

H U N G E R

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Hunger

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Introduction

The need for food is perhaps the most basic of all human needs. People must eat, even if they drink unsafe water, are illiterate, and are not inoculated or vaccinated against diseases. Poor people spend between 70 and 80 per cent of their total income on food, and more than 50 per cent of additional income. The poorest of the poor continue to spend the same proportion on food as their pitiful incomes rise, until they reach the point when this proportion begins to decline. As their incomes rise further, they spend a smaller proportion on food, of that smaller proportion a smaller proportion on cereals, and of that smaller proportion a smaller proportion on the cheaper cereals. Lack of adequate food makes people not only hungry and less able to enjoy life, it also reduces their ability and, by causing apathy and in extreme cases lethargy, their willingness to work productively, and thereby to raise the means to combat their hunger. In addition, it makes them more susceptible to disease by reducing their immunity to infection and other environmental stresses. Prolonged malnutrition among babies and young children leads to reduced adult stature; severe malnutrition is associated with decreased brain size and cell number, as well as altered brain chemistry. Malnutrition of women during pregnancy results in low birth weight of their children, which is a particularly important cause of infant mortality. Children who suffer from severe malnutrition show lags in motor activity, hearing, speech, social and personal behaviour, problem-solving ability, eye-hand coordination and categorization behaviour, even after rehabilitation.

Hunger in this essay includes all conditions resulting from inadequate food intake. From acute starvation in a famine, to liability to illness and

debility due to food deficits, to energy deficits leading to apathy that are not experienced as hunger, to undernutrition, malnutrition and the occasional pangs of hunger experienced by poor people, that do not have harmful effects on life or work. Excluded from consideration is hunger of those who have the capacity to satisfy it but do not wish to do so because they are fasting for religious reasons, or are on hunger strike, or wish to conform to some model figure, or suffer from anorexia nervosa, etc. The distinction is interesting because it brings out the need to differentiate between capabilities, functionings, commodities, needs and utilities. (See A.K. Sen, Commodities and Capabilities, North Holland, 1985.)

Among the world's chronically hungry people are the ultrapoor, the landless and nearly landless labourers, young children of poor families, pregnant and lactating women, and the old. They live in Asia, on the Indian sub-Continent and in Indonesia and the Philippines, and in Sub-Saharan Africa. They constitute about 10-15 percent of households, containing 15-20 percent of the population and 17-25 percent of pre-school children in these countries. About a billion people consume less food than they would like, continue to spend this same proportion on food as their incomes rise, and hundreds of millions are handicapped by undernutrition.

According to a World Bank study there are 340 million people in the developing countries suffering from nutritional deprivation (inadequate calories to prevent stunted growth and serious health risk), which represents about 16 per cent of their populations. In low income countries this proportion rises to 23 per cent. The same study suggests that 730 million people suffer from undernourishment by having "not enough calories

for an active working life". This amounts to 34 per cent of the population of all developing countries and 51 per cent of the low-income countries. A study by Reutlinger and Alderman estimates the number of undernourished at over 800 million people.

Hunger and malnutrition today are not mainly the result of a global shortage of food. So far, over the long run, Malthusian predictions of population increasing faster than food have not come true. Current world production of grain alone could provide everyone with more than 3000 calories and 65 grams of protein daily. It has been estimated that 2 per cent of the world's grain output would be sufficient to eliminate malnutrition among the world's 500 million malnourished. Between 1950 and 1984 real cereal prices - the amount of manufactured goods that could be bought with a ton of cereal - fell by over a third - i.e. by 1.3 per cent per year per pound.

It is true that since 1984 world food production per head has fallen (between 1986 and 1988 by 14 percent) and is now (1989) back at where it was about two decades ago. The agricultural resource base has deteriorated, new technologies have not been forthcoming or not been applied at the same rate as before, and depressed farm prices have discouraged production. Population growth has continued to be high. So, at least at the moment of writing, problems of supply are once again in the foreground. And some observers argue that the rapid growth of grain production per head since 1973 was achieved by overploughing land and overpumping water, with the result that soils were eroded and water tables dropped - an unsustainable situation.

Malnutrition is not primarily a problem of an imbalance between calories and protein. Most surveys have found that if energy intake is adequate, protein needs are also satisfied, and if not, protein is burned up for energy requirements.

The problem is not only one of production, but also of distribution: it is not primarily physical food shortages, but social and political arrangements at the international level that are responsible for the unprecedented amount of hunger and malnutrition. It is the fact that hunger today is unnecessary that makes its continued existence so shocking. The productive capacity of the world is now capable of feeding all the mouths in existence, yet it fails to do so. The problem is partly one of the distribution between countries, regions and income groups, between sexes and within households. In general, it is the very poor, who spend most of their income on food, who suffer most from hunger and malnutrition. In many countries more than 40 per cent of the population suffer from calorie-deficient diets, and about 15 per cent show deficiencies of more than 400 calories per day. Within families it appears that children, and in some societies, such as North India and Bangladesh, women, particularly when pregnant or lactating, receive inadequate amounts of food. Calorie deficiencies vary by geographical area, season and year.

The production of cereals by developing countries grew between 1961 and 1980 at an annual rate of 2.9 per cent, while consumption grew at 3.2 per cent per year. As a result, cereal imports in the developing countries grew from about 15 million metric tons to 64 million tons. In the same period cereal production in the advanced countries grew by 3.1 per cent per year

but consumption by only 2.5 per cent. The difference was exported to the developing countries. Their share in world imports of cereals rose, as a result, from about 36 per cent to 43 per cent. Since the bulk of the increase in food production has occurred in the advanced countries, and since global redistribution through grants is ruled out for political reasons, developing countries must either earn more foreign exchange to buy the food, or grow substantially more food themselves. (Food availability in the developing countries increased from 208 kilograms per head in 1961 to 218 kilograms in 1976.) This is particularly true of Africa, until 1981 the only region in the world where food production has grown less rapidly than population. Since 1981 Latin America has also registered a drop in food production per head.

The other part of the solution is the generation of adequate incomes of the poor, including both production for their own consumption and cash to buy food in the market. For farmers this means security of tenure or ownership of land, a regular outlet for sales and a supply of credit. Extra food production is necessary to meet the additional demand created by population growth and higher incomes per head, and to prevent soaring food prices from cancelling the effects of higher purchasing power.

To achieve perfect nutritional standards is virtually impossible. A reasonable objective is to reduce the significant handicaps from nutritional deficiency. Many people in rich countries present medical problems from being overweight and obese, but no great social significance is attached to these ills. There may be as many as 7 million Americans suffering from malnutrition. In poor countries, people have adapted to mild cases of

calorie deficiency by attaining a lower weight and height, by being less active, and, in the case of women, by ovulating less regularly.

Growth of incomes and of food production, important though they are, are not sufficient to eliminate hunger and malnutrition. Receiving more food does not necessarily meet the nutritional needs of poor people. It may simply meet the needs of the worms in their stomachs. Hunger and malnutrition is a problem of the pathology of the environment, and raising food intake by itself may not help. Cases have been recorded where it made things worse, because the extra food consumption of the earning members of families was matched by extra physical efforts, and the rest of the family got less. In other cases, extra income was spent not on food, and nutritional standards fell, as families moved out of the subsistence-oriented economy and became subject to the influences of the market. It may be not more food that is needed, but education, safe water, medical services, reduced work loads, fewer unwanted pregnancies, shorter walks to or between work places, counter-pressures to advertisements, or a land reform to permit people to make better use of their higher incomes and of the additional food supply. Food needs can sometimes be met more effectively by reducing requirements rather than by raising availabilities.

Raising the real incomes of the poor so that they can buy more food is clearly one important way of reducing hunger and improving nutrition. But this is a slow and cumbersome process and there are speedier and more direct ways. Iodine deficiency, which can cause goiter, apathy, and proneness to other diseases, is easily remedied by iodizing salt. More difficult to remedy are deficiencies in vitamin A, which can cause blindness and death in

children, and deficiencies in iron, which lead to anaemia and reduced productive power. Protein-energy malnutrition, which may cause irreversible brain damage in children and apathy in adults, is the most difficult to remedy. Yet, it is the most serious problem in malnutrition, followed by deficiencies in iron and vitamin A.

Apart from the emergency of famine, nutrition policies for the chronically malnourished poor call for a long-term, sustained effort. Intervention can take the form of agricultural policy, supplementary feeding, food fortification programmes, food subsidies and rationing, and complementary policies (such as employment creation) in non-food sectors. Particularly important are policies for foreign trade and the exchange rate, which determine how much the farmer gets for his crop.

The entitlement approach to hunger and malnutrition, pioneered by A.K. Sen, suggests that diversified employment and earning opportunities are as important as growing more food. It is true that this creates risks, such as the decline in markets or the rise in the price of food, but there are also risks in aiming at food self-sufficiency: harvests may fail or the soil may deteriorate. The need to consider such options is particularly important for Africa, where food production has fallen behind population increase. The best solution may be not to grow more food, but to create diverse, remunerative export industries.

Since hunger is largely a problem of poverty, and since the poor spend their money on different kinds of food from the rich, policies that encourage greater production of poor people's food — such as cassava, corn, sorghum and millet — can help reduce hunger and malnutrition. Food

marketing and storage programmes can reduce regional, seasonal, and annual shortfalls in supplies and increases in prices. Policies to encourage production of food for the poor should extend to all aspects of agricultural policy, including research into new varieties, extension programmes, credit and marketing.

Supplementary feeding may take place in schools, at work, or at clinics for pregnant or lactating women. With the receipt of extra institutional food, however, meals at home may be curtailed, so that the vulnerable groups do not get much additional food, and, at least in the case of schoolchildren, these programmes do not reach the groups particularly at risk, such as children below school age. Here again, the ease of intervention (because schools already exist and delivery is cheap) is inversely related to its importance. Food supplementation at the work place, if neither the food nor the extra energy is diverted to other activities, serves both a basic need and productivity.

Special foods and food fortification, as in the case of protein and vitamin fortification and salt iodization, have been successful up to a point, though they meet with both technical and political difficulties. General subsidies to food are very expensive, absorbing up to 20 per cent of budgetary expenditure in some countries, and selective programmes, such as food stamps, are difficult to administer. Programmes are easier and cheaper to administer if the subsidies are for food that is eaten only by the poor. Rich countries tend to tax poor urban food consumers in order to subsidize relatively better off farmers. Poor countries have tended, at least until recently, to tax (often indirectly and in a disguised form) poor farmers in

order to subsidize food such as high-quality wheat and rice that is consumed by the better-off urban groups. But among the poorest are rural landless labourers and urban dwellers who have to buy food and are helped by these subsidies.

An efficient and equitable system of subsidies to poor consumers that does not penalize poor producers of food is expensive and both administratively and politically difficult. When agricultural prices are increased as an incentive to production, measures should be taken to prevent greater malnutrition among those poor who have to buy food. Some countries have successfully overcome these difficulties.

The eradication of hunger and malnutrition is not only a problem of making the land more fertile and women less fertile. Action is needed on other fronts. Safe water and the prevention of intestinal diseases would enable people to absorb the same amount of food more effectively. Less time spent on collecting firewood and water, or on walking between unconsolidated plots of land, would reduce the food required for women. So would a reduction in unwanted pregnancies or premature deaths of babies. Education can help people to avoid diseases, such as diarrhoea, thereby raising absorption of food, and it can help them spend their money more wisely on nutritious food and prepare food more economically and hygienically; they can learn to complement their diet with local food; educated women tend to marry later and have fewer children. The battle against early weaning and against the use of baby formula has hit the headlines, but the desire of women to cease breast feeding is often part of the general process of modernization and urbanization, and the desire to emulate the more advanced groups in the country.

Hunger and malnutrition are the result of a complex set of conditions, all stemming from poverty. But although most people suffering from calorie deficiencies are poor, not all poor people suffer from such deficiencies. Some quite high-income countries and groups of people suffer from considerable malnutrition, and some low-income countries have none. A.K. Sen has said that the danger today does not arise from Malthusian pessimism (the fear that food production does not rise with population), but from Malthusian optimism (the false belief that if we have solved the problem of food production, we have solved the problem of hunger).

The eradication of hunger is ultimately a question of the political power of the poor. It is sometimes said that free markets give everyone access to the labour force, and thereby to the opportunity to earn enough to meet all needs. But, as Partha Dasgupta has pointed out, "at systematically low levels of nutrition-intake a person's capacity for work is affected adversely. There is thus a possible vicious circle here. Those who have not title to non-wage income are vulnerable in the market for labour, their sole means of generating income." Not until basic needs are met can the market mechanism be said to guarantee productive work.

While power structures and the alignment of interest groups are such that entitlements to adequate food supplies are denied to the poor, hunger will continue. In some conditions, the interest of the ruling group can be harnessed to alleviate poverty and hunger. Infectious diseases do not draw the line at class or income boundaries. The repeal of the Corn Laws in 1846 was in the interest of the industrial classes because it provided cheap food and low wages. A well nourished, healthy and educated labour force is a

more efficient labour force. But while such interests can be harnessed to hunger removal, in the last resort it is the access to political power of the poor themselves which alone can guarantee adequate food supplies to all. This does not mean that only one type of political system can guarantee hunger eradication. Historical evidence has shown that a wide variety of regimes have eliminated the worst types of hunger within a short period. But some types of regimes make this achievement impossible. Some form of participation of the poor in making the decisions that affect their life and work is helpful, though not a necessary condition. But ultimately, the problem of eradicating hunger is a political problem rather than a nutritional or economic one.

The need for a multi-pronged attack

To understand and combat hunger, malnutrition and undernutrition, we must abandon the notion that these are simply the result of an imbalance between food production and population. We have seen that hunger is the result of the pathology of the environment. Many factors determine this environment. They can be roughly divided into factors working on the supply of food and those working on the impact of available food on nutritional status. A principal objective of agricultural policies in developing countries is to raise the rate of growth of the production of food. A useful mnemotechnic device is to divide the factors on the supply side on which policies must work into six "Ins".

1. Incentives (or prices)
2. Inputs
3. Innovation (technology)
4. Information (the diffusion of the technologies through extension

- services)
5. Infrastructure
 6. Institutions (credit, marketing, land reform)

These six "Ins" or Instruments provide a framework for understanding and eradicating hunger. Incentives are important for stimulating farmers to grow more food. It is the prices that farmers get for their crops in relation to the prices they have to pay for their inputs and their consumer goods that determine how much and what kinds of food crop are produced. But price incentives are not enough. Farmers must also have access to inputs: fertilizer, equipment, water, credit, etc. With limited land and labour, and a given technology, food supply runs into rapidly diminishing returns. We also need technologies to raise production with given resources: new high-yielding varieties, irrigation, etc. It is the role of innovation, of technical progress, which has for 200 years postponed the Malthusian limits. Technical progress has been largely institutionalized. Technological innovation is of no use unless the information is disseminated and accepted by farmers. We also need an appropriate infrastructure of roads, harbours, railways, storage facilities, etc., to get the crops to the markets and the inputs to the farmers. Without such a distributional network, incentives and innovations are frustrated. And we need social infrastructure — education, health and nutrition — to produce an efficient rural labour force. Finally, we need institutions, such as rural banks, efficient marketing institutions that buy, store, transport, ship and process the crops from producers to consumers and that bring the inputs to the farmers. To these we should add the need to change the composition of agricultural

output in favour of the higher value crops, as long as the risks attached to growing and selling these do not exceed the extra benefits. Some of these "Ins" are best provided by a market, others by action in the public sector. It is the complementary and supplementary actions of the private and public sectors that produce the results, e.g. the combination of correct pricing policies for food, with the provision of roads and vehicles.

Complex and difficult choices arise within each of the six "Ins". Consider infrastructure, normally at least partly provided at public expense. There are choices between physical, legal, human, social and producer-specific types of infrastructure to be made; choices between centralized and decentralized types of infrastructure, choices between infrastructure for small, deficit farmers and the landless versus large farmers, producers and for consumers, choices between maintenance of existing and new projects, and choices between different methods of financing expenditure on infrastructure. The same is true for institutions and for information. Should, for example, extension workers concentrate on single lines of conveying information or should they combine several? All these activities compete for scarce resources with directly productive investment in food production.

Another set of choices arises in the phasing or sequencing of the six "Ins". Where infrastructure, institutions and innovation are already in place, it will suffice to emphasize price incentives. Alternatively, some of these "Ins" can be induced by others. Prices can stimulate innovation, [Hayami and Ruttan, 1984] institutions and even public action on infrastructure. In other cases, action on one front can be a substitute for

action on others. Heavy public subsidies to well-chosen inputs can be a substitute for higher prices of outputs. Phasing and sequencing are of the utmost importance, since most countries are too poor to do everything at once.

The six "Ins" refer mainly to the supply side of food for the eradication of hunger. As we have seen, measures are also needed for creating remunerative employment and incomes, for health and education, for reducing food requirements through eliminating unnecessary work (e.g. land consolidation to eliminate long walks between plots) and unwanted pregnancies, for population control and family planning, and for the distribution of food within households. Even with more than adequate food supplies and incomes, people starve either because parasites in their stomachs or because parasitic landlords-moneylenders, or, in some societies, because male heads of households deprive them of access to the nutritional benefits of food. The attack on hunger comprises reforms at the micro-micro level, what goes on within the family, at the meso-level, how macropolicies affect particular groups, at the macro-economic level, what happens to the exchange rate, at the macro-policy level, what is the system of land distribution and money lending, and the power structure and at all intermediate levels, both private and public, and at the global level.

Food policy makers start from a fundamental dilemma. Should they keep food prices high in order to encourage production of food and raise the supply for all, including the poor in the long run, at the risk of hunger and starvation of poor food buyers in the short run? Or should they keep food prices low in order to ensure affordable food for poor buyers at the

risk of aggravating food shortages in the future? The dilemma is aggravated by the fact that many food producers are also poor. There are two ways of resolving the dilemma. First, the policy makers may set high prices and then take specific measures such as rationing and subsidies to protect poor buyers. Or they may set low prices and compensate producers by subsidies to inputs or to their crops. The third horn of the dilemma is that the capacity to raise tax revenue or to administer rationing or fair price shops is very scarce in developing countries.

Another dilemma is whether to "target" food subsidies on the most needy groups or cover a wider group, possibly the whole population. There are bound to be leakages either way. It is very difficult to implement a programme that covers all the poor, and only the poor. Wider coverage can become very costly, narrower coverage runs the danger of leaving out needy people. It also taxes scarce administrative capacity. It is better to err on the side of excess coverage, and recuperate some of the revenue through forms of taxes that do not hit the most vulnerable, at least directly, such as a tax on alcohol or cigarettes.

The multi-pronged attack applies also to the agents. We think normally of government action through taxes, subsidies, employment programmes, feeding programmes, etc. But non-governmental organizations such as Oxfam and private agents also have important roles. For example, A. K. Sen has shown the importance of a free press, both as an early warning system about impending famines and as a pressure group on governments to respond quickly and adequately to threats of famine.

Export Crops v. Food for Domestic Consumption

There has been a good deal of discussion of the respective merits of export crops and food for domestic consumption. Some have argued that if the comparative advantage points to export crops, it is they that should be promoted and the foreign exchange earned be used for inputs into agriculture or industry, or even for food imports. On the other hand, there have been those who have argued that export crops impoverish the poor, deprive the people of food, and lower nutritional standards. It has also been argued that they are ecologically destructive.

A parallel debate has gone on over the respective merits of marketing more food, whether for the domestic market or for exports, against growing more food for consumption within the farm household that grows it. Some of the arguments that apply to the debate on exports versus food for domestic consumption also apply to the debate on more marketing versus more production for own consumption.

Clearly much depends on the institutional arrangements. If export crops are grown on large plantations, perhaps owned by foreigners, which generate little employment, while food is grown by small farmers, the impact on income distribution will be different according to which type of crop is promoted. If the foreign exchange earned by export crops accrues to the government and it spends it on arms or office buildings, while the receipts from food would have gone to the poor peasants, again the distributional impact will be different.

The interesting fact, at least in Africa, is that there is little evidence that there is a necessary conflict between the two. Where land and

labour are not scarce, the movements in export crops go in the same direction as the movements in the production of food for domestic consumption. There is also little evidence that nutritional standards have suffered as a result of the growth of export crops, though sugar in Kenya may be an exception. There are several reasons for this. First, certain services can be in joint supply and help both export crops and food. Among these are extension, marketing, and supplies of inputs. Similarly, equipment and fertilizer can be used to raise the production of both. It can also be the case that similar complementarities exist on the side of demand: the demand for food by the farmers who grow export crops creates a stable market for local food supplies and encourages their increase. For some export crops, such as cotton, a part of the export crop can be used as food, in the form of edible oil, or as feed in the form of cottonseed cake.

In spite of the positive relationship between export crops and food in some conditions, clearly conflicts can arise. Where there has been in the past unwarranted discrimination against food crops, there is a case for removing that discrimination. Colonial governments have tended to favour export crops by improving infrastructure, such as transport, marketing and distribution services, compared with facilities for domestic food consumption. Research activities and extension services also have been concentrated on export crops, particularly if linked to large firms with market power and capacity to process the crops and make profits by raising prices in the face of an inelastic demand. On the other hand, export crops have often borne higher taxes than food crops and are more easily controlled by governments, since often they grow in specialized regions, they have to

pass through ports, the buyers are more concentrated, etc. But economists have a bias in favour of trade, whether international or intranational, and against locally consumed food. Such historical biases, where they exist, should be removed.

Some scholars have gone further and have criticized colonial governments for destroying the integrated farming-herding systems which, in precolonial times, protected the ecology while allowing substantial food production. In Africa, in precolonial days, farmers opened their fields in the dry season to pastoralists who brought their herds to graze on the harvested millet and sorghum stalks. The animals were fed through the grazing, they manured and fertilized the soil with their dung, and the cattle hooves broke up the earth around the plant stalks, allowing oxygenation of the soil. The herdsmen traded their milk for the farmers' grain, and people, animals and land were simultaneously maintained. The introduction of monocrop cash production (peanuts, cotton) by colonial governments destroyed this system. In addition, well digging concentrated animals round watering sites and their trampling turned them into small deserts. Post-colonial production further encouraged this erosion of land, and in the view of some contributed to the present famines. It is, however, not clear how the traditional system could have been maintained in the face of a rapidly growing population.

In some cases export crops face an inelastic world demand. Then production should be curtailed and total proceeds raised, unless current price rises reduce future demand, appropriately discounted, by more than present gains. Such reasoning underlies the attempts to design commodity

agreements for tea, cocoa, coffee, sugar, spices, etc. Much current research is devoted to raising further the productivity and production of such export crops, not always to the benefit of the growers. The difficulty here is that, in the absence of effective commodity agreements, the national efforts of small countries are not coordinated with those of the growers and exporters in other competing countries.

A shift to export crops sometimes reduces the role of women in societies in which they traditionally produce, prepare and distribute food. In spite of the higher family income earned, this can lead to a reduction in nutritional standards. Sometimes the men migrate to other areas and leave their families with less food. But few generalizations are possible. Sometimes women increase their labour in food crop production to compensate for the reduced labour of men, sometimes producing surplus output for sale, thus raising both their income and their independence. A case is reported from Cameroon where men took up cocoa, coffee and bananas, abandoning the food farms they had previously cultivated. Women took up the slack. But the women grew the food crops in an entirely different way from the men, using a system of cultivation which involved small, daily outputs of labour throughout the growing season, in contrast to the men who had cultivated a combination of crops, requiring occasional short peaks of concentrated labour. The result was an increase in total output, of export crops and of food crops, where the additional food was grown by fewer people (only women) who used more labour-intensive techniques than the average labour intensity of men and women combined in the past.

The impact of changes to export crops on (a) expenditure patterns as a result of cash accruing to different members of the family, and in large,

discontinuous lumps rather than as a steady flow, (b) distribution of food to different members of the family, and (c) the allocation of time and effort by women to different types of work, are important areas of study. On the other hand, a shift to export crops may raise employment opportunities and therefore offer more people access to food. Jute is produced more labour-intensively than rice. A shift from rice to jute in Bangladesh therefore creates more jobs and contributes to better nutrition.

A good deal depends on the distribution of land and the mode of agricultural production. If export crops benefit large plantations or commercial farms, whereas food is mainly produced by small farmers or their wives, a switch to export crops can aggravate inequality in access to resources, income earning power and land ownership. (Examples are sugar in Jamaica and cotton in El Salvador, but even in Africa the trade bias has favoured the large export-orientated farm and firm.) Export crops are often grown more efficiently in large farms, and the change-over can lead to an impoverishment of small farmers. In African countries, additional export earnings tend to increase the income of small farmers, and the extra foreign exchange contributes to the ability to break bottlenecks in transport and agricultural inputs, which are important for food production. This was certainly the case in Tanzania in the early eighties.

How much should be devoted to export crops is also determined by trends in the cost of international transport, which in turn is affected by oil prices. The lower these costs, the stronger the case for international trade. Expectations of higher future transport costs, other thing remaining equal, would justify a move towards reduced dependence on foreign trade.

Foreign exchange is often one of the scarcest resources, while its increase can make fuller use of many domestic resources possible and contribute to greater food production, as well as to higher imports of food itself. It has already been mentioned that it is sometimes possible to increase the production of both export crops and food for domestic consumption, particularly if improved technologies are introduced. In some cases the opportunity costs of increasing exports are very small, and the choice does not arise. Land may be plentiful, and little labour and other inputs be required. Where domestic food production does decline, it is possible to encourage home gardens simultaneously with the expansion of export cash crops to ensure continuing adequate nutrition. A Kenyan Ministry of Health study of 1979 showed little evidence that four export crops (coffee, tea, cotton, pyrethrum and sugar cane) had been detrimental to nutritional status. We have seen that the only possible exception was sugar cane.

However, some qualifications are needed to the notion that resource allocation should be guided by comparative advantage, so that a comparative advantage in an export crop can buy more food from abroad than would be produced at home. The comparative advantage is not God-given but itself determined by the direction of research, and research has been heavily biased in favour of export crops and the staple grains, to the neglect of 'inferior' food such as millet, sorghum and cassava. With the growing importance of human capital, the direction of comparative advantage can be quite strongly influenced by research, extension services, education, and other forms of investment in human beings. It is no longer only or even

mainly 'endowments' that determine specialization in international trade, but conscious policy decisions.

Recently, there have been some successes in research on these 'inferior' food crops. In Zimbabwe hybrid varieties of maize, in the Sudan high-yielding, drought-resistant strains of sorghum, and in Nigeria a disease-resistant variety of cassava with three times the yield of native strains, have been developed. But a complete elimination of the bias in favour of export crops, combined with the provision of credit and delivery systems would change the comparative advantage and convey benefits to poor people. There is also some evidence that poor people are more likely to produce the things they themselves consume, and to consume the things they produce. There are several reasons for this. First, when households switch from semi-subsistence cropping for their own needs to monocropping for export, their incomes may rise but their nutritional status drop. Second, monocropping for export may raise the risk of crop failure, even though the average returns are higher. Third, export crops often take a long time to mature, and the outcome may turn out to be less profitable than expected. Fourth, there is a distributional consideration in favour of growing food. There are two dangers in simply raising the productivity of the poor by switching to export crops.

First, there may not be adequate demand for the things they produce, or export taxes may be levied, or marketing margins may be high; and, second, the price of food, on which they will want to spend a large part of their income, may rise sharply, particularly if the change involves shortages of food in local markets. These two dangers are more likely to be avoided if

the poor can meet their own needs in somewhat more self-sufficient units than would be indicated by a strict application of the theory of exchange and comparative advantage. This applies to families and households, to villages, to nations and to groups of poor nations. There are distributional advantages in this mutual meeting of basic needs which have to be set against the conventional claims of the aggregate gains from trade, which may be greater but less well distributed, more uncertain, or longer delayed.

In some countries such as Zambia, Mali and Tanzania, a dilemma arises. The above arguments for encouraging smallholder production of food for local consumption are strong. At the same time, foreign exchange scarcities constitute a bottleneck to expansion because they reduce the availability of consumer goods, fuel, transport equipment and fertilizer. If productivity in food production is to be raised, growth of inputs is necessary, and this frequently depends on importing these inputs. Productivity growth depends crucially on moving towards machinery, fertilizer and pesticides which often have to be imported and cost foreign exchange. Imports have been scaled down to the minimum, so that, without extra aid, an increase in exports is the only solution. Local food production and consumption cannot be raised without raising exports, but exports can be raised only by curtailing food for local consumption. Non-project, untied foreign aid combined with the right policies can transform this vicious circle into a virtuous one.

Generalizations, such as export crops are grown on large farms, food crops on small; export crops are grown as monocrops, food crops in diversified farming enterprises; or use more or less female labour, are

quite impossible to make, though they are often made. Some progress has been made by combining output, sales and methods of production in different ways. The best guideline is to avoid dogmatism on this issue and to promote policies that raise and stabilize the incomes of poor people, whether through exports or food for domestic consumption or both, and to make sure that they have access to the food.

To sum up the controversy: the passionate opponents of export crops, the value productivity of which is often higher than that of food production, have, on the whole, not provided good reasons for their attack, but there is a kernel of truth in their criticism of the advocates of comparative advantage as a guide to foreign trade. This can be summed up under the following headings.

1. Comparative advantage can change, particularly as a result of changes in the direction of research and human capital formation.
2. The institutional arrangements as to who benefits from foreign sales (government through export taxes, parastatals, foreign firms, plantations, large commercial farmers) and from domestic production of food (small farmers) make an important difference.
3. Local production and local markets of food can be harmed or destroyed by foreign trade. In spite of higher earnings to the country, local food prices may rise or certain foodstuffs may cease to be available. But local self-sufficiency in food, like national self-sufficiency, may also harm the poor.
4. Higher incomes to the growers do not always mean that nutritional standards of all members of their families are improved.

5. Export crops sometimes carry higher risks in production, the costs of foreign transport, and foreign demand.
6. The distribution of benefits (and power) between men and women, and between government and private agents, may be different.
7. Foreign trade contributes to a change in tastes which can make the country both more vulnerable and reduce nutritional standards.
8. Monocropping for export can be ecologically harmful.
9. In many situations experience has shown that food and export production are not alternatives but complementary.

Distribution of food within the family

In the past, it tended to be assumed that if the head of a household earns enough income to feed all members of his family, they will be adequately fed. More recently, the distribution of food within the family was more closely examined. The results are still controversial. According to some, women and children, especially girls below 4 years old, are discriminated against in favour of adult men and boys. According to others, such discrimination is greatly exaggerated. Where children and women receive less food than adult men, this can be partly explained in terms of their lower requirements, their working less or their lower productivity. It is generally agreed that in some cultures, such as Bangladesh and Northern India, girls below 4 are suffering from food discrimination. Of course, there are disproportionately many small children in poor families, and they are among the most vulnerable groups. It may also be that poor families have to concentrate on feeding the member most likely to bring in

earnings, and that is often the male adult. In Africa, female children are favoured compared with males. In many cultures it is the women who dispose over food; they control grain stores and deplete them to feed themselves and their families. It is not likely that they will be entirely subservient to the selfish demands of their husbands.

If poor families suffer from hunger and undernutrition, it is not always best to raise their income, however desirable this may be on other grounds, if we are concerned with raising the nutritional status of their children. The GOBI package designed and propagated by UNICEF — growth charts, oral rehydration, breast feeding and inoculation — may be a more effective and quicker way to improve children's nutrition, where they had been suffering from diarrhoea.

Seasonal fluctuations in food consumption increase the damage both by making the shortfalls worse for the very poor, and by increasing their number compared with a count taken on an average day. The range of benign adaptation for any given individual is likely to be exceeded, and more individuals will drop into the group of severely undernourished. In Gambia, for example, women's weight declined between pre-harvest and post-harvest seasons by 5 kilograms, and food intake per day was 60 calories lower. In Bangladesh the difference in calorie consumption per kg dropped from 62 to 50. Some of these variations may be planned. The variations may correspond to variations in required work or to the high cost and wastage of storing food. Temporarily raising body weight may be the best way to overcome these difficulties. As we have seen, there may also be a range of benign adaptation. But for very poor people the shortfalls indicate serious

stress, particularly since the periods of low intake coincide with increases in diseases and infections and higher prices of food bought.

Engel's and Bennett's Laws

There are several regularities in food consumption, which have been formulated in "laws". Engel's law states that the proportion of a family's budget devoted to food declines as the family's income rises. Although it is sometimes derived from the proposition that the capacity of the stomach is limited, it should be noted that it is expenditure, not amount of food eaten, that Engel's law applies to. Calories consumed level off well before expenditure. The law does not apply to very poor families, whose expenditure rises proportionately or even more than proportionately, as their incomes increase. It is between 80 and 85 per cent of their total outlay. The poverty line has at times been defined as that level of income at which the proportion of expenditure on food begins to decline. It is among members of the group below this poverty line that the risk of nutritional damage is greatest.

Bennett's law states that the ratio of starchy staple foods consumed declines as incomes rise. Starchy staples, comprising mainly grain and root crops, are the cheapest form of food. As incomes rise, families diversify their consumption into dearer calories. The quality of food, measured by prices paid for it, rises with income. When income is calculated for the purpose of testing these laws, addictive expenditures (e.g. on cigarettes) and interest on loans may have to be deducted before determining available income, for they do not represent discretionary components of income. While

Engel's law refers to expenditure on food, relative to income, Bennett's law refers to sources of food calories relative to income. A third law says that the average quality of food calories, measured by prices, rises with incomes.

Until recently the number of undernourished people was greatly overestimated as 40-60 per cent of the population in low income countries such as India or Nigeria. The true figure is nearer 10-15 per cent. The reasons for past overestimates are many, but largely an overestimate of required calories, neglect of the ability of people to adapt, within a range, to lower food intake without damage, and various statistical reasons relating to differences in climate, work load, and age- and sex- structure. Food requirements depend not only on climate, work, age, size and sex, but also vary both between individuals and for any given individual for different times. People can also adapt, within a range, whose width is controversial, and for a time, to lower food intake without damage. This does not mean that there are not many more deprived people than undernourished people. The 40-60 per cent may well lack many of the ingredients that make human life worth living (adequate shelter, schooling, health services, productive assets, power) and they may suffer from time to time from hunger and deprivation. But they are not chronically undernourished, and they require different projects and policies. The poor need more and better schooling, safe water, better health care, more productive assets and more power. But food deficiency is not their main problem. Giving them more food may simply leave them poor and fat. It is, however, the main problem for the ultrapoor whose principal need is higher

nutritional status. These ultrapoor spend, as we have seen, 80-85 per cent of their income on food, and this ratio does not fall as their income rises. They also consume very cheap, especially cereal calories, whereas less poor people spend large portions of increases in incomes on tastier and dearer calories.

Weight for height (in adults), height for age and weight for age (in children) are measures of undernutrition. Extreme shortfalls can lead to impaired physical development, leading to stunting, threatening mental development and even survival. But to feed more to children suffering from only moderate shortfalls may only lead to obesity. Other measures, such as better schooling, safer water or better health care deserve higher priority. Provided weight for height is adequate, low height for age probably has few disadvantages for adolescents and adults.

It might at first be thought that if people have enough income to buy adequate amounts of food for all members of the family, hunger is absent. But adequate income is not enough. For any given level of income there are wide variations in nutritional standards achieved. First, average income for a country may conceal wide differences in the distribution, and countries like Libya or South Africa, with quite high incomes, include many people below the poverty line. Second, the relative price of food may be different between countries and income groups. Even though total income is adequate for one country or one income group, higher prices of food, even though compensated by lower prices of other goods, put these groups at nutritional risk. Third, for the same income level, the amount and quality of social services, particularly health and education, provided free, will

vary between countries, so that for the same income level and income distribution, different performances will be registered. Fourth, there are gaps between income received and available for expenditure which are due to constraining obligations such as rent, interest payments, and perhaps some forms of addiction such as smoking. Fifth, food needs will vary according to the size, age, and sex composition and the amount of work of members of the household. Sixth, even for the same age, sex, climate and activity food needs vary for different individuals and for the same individual at different times.

International trade in food

In the last twentyfive years (1960-1985) international trade in food increased both absolutely and as a ratio of total food supplies. In 1960 world imports of food were about 8 per cent of production, in 1985 12 percent. Food imports by developing countries doubled in terms of calories per head in the 1970s and then increased very little in the 80s. By the mid-eighties imports provided about 15 per cent of their total food calories. This growing dependence gave rise to serious problems. Commercial food imports cost foreign exchange. Some developing countries were faced with serious debt service problems. At the same time the prices of their export commodities had fallen to all time lows. Not only had domestic agriculture been discouraged by subsidized food imports, but tastes had been changed in the direction of wheat (of which imports by developing countries rose two and a half times in the 1970s), away from the commodities that could be produced in the developing countries economically.

As we have seen, by and large, the advanced and richer countries have taxed the majority of relatively less well off urban consumers to subsidize the better off minority of food growing farmers. In the poor, developing countries, the relatively poorer rural population, including the food growing farmers, have been exploited to subsidize the better off urban communities. As a result, the world has produced large food surpluses in the advanced countries. Some of these have been used for food aid, others for commercial sales to socialist and developing countries.

But these policies have not been the only cause of the growing food exports from the developed to the developing countries. There are more fundamental forces at work. In the advanced countries, higher incomes are not spent on food. The growth of agricultural output due to research combined with the difficulty of redeploying resources from agriculture to other sectors, leads to a tendency to overproduce and export. In the developing countries, on the other hand, a large proportion of higher incomes is spent on food. Paradoxically, in those developing countries where domestic food production is growing fastest, the demand for imported food also grows rapidly. This is so because of the multiplier effects of agricultural growth on incomes and the demand for food, the autonomous growth of demand in other sectors, as well as the need to import feed stuffs for cattle. Demand for food and feed rises even more rapidly than the domestic supply of food. It is therefore the middle income developing countries, in which food production has grown rapidly, which have been the booming markets for the food surpluses of the advanced countries.

Food Aid

International food aid can play a useful part in alleviating hunger in low income countries, although its beneficial role has been disputed. Most obviously in cases of disaster, whether natural or man-made, it can provide emergency relief. Its role as a more permanent instrument of policy is more controversial, particularly because it can reduce incentives to grow food domestically, and therefore aggravate the longer-term problems of hunger.

There are at least seven criticisms that have been made of food aid, other than emergency famine relief. First, it reduces the pressure on recipient countries to carry out policy reforms, especially with respect to producer incentives and nutritional objectives. Second, it tends to depress domestic farm prices, to discourage domestic agricultural production and to reduce the spread of production-increasing agricultural technology. Third, it is unreliable, because it depends on donors' surpluses. When needs are greatest, i.e. when prices are high, it tends to dry up. Thus, in the plentiful year 1970 annual food aid exceeded 12.5 million tons, whereas in the food crisis of 1973-4, when the price of wheat rose by 50 per cent, annual shipments fell to below 6 million tons. Not only the amount and timing but also the country distribution serves the political, economic and military interests of donor countries. Thus in 1982 and 1983 Egypt received 18 per cent of the food aid distributed by the Food Aid Convention. Moreover, since donors make their allocations in terms of money, higher prices buy a smaller amount of grain. Fourth, if administered through state agencies, it is said to reinforce state hegemony over people and does not reach the poor. Fifth, it promotes an undesirable shift in consumption

patterns away from staples and towards wheat and wheat flour. Sixth, it disrupts international commercial channels. Seventh, it leads to unfair burden sharing between donors, if the price of food contributions is overvalued.

The principal objection, that it discourages domestic agriculture by depressing prices, can be met by using the counterpart funds from the sale of the food aid at market-clearing prices to make deficiency payments to the farmers who would otherwise be injured, so that supply prices are restored to the level at which they would be without the food aid. (Even food distributed free, say in schools, frees budgetary revenue if the government would otherwise have paid for it.) In this way the amount by which expenditure on food aid reduces demand for domestic food is channelled back to the farmers and incentives are fully restored. The reason why this obvious solution has not been adopted more frequently is the budgetary/political constraint. Financially straitened governments normally find other uses for the collected revenue of greater importance and cannot, or do not wish to, collect additional revenue. The argument that counterpart funds should be used for deficiency payments to farmers applies also to subsidized food imports, or to those admitted at an overvalued exchange rate.

Food aid can also be used to finance additional food consumed by construction workers on infrastructure projects for agriculture. Or food aid can be linked with other forms of agricultural assistance to avoid neglect of agriculture. Or additionality of demand can be ensured by distributing the food or its money equivalent to the poorest households who

could otherwise not afford it. But the importance of the charge has been greatly reduced, if not entirely eliminated, by the fact that many developing countries have become substantial food importers. (Only in low-income African countries is food aid increasing as a proportion of food imports.) In such a situation the traditional roles of food aid and financial aid are reversed. Food aid, in so far as it replaces commercial purchases, becomes fully convertible foreign exchange, whereas financial aid often remains tied to procurement, commodities or projects. It has, however, been argued that the free foreign exchange made available to governments presents an obstacle to fundamental reforms, such as devaluation of the exchange rate, or investment and reforms in agriculture, which would raise food production. This is not, however, an argument against food aid, but against all forms of intergovernmental aid. Such aid can be used either to support or to delay reforms.

Food aid can be used either as balance of payments support or as budgetary support. The two extreme cases are, first, where the food aid is wholly additional to commercial purchases and is sold by the government in open markets at market clearing prices, yielding government revenue in the form of counterpart funds of the maximum amount; or second, where the food aid wholly replaces commercial imports and the foreign exchange saved is used to buy other imports, or more food, or to repay debt.

Historically, there are many instances of food aid that did not harm domestic food production. Forty per cent of Marshall Aid consisted of food aid, yet European food production flourished, excessively. Similarly, South Korea, Israel and India received large amounts of food aid, without apparent long-term harm to their agriculture.

The charge of disruption of commercial sales is greatly reduced by the shrinking and now small role of food aid in total world food trade. If food aid wholly replaces commercial sales by the donor (the government pays the farmers what they otherwise would have earned) no disrupting effects on sales by other countries are suffered. Ensuring additionality, e.g. by linking it with job creation for poor people who spend a large portion of their income on food also reduces the damage to commercial sales.

Additionality of supply is also important in order to meet the charge that advanced countries that are commercial food importers are faced with higher prices than if, in the absence of food aid, the food had to be sold through commercial channels, lowering prices. The valuation of the food aid has to be done in such a manner as to ensure fair burden sharing between food surplus donor countries and food importing donor countries.

Another charge against food aid is that tastes depend, to some extent, on relative prices and food availabilities (and are not given exogenously, as is often assumed in economic analysis). A prolonged policy of finer grain imports changes tastes away from domestically produced food stuffs and, it is alleged, increases dependency on foreign supplies. The situation has been described as analogous to drug addiction, countries becoming "hooked" on grain. It should, however, be remembered that these changes in tastes have many causes, connected with development and urbanization, with commercial import policies with the growing value of time as incomes grow, and reduced time available to women to prepare food as they join the labour force, and that food aid is only one, possibly small, contributory cause.

The volume of food aid has been greatly reduced in the last twenty years. Food aid has, however, increased since 1975. In the sixties it had

been as high as 16-17 million tonnes in some years. In 1973-4 the cereal tonnage had fallen to 5.5 million tonnes. In 1976-7 it was 9 million tonnes and in 1984-5 had risen to 10.4 million tonnes. The 1985-6 figure is higher because of emergency aid to Sub-Saharan Africa. There has been an increasing proportion of non-cereal food aid, not covered by these figures, especially EEC aid in dairy products. The aid component in food aid has also increased and more has gone to the poorest countries. Africa has benefited at the expense of Asia, and within south Asia Bangladesh at the expense of India, and project and emergency aid have replaced bilateral programme aid.

At the same time, so-called subsistence crops such as sorghum, millet, yams, cassava and bananas could be traded in local and even national markets, if they were not discriminated against. Low prices of subsidized grain, the import of which is encouraged by overvalued exchange rates, or which is supplied by food aid, discourage the production of these "poor man's crops" for the market. Although devaluation would encourage the production of export crops, the demand for the subsistence crops would also rise and would constitute an incentive to produce more. The precise amount would depend on the elasticities of substitution in supply and demand. Relatively little research is done on these crops, although there are some exceptions, such as sorghum in Maharashtra and the Sudan, and maize in Zimbabwe. The International Institute for Tropical Agriculture in Ibadan (Nigeria), which is part of the system set up by the Consultative Group for International Agricultural Research, specializes in research on roots and tubers. But more could be done for these crops, especially millet and

sorghum. Even where research on food crops has been successful, African countries lack the indigenous research capacity to adopt and adapt the results of this research, so that much expenditure on research has low yields.

To give greater encouragement to research on subsistence crops would have the advantage that they can be grown on marginal land, do not require a sophisticated technology or complex skills, are ecologically benign, and have frequently great nutritional value. They can also be used to supplement the more preferred cereals when these are in short supply, through additions to wheat flour or maize meal. But even if research in this area were to yield good returns there are limits to what can be expected. These crops, particularly roots and tubers, are bulky and expensive to transport. Storing and processing them is costly and often capital-intensive.

The various criticisms that have been advanced against food aid have led to the recommendation of better alternatives. Among these is a financial insurance scheme. Countries would then be able to buy food in commercial markets, and not be dependent on the political vagaries of donors. Unfortunately, such insurance schemes have not been very successful in the developing world, largely for the well-known reasons of adverse selection and moral hazard. The International Monetary Fund's Compensatory Financing Facility mentioned above was extended in 1981 to apply to cereal imports. The criticism of unreliability of supplies can also be met by multi-year commitments of grain at flexible delivery. These can be bilateral or by groups of donor countries.

Food aid, properly designed and administered, is only one way in which the international community can help poor people in poor countries to be better fed. But its success depends on the ability to match the motivation and mobilization of food surpluses from advanced countries to the food needs of developing countries. A more sensible approach would be for the international community to support efforts by developing countries to eradicate hunger. Many domestic measures aiming at this entail difficulties. A land reform, giving land to the tiller, may cause a temporary drop in food production. A tax reform may lead to capital flight. Redistribution of income through employment generation may lead to inflation, balance of payments difficulties, strikes and capital flight. If the international community is serious in wishing to eradicate world hunger, it would provide resources to the reforming governments to tide them over such temporary crises and difficulties. They would be like the present Structural Adjustment Loans of the World Bank; only they would be Radical or Reformist Adjustment Loans.

The limits of food supply

We have seen that for a long time, people have expressed concern that population growth will outrun food supply and force people to starve. In fact so far food has increased more rapidly than population. In the last quarter century, 1800 million additional people were born into this world. Agriculture has responded to this by producing enough food and better quality food for these extra people. While certain regions, such as Africa,

and certain groups, have faced shortages, global quantities and qualities have not fallen short. Fears in the early 1970s of chronic global food shortages have proved wrong.

This does not mean that we can be complacent about food supplies. There are limits to raising food production. Environmental threats arise from the package of fertilizer, irrigation, pesticides and mechanization. Water is becoming a very scarce resource. The chemical effects of fertilizers can be hazardous. Pesticides also threaten human health. Forest clearance, slash-and-burn agriculture and cropping on hillsides in arid zones have led to soil erosion throughout South America, Africa and South Asia. Desertification is spreading. There are ways of avoiding or at least reducing these threats, without reducing food production. For example, chemical pesticides can be replaced by natural pest predators and resistant crop strains. Terracing, intercropping and agroforestry can reduce soil erosion. Economies in the use of water can be achieved by raising the efficiency of irrigation systems. Pressures on available land can be relieved by more intensive cultivation. But this can lead to erosion, water shortages and fertilizer and pesticide runoff. Erosion can be reduced by no-till farming, but this implies greater reliance on herbicides. Pest control can lead to resistant species. The high yielding varieties make greater claims on water, fertilizer and pesticides and reduce the genetic diversities of the wild varieties.

Sustainable food production calls for soil conservation and erosion control; more organic rather than artificial fertilizer and recycling of plant and animal wastes; conservation of water resources; more efficient

irrigation, re-use of water and crops of less water demand; promotion of diversity of biological strains in agriculture and symbiotic relationships between cultivated and wild biota.

Many of these ecologically sound policies coincide with policies for greater equality. Ecologically sound techniques are particularly appropriate for small farmers. A land reform redistributing land to small farmers would also generate the demand for food crops.

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