

FOOD, POPULATION, AND EMPLOYMENT: THE
ECONOMIC AND POLITICAL CONTEXT OF WORLD HUNGER

By

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THE ECONOMIC AND POLITICAL CONTEXT OF WORLD HUNGER*

When, some weeks ago, I was asked to participate in this Symposium, I was concerned when told that its point of departure would be the Report of the Presidential Commission on World Hunger. Although I had then only skimmed through the Report, my impression was that the resounding yawn with which the American people received it a year ago was not unjustified. "There are more hungry people than ever before," said the AP release buried on page 23 of the Sunday New York Times, and went on to note that "the Commission recommended that the United States 'make the elimination of hunger the primary focus of its relationships with the developing countries'" (1, p. 23). So what else is new?, seemed the reaction. When I asked Dan Morgan, the politically savvy reporter on world food matters for the Washington Post, whether his paper had done a piece on the Report, he could not even remember (2).

The public's boredom with world hunger pronouncements reflects, first of all, I think, the inevitable reaction to years of persistent exaggeration--the same sort of response that did in The Little Boy Who Cried Wolf. We were, after all, assured 30 years ago by Lord Boyd-Orr, the first Director General of the Food and Agriculture Organization (FAO), that "a lifetime of malnutrition and actual hunger is the lot of at least two-thirds of mankind" (3, p. 11), and by the Paddock Brothers in 1967 that widespread famine would overtake us by 1975 (4). If such statements were correct, the reasonable mind might ask, how is it that we are still here, and how is it that population growth is most rapid in precisely those parts of the world where hunger is supposed to be most widespread?

A further turnoff in the case of the Presidential Commission's Report was, I suspect, the enormity of the measures recommended by it to alleviate hunger. These amounted to a call for a sweeping change in U.S. relations with the LDCs. Hardly a base was left untouched. Arms sales should be restricted, commodity agreements should be negotiated, tariffs should be reduced, food reserves should be established, food aid should be increased, development assistance should be liberalized, and the LDCs should be encouraged to promote equitable growth by emphasizing land reform, the small farmer, and the basic needs of all. The amusement in that part of official Washington which bothered to take note must have been great.

* Presented at the Symposium on World Hunger, Oregon State University, Corvallis, Oregon, 31 March-1 April 1981.

But if the Commission took the path of idealism and political naïveté, it does not follow that it failed to pinpoint the causes of hunger. It did so with admirable clarity: ". . . they are hungry because they are poor, and they are poor because they do not have jobs that provide a decent income" (5, p. 49).

This statement may sound trite, but, believe me, it is not. To have said it 20 years ago was to risk derision. In fact, when I said it five years ago in an article in Science (6, pp. 514ff) I was amazed at the number of people who wrote to say that for them it was an utterly new idea. This is because it flies in the face of the notion--erroneous, but still widely held--that there is not enough food to go around, and that current world hunger is simply a sign that mankind is losing the race between food production and population growth first visualized nearly 200 years ago by Robert Malthus.

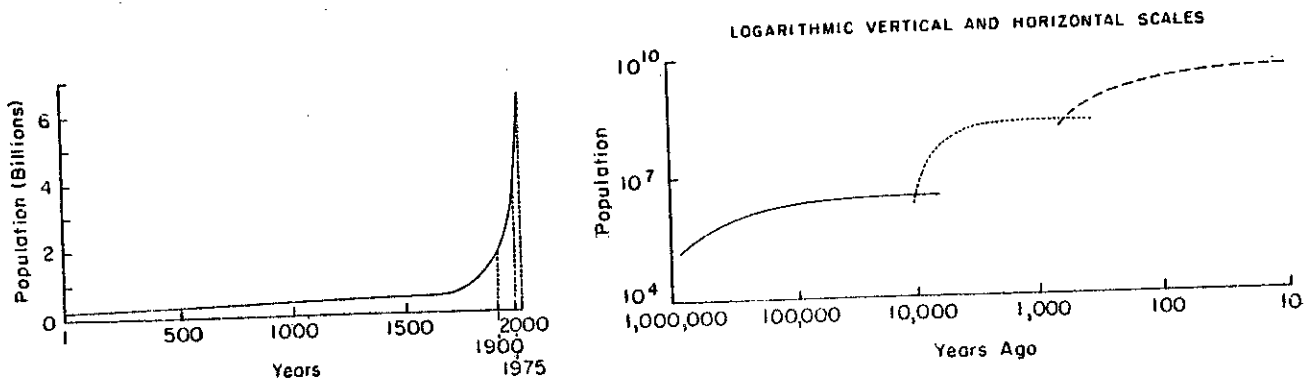
That there is a race no one questions. But it is not the mindless one foreseen by Malthus in which food and population push relentlessly toward some saturation point and ultimate mass starvation. Rather it is a two-way race--between population growth and economic participation on the one hand and between 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 so essential to an understanding of the problems confronting the developing countries, and of proposals for their alleviation, that I will--at the risk of repeating some of this morning's discussion--outline the basis for it.

I. THE EMPLOYMENT/POPULATION RACE

First, the race between economic participation and population growth. We are all familiar with drawings, such as the figure on the left in the first chart (Chart 1) in your handout, which indicate that the world's population remained essentially stable from biblical times to about 1650. Such drawings are valid in that they drive home the magnitude of the current explosion in numbers, some 80 percent of which is taking place in the LDCs, but they mislead in several important respects. The current upturn is not unique, and growth (and contraction) 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 drawing of Chart 1, a simplified graphing conceived by E. S. Deevey of the University of Florida (7, p. 198). The drawing, which is 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 not the first but the third in a sequence of bursts that have been associated with major breakthroughs in man's ability to cope with his environment. The first occurred several million years ago--Deevey plotted it at one million, although today he would no doubt move it back--and attended man's emergence from the primate line into a maker of tools able

CHART 1. TWO VIEWS OF WORLD POPULATION GROWTH*



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

to hunt and gather over a range of conditions. The second marked his domestication of plants and animals some 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 so-called demographic transition, shown schematically in Chart 2. Prior to the transition, the stability or near stability in the population of a traditional society reflects 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.

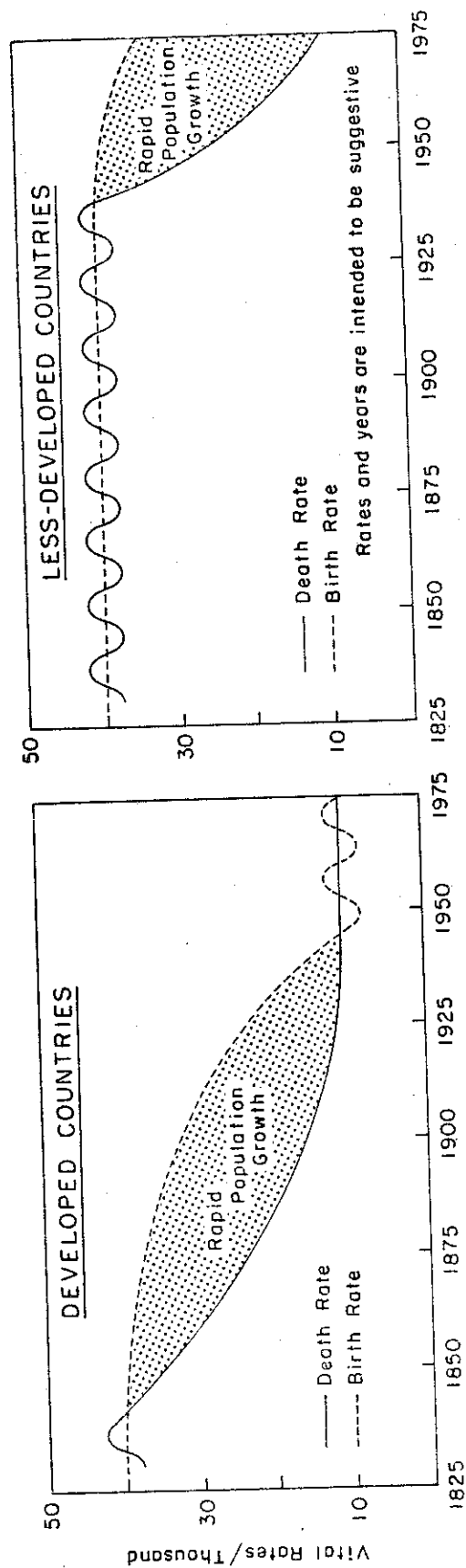
Most of the industrialized nations have passed through this transition and have reached, if not stability, the condition immediately preceding it. For them the transition averaged between 50 and 100 years; in the chart I show this as running more or less from 1850 to 1950. Most of today's developing 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 populations will depend on the speed with which birth rates fall.

The factors associated with a decline in birth rates are many and not fully understood. Access to birth-control devices and instruction are clearly positively correlated, as are liberalized attitudes toward abortion. So too is a reduction in infant mortality and the need for parents to plan on several live births in order 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. Children become expensive to educate and maintain, and the state or employer assumes responsibility for retirement income. The role of women also is 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 had led many 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 the United States--to replacement levels in as few as 25 or 30 years. And so it seems to be doing in such places as Singapore, Taiwan, Hong Kong, and Mauritius.

But implicit to 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

CHART 2. THE DEMOGRAPHIC TRANSITION SCHEMATIZED



this reason that statisticians search in vain for strong correlations between birth rates and income levels averaged nationally. Consider Chart 3, in which are plotted the birth rate and per capita GNP of a number of countries in 1960 and 1970, and note especially the data for Mexico. Several things are apparent: 1) that the birth rate in Mexico is well above that of other countries with similar average levels of income; 2) that Mexico's birth rate is more nearly comparable to those of much poorer Asian countries, and 3) that a number of these poorer countries are experiencing much more rapid drops in fertility than is Mexico.

This seemingly anomalous behavior for Mexico no doubt reflects a number of factors, but above all it may be attributed 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"; the figure of average per capita income there 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 the United States. But those little effected by the growth process, particularly the bulk of the 40 percent or so of the population which remains in the countryside, are another matter. For them the traditional incentives for large families persist.

Hence 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 most developing countries the proportion of society being bypassed is distressingly large.

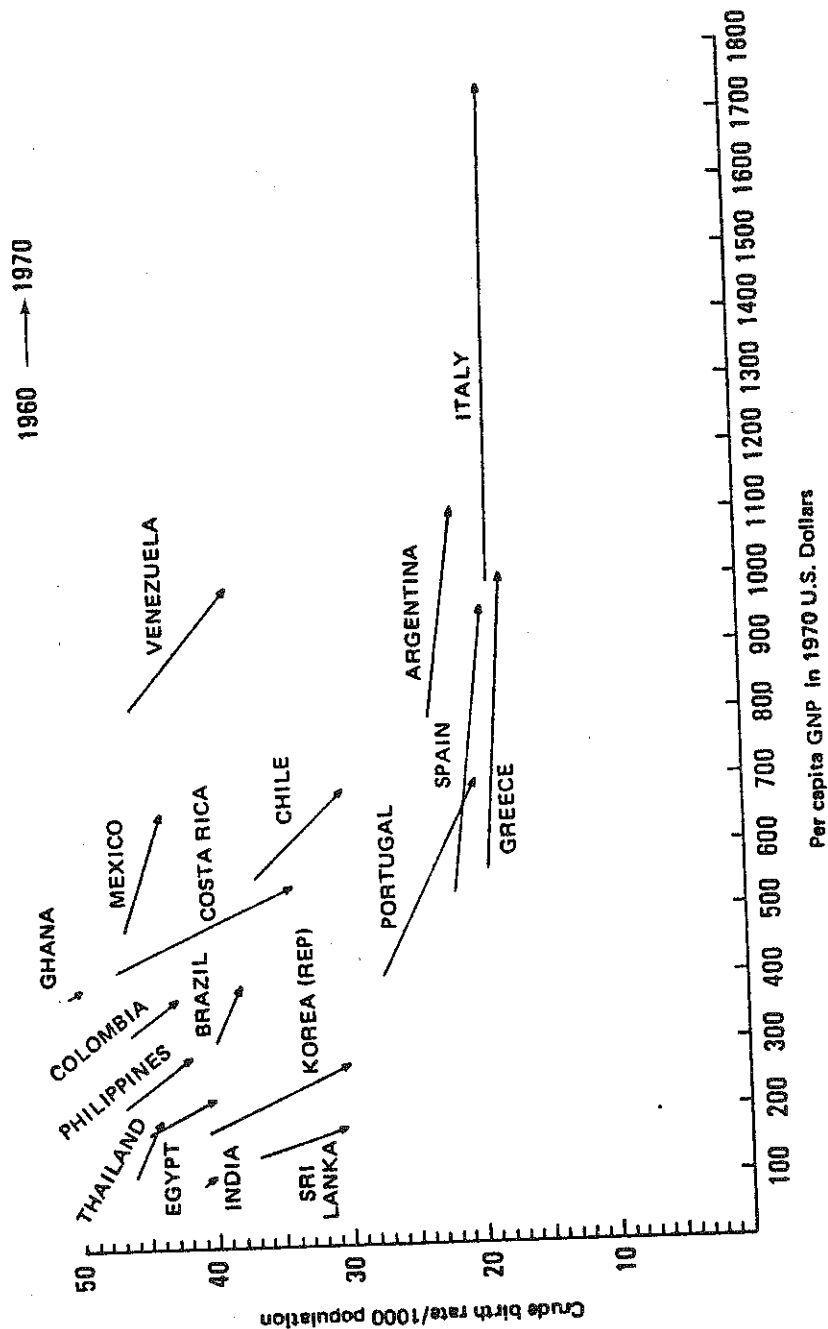
II. THE EMPLOYMENT/FOOD RACE

To understand the second race--that between food and economic participation--it is necessary to set to rest the idea that the world is no longer able to feed itself and teeters uncontrollably on the brink of mass starvation. 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. This is because few of those who have seen fit to pronounce on world hunger--and this includes the recent Presidential Commission--have troubled to undertake original research of their own.

The findings of the early FAO studies and those of more recent work by FAO, the USDA, and the World Bank are shown graphically in Chart 4; the methodologies they employed are summarized in Table 1.

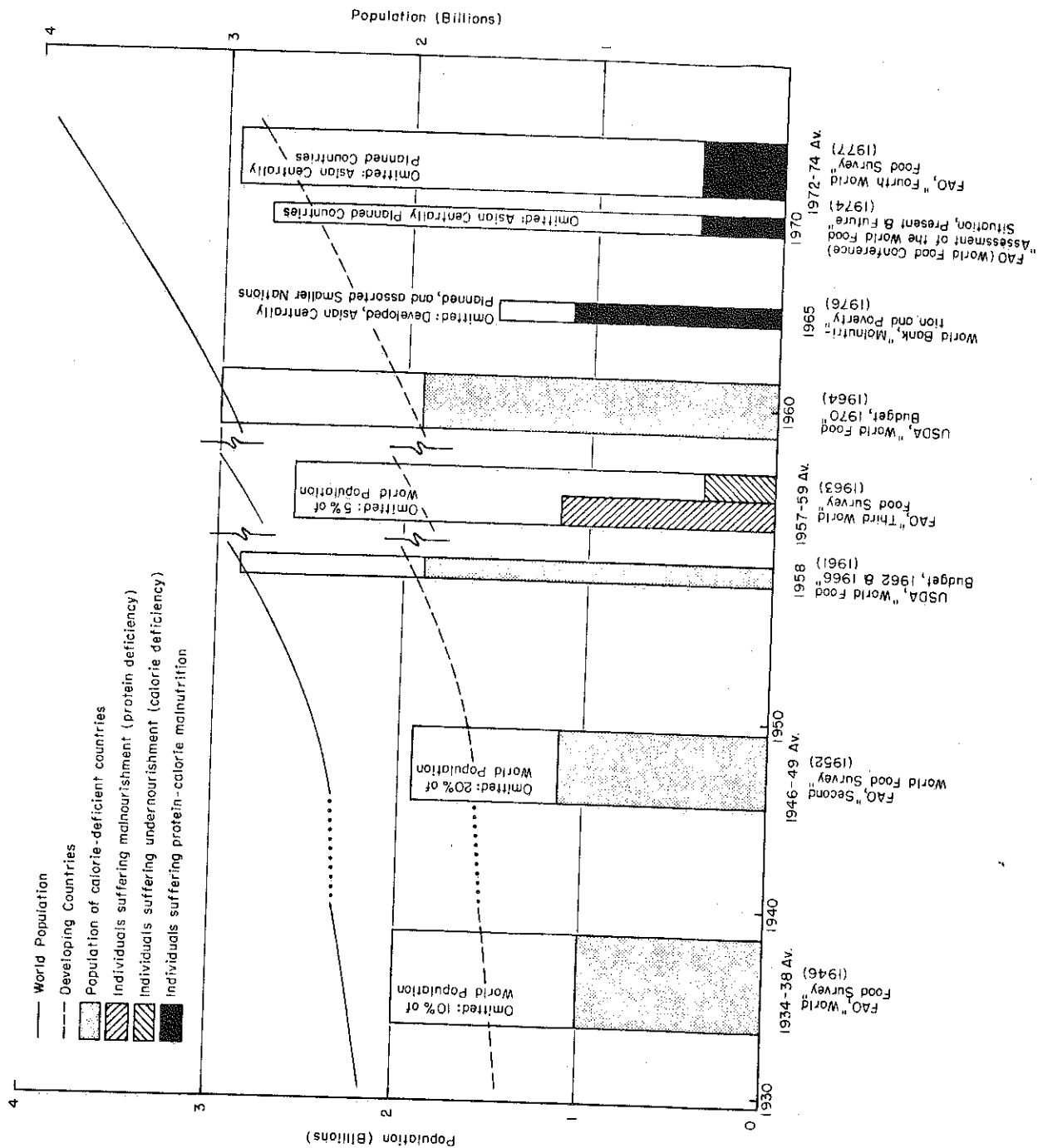
The extent of disagreement among them is extraordinary. Boyd-Orr's conclusion that two-thirds of mankind were hungry came from FAO's Second World Food Survey. An earlier survey suggested a lower figure. The USDA's two World Food Budgets concluded that almost the entire population of the developing world lived in "diet deficit" countries. FAO's Third World Food Survey put the afflicted in such countries at about 60 percent and identified a shortage of protein as the principal problem. The World

CHART 3. RELATION BETWEEN CRUDE BIRTH RATE AND PER CAPITA INCOME, SELECTED COUNTRIES, 1960 AND 1970



*Source: Maria Eva Vindiola, "Human Fertility in Mexico and its Relation to Nutrition" (unpublished, Cornell University, July 1978).

CHART 4. PERSONS IDENTIFIED AS NUTRITIONALLY DEFICIENT IN MAJOR WORLD FOOD ASSESSMENTS*



*Source: T. T. Poleman, "Quantifying the Nutrition Situation in Developing Countries," Food Research Institute Studies, Vol. XVIII, No. 1, in press.

TABLE 1. CONCLUSIONS OF MAJOR EARLY POSTWAR STUDIES OF THE WORLD NUTRITION SITUATION AND SELECTED RECENT PRONOUNCEMENTS

Year Published	Conclusions	Methodology
1946	FAO - "World Food Survey" ^{a/} "In areas containing over half the world's population [prewar] food supplies . . . were sufficient to furnish an average of less than 2250 calories . . . an average of more than 2750 calories . . . were available in areas [with] less than a third of the world's population . . . the remaining areas . . . had food supplies between these . . . levels" (pp. 6-7).	National food balance sheet availabilities minus 15 percent wastage allowance compared with 2,600 Kcal./caput/day allowance (p. 11).
1952	FAO - "Second World Food Survey" ^{b/} "The average food supply per person over large areas of the world, five years after war was over, was still lower than before the war" (p. 2). "59.5 per cent of population [lives in countries] with under 2200 [Calories]" (p. 11).	National food balance sheet availabilities minus 15 percent wastage allowance compared with regional allowances (p. 22): Far East - 2230-2300 Kcal.; Africa - 2400-2430 Kcal.; Latin America - 2440-2600 Kcal.
1961	USDA - "World Food Budget, 1962 and 1966" ^{c/} "Diets are . . . adequate in the 30 industrialized nations . . . [where] more than 900 million people live . . . For most of the 70 less-developed countries . . . diets are nutritionally inadequate, with shortages of proteins, fat, and calories. These countries contain over 1.9 billion people. In most of them, population is growing rapidly, malnutrition is widespread and persistent, and there is no likelihood that the food problem soon will be solved" (p. 5).	Almost identical to "Second World Food Survey."
1963	FAO - "Third World Food Survey" ^{d/} [As of 1957-58, national food balance sheets and extrapolation of a limited number of budget surveys imply:] "as a very conservative estimate some 20% of the people in the underdeveloped areas are undernourished and 60% are malnourished. Experience shows that the majority of the undernourished are also malnourished. It is believed therefore . . . some 60% of the people in the underdeveloped areas comprising some two thirds of the world's population suffer from undernourishment or malnourishment or both." [Since some people in developed countries don't eat well,] "up to half of the peoples of the world are hungry or malnourished" (p. 51).	National food balance sheet availabilities with distribution around mean inferred from a few surveys in India and elsewhere compared after allowance for wastage with requirements calculated according to the 1957 FAO ^{e/} system.
1964	USDA - "World Food Budget, 1970" ^{f/} "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 afford 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" (pp. iii-iv).	Little changed from "World Food Budget, 1962 and 1966"
In 1971 an FAO/WHO Expert Panel reassessed energy and protein "requirements" and dropped the protein figure for adults by about one third. ^{g/}		
1973	FAO - "Food Balance Sheets and World Food Supplies" ^{h/} [As of 1964-66, most national balance sheets] "suggest a surplus of protein availability." [However, other evidence] "suggests a very uneven distribution of protein supplies . . . aggravated by seasonal imbalances . . . Furthermore, wherever calories are in short supply, proteins are diverted from their primary function of providing for growth and maintenance of tissues to the supply of energy for other vital functions. This explains the widespread incidence of protein/calorie malnutrition in spite of the apparent excess of protein supplies" (p. 19).	
1974	UN World Food Conference - "Assessment of The World Food Situation, Present and Future" ^{i/} "Taking a conservative view, it would appear that out of 97 developing countries, 61 had a deficit in food energy supplies in 1970 . . . Altogether in the developing world . . . 460 million people [are affected]; a less conservative definition might give a much higher figure" (p. 5). "The poorer segments of the population, and within these segments, the children in particular, will bear the brunt of an insufficient food supply" (p. 64).	National average energy availabilities with distribution by income inferred from a limited number of surveys compared with energy cost of maintenance (1.5 basal metabolic rate) minus 20 percent. "It is the use of this very conservative level that leads to the estimate of over 400 million individuals . . ." (p. 72).
1976	World Bank (Reutlinger and Selowsky) - "Malnutrition and Poverty" ^{j/} [As of] "the mid-1960s, it is estimated that 56 percent of the population in developing countries (some 840 million people) had calorie-deficient diets in excess of 250 calories a day. Another 19 percent (some 290 million people) had deficits of less than 250 calories a day" (p. 2).	Regional average energy availabilities with distribution by income derived from country income data and alternative (.15 and .30) calorie-income elasticity estimates compared with recommended energy allowances calculated according to the 1971 FAO ^{g/} system.
1977	FAO - "Fourth World Food Survey" ^{k/} "The evidence . . . indicates that the overall supplies of food . . . could be adequate to meet nutritional needs of the world's population if the distribution . . . were ideal . . . It is clear that the malnourished are found particularly . . . in the poorest section of urban population and in rural areas where adverse ecological conditions, land tenure systems and other economic factors lead to . . . large landless and unemployed groups . . . Within these groups, it is the pre-school children, younger women and school-age children who suffer most" (pp. 45-46). "Calculations indicate an order of magnitude of about 400 million as a conservative estimate of the number of persons undernourished in the developing countries, excluding the Asian centrally planned economies" (p. 54).	National average energy availabilities with distribution by income derived from national income distribution estimates and unspecified calorie-income elasticities compared with energy cost of maintenance (1.5 BMR) minus 20 percent.

- Sources: a/ FAO, World Food Survey (Washington, 5 July 1946).
b/ FAO, Second World Food Survey (Rome, November 1952).
c/ USDA, ERS, The World Food Budget, 1962 and 1966 (For. Agr. Econ. Report 4, October 1961).
d/ FAO, Third World Food Survey (Freedom from Hunger Basic Study 11, 1963).
e/ FAO, Calorie Requirements (Nutritional Studies 15, 1957).
f/ USDA, ERS, The World Food Budget, 1970 (For. Agr. Econ. Report 19, October 1964).
g/ FAO, Energy and Protein Requirements (Nutrition Meetings Report Series 52, 1973).
h/ "Food Balance Sheets and World Food Supplies," (FAO) Nutrition Newsletter, April-June 1973.
i/ UN, World Food Conference, Assessment of the World Food Situation, Present and Future (Item 6 of the Provisional Agenda, November 1974).
j/ Shlomo Reutlinger and Marcelo Selowsky, Malnutrition and Poverty (World Bank Staff Occasional Paper 23, 1976).
k/ FAO, The Fourth World Food Survey (Statistics Series 11, 1977).

Bank saw a problem of roughly the same magnitude--involving some 1.2 billion people--but suggested the prime cause was a shortfall of calories. In its two most recent studies the FAO also identified calories as the culprit, but put the total afflicted at something over 400 million.

The analytical approach followed in FAO's first two World Food Surveys and the two World Food Budgets prepared by the USDA was simple in the extreme and may be summarized by the equation:

$$\frac{\text{Food available for human consumption}}{365 \times \text{population}} - \text{loss allowance} \neq \text{average daily recommended nutrient allowances}$$

To determine whether or not a country was experiencing a food problem, apparent per capita food availabilities, minus an allowance for wastage between the so-called retail level and actual ingestion, were set against estimates of per capita nutrient needs. Where and when availabilities exceeded requirements, all was presumed well; where they did not, the country or region's entire population was considered to be inadequately nourished.

The failings of this approach are several and, when probed, obvious. First of all, it implicitly assumes that societies are sufficiently homogeneous in their food habits for average data to have meaning. This is certainly not the case in developed economies, where differences in income, locality, ethnic background, and place within the household have long been known to have marked effects on food behavior; and it is now recognized to be no less invalid for the developing world.

A further drawback of the approach is that it presupposed an ability to specify average food availabilities and needs with a fair degree of precision. To estimate food availabilities, one must construct a balance sheet, incorporating on the supply side measurements of production, trade, and stocks changes, and on the utilization side such items as seed and feed use and losses in storage. Availabilities for human consumption are derived as a residual and thus reflect the totality of error.

The error so introduced will almost invariably be in the direction of understatement. Understatement of production is a characteristic of most newly developed agricultural reporting systems. Wheat production in the United States is now recognized to have been 30 to 40 percent above that officially reported during the first decade (1866-1875) of the USDA's statistical efforts (8, p. 260). In Mexico the comparable figures for maize during 1925-34, the Direccion General de Economia Rural's first decade, was over 50 percent (9, pp. 16, 19).

To this very understandable tendency can be added the further complications that:

- The statistical officer in developing countries is frequently (and not irrationally) equated with the tax collector by the farmer, whose response will be to minimize.

- Output which is not seen is not counted and where communications are poor a great deal is not seen.
- Much food production is for on-farm consumption and does not pass through commercial channels where it might be monitored.
- In tropical areas especially, many food crops are not grown in pure stands but mix-planted in fields of bewildering complexity.

To generalize about the extent to which food availabilities in the LDCs have been and are now understated is not easy. A reasonable assumption is that the accuracy of production estimates has improved with time and that the extent of understatement is now less than it was when FAO published its first World Food Survey. An exception may be sub-Saharan Africa, where independence has frequently been accompanied by a deterioration in the reporting systems established by colonial administrators. When perfection may be anticipated is anybody's guess. It was not until 1902, 36 years after the effort began, that the USDA began reporting wheat output with an acceptable margin of error; and not until the mid-1950s, with 30 years of experience in hand, was Mexico able to confidently measure its maize harvest.

Detailed studies a decade ago of the food economies of Malaysia and Ceylon suggested that caloric availabilities in both were officially understated by from 10 to 15 percent (10; 11). As the staple in both countries is rice grown under irrigated conditions, and thus relatively amenable to quantification, and as both countries have by the standards of the developing world an admirable statistical tradition, this 10-15 percent is probably something of a floor. Elsewhere the amount of food actually available may be undercounted by rather more.

Compounding this tendency to undercount food availabilities have been the difficulties associated with estimating food needs. These until recently have been overstated. Nutrition is still a young science and our ability to establish minimal or desirable levels of intake is not nearly so precise as we would like it to be. What in fact were used as surrogates for minimal acceptable levels of intake in the early FAO and USDA studies--and surprisingly enough, by the World Bank as recently as 1976--were the recommended allowances prepared as guidelines for dietitians and other nutritional workers. To insure that the substantial variations in food needs among individuals will be covered, these allowances consciously err on the side of caution. They are also periodically revised as new knowledge becomes available. The history of the FAO, the U.S. Food and Nutrition Board, and other responsible organizations has been one of continual--and generally downward--modification. The energy allowances for the U.S. "reference man"--in his twenties, moderately active, weighing 70 kgs.--now stand at 2,700 calories daily, 500 calories less than the 1953 recommendation (12, Table 3); and the FAO allowance for protein was reduced by about a third in 1971 (13, pp. 40ff).

Since they used food availability estimates that understated to compare against food requirement figures that overstated, it is not surprising that the early FAO and USDA global food assessments were able to paint a gloomy picture of world hunger. Though the numbers varied, 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 put it (14, pp. iii-iv):

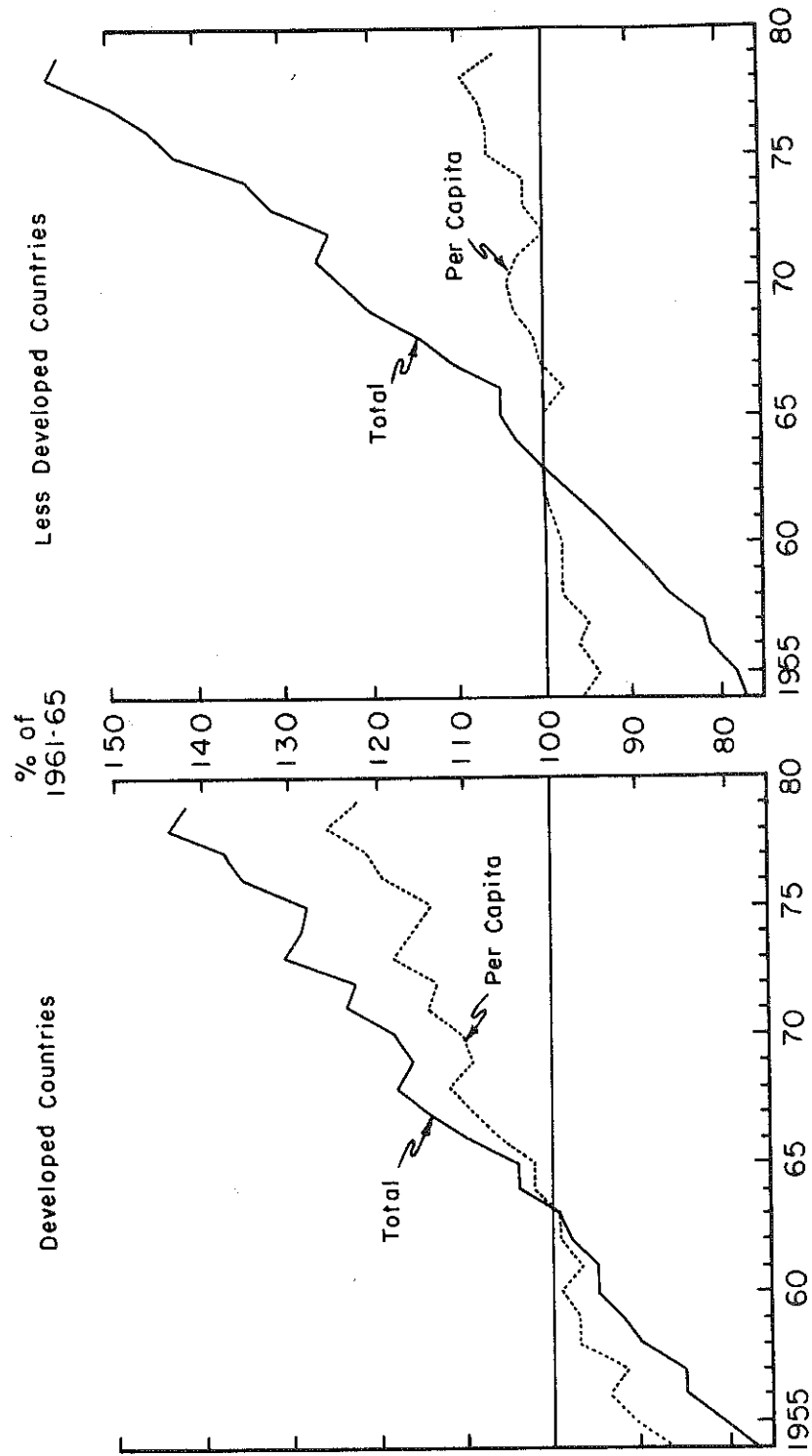
Two-thirds of the world's people live in countries with nutritionally inadequate national average diets . . . The diet-deficit countries are poor and food deficiencies merely reflect the low level of income in general . . . The basic problem of the diet-deficit countries is one of productivity. The people 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. According to such generally used series of "world" output as that currently issued by the USDA--shown in Chart 5--the LDCs over the past quarter century have expanded production no less rapidly than the developed countries, a remarkable achievement in view of the minimum priority given to agriculture in their development programs. Population growth to be sure, absorbed most of the gains, but modest per capita improvement occurred.

There have, of course, been year-to-year fluctuations in this trend--fluctuations whose import has tended to be magnified by those who would influence public opinion. The first apparent faltering came in the mid-1960s and resulted almost exclusively from two successive droughts in India. Indian production bulks so large in the LDC aggregate that major fluctuations in her harvest influence visibly the index for all developing countries. This fact, however, was lost on many commentators. Conditioned by the early FAO and USDA findings to think of all LDCs as "hungry" and hearing of massive food aid shipments--of the 30 million tons of grain shipped by the United States under Public Law 480 during the 1965 and 1966 crop years, half went to India--not a few were inclined to predict imminent global starvation.

A reaction set in almost immediately and again closely mirrored the Indian situation. A sequence of favorable years in terms of weather was accompanied by introduction into the Punjab of high-yielding varieties of Mexican wheat. The result was that the index for all low-income countries rose steeply, as did the per capita availabilities. The assessment was as extreme in the opposite direction as it had been in 1965 and 1966. These were the years when the Green Revolution began to be talked of. The situation in Northwest India, together with the introduction of high-yielding, fertilizer-responsive rice in the wetter portions of Asia, led many to believe that a fundamental change had taken place and that feeding the world's rapidly increasing population no longer posed problems. So pervasive was this optimism that the FAO went so far as to suggest, in its State of Food and Agriculture for 1969, that the food problems of the future might well be ones of surplus rather than shortage (15, pp. 1-3).

CHART 5. WORLD AGRICULTURAL PRODUCTION, 1954-1979*



*Data supplied by Economics and Statistics Service, USDA. Developed countries: North America, Europe, USSR, Japan, South Africa, Australia, and New Zealand; less-developed countries: Latin America, Asia, (except Japan and Communist countries), and Africa (except South Africa).

The factors underlying the second pause--the "food crisis" of the early 1970s--were more complex and primarily involved the developed rather than the developing countries. In brief, it resulted from an unhappy coincidence of four main influences: an intentional running down of stocks and a holding down of production in the United States; unprecedented prosperity and rising demand in Europe and Japan, which led to rapid increases in the use of grain for livestock feed; a general relaxation of attention to agriculture in the LDCs; and unfavorable weather in India, the African Sahel, and the Soviet Union. The role of the Soviet Union was particularly destabilizing. The failure of its 1972 harvest triggered the run on world supplies and the short crop of 1975 prolonged it. Nonetheless the crisis was truly global in that the price rises were general and in that it exposed the weaknesses of the international agricultural order. "International" is the operative word: most affected were the countries trading in the world market. Least involved were the largely self-reliant LDC economies.

More recently the pendulum of assessment has once again swung. Harvests almost everywhere were favorable in 1976, 1977, and 1978. India entered the 1977/78 crop year with an unprecedented 18 million tons of grain on hand, and the carryover a year later was thought to approach 25 million tons. To the extent that there is talk of crisis, it is usually in the context of shipments from the West to the Soviet Union setting the stage for another round of rising prices in the early 1980s.

But if this story of modest progress does not tally with the pessimism of the early FAO and USDA studies, it does not follow that the postwar years have witnessed a reduction in the actual number of people nutritionally distressed. For the suggestion that increased production alone could eliminate hunger was the only one of the misconceptions conveyed by the early studies.

A second unfortunate legacy was the notion that countries could be classified as hungry or well fed. It is now clear that, to the extent that this notion has validity, the early studies misrepresented reality. With food availability estimates that understated and requirements that overstated, the cards were so stacked that almost all LDCs could be classed as "diet deficit." Redone with truly accurate information, it is probable that few countries would be so classified.

But such a computation would perpetuate the most important failing of the early methodology. It is individuals, not countries, who experience nutritional deprivation, and average country data tell us little about the individual. It is now a commonplace among 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.

III. EMPLOYMENT: THE ELUSIVE EQUILIBRATOR

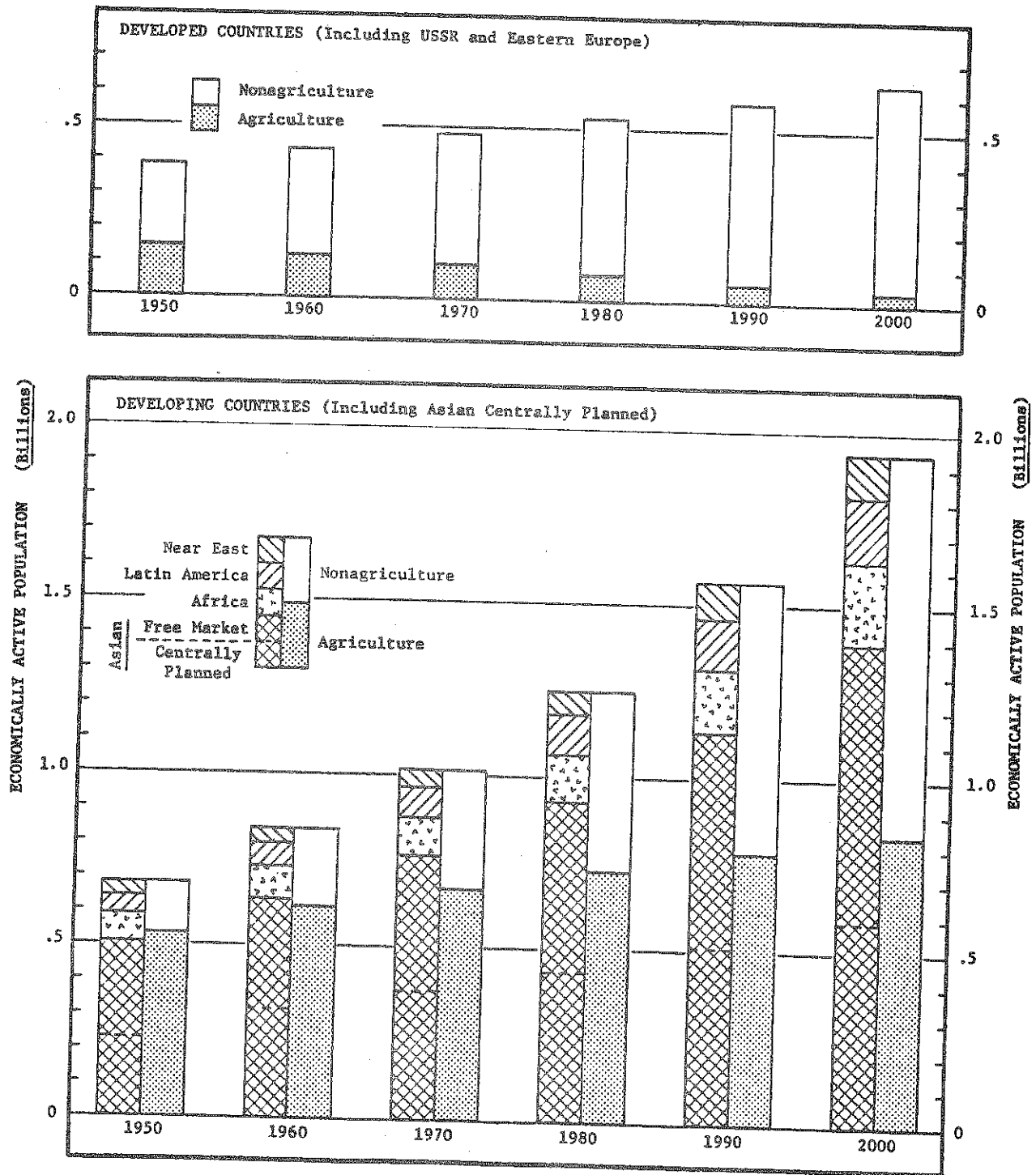
Having established the critical importance of economic participation--by which we mean more and better paying jobs--to the elimination of hunger and the control of population growth, I would like to turn now to the employment situation in the developing world and the outlook for achieving something approaching full employment there.

The prospect is anything but good, simply because of the masses of people who are and will be competing for jobs. Their number is truly staggering. Chart 6 illustrates a recent projection of the International Labour Office. Between 1970 and 2000 it is expected that the LDC labor force will double--from one to two billion people. The billion new jobs that must be found are roughly twice the number presently existing in the industrialized countries and mean that the LDCs will be called on to transform themselves at a rate and on a scale unprecedented in history. In terms of just one country, it means that during the remainder of the century Mexico will be adding to its labor force each year about the same number of new entrants as the United States and Canada together were able to absorb during the boom years of the 1950s and 1960s (16, p. 16).

The ILO projection sees few of the new entrants being absorbed into agriculture, and one must ask whether this need be so. The basis for it is the selectivity of the various technical breakthroughs that have so far characterized 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 to mention the more obvious. Thus the "miracle" rices are highly responsive to fertilizer--as the Indica varieties they replace are not--and yield well only under irrigated conditions. Simply to provide the conditions under which they can be introduced can be very 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 place where, thanks to Rockefeller-funded Office of Special Studies (now CIMMYT), the Green Revolution first blossomed. 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. Average yields per hectare almost doubled: from 700 to 1,300 kilograms. 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. Cotton and other specially crops for export fared almost as well (16, p. 19).

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



*Data from ILO, Labor Force Projections (Geneva, 1971) as reproduced in FAO, The State of Food and Agriculture--1973 (Rome, 1973), pp. 131 and 138. Projections are based on U.N. medium variant for total population.

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 governmentally-sponsored irrigation opened up expanses of highly productive land--and the Gulf coastal strip, the one portion of the country receiving abundant rainfall. Though lip service throughout the period was paid to continued agrarian reform, the great majority of the rural population was bypassed.

The dual nature of the agricultural economy that has emerged is illustrated by Chart 7, drawn from data collected in the 1960 Census of Agriculture. Less than five percent of 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 four percent of irrigated land and contribute a mere 20 percent of output by value.

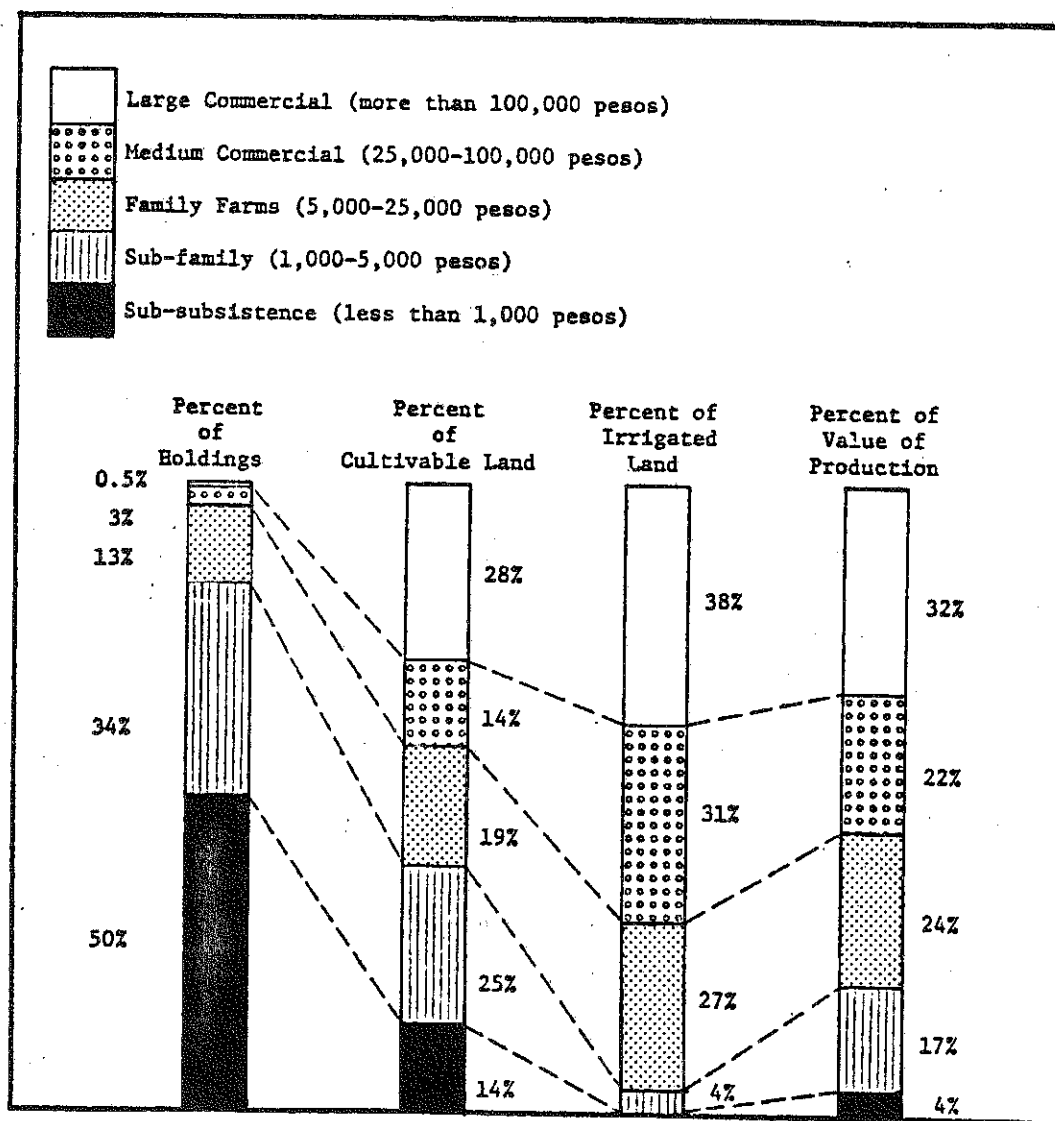
While the selective impact of their breakthroughs came as a shock to the Rockefeller scientists and their Mexican colleagues, it should not have. A similar selectivity characterized the innovations which transformed agriculture in Europe and North America during the 19th century. But here the historical parallel begins to break 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 by-passed or displaced farmer could look to the city for opportunity. Industry was growing, and as industry 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--many of the larger centers are doubling in size every eight or ten years--most of the cities remain administrative and trading centers. Though industry is growing, the bulk of it is capital-, not labor-demanding. Jobs are far fewer than people in search of them.

It is thus more in the context of urban and industrial failure, rather than agricultural, that the various new strategies proposed for Third World development should be judged.

If these strategies have a common feature--and the variations are legion--it is the emphasis they give to the landless and the small farmer: the 50 percent or so of the labor force thus far bypassed by the forward march of development. Not only must he be persuaded that his future lies in the countryside, not town, but his growing affluence, and the rapid increase in food production it reflects, is seen as the driving force behind transformation of the whole economy.

Have such strategies a chance of success? There are some grounds for optimism. We sometimes forget how recent is the application of the scientific method to food farming in the Third World. It dates no farther back than the mid-1940s and enormous scope for improvement remains. Breeding work until just a year or two ago concentrated on wheat, rice, and maize; and even for these crops yields in the LDCs have reached but a fraction of their level in the developed countries. There is every reason to believe that other crops, particularly the roots and tubers, which are smallholder crops par excellence, offer similar possibilities.

CHART 7. MEXICO: DISTRIBUTION OF CULTIVABLE AND IRRIGATED LAND AND VALUE OF OUTPUT BY TYPE OF HOLDING, 1960*



*Data from Comité Interamericano de Desarrollo Agrícola, Estructura Agraria y Desarrollo Agrícola en México (Mexico, 1970), pp. xiv-20. Holdings classified according to value of production shown in ().

But major snags lie in creating the political climate under which the strategies can be introduced. The selectivity problem alone dictates that investment in rural development be on an unprecedented scale. Such investment will be at someone's expense. Farm-to-market roads may mean fewer urban expressways. More credit to farmers could mean less to manufacturers. Certainly 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 view the Chinese and Cuban experiences with tolerance--argue that the necessary political restructuring can come about only through revolution. Whether or not this is so, the Chinese experience is certainly suggestive of the extent to which agriculture can productively absorb more labor. According to the recent book by T. G. Rawski, which, so far as I know, is the only serious study of the question (17), agriculture in 1957 employed about 230 million of China's 280 million man work force. In less than two decades, by 1975, the labor force had grown by half again, to 430 million, and of these 330 million, or 100 million more than in 1957, were working usefully on the land (17, pp. 123-26).

This remarkable achievement was possible, according to Rawski, because of collectivization and industrial support of the Chinese system of agriculture, which most of us would equate more with gardening than with farming. Improved irrigation systems permitted the spread of multiple cropping and such labor intensive practices as transplanting of rice seedlings rather than broadcast sowing.

Rawski's book is pretty hard going--few could have made so important a topic so dull--but if I read him correctly, many of these changes were one-shot improvements and the scope for further labor absorption in Chinese agriculture is now minimal. Increasingly China will have to look to its towns and cities for new employment opportunities and such evidence as is available suggests they will not have an easy time of it (cf. 18, pp. 108-109).

The conveners of this Symposium asked me to say something about technology transfer, a subject about which I know little. I would rather leave it to you to decide the extent to which American agricultural technology, devised for conditions of abundant land and capital, is relevant to the LDCs, most of which have an abundance only of redundant labor. While you are at it, you might also reflect on the extent to which the experience of China--with its highly disciplined, controlled, and socially responsive population--is amenable to replication elsewhere.

You might also contemplate the likely response of Western governments to strategies for Third World development perceived to involve revolution and repression, especially as revolution--as El Salvador demonstrates--would inevitably be seen in terms of the East/West conflict.

IV. 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 opt not for attempting 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 forward march of development can be persuaded to reduce their birth rate and also somehow command a minimally acceptable diet? The answer is an unequivocal "maybe."

With respect to population, there are clear signs that birth rates in the developing countries outside of sub-Saharan Africa are on the decline. In Asia, where the bulk of the population lives, the birth rate declined by a quarter--from over 41 per 1,000 to about 30 per 1,000--between 1950 and 1976 (19, p. 151). The decline of course, has been greatest in such prospering micro states as Singapore, Hong Kong, and Taiwan and least in such large countries as India, Pakistan, and Bangladesh.

Singapore, whose birth rate now stands at little over 15 per 1,000, is a classic example of the effectiveness of direct governmental intervention in controlling population growth. Singapore has undergone an amazing economic metamorphosis during the last two decades, but the government has hastened the demographic response by making large families even more of an economic liability (20, p. 51):

- Income tax relief is given for only the first three children.
- Paid maternity leave is given for the first two confinements; thereafter leave is given, but no pay. In addition, delivery charges increase with each child.
- But perhaps most importantly in a country where virtually all new housing is government owned, 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 stated goal is to reduce the current rate of population growth--thought to be about 1.2 percent annually--to 0.5 percent in 1985 and to zero by the year 2000 (19, p. 153). Families having a single child and insuring that they will not have a second are issued a "planned parenthood glory coupon," guaranteeing child health subsidies, bonus work points, higher pensions, and priority in the allocation of housing in the cities and private plots in the countryside (21, pp. 61-62).

That economic status can be by-passed as a determinant of fertility is also suggested in India, where the birth rate is declining only about half as rapidly as in Asia as a whole. Kerala is the smallest state in India and also has the lowest per capita income. But it also has the

lowest birth rate--about 25 per 1,000 as opposed to about 35 per 1,000 nationally--a fact usually explained by the state's relatively advanced education and health facilities. Kerala is perhaps the most telling argument for those who advocate the basic needs development strategy.

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 may be divided into those designed to increase food consumption without a corresponding rise in food expenditures and those that improve the nutritive value of given foods.

Fortification of traditional foodstuffs with special nutrients is the most attractive means of accomplishing the latter. Iodization of salt is a classic example, as is the admixture to milled cereals of niacin, iron, thiamin, riboflavin, and calcium. The impact of such measures can be widespread and immediate. Beriberi, for instance, was endemic on the famed Bataan Peninsula of the Philippines immediately after the war. With the introduction of thiamin enrichment of rice, it virtually disappeared. The problem with this approach, of course, is that enrichment is only possible when foods are centrally processed; and in the LDCs few are.

Similarly flawed are most of the schemes designed to permit greater consumption of food for a given level of expenditure. 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 LDCs have one or more programs of this type and, as their effect is to transfer income, the motivation for them has been more political than nutritional. Nonetheless their nutritional impact can be appreciable. In Sri Lanka, for instance, rice was from the Second World War to a year or two ago "rationed"; that is, virtually the entire population was entitled to a weekly quantity either free or at a subsidized price. Throughout most of the period this amounted to two pounds per capita per week, or the equivalent of about 475 calories per day. Most observers credit this program with having contributed to the well-being of the Sri Lankan people, as they do the Egyptian program of subsidizing the retail prices of staple foods in Cairo and Alexandria (22; 23). The cost, however, of such schemes can be very high. The rationing program in Sri Lanka regularly absorbed between 15 and 20 percent of the government's budget (24, p. 71), and was abandoned by the current leadership as being incompatible with rapid economic growth. One estimate of the cost of the Egyptian food subsidy puts it at a twelfth of the country's GNP. Neither program would have been possible without concessional food from abroad.

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--the Egyptian and Bangladesh cases being the most prominent--and thus have minimal impact on the very poor, most of whom still live in the countryside. In Bangladesh, proof of employment is a prerequisite for being issued a ration card.

- If not political from their inception, they quickly become politicized, with the result that modification is very difficult. An attempt to reduce the consumer food subsidy triggered such severe riots in Cairo in January 1976 that the plan was immediately rescinded. The price and wage distortions they engender thus tend to become permanent.
- Where not dependent on food aid from abroad, the schemes tend to rely on low procurement prices in order 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. By far the simplest and, to my mind, the most appealing of these is to channel assistance in kind directly to those at greatest risk through maternal and child health clinics.

To some of you this suggestion no doubt would seem a step in the wrong direction. For it is precisely this sort of targeted intervention which was for long central to the (modest) activities of the more traditional nutritionists working in developing countries and which has been downgraded by the new wave of nutrition planners in the World Bank, FAO, and the U.S. Agency for International Development. Yet there are, I think, compelling reasons in its behalf, not the least of which is the degree to which the extent of world hunger has been misrepresented.

V. QUANTIFYING THE HUNGER PROBLEM

A few days ago I watched a truly heart-rending three or four minutes on television. The program was the CBS Morning News, the subject starvation in Africa (25). Pictures of emaciated women and children in the Karamoja District of Uganda were shown, as were some of equally distressed people in the Ogaden desert of Somali. I have never been in the Ogaden, but have the impression that the problem there is war and that Ethiopia and Somali are fighting over some pretty worthless real estate. I have been to Karamoja and know this to be the case there. The nomadic Karamojong are among the least advanced peoples in Africa and to the extent that they have a future the aridity of their homeland dictates that it lies in outmigration. This process was halted and the plight of the Karamojong made worse still by the chaos that has reigned for the last decade in Uganda.

All this, I'm sure, was known to the CBS team. However, it did not prevent them from using these two extreme situations to portray the problem as drought and Africa as a hungry continent. What harm, one suspects they reasoned, could come from a bit of exaggeration. Surely it is not wrong to exaggerate the misery of the few by making it seem the plight of the many, if the result is to prick the world's conscience and hasten remedial action.

Such reasoning, one must presume, lay also behind the recent attempts by FAO and the World Bank to measure world hunger. So what if their methodologies led to exaggeration? Wouldn't overstatement of the problem make it all the easier to organize a meaningful response?

Unhappily, the best of intentions can go awry. Exaggeration can, as one reviewer of the World Bank study noted, "cast doubt upon the adequacy of [the world's] resources to mount programmes which have any reasonable chance of success" (26, p. 165); and, worse still, set the stage for such nonsense as the "triage" argument put forth a few years ago by Garrett Hardin (cf. 27; 28). This saw an already hungry world plunged into even deeper misery as populations grew, and the developed countries forced to make a choice as to which LDCs to save-- a decision to be made in the spirit of the World War I practice of dividing the wounded according to whether they would survive without medical aid, profit from it, or die no matter what.

Unlike the early studies, which attempted to measure world hunger by using national averages, the recent FAO and World Bank studies focused, quite correctly, on how these averages break down across the income spectrum. Although they used broadly similar techniques for estimating the effect of income, their conclusions differed wildly. As Chart 4 and Table 1 indicate, FAO concluded in its Fourth World Food Survey that about 450 million people are suffering from protein-calorie malnutrition; the World Bank put the number at almost 1.2 billion. Not knowing what to do about this discrepancy, the Presidential Commission mentioned both figures (5, p. 16).

Faced with so much conflicting material about the extent of world hunger, the USDA some months ago asked me to look into the basis for the confusion. Copies of my report (29), should any of you be interested, can be obtained either from the USDA or Cornell. A somewhat condensed and more literate version will be published in a few weeks by the Stanford Food Research Institute (12). Among my conclusions was one which could be anticipated at the outset. This is that there still is not enough evidence about the effect of income on food behavior for us to generalize with confidence. Such evidence must come from household budget surveys, and carefully conducted surveys of broadly representative samples are still few for the developing countries.

Such surveys as do exist, however, do not evidence behavior that would bear out the existence of the sort of widespread hunger suggested by the FAO and World Bank inquiries. Rather they indicate that the people of the developing world shrewdly allocate their limited resources so as to get by on what by the standards of the industrialized world is very little.

The course of dietary evolution which accompanied economic development in the West was analyzed during the 1930s and 1940s by M. K. Bennett (30). He noted that the very poor would seek to maximize the nutritional return per outlay for food by building their diet around the cheapest starchy staple foods (such as maize and potatoes). Then

as incomes increased and the necessity for buying quantity alone diminished, quality considerations would begin to manifest themselves. First the cheap starchy staples would be replaced by more preferred ones (such as wheat bread), and then the importance of the starchy staples in toto would decline. A hundred years ago our great-grandparents consumed large amounts of bread and potatoes. Today our diets are dominated by meat, fats and oils, sugar, vegetables, and dairy products. We pay much more for such a diet and presumably enjoy it more. But it does not follow that it is a better diet. In fact it may not be.

About halfway through my research for the USDA, it occurred to me that since it was not likely that the next few years would see more accurate estimates of either food availabilities or minimal nutritional needs in the developing countries, we should consider abandoning altogether the approach of comparing availabilities with needs, and search instead for behavior indicative of perceived dietary adequacy or inadequacy. Would not Bennett's progression of dietary change provide the necessary framework for such a search and would not the point where households began to purchase quality instead of quantity be the threshold we sought?

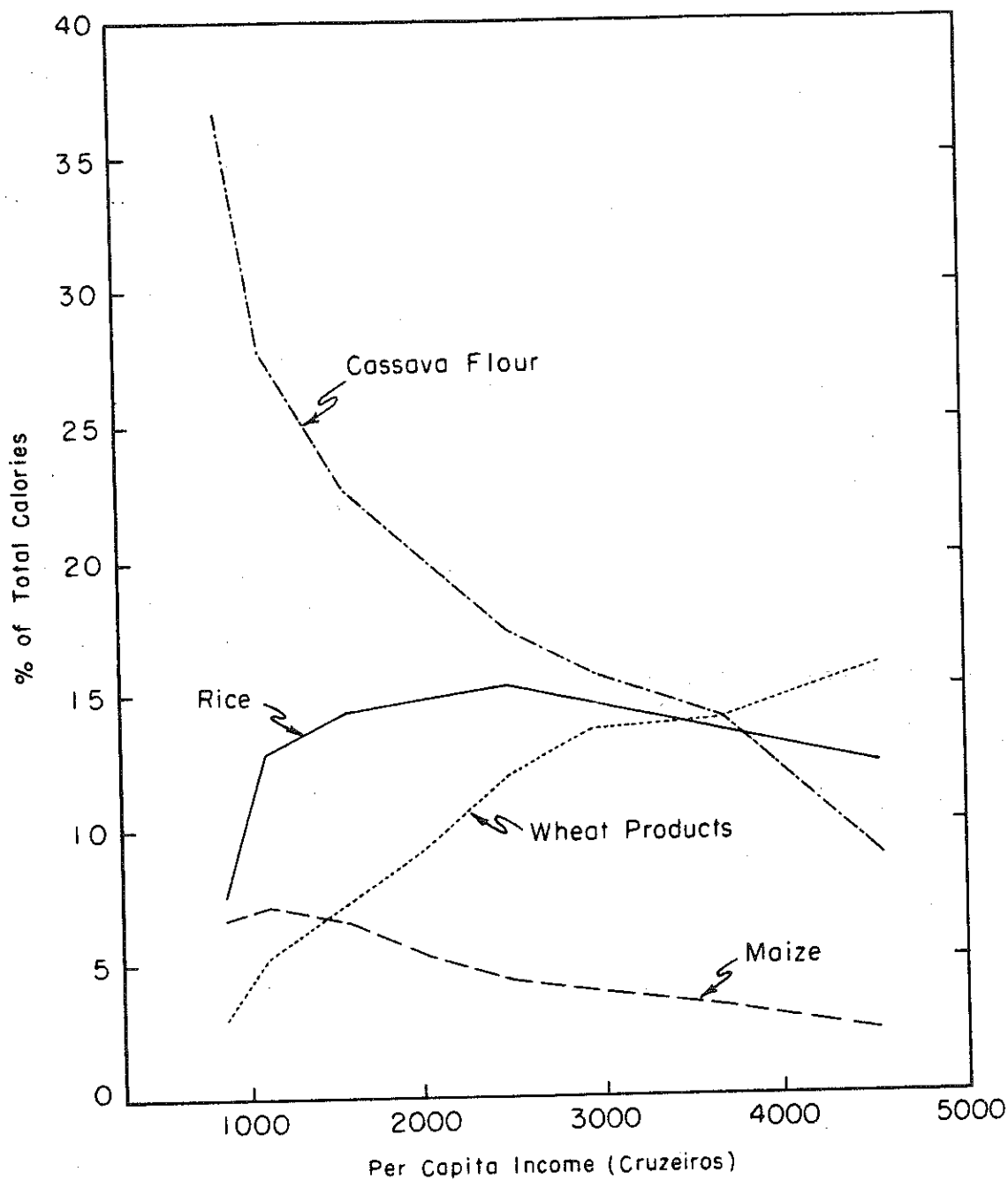
Preliminary analysis of four recent surveys--conducted in Sri Lanka, Indonesia, Bangladesh, and Brazil--indicates the idea has merit. Consider Chart 8, based on data collected in Brazil in 1974/75. You will note that the diet at the lower end of the income range is that of poor people: the four starchy staples--cassava, maize, rice, and wheat--supply about 55 percent of total caloric availability. But it would not appear to be the diet of people who perceive themselves threatened with hunger. Additional calories are not purchased as income goes up. Instead, consumption of the less-preferred starchy staples--cassava and maize--drops off, their place taken by rice and wheat bread.

This type of behavior--also evident in the data for the other three countries we examined--is less suggestive of widespread hunger in the LDCs than it is of the ability of the people there to accommodate logically to poverty. And lest you think the poor were excluded from the surveys, be assured that they were not. The Brazilian data are for the northeastern corner of the country, Brazil's poorest region, and the survey has been suppressed by the government because of the social inequality it reveals.

But if such evidence suggests that most people in the LDCs contrive to adjust their food behavior to poverty, it does not follow that all do. Household surveys disaggregate only to the family level and say nothing about who within the family eats what.

If we do not know how many among the poor in the LDCs suffer nutritional deprivation, nutritionists are agreed that the preschool child and the pregnant and lactating mother are those most likely to be adversely effected by protein-energy malnutrition (PEM). There are several reasons for this. The early growth and reproduction phases are nutritionally the

CHART 8. RICE, CASSAVA, WHEAT, AND MAIZE AS CONTRIBUTORS TO APPARENT PER CAPITA ENERGY CONSUMPTION, NORTHEAST BRAZIL, 1975/76, BY INCOME CLASS*



*Steve Tabor, "Notes on the Brazilian Consumption and Expenditures Survey" (unpublished working paper, USDA, ESCS, August 1979), p. 19.

most demanding in the life cycle. Yet persons in these phases are precisely the family members 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.

Discrimination against mothers and the young in eating habits will reflect educational as well as income deficiencies. It is not just that undesirable food taboos relate particularly to the mother and her young; where households do not eat together, the father and other elders will typically satisfy themselves first, leaving what remains to the women and children. Adult tastes, rather than those of the infant, will be the usual criteria of dietary excellence, to the end that much of the animal protein a meal may contain can be impossible for the very young to swallow. The younger the child, moreover, the less well he is able to fend for himself at table. And in times of shortage the mother is likely to defer to her children, not realizing that it is not only she, but her unborn child, who will suffer the consequences.

In its extreme form, protein-energy malnutrition among the young will occur either as kwashiorkor or marasmus or some combination of the two. Kwashiorkor is generally the result of an inadequate intake of protein relative to calories. Marasmus, on the other hand, arises from an insufficiency of both energy and protein. Cases of pure kwashiorkor or marasmus seem to be the exception rather than the rule. Instead, most severely malnourished children will present signs and symptoms of both conditions and perhaps even alternate between the two. In addition to low weight for age and other overt physical signs, symptoms are apathy, instability, and poorly developed motor skills (31, pp. 46-47).

Although marasmic children may be at risk of outright starvation, the main danger to the severely malnourished lies in their diminished resistance to other disease. Should they survive these, they may well go through life permanently impaired, both mentally and in the height and weight they will ultimately attain. Although the linkages between severe PEM and brain growth and development are by no means understood, they give rise to particular concern.

Compared with its impact on pregnant and lactating mothers and the very young, the adverse effects of PEM on the other elements of a population are likely to be moderate. This is because these elements 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.

Some nutritionists have suggested that cases of frank marasmus and kwashiorkor among the very young are but the tip of an enormous iceberg of protein-energy malnutrition in the developing world and that for every child demonstrating symptoms of clinical PEM there may be 99 others who are inadequately nourished, grow poorly, and are highly susceptible to disease infection (32, p. 7). The iceberg analogy may indeed be appropriate, but should be treated with skepticism. Certainly attempts to quantify the submerged portion--where no demonstrable harm is being done--do not yet warrant scientific credence.

Nutritionists commonly define severe PEM as being evidenced by a weight for age of less than 60 percent of standard and the moderate form as being reflected by weights in the 60-80 percent range. Following (more or less) these definitions, the findings of the hundred or so nutrition surveys available a decade ago have been summarized as shown in Chart 9. It is apparent that only a small fraction of children--in most of the surveys just one or two percent--suffered from severe PEM and perhaps for each one of these 10 or 15 were moderately afflicted. But beyond this, generalization is impossible. Most of the surveys covered small samples of questionable typicality, and the range in findings is too extreme to permit extrapolation. If the number of those at greatest risk is to be estimated, therefore, we have no alternative but to do so rather arbitrarily.

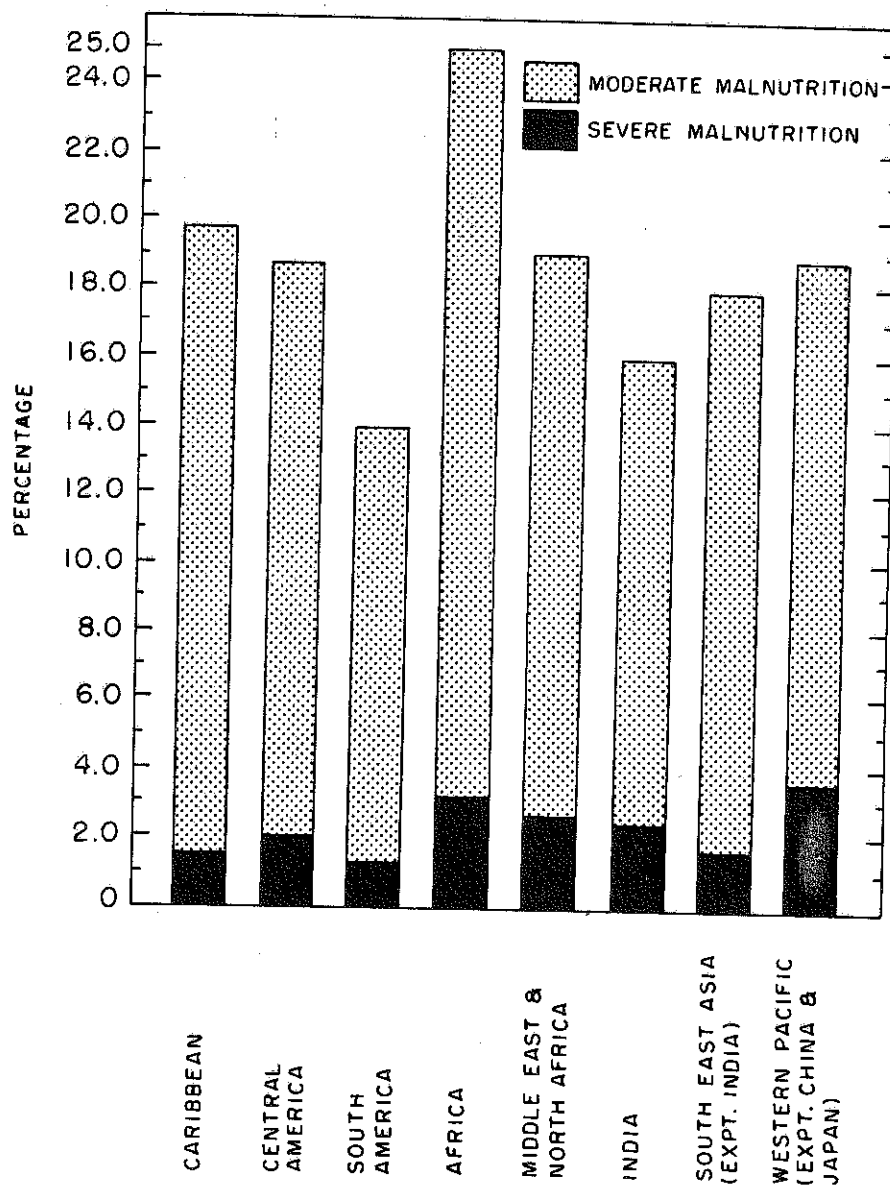
Table 2 offers one method for doing this. In it the number of pregnant and lactating women is approximated by doubling the birth rate. To this figure is added the number of infants below five years of age. Arbitrary percentage estimates of those likely to be at risk nutritionally are then applied. A ten percent assumption is not an unreasonable minimum for most developing countries, while a 50 percent figure would seem an absolute maximum. The resulting range of those at risk--62 million to 309 million persons--define a world hunger problem of vastly different dimensions than that conjured up by the World Bank study and The Fourth World Food Survey:

	<u>Insufficient Protein-Energy Supply</u>		<u>Vulnerable People at Risk</u>	
	<u>Fourth Survey</u>	<u>World Bank</u> <small>(millions)</small>	<u>10 percent Assumption</u>	<u>50 percent Assumption</u>
Far East (ex-China)	297	736	26	131
China	-	-	14	71
Africa	83	190	9	46
Latin America	46	113	7	37
Near East	29	91	5	24
	<u>455</u>	<u>1,130</u>	<u>62</u>	<u>309</u>

Although Table 2 includes China, which the two studies did not, even the 50 percent assumption yields figures well below FAO's 450 million and about a fourth the number arrived at by the World Bank.

Thus the basis for my suggestion that efforts to treat the symptoms of hunger focus on aid in kind channeled 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 would be doable. Presidential Commission, wherever you went, please note.

CHART 9. PREVALENCE OF SEVERE AND MODERATE PROTEIN-ENERGY MALNUTRITION, BY REGION, 1963-73*



*Reproduced from J. M. Bengoa and G. Donoso, "Prevalence of Protein-Calorie Malnutrition, 1963 to 1973," PAG Bulletin, Vol. IV, No. 1, 1974, p. 31.

TABLE 2. NUMBER OF WOMEN AND CHILDREN AT RISK NUTRITIONALLY
ACCORDING TO TWO ASSUMPTIONS, 1975, BY REGION*

(millions)

Region ^{a/}	Total Population	Infants (Age 0-4)	Births	At Risk ^{b/}	
				10 Percent Assumption	50 Percent Assumption
Far East (ex-China)	1,057	174.3	43.5	26.1	130.6
China	823	98.6	22.1	14.3	71.4
Africa	331	60.6	15.8	9.2	46.1
Latin America	319	50.4	11.7	7.4	36.9
Near East	188	31.9	8.1	4.8	24.0
TOTAL	2,718	415.8	101.2	61.8	309.0

*Population data from World Bank, World Atlas of the Child (Washington, 1979), pp. 24-33.

^{a/} Regional breakdown follows current FAO usage and includes only those countries classified as "developing." See FAO, The Fourth World Food Survey (Statistical Series 11, 1977), pp. 67-68.

^{b/} 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. The number of pregnant and lactating mothers is taken as being twice the birth rate.

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