

Will Mankind be Able to Secure Food in the 21st Century?

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I am honoured to have been asked to address this important international symposium. Your concern here is with a problem that is both one of humanity's oldest plagues and one of its most immediate. Hundreds of millions of people around the world today co-exist with the grim spectre of hunger. Hunger is no stranger to our midst, but perhaps never before has it presented such an intolerable contrast between humankind's capability and its will to act. In the light of the tremendous scientific and technological expertise that is available, the persistence of hunger casts an appalling shadow. And it raises painful moral questions about the commitment of individuals, institutions, and national governments to the well-being of all people, even the poorest.

There are ample scientific and technological grounds for asserting that the world is capable of producing enough food to meet projected population increases for the foreseeable future. When we begin to consider, therefore, why hunger persists in today's world, of necessity we enter the murky waters of political will, vested interests, shifting social values, contradictory goals and imprecise perceptions. This is the area with which I wish to deal today-- for I am not an expert on food and nutrition but rather a student of the complexities of development, which manifest themselves in so many unforeseen and unintended ways.

I also would like to touch briefly upon the role that Japan might play in helping the world fight its battle with hunger. This is a land which, not so many years ago, also knew wide-spread hunger and deprivation and where the struggle to eke out an existence from the soil was an arduous one. When the Meiji Restoration was launched more than a century ago, the average Japanese family was spending 64 per cent of its household income on food; in 1980, the comparable figure was 29 per cent. Japan now has the highest life expectancy in the world, and one of its chief causes, in the view of experts, is the well-balanced diet of the average Japanese. Japanese agricultural productivity per hectare is envied throughout the world. So too, I suspect, are the Japanese farmers, for the extraordinary level of public subsidy to their production that public opinion in this country seems to support with few reservations.

Japanese farmers produce extraordinarily large amounts of food on extraordinarily small plots of land, compared to their counterparts in the other leading industrial powers. Though small in scale, these farms are

highly capitalized, and draw upon the scientific and technological results produced by just such advanced centres of biological research as this one. Japanese farmers are today able to produce most of the rice, vegetables, poultry products and fruits needed to keep this citizenry one of the healthiest in the world. Agricultural productivity in Japan - with its intensive use of chemical fertilizers - is, of course, also very reliant on imports of other goods. Withal, Japan is an excellent example of how natural resource constraints on food production can be overcome-- and of how extremely expensive and socially demanding it can be to do so.

For this audience, I need not spell out the stark dimensions of the world's present food crisis in great detail, since other speakers will do so with far greater expertise than I can offer. I shall refer only to the broad outlines, to remind us of the truly staggering problems still to be faced in the battle against hunger. Estimates of the number of people who are chronically undernourished differ by a factor of two-- from half a billion, according to FAO, to one billion, according to the World Bank. Whatever the figure, a world in which at least one out of eight people-- and possibly one out of four-- is always hungry, is not a world that we can hand over in good conscience to our descendants.

Much of the world's attention at the moment, of course, is focused on the unfolding tragedy in Africa, where as many as 100 million people are afflicted by severe malnutrition, and where one of every 200 people is a refugee. The existence of those headlines has sensitized many people to the need to deal with hunger in its most immediate and extreme manifestation - famine. The willingness of the global community to rush food relief to areas afflicted by disaster has reduced the magnitude of the tragedy somewhat, but the unedifying spectacle of human intransigence, greed and callousness reminds us that the worse dimensions of famine in our time are man-made. It is interesting to contrast the current situation in Ethiopia with that of the Indian crop-failure of 1964 and 1965. In the latter case, early anticipation of the impending food shortage, full and relatively efficient co-operation by the governing authorities, and a prompt response by donor countries combined to avert wide-spread starvation even in the midst of nearly total crop failure over a large region. By contrast, in Ethiopia, the food shortages produced by drought and long-term ecological deterioration have been exacerbated by war and politics. In many modern conflicts, food deprivation has been a matter of policy. International relief has been available in most of the major famines since World War II, but food still has not always been made available to those in need. As has been vividly demonstrated in the case of Ethiopia, when people die of starvation, the media of mass communication have been able to appeal successfully to the consciences of people in many countries. They have been less successful in appealing to the consciences of authorities who would manipulate the supplies of food, and even the images of suffering, for political ends.

Acute episodes of hunger are easily focused upon, and their terrible ravages do eventually subside. Endemic hunger is a much tougher problem. Its roots are embedded deeply in poverty and social structures, but being less visible, it is also less dramatic and fails to capture the conscience of the affluent. It is, however, one of humanity's most dreadful scourges. It impairs the normal physical and mental growth of children, reduces the

capacity of adults to work productively, reduces resistance to infectious disease, and constrains the intellect, the emotions, and the spirit.

The core problem is that much of the world's population lacks either the income to pay for adequate food or the means to produce it. Even in famines, as mentioned, food has often been available, even exported, while people starved because they could not purchase it. The food surpluses of North America and the EEC, resulting in part from subsidies that operate without regard to domestic demand, cannot solve the long-term food problem for developing countries. Indeed, the distribution of subsidized imported food seems to worsen the problem by undermining the incentives for local farmers to produce a surplus.

There are at least three reasons for confidence in the technical ability of the world to produce enough to feed itself in the next century.

- First, there are large discrepancies between the crop yields of the most advanced countries and the less developed ones. For example, Japan harvests seven times as much cereal per hectare of arable land as Nigeria does. But its fertilizer input per hectare is 65 times as high as Nigeria's.

When there is such clear evidence that yields can be increased several-fold, food shortages cannot be blamed on physical limitations to food production-- if intensively farmed, the arable land in the world is capable of producing the food needed. Moreover, the experience of the last three decades indicates that expanding output through higher yields costs less than bringing new land under cultivation.

- Second, it seems clear that much land presently being farmed is being used inefficiently. Changing to more appropriate crops, for example, could make a large difference in total production. Enormous quantities of organic wastes from fruits, vegetables, animals and humans, as well as cellulosic and starchy residues, could be used as fertilizers, as microbiological substrates for incorporation into feed stuffs, and for some single cell proteins grown on starch or sugar substrates for direct human consumption. The demonstrated potential in multiple cropping, inter-cropping and other such practices are presently exploited to only a limited degree by most Third World farmers. Finding ways to bring scientific knowledge to the fields is one focus of our research and training at the United Nations University.

- Third, the technical boundaries of world food production are likely to expand enormously as research now underway on the frontiers of science begins to bear fruit. The techniques of recombinant DNA added to those of the conventional breeder will assure more efficient plants and animals. Increased growth rates and heightened disease resistance for both plants and animal are already being achieved. Nitrogen fixing capabilities can be enhanced for some plants, pest resistance can be improved, better storage characteristics introduced and actual new food plants created.

We are at the beginning of a new agricultural revolution-- following the Green Revolution, it might be called the Gene Revolution, for it is based on the new, most advanced techniques of microbiology. However, even as this

new prospect unfolds, we should keep in mind the lessons and missed opportunities of the Green Revolution. In many settings, its techniques have increased social inequality along with food production. The Green Revolution did much to resolve the supply-side causes of hunger, but it has left us with a vast unresolved demand-side problem-- namely, that the poor still cannot afford to buy the miracle rice and miracle wheat, just as they could not afford to buy its humbler predecessors.

The very successes of the Green Revolution have highlighted other problems that are not susceptible to laboratory solutions. These are the political and institutional problems that constrain both food production and the purchasing power of would-be consumers, such as inequitable land-tenure systems, exploitative tenancy relationships, disincentive food-pricing policies, the neglect of rural infrastructure and services, the over-regulation of markets, and so forth.

The disincentives of low agricultural prices have also encouraged migration from rural areas-- swelling already unmanageable cities and stripping the rural areas of their young and most ambitious people. At the same time, these policies dampen the potential rural market for manufactured goods and thus generally slow economic or industrial growth in the nation as a whole.

To be sure, there have been successes in certain Third World countries-- and, interestingly, they have not respected any particular ideology. A common denominator of these successes would appear to be concern for the small farmer and encouragement of his or her agricultural production through a now-familiar menu of such measures as agricultural extension programmes, credits, and access to the necessary inputs of seed, fertilizer, and pesticides. Similarly, when one looks at the failures-- again characterized by no particular ideology-- one can also see a common denominator: protection of the status quo or vigorous pursuit of new privilege by elites who have little stake in increasing production of food for the masses.

Though the world food problem is global in its ramifications, it must be tackled at the national level first and foremost, for this is where the heart of the problem lies. Hunger and poverty are inextricably interlinked, and malnutrition is patently the disease of the poor. The interaction of poverty, high population growth, and oppressive social structures in the countries of the Third World is the greatest impediment to the eradication of hunger and malnutrition. There are whole regions or pockets within these countries in which absolute poverty has been endemic for generations. In these, one finds severe malnutrition associated with a markedly shorter life expectancy and a much higher infant mortality rate than the national average. But this kind of endemic malnutrition is relatively easy for governments to ignore. It doesn't cause sudden chaos in markets, or provide inescapable, visual images of people dying en masse. It is normal, and unless some dramatic catalyst arises, it does not upset the system.

It is now widely recognized that earlier development strategies, based on emulation of Western industrialization patterns and an anticipated

trickle-down of economic growth, have not responded to the needs of those living in absolute, endemic poverty-- in many cases, the adoption of such strategies has only left the poor farther behind, more marginalized and powerless. But it is hard to believe that the relative quiescence of the hungry masses will continue. There are now an estimated 1.2 billion children under the age of 15 in the developing world, most of them in rural areas, who will soon put enormous pressure on the job markets as well as the political systems of these countries, whatever their ideology. The creation of adequate employment opportunities must be facilitated both through the encouragement of labour-intensive small businesses and factories and through essential public works projects for the building of local infrastructure. The construction of roads and irrigation systems, the terracing of sloping farmlands, and the reforestation of barren lands can and should be done in ways that simultaneously address the food and energy needs of small farmers and landless labourers.

The possibilities for dispersed rural industrial production systems in developing countries with significant impact on direct and indirect employment and capable of competing with urban production centres, should not be overlooked. The realization of such possibilities would ensure that the urban areas would no longer monopolize new economic opportunities. This in turn might lead to new and more equitable urban-rural configurations, a central issue whose solution has so far escaped all development efforts aimed at poverty reduction. The prospects of this kind of rural industrialization hinge on a systematic effort constantly to modernize existing technologies and continuously to integrate old and new technologies. It also depends on linking up traditional crafts and social infrastructures with modern, even computerized, quality control and marketing systems.

One could think of a number of areas in the developing world where the preconditions for such an effort seem to exist. Experiments have shown that the productivity of fish and other aquatic organisms is enhanced through induced breeding and polyculture techniques, and through the synergistic combination of animal husbandry practices such as poultry raising and aquaculture. A report of experts to the United Nations relates the experience of rural women successfully trained to induce carp breeding by extracting the pituitary hormone and injecting it in female fish. Textile production is a major industry in developing countries and one where large modern establishments and traditional small local industries can and do co-exist successfully. In most cases, advanced but appropriate technology is not only more productive, but is also more sparing of natural resources and the environment.

In many parts of the Third World, the combination of poverty and overpopulation has already upset the ecological balance between man and nature. In these areas, there is no prospect of supplying food to the growing populations unless soil erosion and other kinds of deterioration of the natural environment are halted. Public works projects for this purpose could both provide additional income to the poor and improve the carrying capacity of the environment.

In the end, really, it will be the many hundreds of millions of individual actors among the globe's poor and hungry whose decisions will determine the future state of the world that must be shared by rich and poor alike.

The elimination of poverty, and the hunger and malnutrition so deeply rooted in it, is clearly a political and not a technological problem.

It is important to recognize, moreover, that there is no one set of policies that will promote agriculture and food production in the Third World; in addition to regional food-security arrangements, specific strategies must be designed for each country tailored to its own particular food problems, ecological conditions and social structures. Some specific recommendations may be applicable to many local situations - including the necessity to strengthen agricultural research capabilities, expand extension services, and give farmers access to credit facilities when they need them. But at present, policy-makers either do not have or have not chosen to follow well-thought-out strategies for eliminating malnutrition in their societies. There is great need for researchers to do the hard work of designing such strategies in detail for each country or at least for categories of countries with similar conditions. In short, much still needs to be done before we can place the entire blame for the lack of progress on lack of political will.

This suggests, to me, an important role that a leading industrial power like Japan might play in helping to solve the problem of hunger. Japanese scientific expertise in improving food production could be brought into play - and we at the United Nations University have had first-hand experience with that expertise through our co-operative work with organizations like the National Food Research Institute at Tsukuba and the National Institute of Genetics at Mishima.

Japan can help, with both scientific resources and funds, in promoting research into food production and improved agricultural techniques appropriate to the food-deficient nations - particularly in Africa where the agony is so great and the need so urgent at the moment. There is general agreement now that an effective attack on hunger must include co-ordinated action in many fields - and for that very reason it is imperative that researchers should be able to present policy-makers with detailed recommendations leading to both greater food production and adequate levels of food consumption. These can be done only on the basis of detailed analyses of many aspects of the food situation-- and that kind of research is beyond the means of many poor countries. African governments, for example, tend to have unstable sources of income whereas the research that is needed demands a stable and continuous commitment.

Researchers in Africa and other food-deficient regions, need an economic base that will allow and encourage them to remain in their own countries. Due to lack of domestic funding, the best young scientists are now too often lured away by the promise of lucrative jobs in northern research laboratories. International funding could do much to help alleviate this situation-- and Japan, with its own proud record of scientific expertise

that has helped to improve the health and lives of its own people, could be a logical and appropriate leader in this funding effort.

Whatever the specific form of assistance the Japanese contribution should take, a major criterion applied to potential recipient governments should be convincing and clear evidence that such support will be used to benefit the population as a whole and not wind up improving the position of national elites. One way to help ensure that funding is free from national politics and selfish interests is to offer it through international channels.

It is, of course, only natural that a nation should wish to direct its aid to where it is perceived to best serve that nation's self-interests. I, for one, firmly believe that the ultimate long-term interests of the industrial nations would best be served through "no strings" support, permitting the aid to be applied within the framework of the recipient nation's own culture and values as it seeks to build self-sufficiency. Aid in this form by Japan could help its needy neighbours in this part of the world to take their rightful place in the community of nations, in full justice and dignity. We now know full well hunger's adverse consequences for individual growth and equitable participation in the global community, which translate into a serious impediment to economic and social development. The elimination of hunger is both a moral imperative and a matter of enlightened self-interest.

At the United Nations University, we are seeking to strengthen the capacity of institutions in the developing countries to provide the needed research, advanced training, and advisory services in food and nutrition. Our focus is a multidisciplinary one - recognizing that hunger and poverty are set in a web of economic, social, cultural, technological and political forces. Our aim is to stimulate the nutritionist to work closely with the anthropologist, the economist, the rural sociologist, the political scientist and many others in a collaborative effort at mutual understanding of the interplay of these many forces. In Africa, for example, where famine is at present the most severe in recent memory, such efforts are aimed at strengthening the capability of African institutions and scholars to address more effectively the food and nutrition-related problems facing the continent. In addition, we are working to establish an Institute of Natural Resources in Africa. It will seek to address a broad range of problems related to the use and proper exploitation of Africa's vast endowment of natural resources by Africans. The institute will also provide an opportunity to look at the proper use and management of land, water and energy resources which are crucial to improving the agricultural productivity of the African continent. The UNU is in addition trying to play a part in setting in train the immense social learning process that must be involved in the attack on hunger-- one involving not only scientists but also farmers, consumers and local communities.

Will mankind be able to secure food for the 21st century? I think the jury is still out on that question. But it is important to recognize that we, the peoples of the world, from rich and poor nations alike, are the jury on this question. The scientific and technical evidence has been marshalled, impressively and believably, that the world can produce enough food to feed

its people in the next century. Whether we in fact will do so, and thus end the ancient and intolerable curse of hunger, is something we must decide together. Thank you very much.

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