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**Working Paper**

## Food, Population, and Employment: The Malthusian Prospect Two Centuries Later

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**CORNELL**  
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**FOOD, POPULATION, AND EMPLOYMENT:  
THE MALTHUSIAN PROSPECT TWO CENTURIES LATER**

**by**

**Thomas T. Poleman**

**June 1988**

**No. 88-12**

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FOOD, POPULATION, AND EMPLOYMENT:  
THE MALTHUSIAN PROSPECT TWO CENTURIES LATER\*

by

Thomas T. Poleman\*\*

I confess that my first reaction on being invited to participate in this lecture series was to yawn. I was in India when I received the call, and when it's daylight in Toronto, it's the middle of the night in Delhi and I was asleep. A second reason for my subdued response was concern whether I really had anything new to contribute to an understanding of the global food-population prospect. That was the subject of the early 1970s--the time of the so-called World Food Crisis--and I had then made something of a cottage industry of debunking the notion that the world teetered on the brink of starvation. Certain professional doomsayers do continue to issue dire pronouncements, but these in a time of depressed agricultural prices and apparent abundance, fall largely on deaf ears. Yet, ask the man in the street for his impression of what life is like in the developing countries and he will invariably reply "hungry."

These apparently conflicting elements in the conventional wisdom--a willingness to believe the worst, but, because it involves "them" not "us," not to become unduly concerned about it--have their origin in the wildly misleading postwar literature on world hunger. We were, for instance, assured in 1950 by Lord Boyd-Orr, the First Director General of FAO that "a lifetime of malnutrition and actual hunger is the lot of at least two-thirds of mankind," (1, p. 11) and just 10 years ago by the Carter administration's Presidential Commission on World Hunger that the "world hunger problem is getting worse rather than better. There are more hungry people than ever before" (2, p. 49).

Thinking of this type is little more than an updating of one whose bicentennial is just a decade away: the old Malthusian saw of a losing race between food and mouths to feed. One calls it Malthusian with reluctance. A pessimist he was, but it is not easy to believe that Malthus, had he today's evidence on matters about which he could only theorize 200 years ago, would have had much truck with what is said in his name.

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\*\* Professor of International Food Economics.

Malthus wrote at a time when very little was known about population trends. The first British census was not taken until 1801, three years after his Essay first appeared; compulsory registration of births and deaths did not begin until 1837, three years after Malthus died; and, in the first edition at least, the Reverend Malthus seemed quite prepared to go along with Bishop Ussher's timing of the Creation at 4004 B.C. (3, p. 6). Evidence on food production was even sketchier. Nonetheless Malthus was bold enough to perceive in them tendencies sufficiently strong to upset the then prevailing notions of man's perfectability (3, pp. 6-8):

. . . the power of population is indefinitely greater than the power in the earth to produce subsistence for man.

Population, when unchecked, increases in a geometrical ratio. Subsistence increases only in an arithmetical ratio. . . . By that law of our nature which makes food necessary to the life of man, the effects of these two unequal powers must be kept equal.

This implies a strong and constantly operating check on population from the difficulty of subsistence . . . . Among plants and animals its effects are waste of seed, sickness, and premature death. Among mankind, misery and vice.

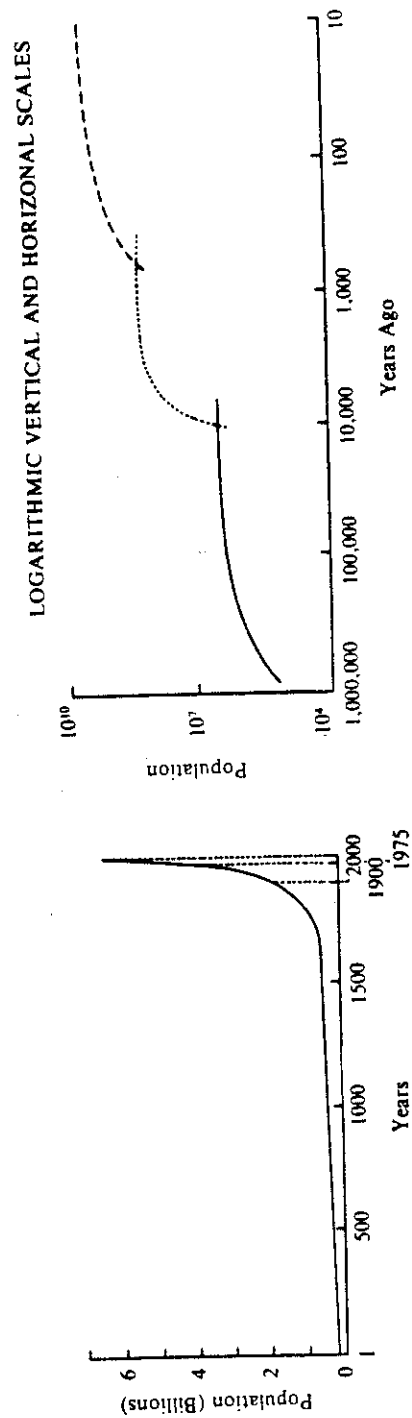
In later editions, as Malthus grappled with the question of how populations controlled their size, the argument expanded and became less tidy. But it was his original perception of the inevitability of a population outstripping its food supply that first captured the world's attention and it is this perception which has so often been used to dramatize the problems posed by the current spurt in the world's population.

That there is a race, no one questions. But we now know it is not the mindless one foreseen by Malthus in which food and population push relentlessly toward some saturation point and ultimate mass starvation. Rather it is a two-way race--between population growth and economic participation on the one hand, and between economic participation and food on the other--in which more and better jobs and the elimination of poverty act as the equilibrating mechanism. This concept of two parallel races is essential to an understanding of the problems confronting the poorer countries of the world today.

#### The Employment-Population Race

First, there is a race between economic participation and population growth. The left-hand drawing in Figure 1 is a familiar illustration. It shows that the world's population remained essentially stable from biblical times to about 1650, when it stood at perhaps .5 billion. It reached 1 billion by 1800 and 2 billion 130 years later. Since then

FIGURE 1. TWO VIEWS OF WORLD POPULATION GROWTH\*



\*Source: E. S. Deevey, Jr., "The Human Population," *Scientific American* (September 1960), p. 198.

successive billions have been added at ever shorter intervals. The current population is a bit in excess of 5 billion and it will top 6 billion before the year 2000. The drawing is valid in that it drives home the magnitude of the current explosion in numbers, 90% of which is taking place in the Third World. But it is misleading in several important respects. The current upturn is not unique, and growth prior to 1650 took place not gradually, but in spurts.

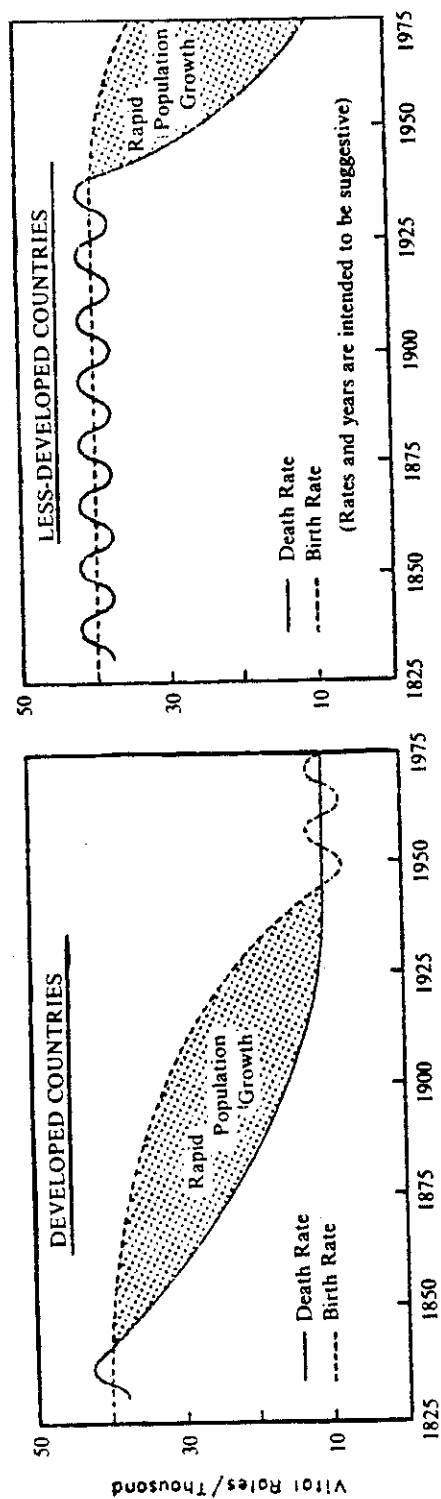
This is of fundamental importance and is perhaps most easily appreciated when visualized in terms of the right-hand part of Figure 1. The drawing, plotted on logarithmic scales to make great differences in time and magnitude manageable, summarizes much of what we have learned since Malthus' time. The present upsurge in numbers is the third in a sequence of bursts that have been associated with major breakthroughs in mankind's ability to cope with its environment. The first occurred several million years ago and attended mankind's emergence from the primate line into a maker of tools able to hunt and gather over a range of conditions. The second marked the domestication of plants and animals about 10,000 years ago and the beginnings of agriculture--the Neolithic Revolution.

The third and current population burst--associated with the industrial and scientific revolution and the spread of modern economic development--is commonly explained by demographers in terms of the demographic transition, illustrated in Figure 2. Prior to the transition, the stability or near stability in the population of a traditional society reflected high birth and death rates offsetting each other. Then as the economy begins to develop and public health measures are introduced, life expectancy increases and the death rate drops. Births, however, remain at their old level and for a period the population soars. Then the birth rate in its turn falls, and the population again approaches stability, but at a much higher level.

Most of the industrialized nations have passed through this transition and have reached, if not stability, a condition approaching it. For them the transition averaged between 50 and 100 years--roughly from 1850 to 1950. Most of today's developing countries, by contrast, did not enter the stage of declining death rates until about the time of the second world war. These countries are therefore still in the interval of maximum population growth and the ultimate size of their population will depend on the speed with which birth rates fall.

The factors associated with a decline in birth rates are several. Access to birth control devices and instruction are clearly positively correlated, as are changing attitudes toward abortion. So too is a reduction in infant mortality and the need for parents to plan on several live births to feel reasonably assured that one child will reach maturity. Additionally, the course of development seems linked to a decline in the attractiveness of large families. In a traditional rural society children are economic assets. Cheap to feed and clothe, they can be put to work at an early age, and as adults they become their parents' old-age insurance. With urbanization this changes.

FIGURE 2. THE DEMOGRAPHIC TRANSITION SCHEMATIZED



Children become expensive to educate and maintain, and the state or employer assumes responsibility for retirement income. The role of women is also modified by development. Education widens their access to roles outside the home and almost everywhere is the factor most strongly linked to reduced fertility.

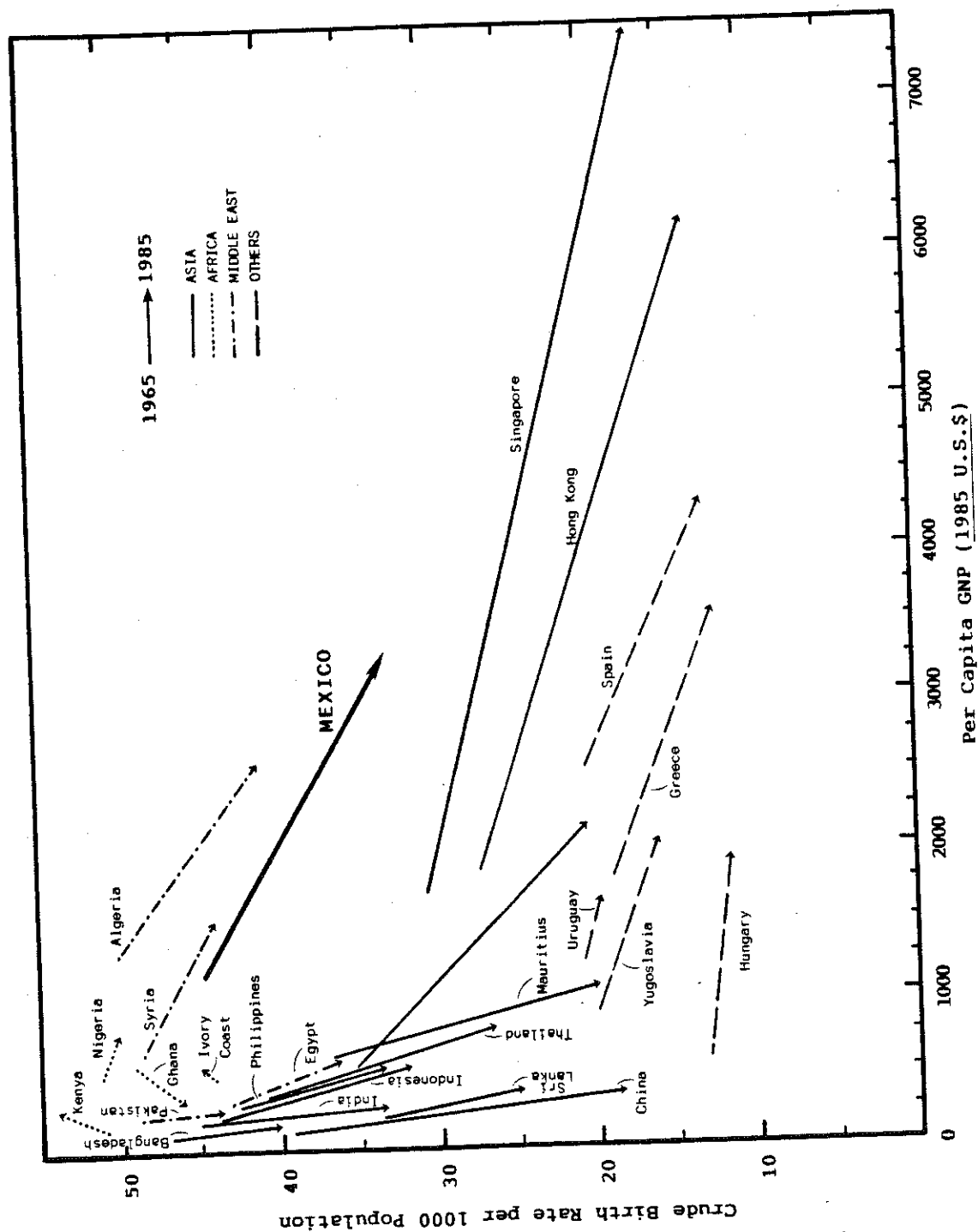
Taken together, the operation of these and other linkages has led some observers to conclude that countries with rapid population growth need not be concerned about it; that economic and social progress will automatically bring it under control. Indeed, they argue, with such recent birth control techniques as the pill, the birth rate can be reduced much more rapidly than it was in Europe and North America--to replacement levels in 25 or 30 years. And so it seems to be doing in a number of countries.

But implicit in this happy scenario is the assumption that all within a population will participate more or less equally in the development process. Where they do not the argument falters, and it is for this reason that statisticians search in vain for correlations between birth rates and average national income levels. Consider Figure 3, in which are plotted the birth rate and per capita GNP of a number of countries in 1965 and 1985, and note especially the data for Mexico. Several things are apparent: that the birth rate in Mexico is well above that of other countries with similar average levels of income; that Mexico's birth rate is more nearly comparable to those of much poorer Asian countries, and, that a number of these poorer countries are experiencing much more rapid drops in fertility than Mexico.

This seemingly anomalous behavior for Mexico may be traced to the unequal manner in which economic change has impacted on the population. Mexico, to students of development, is a textbook example of "growth without equity"; its average per capita income is quite misleading. Those Mexicans lucky enough to have jobs and be caught up in an upwardly-mobile urbanizing society will eventually, if they have not already, respond to the same pressures which acted a few generations ago to bring down fertility in Europe and North America. But those little effected by the growth process, particularly the bulk of the 40% or so of the population which remains in the countryside, are another matter. For them the traditional incentives for large families persist.

These are the reasons for the race between economic participation and population growth--and its near universality. For, though the Mexican case is an extreme example of inequitable growth, it is not all that atypical. In many developing countries the proportion of society being bypassed is distressingly large.

FIGURE 3. RELATIONSHIP BETWEEN CRUDE BIRTH RATE AND PER CAPITA GNP, 1965 AND 1985\*



\*Data from World Bank, World Development Report, 1987 (Oxford University Press, 1987).

### The Employment-Food Race

To understand the second race--that between food and economic participation--it is necessary to set to rest the idea that hunger exists because the world is no longer able to feed itself. This notion may be traced to the formative years of the FAO and its early attempts to assess the extent of world hunger. These studies, and their methodological underpinnings, are worth reviewing because, although they are now discredited, their message has remained remarkably durable.

Before reviewing the specific studies, I should make it clear that there is no way to specify with certainty the extent of world hunger. To do so would require much more information than is presently at hand about the actual availability of food, the exact amount of food people need for proper nourishment, and how access to food varies among different income groups within a country. The FAO and the World Bank do issue estimates from time to time, but these are little more than games played on the computer, with the outcome frequently dictated by political considerations and bureaucratic scheming.<sup>1</sup> Still I would hazard the guess that at no time in history has the world been as well fed as it is today. To argue otherwise would be to deny a basis for the increase--from about 40 years to over 60 years--that has occurred since mid-century in life expectancy in the poorer countries. In the rare instances where outright famine has occurred recently--in Ethiopia and Sudan, for example--the problem has been localized and attributable to political conflict.

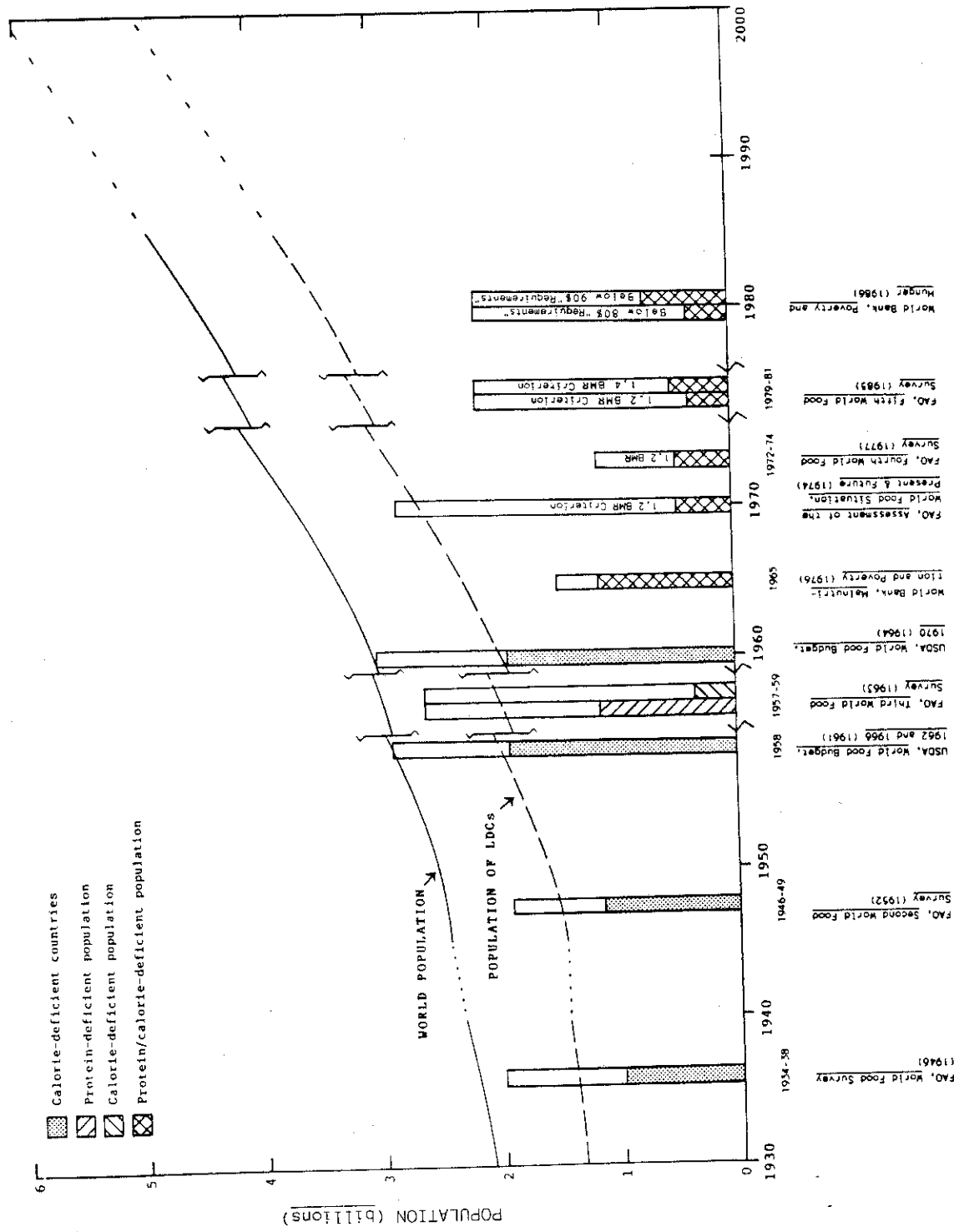
The findings of the early hunger quantification studies and those of more recent work by FAO and the World Bank are shown in Figure 4. The extent of divergence among them is extraordinary. Boyd-Orr's conclusion that two-thirds of mankind were hungry came from FAO's Second World Food Survey. The USDA's two early World Food Budgets concluded that almost the entire population of the developing world lived in "diet deficit" countries. FAO's Third World Food Survey put the afflicted in such countries at about 60% and identified a shortage of protein as the principal problem. The World Bank's first attempt saw a problem of roughly the same magnitude--involving about 1.2 billion people--but indicated the prime cause was a shortfall of calories. The Bank's most recent study has the figure ranging from 340 to 730 million. The last three FAO efforts put the number afflicted at between 330 and 500 million.

With the wisdom of hindsight it is easy to demolish the methodological underpinnings of the early studies. Involved was little more than a country by country comparison of apparent per capita food

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<sup>1</sup> For a detailed discussion of the difficulty of measuring world hunger and of the failings of the various attempts to do so, see T. T. Poleman, "Quantifying the Nutrition Situation in Developing Countries," Food Research Institute Studies, Vol. XVIII, No. 1, 1981.

FIGURE 4. PERSONS IDENTIFIED AS NUTRITIONALLY DEFICIENT IN SELECTED WORLD FOOD ASSESSMENTS



The size of the populations to which the assessments apply is indicated by the total height of bars.

availabilities and per capita food needs as suggested by the recommended dietary allowances employed by nutritional workers. The methodology had a built-in bias. Apparent per capita food availabilities are derived from production estimates and the tendency is for food production to be underestimated almost everywhere in the Third World. Conversely, recommended dietary allowances consciously err on the side of caution.

Since they used food availability estimates that understated to compare against food requirement figures that overstated, it is not surprising that the early global food assessments painted a gloomy picture of world hunger. The picture conveyed was one of hungry countries and of a world unable to feed its rapidly growing population. Insufficient production was seen as the problem. As the second of the USDA's World Food Budgets, published in 1964, put it (4, pp. iii-iv):

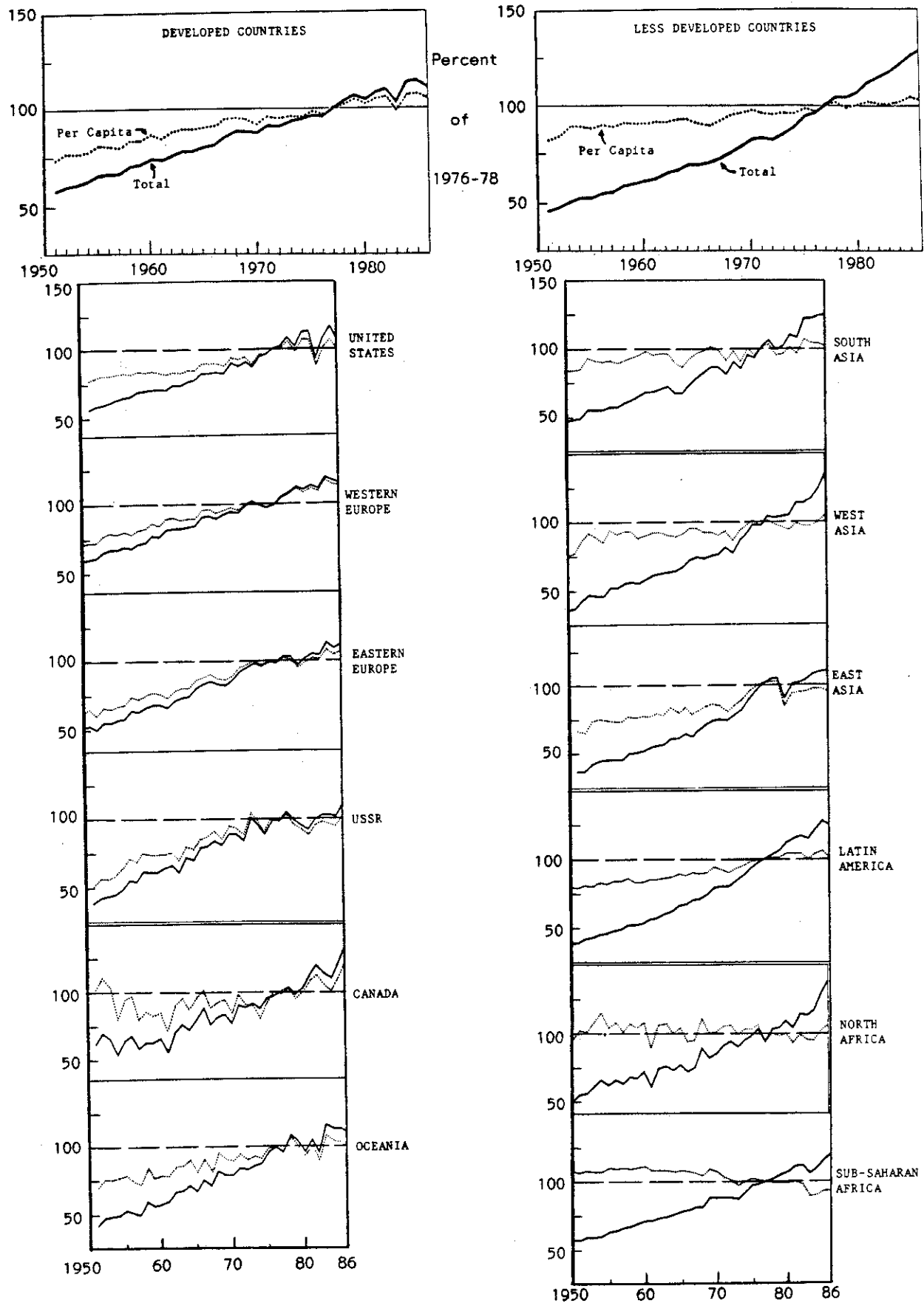
Two-thirds of the world's people live in countries with nutritionally inadequate national average diets . . . . The basic problem of the diet-deficit countries is one of productivity. The people cannot produce enough food to feed themselves or produce enough other products to buy the food they require. Food production has barely been able to keep ahead of population growth, much less provide for the expanded demand resulting from some improvement in per capita income, most of which goes for food.

We now know that such conclusions seriously distort reality. The record of agricultural productivity in the LDCs has not been all that bad. Please refer to Figure 5, which is based on USDA data. It indicates that the LDCs have expanded production no less rapidly than the developed countries. Population growth, to be sure, has absorbed most of the gains, but with the exception of Sub-Saharan Africa modest per capita improvement occurred.

It does not follow, however, that the post-war years have witnessed a reduction in the number of people nutritionally distressed. For the suggestion that increased production alone could eliminate hunger was only one of the misconceptions conveyed by early studies.

A second unfortunate legacy was the notion that countries could be classified as hungry or well fed. It is individuals, not countries, who experience nutritional deprivation, and since the early 1970s it has become a commonplace in serious pronouncements on the food situation that, equitably distributed, global supplies are sufficient to feed all. The problem is that all within a country do not have equal access to existing supplies. Access to food is a function of income. Those with adequately paying jobs are easily able to afford an acceptable diet; their less fortunate neighbors sometimes cannot. Hence our second race: that between food and economic participation.

FIGURE 5. INDICES OF TOTAL AND PER CAPITA FOOD PRODUCTION, 1950-1986\*



\*Data from: U.S. Department of Agriculture, *World Indices of Agricultural and Food Production*, Washington, D.C.: ERS Statistical Bulletin 669, July 1981; and *ibid.*, *World Indices of Agricultural and Food Production, 1977-86*: Bulletin 759, March 1988. Developed countries: North America, Europe, USSR, Japan, South Africa, Australia, and New Zealand; less developed countries: Latin America, Asia (except

### Employment--The Elusive Equilibrator

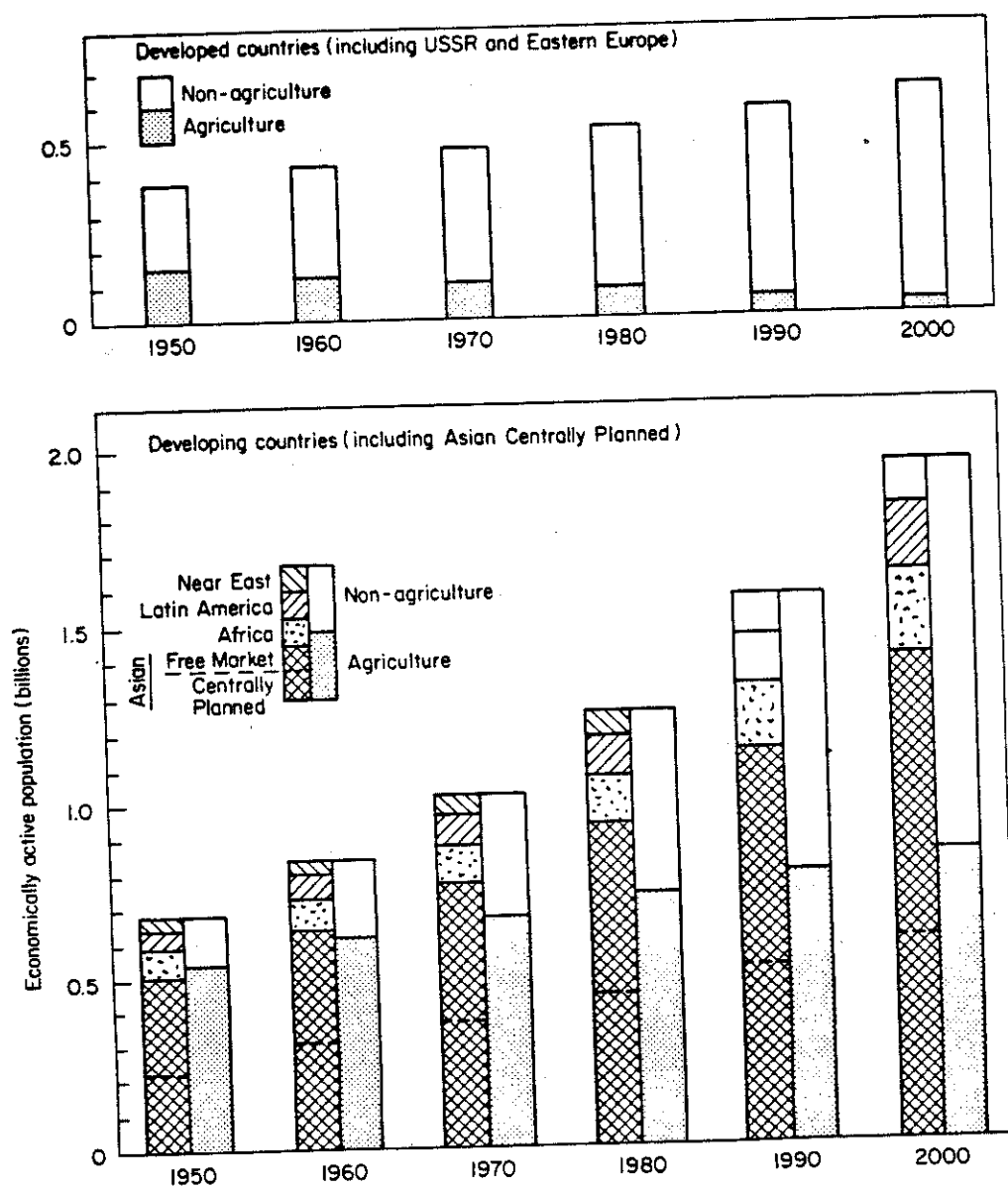
Having established the critical importance of economic participation to the elimination of hunger and the control of population growth, I turn now to the outlook for employment in the developing world.

The prospect is anything but good, simply because of the masses of people who are and will be competing for jobs. The number is staggering. Figure 6 illustrates a projection made in 1971 by the International Labor Office. Between 1970 and 2000 it was expected that the LDC labor force would double from about one to two billion people. The billion new jobs called for are roughly twice the number presently existing in the industrialized countries and mean that the LDCs are being asked to transform themselves at a rate and on a scale unprecedented in history. In terms of just one country, it means that during the last three decades of the century Mexico is adding to its labor force each year about the same number of new entrants as the US and Canada together were able to absorb during the boom years of the 1950s and 1960s. Mexico has thus far been able to do this only briefly--during the late 1970s, while the country was running up its \$100 billion international debt. Since then formal off-farm employment has grown hardly at all, and Mexicans have flocked across their porous northern border in search of jobs.

The ILO projections foresaw--so far, unrealistically--few of the new entrants being absorbed into agriculture. The basis for this was the selectivity of the various technical breakthroughs that have attended the application of the scientific method to agriculture in the Third World--the Green Revolution. To the layman the term Green Revolution conjures up visions of miracle seeds which offer all farmers the same potential for dramatic increases in yield. In fact, the high-yielding varieties have not been designed to be introduced alone, but as one component of a package involving a host of complementary inputs: fertilizers, adequate water, and effective control of disease, insects, and weeds. Thus the miracle rice is highly responsive to fertilizer and yield well only under irrigated conditions. Simply to provide the conditions under which they can be introduced can be time-consuming and expensive. To the extent that the new systems are specific to particular ecological conditions, benefits will clearly be restricted. Equally obvious is that those best able to command the new inputs--the larger and wealthier farmers--will reap the lion's share of the benefits.

The experience of Mexico is again instructive. Mexico was the site of the first "agricultural miracle" of the postwar period. The achievements were impressive. The output of maize increased from about 3.5 million tons during the late 1940s to nine million tons in 1968. The performance of wheat was even more spectacular: from 300,000 tons to over 2.5 million tons in just 20 years, with yields quadrupling to 3.2 tons per hectare.

FIGURE 6. ECONOMICALLY ACTIVE POPULATION, RECENT YEARS AND PROJECTIONS TO 2000\*



\*Data from: International Labor Organization, Labor Force Projections, Geneva, 1971. United Nations, Food and Agriculture Organization, The State of Food and Agriculture--1973, Rome, 1973, pp. 131, 138.

But, as every Mexican knows, this extraordinary achievement was localized both geographically and with respect to its impact on the rural population. Change has largely been confined to the north and the north-west, where the program of government sponsored irrigation opened up expanses of highly productive land. Though lip service throughout the period was paid to continued agrarian reform, the great majority of the rural population was bypassed. Today less than 5 percent of the holdings occupy almost two-thirds of the irrigated area and account for over half the value of production. In contrast, 85 percent of farms have access to only 4 percent of irrigated land and contribute a mere 20 percent of output by value (5, pp. 13-14).

A similar selectivity in impact characterized the innovations which transformed agriculture in Europe and North America during the 19th century. But here the historical parallel breaks down. There is a great difference between the cities of last century's developing countries and those of today's. A hundred years ago the bypassed or displaced farmer could look to the city for opportunity. Industry and construction were booming, and as both then had high labor requirements, virtually all who left the land found jobs. Today the movement to town rests on less solid foundations. Though urbanization in the LDCs is proceeding at a breakneck pace, much of the structural change which is taking place is more capital- than labor-demanding. Indeed, in Africa little structural change of any kind is taking place, with most urban centers continuing as administrative and trading centers. Apart from the Pacific Rim success stories, jobs almost everywhere are far fewer than the people in search of them.

An assessment of the Malthusian prospect in 1988, then, involves consideration of not just whether food output can be increased, but whether the course of development can somehow be modified to enable all to find useful employment.

#### Increasing Food Production and the Special Problem of Africa

First, what are the prospects for producing enough food to feed a global population of 10 billion, give or take a few billions, the figure demographers seem to accept as representing the next stage of population stability? Good, I think, with one important caveat.

Some years ago Colin Clark, the eminent Australian economist and long-time Director of the Agricultural Economics Research Institute at Oxford, calculated that were global resources fully utilized, 47 billion people could be supported at US dietary levels and 157 billion at the dietary level which prevailed in Japan immediately after the war (6, p. 153). Were the calculation to be done again, these figures would rise. Clark's estimates were published in 1968, well before the yield increases which genetic manipulation will make possible could be visualized.

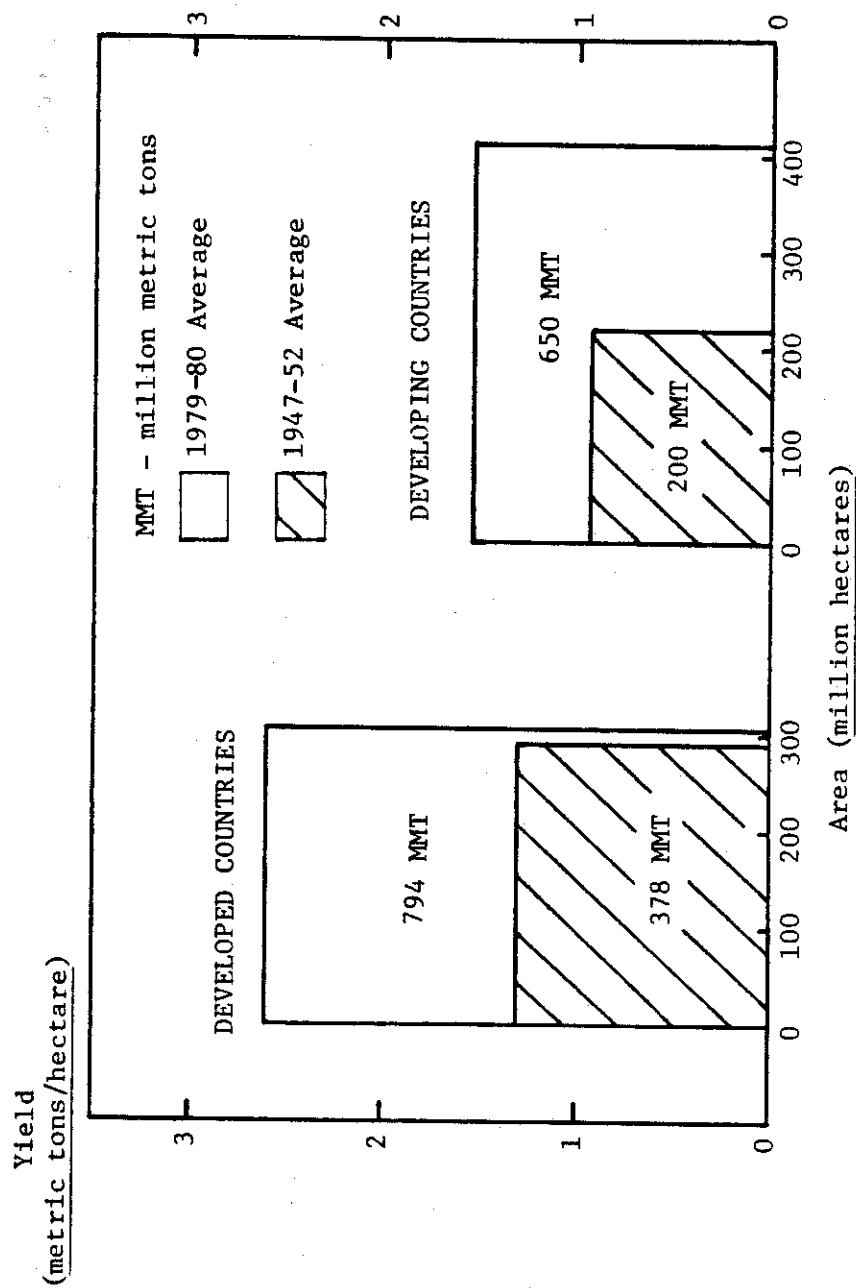
I have noted that the record of LDC agriculture has not been unimpressive; that output has increased just as rapidly as in the industrialized countries. What is all the more noteworthy about this is that it has taken place without the huge upsurge in yields which has so transformed agriculture in the developed countries. Figure 7, in which are compared the production, area, and yield of all grains immediately after the war and recently, offers some perspective. Prior to the war, grain yields everywhere averaged in the neighborhood of one ton per hectare. By 1980, as the result of greater use of fertilizer, improved seed varieties, and better cultivation practices, yields had more than doubled in the developed countries. In the LDCs, on the other hand, the gains have been comparatively modest. Despite the publicity given the Green Revolution and certain spectacular accomplishments, LDC average yields have increased to only a bit above where they were in the developed countries at the beginning of the postwar upsurge.

The systematic application of the scientific method to food farming in the developing world is very recent, dating no further back than the mid-1940s. It is not surprising, therefore, that the scope for improving yields has been only superficially exploited. Moreover, breeding work until just this decade ignored the root crops and concentrated on wheat, rice, and maize; and even for these crops yields have risen to only a fraction of the potential.

But if the LDCs are potentially capable of enormous increases in food production, it is not possible to be equally sanguine about the immediate outlook for one part of it: those portions of Africa which lie south of the Sahara and north of the Republic. Black Africa is the only region in which the data in Figure 5 suggest per capita food availability has actually declined, and it is the only region in which the birth rate has hardly begun to drop. Turn back to Figure 3 and look at the figures for Nigeria, Kenya, Ghana, and the Ivory Coast, four of Black Africa's statistically more reliable countries. In all the birth rate remains above 45 per thousand, and in Kenya it stands at a truly remarkable 54 per thousand. Unless things change, Kenya's population, increasing at 4.1 percent a year, will jump from 20 million to 40 million in just 18 years. It would be idle to pretend that feeding them will not be a major challenge.

The sorry story of agriculture in the newly independent states of Black Africa reflects many things, not the least of which has been the breakdown of law and order in a depressingly large number of countries. More important, however, has been the fact that almost every African government has implemented measures which have acted to reduce incentives to commercial farming, including artificially low producer prices and overvalued exchange rates. A few years ago the World Bank concluded from a country-by-country study in Africa that the involvement of government in food-policy related matters was almost everywhere counterproductive and that new lending should be tied to a freeing up of the marketplace. The turnaround in the last couple of years in the food situation in Ghana is testimony to the efficacy of such steps.

FIGURE 7. WORLD PRODUCTION, AREA AND YIELD OF GRAINS, AVERAGE  
1947-52 AND 1979-80



Data from: U.S. Department of Agriculture, Foreign Agricultural Service.

But even with the right policies, there are reasons for believing that the rapid gains which characterized the Green Revolution in Asia are not likely to be repeated in Black Africa. In Asia the rural population is concentrated in great alluvial flood plains; these lend themselves ideally to introduction of the package of new inputs, especially irrigation. Not so in Africa. The only floodplain of consequence in Black Africa is the inland delta of the Niger; and Mali and Burkina Faso, within whose borders it falls, rank among the half dozen poorest countries in the world. Further, apart from the West African coast and the Congo basin, Black Africa is comparatively dry. So the fact that it has more than twice the amount of arable land per person as Asia is not too meaningful. Finally, the expense and limited availability in Africa of the various components of the Green Revolution package will doubtless temper their introduction. Transportation costs are very high. There are hardly any railroads and those that there are were located for the export of minerals, not the movement of agricultural inputs. Outside of the Congo and Niger, river transport is negligible. So transportation is heavily dependent on roads and trucks, the maintenance of which is difficult and expensive. My introduction to Africa 30 years ago was through a series of studies of how its cities were supplied with food. To me one of the saddest changes which has subsequently taken place has been the degree to which this system and the road network which supported it have broken down. Small wonder that such fertilizers and pesticides which find their way into the countryside fall far short of needs and are priced beyond the means of most farmers.

Even assuming political stability, then, the combination of very rapid population growth and slow agricultural progress does not auger well for Black Africa. Whether, as some suggest, the next several decades are likely to witness a rise in the death rate and perhaps even the local fulfillment of the Malthusian nightmare is an open question. Certainly without an improvement in the political scene it should not be ruled out.

#### The Outlook for Growth with Equity

Elsewhere in the developing world the problem will not be so much one of increasing food production, but assuring that all will have fair access to it. The employment problem is the critical dilemma confronting most Third World countries, and it is worth asking why it has been so little remarked on by the press and other opinion makers in Europe and North America. Certainly compared to hunger it has received little attention. The reason, I suspect, is that the solutions are perceived as likely to be at our expense. When hunger is decried and food aid offered for its relief, not far from the politicians' mind will be a reduction of our surpluses. But they are wary of being accused of sacrificing American, Canadian, or West German jobs in order to relieve unemployment abroad, even though this need not be the result of freer trade.

The issue has, however, been addressed by such organizations as the World Bank, The U.S. Agency for International Development, and your International Development Research Council. If the new development strategies they propose have a common feature it is the emphasis given to the landless and the small farmer. Not only must they be persuaded that their future lies in the countryside, not town, but their growing affluence is seen as the driving force behind transformation of the whole economy.

Have such strategies for rural growth with equity much chance of success? There are some grounds for optimism. However, major snags lie in creating the political climate under which the strategies can be introduced. If the landless are to have an opportunity to participate, land reform would seem an absolute prerequisite in many countries of Latin America and Asia. During my recent trip to India I had the opportunity to travel in the Gangetic Plain between Delhi and Lucknow. This is the heart of the Green Revolution belt, flat and fertile, and when provided with irrigation capable of producing three harvests a year. The productivity of the area is striking, as is the prosperity of some of the population. But what sticks most in my mind is the land use pattern. One would have expected that most of the land would be given over to the annual grains and pulses for which the region is so ideally suited. Instead a surprising amount is planted to mango orchards and eucalyptus trees. For under these crops the amount of land an individual can legally own rises to about double what it would be were the land in annuals. Such people will not readily give up their land and who can blame them.

A further reason for questioning the feasibility of the new strategies is their cost. The outlays called for will be at someone's expense: more farm-to-market roads may mean fewer urban apartment blocks; more credit to farmers could mean less to manufacturers; and--perhaps most significantly--a pricing structure designed to give greater incentives to agriculture would mean dearer food for urban consumers. In every instance it would be idle to pretend that those who found their interests no longer catered to would submit silently.

Some, particularly those who are impressed with what has happened in China, argue that the necessary political restructuring can come about only through revolution. Certainly the early Chinese experience is suggestive of the extent to which agriculture can productively absorb more labor, and the last decade of what another type of revolution can do to production and prices.

In 1978 Deng Xiaoping replaced the communes with the production responsibility system, which had the effect of returning decision making to the individual household. Quotas were relaxed, and market prices, especially for vegetables and pork, were given the opportunity to influence production. Output has subsequently risen by 7-8 percent annually, but at the cost of China's much vaunted price stability. Food prices have risen rapidly, and even the most determined government cannot long withstand the ensuing pressures. To placate urban

consumers, a bottomless pit of subsidies seems to have been opened, with something like 40 percent of the municipal budget in Peking reportedly going to subsidize the cost of food (Z, pp. 72-73). Sooner or later, something will have to give.

The extent to which these or other experiences in China are amenable to replication elsewhere is open to question. Most of us would equate Chinese agriculture more with gardening than farming, and its disciplined population is the envy of the totalitarian world. Western governments are not likely to respond favorably to strategies for Third World development perceived to involve revolution and repression, especially since revolution--witness Nicaragua--would almost certainly be seen in terms of the East-West conflict.

### Treating The Symptoms

Given these political problems and the magnitude of the employment dilemma, my suspicion is that both the West and a majority of LDCs will not attempt to resolve the causes of poverty in a generation, but will seek instead to treat the symptoms. Are there means whereby those excluded from the development process can be persuaded to reduce their birth rate and also somehow to command an acceptable diet? Can the Malthusian nightmare be forestalled by the policy equivalent of an aspirin? The answer is an unequivocal "maybe."

With respect to population, there is clear evidence that birth rates in the developing countries outside of Black Africa are on the decline. In Asia, where the bulk of the population lives, the birth rate declined by a quarter between 1950 and 1985--from over 41 per 1000 to less than 30 per 1000. The decline, of course, has been greatest in the prospering states of the Pacific Rim, and least in such large countries as India, Pakistan, and Bangladesh.

Singapore, whose birth rate now stands at 17 per 1000, is a classic example of the effectiveness of direct government intervention in controlling population growth. Singapore has undergone an economic metamorphosis during the last 25 years, but the government has hastened the demographic response by making large families even more of an economic liability. Income tax relief is given only for the first three children, and maternal benefits diminish with each child. Most importantly in a country where virtually all new housing is government-sponsored, large families drop to the bottom of the waiting list and those with two children or less are given priority.

That such social and economic incentives can also be made to work in large countries is suggested by the Chinese experience, where the birth rate reportedly dropped from 39 to 18 per thousand in 20 years. Families having a single child and ensuring that they will not have a second are guaranteed child health subsidies, bonus work points, higher pensions, and priority in the allocation of housing. In addition, the

social pressure exerted on those parents wishing more than one child is apparently enormous.

That economic status can be bypassed as a determinant of fertility is also suggested in India, where the birthrate is declining only about half as rapidly as in Asia as a whole. The southern state of Kerala is the poorest state in India, but also has the lowest birth rate, a fact usually explained by Kerala's relatively advanced education and health facilities. Kerala and the nearby island of Sri Lanka are widely cited as illustrating the impact basic needs programs can have on bringing down the birth rate.

With respect to food, there are a variety of ways that the plight of the nutritionally deprived can be eased without waiting for revolution or the normal course of development to raise incomes. These usually involve some form of price manipulation by government, whether through direct procurement in the countryside, by subsidizing aspects of production or consumption, or by controlling the price paid by consumers.

Virtually all developing countries have one or more programs of this type, and as their effect is to transfer income, the motivation for them has been as much political as nutritional. Nonetheless their nutritional impact can be appreciable. In Sri Lanka, for instance, the ration of free or subsidized rice--which throughout most of the postwar years amounted to two pounds per head per week--is credited by most observers with having contributed to the well-being of the population; as is the Egyptian program of subsidizing the retail prices of staple foods in Cairo and Alexandria. The cost, however, of such schemes can be high. The rationing program in Sri Lanka regularly absorbed between 15 and 20 percent of the government's budget, and was abandoned by the current leadership as being incompatible with rapid economic growth. One estimate of the cost of the Egyptian food subsidy put it at about a tenth of the country's GNP. It is not surprising, therefore, that such programs are among the first the IMF targets for elimination when it links its lending to structural adjustment.

In addition to their expense, the problems with programs of this type are several and severe:

- They tend to be restricted to the urban centers and thus have minimal impact on the very poor, most of whom still live in the countryside. In Bangladesh, for instance, proof of employment is a prerequisite for being issued a ration card.
- If not political from their inception, the programs quickly become politicized, with the result that modification is difficult. Attempts to reduce the consumer food subsidies triggered such severe riots in Egypt, Bangladesh, Tunisia, and Ecuador in recent years that the plans were quickly rescinded. The price and wage distortions the programs engender thus tend to become permanent.

- Where not dependent on food aid from abroad, the schemes tend to rely on low procurement prices to keep costs down. In either case the effect is to discourage the growth of domestic agriculture.

This disincentive effect is probably the most telling of the objections to both food aid and the various distribution and subsidy schemes as vehicles for combating malnutrition. To get around it a number of two-price systems and other devices have been proposed. In my opinion the most appealing of these would be to channel assistance in kind directly to those at greatest risk through maternal and child health clinics.

The justification for this statement is as follows. If we do not know how many among the poor in the LDCs suffer nutritional deprivation, there is agreement that the preschool child and the pregnant and lactating mother are those most likely to be adversely effected. There are several reasons for this. The early growth and reproduction phases are nutritionally the most demanding in the life cycle. Yet it is precisely the mother and young child whose needs can be reflected least in the choice of foods purchased by the household and who may be the residual claimants on that which has been prepared for all to eat.

Compared with its impact on pregnant and lactating mothers and the very young, the adverse effects of malnutrition on the other elements of a population are likely to be moderate. This is because these age groups are either not growing so rapidly or have stopped growing altogether and can adapt to reduced energy intake by either taking off body weight or by curtailing activity.

Estimating the extent of malnutrition among young children and their mothers is not easy. It involves the new science of nutritional anthropometry and debate attends the standards for healthy children it should employ, the measurements it should involve, and where the cut-off criteria should be established. If the number of those at greatest risk is to be estimated, therefore, we have no alternative but to do so rather arbitrarily.

Table 1 offers one method for doing this. In it the number of pregnant and lactating women is approximated by doubling the birth rate. To this figure is added the number of infants below five years of age. Arbitrary percentage estimates of those likely to be at risk nutritionally are then applied. A 10 percent assumption is not an unreasonable minimum for most non-African developing countries, while a 50 percent figure would seem an absolute maximum. The resulting range of those at risk--77 million to 385 million persons--defines a world hunger problem rather more manageable than the one conjured up by FAO and the World Bank.

Several years ago I was quoted in a front-page article in The New York Times to the effect that "if it could be channeled to the truly needy, food aid of only three million tons of grain a year would enable

TABLE 1. NUMBER OF WOMEN AND CHILDREN AT RISK NUTRITIONALLY  
ACCORDING TO TWO ASSUMPTIONS, 1985, BY REGION\*

(millions)

Region <sup>a/</sup>	Total Population	Infants (Age 0-4)	Pregnant/ Lactating <sup>b/</sup> Mothers	At Risk <sup>c/</sup>	
				10 Percent Assumption	50 Percent Assumption
Far East (ex-China)	1,434	236.6	97.5	33.4	167.0
China	1,041	124.9	39.6	16.4	82.3
Africa	448	82.0	41.2	12.3	61.6
Latin America	397	62.7	25.4	8.8	44.0
Near East	245	41.6	18.1	6.0	29.9
TOTAL	3,565	547.8	221.8	76.9	384.8

\* Population data from: United Nations, 1985 Demographic Yearbook (New York, 1987).

<sup>a/</sup> Regional breakdown follows current FAO usage and includes only those countries classified as "developing." See: United Nations, Food and Agriculture Organization. The Fifth World Food Survey (Rome, 1985), pp. 84-87.

<sup>b/</sup> The number of pregnant and lactating mothers is taken as being twice the birth rate.

<sup>c/</sup> Assumptions are that 10 percent and 50 percent of the vulnerable groups (infants up to five years of age and pregnant and lactating mothers) can be considered malnourished.

100 million malnourished people to have an adequate diet" (8, p. 1). Whence came this statistic? It was a guess based on the assumption that perhaps 100 million mothers and young children are seriously malnourished and their average deficiency is in the neighborhood of 300 calories per day. I cannot defend it. The truth could be 400 calories for 150 million people or 200 calories for 200 million. If the former, the deficit would be 6 million tons; if the latter, 4 million tons. The point is that the deficits are trivial for a world which produces almost 2 billion tons of grain and in which over 200 million tons move annually in international trade. There is no doubt in my mind that such quantities would be immediately forthcoming if donors could be assured that the recipient countries would pass them on to those in true need.

Thus the basis for my suggestion that efforts to treat the symptoms of hunger focus on aid in kind channelled through maternal and child health clinics. Such targeted assistance would recognize that hunger is rarely all pervasive and would be addressed to those most likely to be at greatest risk. It could be handled in a way that would not tamper with the pricing mechanism and thereby not run the risk of dampening incentives to producers. And perhaps most importantly, because it would involve neither great expense nor social and political restructuring, it could be done.

#### Summing Up

What, then, is the prospect for world food and population as we approach the bicentennial of Malthus' gloomy forecast? Not all that bad, I would say, for most of the world, especially considering the magnitude of the current population explosion. Hunger in most parts of the globe has not risen and band aids are at hand which if properly applied could go far toward eliminating it altogether.

But to apply such temporary remedies without recognizing the underlying disease of poverty and unemployment would be a mistake. The West must understand that such painless activities as dumping our food surpluses accomplish little and indeed may be counterproductive. We should also be aware of the precarious situation in Africa, where, to repeat, food production will not be easy to increase and where the birth rate has not yet begun to decline. It is a cloud on the horizon that could well become a maelstrom.

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