prices is reversed.