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ON

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Message from the Director-General of the Food and Agriculture Organization of the United Nations (FAO) to participants in the United Nations International School Conference "Food and Development"

I would like to congratulate the students of the UN International School on their decision to organize a conference on the theme of "Food and Development". This will be an important means of demonstrating their concern for the problems of world hunger and their commitment to the eradication of poverty.

FAO is the organization in the United Nations system which is charged by its Member Countries with the responsibility for tackling these problems. Young people, especially, should understand the causes and effects of world hunger and the action which is required to achieve freedom from hunger. It was for this purpose that the Member Governments of FAO decided that 16 October 1981, commemorating the establishment of our Organization in 1945, should be the first World Food Day. It will be an international demonstration of solidarity by all those concerned with food and development issues and help to increase public awareness.

It is gratifying to know, therefore, that this Conference and an essay contest among students in the School will provide advance support for the first World Food Day, in 1981. Both initiatives deserve the fullest support. I send my best wishes for their success.

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HUNGER

Food is the most basic of human needs; yet millions of people live out their lives in hunger. They are not faceless refugees from drought or war. They are children who cannot understand their own pain; mothers who starve themselves to feed the children they have, and jeopardise the health of those not yet born; the aged who are last in the food line because they are no longer considered useful.

Yet, the problem of world hunger will not go away unless we understand its causes. Several factors in the past decade have made us more aware of the increasing urgency of food production and its distribution. The Sahel drought of the early 1970s alerted the world to the fragility of the environment when faced with increasing population pressure. A world food crisis took place in 1973-74. The increases in oil prices put further strains on the world's production and distribution systems. Population growth, inflation, and recession were dangers added to the wars and natural disasters that caused millions to flee their farms and become refugees who were fed through the charity of others.

Triage:

It is common to blame world hunger on the population explosion. Has the world in fact reached the "Limits of Growth", and are some people condemned to die while others live? The term Triage comes from the World War I field hospitals where doctors would have to divide the wounded into three categories: those who would survive in any case; those who would most likely die; those who were seriously wounded but would survive with the use of the limited medical facilities available. Do we put all our development resources into that last category and ignore the poorest, condemning them to sure death? Who decides? Who has the right to decide? Are there no alternatives?

Poverty:

The alternative lies in viewing the facts through a different perspective. It is not that there is not enough food to go around. It is divided unequally. The world produces enough food to assure every man, woman and child enough to eat, but there is a dislocation in both what is produced and how it is distributed. World hunger is caused by poverty; people cannot buy what they need to feed themselves and their families. To eradicate this poverty, this imbalance in distribution, is the task of development.

DEVELOPMENT

The aim of development is to enable people to fulfill their basic needs for food, shelter, health and education in a self-reliant and self-respecting way. People are not poor because they are lazy but because they have been denied the means of gaining control over their lives. They need land; they need jobs; they need the infrastructure, the web of services such as health, education, transport, credit, and marketing facilities, to supplement their own efforts. All this costs money, and in the field of development economics there is much controversy as to where this capital should come from and how and where it should be invested.

The New International Economic Order

We are starting the United Nations Third Development Decade with caution and some degree of pessimism. The 1960s and 1970s defined the problem of the growing disparity in the wealth of the industrialized and the under-developed, or developing, nations. The former, many of which had once owned colonies, are centered in the temperate "North". The developing countries, many of them ex-colonies, are in the semi-tropical "South". At first the causes for the difference in wealth seemed obvious - one set of countries had become industrialized and made progress at the expense of the other.

In the Sixteenth and Seventeenth centuries, when European states expanded into Asia, Africa, and the New World, colonies were established to serve the economic interests of the mother countries. The strength of the colonial powers weakened after World War II, enabling those colonies to gain political independence.

However, the ex-colonial countries discovered that political independence does not guarantee economic freedom. They lacked both the technology and the capital to exploit their raw materials. Many of them depended on an economy incapable of supporting the nutritional needs of the population and,at the same time, providing an exportable surplus. A new era began, commonly known as neo-colonialism. During this era, the industrialized countries encouraged the ex-colonials to switch to mono-crops for export and stripped them of their raw materials in exchange for the technology and capital needed for development. Neo-colonialism paved the way for transnational corporations and provided opportunities for the industrialized nations to offer aid, which usually came with strings attached. Much of the independence gained politically was lost again economically.

In order to become economically independent, these countries needed development technology adapted specifically to their needs. In 1961 the United Nations declared the First Development Decade, which was designed to raise the economic power of the developing countries to a point where they would be able to share the physical and social well-being of the developed world. During the Second

Development Decade, in the 1970s, it was discovered that the gap between the developed and developing countries was becoming larger rather than smaller. A New International Economic Order was called for in the Fifth and Sixth Special Sessions of the General Assembly in 1974 and 1975. Through the new order the developing countries hoped to reshape the patterns of growth perceived to be unilaterally in favour of the developed countries. The latter were asked to give 0.7 percent of their GNP to the developing countries, and plans were made to modify international trade and the transfer of technology. We are now in the Third Development Decade and the gap between developed and developing countries has not closed. In fact, developing countries that import oil have become so indebted now that they have to borrow even more in order to pay for their essential food imports. This means that they can still barely feed their own populations, even with extended aid, and they are certainly far from being economically self-sufficient.

The Report of the Independent Commission on International Development Issues (the Brandt Commission) stated that the North-South negotiations have become "the dialogue of the deaf". The objectives, goals and concepts for development remain largely the same, namely to enable the developing countries to become a self-reliant part of the world economic system. But the strategies that are needed to achieve these goals must be changed in the decade of the 1980s.

Development Strategies

The various suggested development strategies fall into two groups:

Supply: Increase the supply of goods, both to bring down prices and to have more to go around. The term "goods" includes food, manufactured items, energy, services. The emphasis is on large scale production, industrialization, agribusiness, trade, banking - a marshalling of all the best in modern technology and managerial skills. One aspect of this strategy is the creation of the incentive to produce. People are most productive when it is in their own self-interest.

Demand: People have to be able to buy what they need. Unless active measures are taken to bring the means of making a living to the poor, the inequity within and among nations will continue. Development strategies that are concerned more with demand - with who needs what and how they will get it - focus on smaller communities and their self-reliance.

The view is expressed that the first strategy enables the rich at least to stay rich, if not to get even richer, while the poor continue to wait for the trickle down effect to reach them. Humanitarian motives even encourage such strategies in urging aid in the form of food and government loans to buy imports. Economists and politicians who favor the second model become suspicious whenever they see a plan with a large component of supply side aid. They see it as perpetuating the pattern of dependency where the poor continue to buy or receive from the rich rather than producing for themselves.

Many economists in the developed world are also beginning to view supply-side strategies with misgiving. Who is going to pay for the massive aid and imports? The mounting debt of the developing countries is becoming increasingly difficult to finance with yet more loans. Not only is self-reliance a more equitable strategy but it is also economically wiser in the long run.

Industry vs. Agriculture

If we turn to strategies of development for self-reliance, we meet yet another dispute. In shorthand you might call it that of industrial vs agricultural development. The argument of the pro-industrialization developing countries is that it was the Industrial Revolution that brought power and prestige to Europe and enabled it to dominate the world. Only industrialized nations can meet as equals in the global market place. Any attempt to keep more than half the world in a pre-industrial state is a plot to perpetuate inequality. Nobody thinks in quite such simplistic terms, but there is nevertheless some justice in the proposition that industrialization is essential for a country's economic strength.

Some developing countries have been able to use the aid of the past two decades to begin to industrialize. Their success has been so marked that they have added another group of letters to the alphabet soup of so much UN terminology; they are the Newly Industrialized Countries, or NICs. Brazil and the Republic of Korea are examples of such countries whose exports compete successfully on world markets. But that still leaves the LDCs and MSAs, or Least Developed Countries and those Most Seriously Affected.

The funds needed for investment in heavy industry and energy projects are not forthcoming from the developed countries. It depends on how you look at it - economically or politically. The money is not there because developed countries are experiencing recession; or the money is not there because the developed countries don't want to spend it on that kind of development. If you espouse the first alternative, you will have difficulty explaining why "the money was not there" in pre-recession days. If you lean towards the second explanation you might have little sympathy with the following strategies.

Basic Needs

Because development money is scarce it must be used in ways that most directly benefit the larger number of people. These are the poor in the rural communities of the Third World. They need an income to buy food, they need clean water, health services, schools. The Basic Needs approach was first voiced by the World Bank and immediately became controversial. It was attacked by two philosophically distinct groups. One group saw it as a diversionary tactic by the rich countries: by helping the poor within the poor countries they were still not raising those countries to their level. The other group recognized the revolutionary potential of that strategy; by making the poor self-reliant they would eventually challenge the control of the elites within their own countries. One cannot have it both ways!

Agricultural Development

There seems to be growing unanimity that agricultural development should be the area to concentrate on in the next decade. Supporters of the Basic Needs approach see that agriculture is closer to the rural poor than industry. Those who feel that industrialization is more important realize that countries first need to feed their people. Precious capital is being used to import food. If countries were more self-reliant in agriculture, that capital could be used to invest in industrial development. The FAO is particularly pleased that in all the haggling over a development strategy for the 1980s and in the context of the global round of negotiations going on at the United Nations now, most countries agree on the need for agricultural development. However, there is still the problem that most of the rich nations will not be prepared to transfer the 0.7 percent of their GNP, as promised a long time ago, to the poor countries. The new Reagan administration in the United States is even considering cutting its ODA (Official Development Assistance), which stands somewhere around a poor 0.2 percent of GNP as it is. If the rich cannot or will not help the poor, can the poor help themselves?

Cooperation Among Developing Countries

Technical Cooperation among Developing Countries (TCDC) was proposed by the developing countries at the United Nations in 1972 and further explored in a conference in Buenos Aires in 1978. This plan involves a sharing of technical resources, skills and capacities among developing countries for their mutual benefit. The developed nations of the first and second world (free market economy and planned economy, respectively) have for the past three decades dominated the field of science and technology, employing more than 95 percent of the world's research and development. The Third World nations, although representing 70 percent of the world's population, have only 5 percent of the world's research and development capacity. The Vienna conference on Science and Technology for Development in 1979 did not give the developing countries any hope for the transfer of technology, so the answer is still - cooperation among themselves. TCDC would set up ways for the developing countries to exchange and share information about ways they have discovered to solve their particular problems. Joint research centers would be established, and developing countries would be neither dependent on the industrialized countries for technology, nor be forced to use methods that are not suited to their needs.

The search for increased self-reliance and economic independence has led the developing nations to a stronger emphasis on mutual cooperation - and hence ECDC (Economic Cooperation among Developing Countries). This program does not imply that the developing countries wish to disassociate themselves from the North. They wish to achieve greater self-reliance on a national and collective basis to attempt to reduce economic reliance on the North, to rely more on themselves.

It remains to be seen whether TCDC and ECDC can fulfill their promise. Regional Cooperation among Developing Countries (RCDC) attempts to reorganize the approach to this kind of development by grouping it in smaller units. Some areas of cooperation among neighbouring countries could be: expansion of South-South trade,

joint production and marketing ventures, creation of jointly owned banking facilities, joint agricultural policies, field testing and adapting new and appropriate technologies, developing local and regional energy sources, and coordinating cultural, social and educational policies. Through such schemes countries sharing the same river basin or ocean resources could participate to overcome common problems of development. RCDC should be accorded equal importance in the examination of all development strategies. It brings greater cohesiveness to South-South cooperation and so strengthens the collective self-reliance and negotiating power of the South vis-a-vis the North. It is a strategy towards achieving an equality in bargaining power between developed and developing countries, a necessary factor in achieving a New International Economic Order with peace and mutual agreement.

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The particular aspect of development that we are concerned with in this conference is food production and distribution. The first question is "What is an adequate diet?"

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NUTRITION

Many quotations have come down through the ages to illustrate the relation between food and the very fact of being human. Mann ist was er isst - man is what he eats. Mens sana in corpore sano - an alert mind in a healthy body. Food is basic, not only to man's biological nature but to his intelligence, his personality and his functioning in society. Hunger is not only cruel and unjust; it is also a waste of human resources. Malnutrition greatly inhibits the growth of a developing country. Approximately 653 million people, excluding those in centrally planned Asian economies, have inadequate diets and food intakes below the critical minimum energy level (1500 calories per day). Without this essential proper diet, the population of developing countries are more prone to brain retardation and disease and thus have neither the energy nor the knowledge to develop their economies. Better nutrition produces multiple effects. Empirical studies prove conclusively that when fewer children die the birth rate goes down. When people are stronger and more alert they can work better and participate more fully in shaping the decisions that will affect their lives. If we hold on to our definition of development as improving the lives of all the poeple, then adequate food is at the very heart of it.

What is an adequate diet and what are the physiological effects of food deficiency? The base of 1500 calories a day is just about enough to keep a man sitting all day. Calories requirements vary from size of body to type of work. The poor in the world (and there are millions of hungry people in

developed countries also) consume an average of 2000 calories a day. This implies that many eat less. The rich eat well over 3000 calories a day. Their dietary problem is often obesity.

There is a distinction between undernourishment and malnutrition. Hunger is painful but does not, of itself, cause irremediable damage. Malnutrition is the lack of specific nutrients that cause specific physiological symptoms. It can be caused by long term hunger, but some of its effects can be reversed if treated in time.

Protein - Calorie Malnutrition (or Protein - Energy Malnutrition) is caused by insufficient protein in the diet, and affects mostly small children. Nutritionists today consider that protein deficiency will not normally occur if the overall calorie intake is adequate. There is sufficient variety in such diets, when grains are supplemented by vegetables, to assure a balance. However, poor children are particularly vulnerable. Not only do they not receive enough food, but their susceptibility to gastroenteritis makes it difficult for them to absorb what they do get. Each new attack of diarrhea makes them weaker and so more vulnerable to the next attack. Even the nursing child is not immune. Milk cannot be digested when a child is suffering from gastroenteritis. A mother must then feed her child vegetable water, which has probably not been properly boiled, and certainly has little nutritional value. The problem of disease and malnutrition is thus compounded. WHO has brought out an inexpensive mixture of glucose, potassium, sodium and bicarbonate of soda which, when mixed with boiled water, can prevent the worst ravages of dehydration. But the problem of Protein-Calorie Malnutrition (PCM) still exists.

Kwashiokor and Marasmus are the most common forms of PCM. Kwashiokor usually occurs between the ages of 1-3. It results in growth retardation, low body weight and reduced height. Muscles waste away, the body swells, the liver becomes enlarged and fatty, the hair becomes light in color and falls out, the skin acquires dermatitis; and often diarrhea, anemia and anorexia are present. Marasmus sets in under the age of one. When the body is not fed enough it begins to feed on itself. Muscles and subcutaneous fat waste away, growth is stunted, and diarrhea often sets in.

There are other diseases of malnutrition, too. Anemia results from blood loss or too little iron and folic acid. More than half of the 500 million anemics are women in developing countries, predominantly pregnant women. Anemia in pregnant women can lead to premature birth and often weak and unhealthy babies. The more children an anemic woman gives birth to, the worse her condition becomes, and the more lethargic, apathetic and fatigued she becomes. Goiter, affecting 200 million people, is caused by a deficiency of iodine. This stunts mental and physical development and, in extreme cases, the child may become a deaf mute.

UNICEF's studies show that better nutrition alone is not as effective as a more integrated approach. Clean water and better health care are also necessary.

Water

We are now entering the International Water Decade. It is estimated that 1.8 billion people lack drinking water and 2.4 billion lack sanitation. That means that one half of the Third World does not have safe drinking water. In addition, the quality of the water is getting worse, not better, while clean water is essential for adequate nutrition.

Water and nutrition are directly related. Contaminated water causes gastro-intestinal disease, leaching out of the body the nutrients the poor have worked so hard to put in. Water pollution is one of the effects of population pressure on the environment. Clean water and adequate sewage go together. Rivers, lakes and ground water are becoming the disposal sinks of human and animal waste. Another serious problem is that of toxic wastes in those parts of the world that are industrialized. Many industrial processes use chemicals which are then washed into the nearest water source. These wastes are not obviously detected, but they are deadly. Mercury poisoning in Japan caused heart-breaking deformities in children. The residents of Love Canal in New York State are waiting to see the long-term effects of the chemical poisoning of their ground water. Pesticides and fertilizers can also seep into ground water, or be carried by rain into lakes, causing contamination.

Seen in a global context, the definition of middle-class is those who have tap water. Because of the ever-present drive towards a higher average living standard, efforts are being made to bring tap water to every village. The digging of wells or the laying of pipes to bring distant water to the villages has other benefits related to development. It releases human labor. Hours a day are spent by women and children fetching water - women whose health might be improved without this extra effort, and children who would be better off spending those hours in school.

Yet it seems that there is not enough money in the international monetary system now, and not much more to become available in the next year or two to spend on improving water facilities. The Third World is being told that it must balance the aid it receives - if it wants to spend more on water facilities, it must cut down on medical or educational systems. As a result, most of the money for development (in so far as water facilities are concerned) must come from the developing countries themselves.

Nutrition from the Sea

Lacking wide grasslands and the suitable climate for animal husbandry, many countries have long been dependent on marine products as a major source of protein in their diets. At present the production of the world's fisheries is about 70 million tons annually. According to the FAO, the demand for marine products will reach about 100 million tons in 1985. Presently the leading fishing nations (in order of size of catch) are: Japan, the USSR, China (mostly from inland waters) Norway, the US, India, Peru and the Republic of Korea. A review of the world's utilization of marine products reveals that 71 percent are used as food and 29 percent for non-food use. Countries with the highest rate of food use include Japan, South Korea, Italy and Spain. Taking the average daily protein need as 35 grams, here are some comparative figures of protein intake in the form of marine products: 17.5 grams for Japan (50 percent of total need) 11.6 grams for Portugal, 10.9 grams for Spain and 10.6 grams for South Korea.

The demand for fish has been increasing in the developing countries, and there has been a parallel interest in developing their fisheries. Such development would bring immense economic benefits, including higher income and job opportunities to millions of fishermen and shoreworkers. Over half of the population of developing countries derive nearly one third of their necessary protein supplement from fish. An indication of this is that developing countries in 1977 accounted for 46 percent of the world catch as compared to only 27 percent in 1950.

The process of farming the oceans holds much promise for increasing world food production. This farming goes beyond fishing. There are such possibilities as making edible foods out of arctic krill, algae and seaweed. The Japanese, who have a long experience of feeding a large population on little resources, are in the forefront of research in aquaculture. The two dominant principles of aquaculture are culture and propagation. Culture is the process of fostering the growth of fishery resources, until the final stage of growth, in an enclosed water area. Propagation is the process of maintaining an increased yield by controlling the environment of fisheries in inland sea waters.

The intensified use of the oceans for food has alarmed environmentalists. Over-fishing has already seriously depleted fish stocks, possibly in an irreversible downward spiral. Countries with access to the sea have moved to gain control of their shores and prevent countries with near vacuum-cleaner-type technologies from emptying their waters of fish. The United Nations has declared the oceans to be the "Common Heritage of Mankind" and has been concerned to protect them and share their resources equitably. The many conferences on the Law of the Sea (see UNIS/UN Student Conference 1978) will soon complete the task of drawing up agreements on the many problems. One of the most important results of these many deliberations is the widespread acceptance that the coastal states have the right to extend their

jurisdiction over all sea resources within a 200 mile zone, known as the EEZ or Exclusive Economic Zone. It makes provision for the determination and allocation of living resources within the 200 mile zone, for universal conservation measures, for the sharing of stocks within the zones of two or more coastal states, for the management of species that migrate between inland waters and the sea. In effect, it is as though all resources within the EEZ belong to the coastal nation in the same way that the resources on their land do. This gives the developing countries the right to lease fishing rights to the fleets of developed countries and receive in return part of the catch, technical training and aid in building up their own fishing fleets. By July 1979, 80 countries had made claims to their EEZ (previously most nations had only claimed 12 miles). The total areas of EEZ and territorial inland seas are equal to two thirds of the world's land surface. When all coastal nations have taken this action, the living resources of these waters will include fish that provide 99 percent of the world's marine harvest.

These facts make the proper utilization of Exclusive Economic Zones by developing countries themselves a crucial part of their economic development, both to increase their own food base and to earn much-needed foreign exchange. It is for this reason that FAO, without waiting for the final conclusion of the Law of the Sea Conference, has launched a Special Action Programme for the Exploitation of Exclusive Economic Zones by developing countries, providing them with training, expertise and material, and helping them find investment sources.

Once again, the financial support by donor countries to this Programme is still far from adequate if measured against the scope, potential and urgency of the task.

Redistribution of food

"At the global level, if income were distributed differently, present output of grain alone could supply every man, woman and child with more than 3000 calories and 65 grams of protein per day - far more than the highest estimates of requirements. Eliminating malnutrition would require redirecting only about 2 percent of the world's grain output to the mouths that need it." (World Development Report p. 61) The release of this 2 percent could very easily be achieved by a change in the diet of the rich: they could eat less beef. Steer are fed on a complex mixture of grains and soy beans. 16 pounds of grain produces one pound of beef. A mixture of grains and beans consist of all the amino acids that make up the protein that we need and that are found in meat, fish and dairy produce. The soy bean itself is a mighty and magic bean indeed - it possesses all the amino acids and is equal in nutritional value to animal protein. If less meat were eaten, those grains and beans - many produced in Third World countries - would go towards food self-sufficiency in these countries. Their increased quantities would bring down prices and so make an adequate diet even more accessible to the poor.

Breast Feeding and Infant Nutrition

Mother's milk is tailor-made for babies. It has all the necessary nutrients and provides immunity from infections. It has been the only and traditional way of feeding babies from the beginning of humanity. In this century, with growing numbers of women working outside the home and the availability of infant formulae, breast feeding has come to be looked down upon as primitive and oldfashioned. The option to breast feed or not might make sense for women in developed countries but certainly not for mothers in the developing world. Breast feeding has multiple benefits. It is a cheap and safe source of infant nutrition if the moher herself is healthy and adequately fed. Some studies have shown a relationship between declining fertility rates and breast feeding. In this context, the attempt of some multinational corporations to find new markets for infant formulae in the Third World should be discouraged. This may be difficult when a sales promotion campaign is launched using white coated salespeople and arguments that formula is better because it is more "western". It might not be so bad if all that happened was the transfer from breast milk to formula. But the formula powder is very expensive and has to be mixed with water. When mothers skimp and dilute it and use unboiled water, the cycle of malnutrition and diarrhea is started all over again.

POPULATION

There are two ways of seeing the connection between food and population. The world's population is estimated to increase from over 4 billion today, to 6 billion in the year 2000. More people to feed will obviously increase the problem of inadequate distribution of food. But one can also turn the equation upside down. Better distribution of food will bring down the birth rate. Slowing the rise in population is a complex problem, and better nutrition for all the world's people is one factor in its solution.

High birth rates are a factor of poverty. The poor need children to work on the land or help earn the family's income. Children are also a form of "old age insurance". But children die easily; in order to be sure that some of them live, it is necessary to have many pregnancies. When the death rate and the birth rate were more or less parallel, or when disasters decimated populations at regular intervals, the demographic curve remained steady. But with the increase in health services since World War II mortality rates began to decline. Children who used to die,now survive to bear children themselves. The population curve rises exponentially.

However, the existence of health services has not convinced families to lower the number of pregnancies. Health services still do not exist in many of the world's villages and apparently the fact of better health alone is too isolated to be more than a fragile beginning in persuading the poor to limit their births.

The answer to the problem of rising population appears to lie in greater security from poverty and better education for women and girls. In the state of Kerala in India the birth and death rate is the lowest in the country. Land redistribution has given farmers both security of tenure and the means to grow cheap and traditional foods, such as cassava, to supplement their diet. The position of women is strong in Kerala, with a matriarchal tradition. Girls are educated and understand both nutrition and birth control. Educated women are inclined to limit their family size to give them the opportunity to work outside the home. Finally, birth control devices are available in village health clinics run by local people in a family setting. The manner in which contraceptive alternatives are introduced into a community is important to their success. If they are a voluntary and rational choice, they will be used. If they are imposed from above or accompanied by forced sterilization, they will arouse much opposition and so fail in their purpose.

China and Sri Lanka have been most successful in their attempts to slow population growth with similarly multifaceted approaches including better nutrition, better health, income security, education and community cooperation. Such programs do not produce results quickly. It has taken 15 years in Sri Lanka for parents to realise their children are not dying and so they need not have multiple pregnancies. But the sooner the world embarks on a humane way of population control, the more likely we will be able to avoid more frightful alternatives.

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One of the first ways to solve world hunger is to increase the production of staple crops while maintaining that of cash crops. This has the dual effect of increasing the food available to feed the country's population as well as achieving a more favorable balance of trade. Less will be spent on importing food and more cash will become available for development through the increased export of cash crops. Production can be increased by the use of simple or traditional methods, or with the help of new technologies.

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APPROPRIATE TECHNOLOGY IN AGRICULTURE

Appropriate technology is a doctrine that means exactly what is name implies: technology is only useful if it is appropriate to the needs of its users.

Appropriate technology is becoming a very important concept in discussion of aid to developing countries for a number of reasons:

1. Because it is based on the needs of the users, it allows local needs to be met rather than submerging them under a single large-scale solution for an entire nation.

2. Instead of attempting to eliminate human labor (of which the developing countries have an abundance) with expensive machinery(of which the profit-minded corporations have an abundance), it is labor intensive.

3. It provides a protective barrier for a developing country against the dangers of outside economic changes, such as a sudden reduction of the availability of fertilizers, or an increase in the price of farm equipment.

4. It renders useless a number of expenses that would otherwise put both the wealth of a developing country and also the control of its infrastructure into the hands of external powers (whether other governments or large corporations).

5. It does not imply the blind acceptance of all things western. Rather it allows for the people themselves to determine what road they will take to development.

Of all the areas in which appropriate technology is important, none is as vital as agriculture. In the past there have been many examples of inappropriate technology in agriculture, and such technologies are a threat to any country in which they are used. One would think that the United Nations or the governments involved would put a stop to this as soon as they realized what was happening, but they have not in the past and might not in the future. There is a reason for this inactivity, however.

The primary reason for the continued use of possibly dangerous technology in agriculture is the rapid increase in crop yields. True, such dramatic increases, in particular through high-yielding varieties, are and remain crucial. But unfortunately, many of the technological aids used to obtain this rapid increase are the ones that do the most harm in the long run. A prime example of this is the use of pesticides. A pesticide is used in an attempt to keep an insect off the particular plant that is sprayed. However, the pesticide will only help until the crop that was sprayed is harvested, and the next crop will need another dose. For this reason, pesticides are at best a costly, temporary solution. The worst of it is, the longer pesticide is used, the more one must use it. In fact, the pesticides eventually become useless. This can be explained simply. If a field is sprayed with pesticides, many insects are killed, but through the random effects of genetic mutations, a few are resistent to the pesticide and survive. While we are killing the harmful insects, we are also eliminating many of their natural predators. As a result the few insects that survive are able to proliferate their species at an accelerated rate. When the crops are sprayed again, many of the insects die, but more survive because the majority are the offspring of the resistent insects and have inherited their

immunity to the pesticide. Soon we have defeated outselves by creating a pesticide-resistant strain of insect through natural selection.

Fortunately, there are alternatives to this pesticide trap. Stronger crops, such as triticale, have been developed that are better able to resist the insects. Natural predators have been introduced to control insect pests. And, in some cases, great numbers of sterilized insects have been introduced to lower the rate of reproduction, and conceivably eradicate the pest entirely.

Farm machinery raises another set of questions of the appropriateness of technology. Most farmers need some form of tools, irrigation pipes, pumps and other equipment for their farms. But whether they need capital intensive machinery like the Caterpillar or Massey Ferguson equipment manufactured by American and Canadian firms is another question.

The advantages and disadvantages must be weighed. The perfectly appropriate technology for agriculture in developing countries is cheap, labor intensive, easily repaired and effective in raising yields. Chemical fertilizers, so necessary a part of the Green Revolution, are expensive and also environmentally dangerous if overused. Technology to fertilize fields with agricultural and animal wastes, at the same time as producing methane gas, would be more appropriate. The Chinese have had the greatest success in encouraging their own peasants to find solutions to practical problems they meet every day. Grass roots technology is often more realistic and effective than that imposed from above.

Appropriate technology is not glamorous and does not win the research funds that more complicated projects receive. However, some appropriate technology is no less advanced in its understanding of science and engineering. It sometimes takes an even more sophisticated understanding to simplify processes for use on the small farm.

If the developing countries are to become self-sufficient at any time in the future, it is clear that appropriate technology must play an important role in development strategy. Appropriate technology is clearly an idea whose time has come. We must not ignore its potential as a successful, beneficial tool in world development.

THE GREEN REVOLUTION

The Green Revolution is an attempt to use technological means to increase food production and thus to eliminate hunger. These means include the use of genetic engineering, fertilizers, pesticides, herbicides, irrigation and both large and small scale farm machinery. Increased food production will result in lower prices, allowing the poor to buy more food.

The Green Revolution originated in 1943 when the Rockefeller Foundation and the Mexican Government cooperated to set up a program of nationwide technologically based food production. This included a program of seed research as well as massive irrigation projects and the introduction of large scale farm machinery. The tremendous increase in production of wheat (national production tripled in less than twenty years) was largely attributed to the high-yielding varieties that were developed. In 1962, the Rockefeller and Ford Foundations established a joint project at Los Banos in the Philippines - the International Rice Research Institute (IRRI). IRRI worked to develop strains of rice which would give higher yields, be appropriate to the environment in which they were grown, and suit the taste of those who were to consume it. One strain - IR 28 - is most resistant to pests and fungus. It not only provides greater yield per harvest; it also can mature in 105 days and can therefore be harvested more often, thus compounding yields. Other seeds in the process of development are drought resistant, have higher protein content, or can produce their own fertilizer through nitrogen fixation in the soil.

However, all these strains are relatively fragile and require heavy fertilization and careful irrigation to attain the high yield. The seeds are often not self-perpetuating but may have to be bought each year from corporations who have the monopoly of raising them from their parent stock. Although this process is expensive, with proper management and adequate land, the profits will eventually outweigh the investment.

Handled incorrectly, however, the technology of the Green Revolution could work against the small farmer. If credit is not available to him he will be less able than the larger farmer to make the necessary investment. Without the new technology, the small farmer continues selling the same wheat. The larger farmer, however, has the potential of lowering his prices as a result of his higher yields, effectively underselling the small farmer. If the small farmer chooses to go into debt to pay for the investment, the possibility arises of crop failure - more likely with the new varieties of grain. The larger farmer could stockpile to protect himself from such an event, but the small farmer is highly dependent on the success of each year's crop. It may turn out that the small farmer is driven even further into debt as he may not have enough land, or the back-up technology (i.e. irrigation and fertilizers), or the knowledge to make use profitably of the new grains. In any case, the small farmer eventually loses his land.

A similar scenario would emerge if land prices were driven up as a result of the land's increased productivity. Richer farmers would be able to take advantage of this situation by charging higher rent to tenant farmers. In some cases, it would probably be more profitable if the rich farmer farmed the whole land himself with hired low-paid laborers. Again, the small farmer would end up landless.

Here, too, the problem of dependency can arise. Due to the nature of the technology, it often cannot be easily produced within a developing nation. The nation can thus become dependent upon the developed world to supply the technology, primarily seed, fertilizers and machinery.

There is no doubt of the basic success of the Green Revolution in increasing food production. The example of Mexico has been cited; India, too, experienced dramatic progress, increasing food production by 2.8 percent a year as compared with a population growth of 2.1 percent a year since 1950. The greatest success in terms of production and lowering prices has been the US who has had the advantage of a longer period of time in which to adapt the technology and has had the capital to do so. The question, however, is not solely national production but whether the poor benefit from the Green Revolution.

Technology in and of itself is neither good nor evil. Its effects depend upon the way in which it is utilized. If managed properly, the Green Revolution can result in greater prosperity for the small farmer and a cheaper, better food supply for the people of developing nations, increasing their self-sufficiency.

With adequate government support, the small farm is as capable of utilizing the Green Revolution as the larger unit. Use of appropriate labor-intensive technology, coupled with the possibility of two or three harvests a year, can create more jobs rather than less. The benefits of the Green Revolution can be spread throughout the nation, taking advantage of it by creating a whole superstructure requiring jobs. In this way more people could start making money to buy food and eat better. An increase in productivity is, however, not the ultimate solution. Lester Brown considers it to have given us a breathing space of only twenty years before population again outstrips food production. The pie can only be increased in size a limited amount.

FOOD STORAGE AND POST HARVEST LOSS

Loss of produce through waste is one of the greatest factors that contributes to the problem of world hunger. Losses can run as high as 40 percent of durable crops such as grains and beans in the tropics and 10 percent in cooler climates. Many developing countries do not produce enough grains to feed themselves and they spend precious dollars that should go towards development to buy imported food. If even half of the estimated loss of food could be saved it would mean corresponding savings of foreign exchange. The FAO estimates this saving at $7.5 billion annually and has instituted an action program to study the problem and help countries improve their food storage facilities.

Small farms throughout the developing world generally store their food in such a manner as to avoid loss only through theft and fire. They do not have the means to counter the threats to their produce that come from pests, rodents and molds. Nor, when their stores are damaged, do farmers often realize the extent of the damage. Since grain is often measured in volume and not by weight, farmers do not notice that their sacks are filled with shells of grain hollowed out by hungry insect larvae.

Fortunately, these problems are susceptible to solutions that do not disrupt basic customs or require expensive equipment. Surplus need not be kept near the farm before being sold; it can be stored instead in a community storage bin subsidized by the government. In such bins, grain can be better cared for and loss can be held to a minimum.

In the warehouses grain can be kept in sacks made of jute, a cheap plentiful material for weaving. Bags made of this material are durable and easily handled and repaired. Sampling can be done by thrusting a knife into a bag and catching the trickle. Afterwards, the hole can be sewn shut quickly. The weave of the jute bags is close enough to prevent adult insects from entering but wide enough to permit ventilation. Although eggs can still be laid in the mesh, the grain can be easily fumigated and insects at any stage of development can be eliminated.

The problem of rat infestation is more difficult to solve due to the uncanny adaptability of the species. Methods that work well for a while are eventually circumvented by the rats' resistence and ingenuity. For the time being, the problem will have to be dealt with through alertness to danger (such as not allowing rats in to begin with, by sealing holes in wall, floors, etc.) and constant research.

Storage at home for the food that the farmer and his family eat themselves, can be improved either through the use of metal bins or, if there is not enough money to buy those, by the modifications of traditional means of storage. In India, where large urns are used, these have been made stronger and built above ground to prevent infestation by rats.

The problem of depredation by insects can be solved through the use of cardboard disks, sprayed with pesticide, that can be placed in the grain.

Many more complicated development plans exist for the production and distribution of food. But the relatively simple procedure of saving what is already produced could help to feed people while they are waiting for those other plans to take effect. So far, even the most modest $20-million FAO Action Programme for the Prevention of Food Losses has not come close to its target, which does not augur well for success in this area.

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Much of the agricultural produce today has taken the form of marketable commodities. Every country imports some sort of food product. The production, import and export of luxury foods and staples reflects the overall economic structure of a nation. Multinational corporations, because of their large resource bases, have been able to control and manipulate most world food trade and production.

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MULTINATIONALS AND DEVELOPMENT

The process of development needs capital and technology. A country's resources must be put into a form that can be sold on the world market. Raw materials must be mined, crops grown, energy generated and transport facilities built. In many developing countries this process was started by the ex-colonial powers, but it needed to be extended and used for the benefit of the country itself. Once the resources had been developed trade on the world market ought to have brought in the profits both to pay off the initial investment and to generate more capital for further development. Why did this upward spiral not occur, or happen too slowly?

The answer lies in the nature of capital itself - the pioneering spirit seems to have gone out of it. Longterm risks are no longer fashionable, and investors prefer quick and assured returns. Third World countries are trying to change this by gaining more control in the decision making process of international ending agencies such as the International Monetary Fund (IMF). However, much of the investing in development has come from private sources, and they are more difficult to influence.

There are arguments both for and against the role of Transnational or Multinational corporations in development. Both sides are presented below.

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Transnational corporation hold the key to the Third World's success. First World industries, by cooperating peacefully with Third World governments, can increase food production. While transnationals have capital, technology and experience, the developing world is abundant in fertile land and labor. What exists in many countries is a 'marriage' between the two groups. Walter Simons of the New York-based Industry Council for Development has said :"Corporations support development through both normal business transactions related to development needs, and participation in intermediary organizations' activities designed to stimulate long-term economic and social growth and stability."

Cooperation between developing country governments and foreign industry has had much success. In Kenya, Booker McConnel Ltd., a large UK firm linked 13,000 independent farmers into a nucleus estate of 7800 acres and saved land in the process. The farmers were given technical aid and an assured market. The company also provided another 3000 jobs for Kenyans in a sugar factory and related stores. The Report of the Presidential Commission on World Hunger summarizes the situation as the "complementarity between imported technology and local needs that has prevented the development of a ghetto colony of landless laborers and social problems ..."

In Pakistan, CPC International helped 450 farmers to increase their yields considerably. Corn has always been a secondary food there, and less than 10 percent of the corn crops have been available for commercial use. Low yields of about 15 bushels per acre were due to a lack of quality seeds, pest control and fertilizers. Rafham Maize Products, a subsidiary of CPC, introduced a corn development program in 1970. Experts provided the Pakistani farmers with what they lacked, including good seeds and technical know-how. The program met with tremendous success. In 1972 the spring crop was zero tonnes; by 1978 it was 13,000 tonnes. Cooperation that benefits both parties must continue to exist between transnational corporations and developing countries. As long as the technology the corporations bring is efficient, labor intensive, and profitable, the 'marriage' can continue to the mutual benefit of both parties.

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The argument against the role of multinational corporations in development acknowledges that, within the past twenty years, such corporations have taken an increasingly important role in the developed countries. Their objectives, like those of the multinationals of any business, are to maximise profits. In doing this, multinational corporations have seriously conflicted with the developmental objectives and national interests of the host country. The operations of multinational corporations in developing countries can easily be summarized. In exchange for capital, technology, marketing skills and resources, multinational corporations convince local governments to place their economic objectives before desperately needed social and economic planning. This priority promotes economic and social backwardness in the host country while maximising the profits of overseas corporations and local elites.

Involvement of the multinationals in the field of food can be summarized as follows: developing countries involved in food export are usually one or two crop economies - sugar in Cuba, bananas in Honduras, cacao in Ghana are but a few of the examples. Such crops are preferred over food staple crops because they fetch immediate cash. The preference to raise these crops is not usually that of the farmer, but of the government that wishes to increase its capital flow.

The increased export of non-essential cash crops (like sugar, tea, cocoa, coffee) is a direct cause of malnutrition in developing countries. It forces them to import staple food like grain, whose prices are based on foreign markets and over which they have no control. World grain markets are controlled by the United States, Canada, Argentina and Australia. The United States produces 42 percent of all wheat in international trade and 63 percent of all corn.

The grain trade is an example of the way that multinationals work. Through a series of steps of buying and selling, most of the wheat, corn, rice and soybeans produced in the United States each year ends up in the hands of five major companies. They are vast conglomerates which the United States government itself cannot control. They not only deal in grain, but control its storage, its transportation, and industries that stem from processing these crops: animal feeds, cooking oils, corn sweeteners. One of these, the Minneapolis based Cargill Corporation, grossed $11.6 billion in 1978 with net profits of $121 million. It owns 140 subsidiary companies in 36 countries, as well as a substantial number of storage elevators, freighters, railroad cars and barges. Terms like "octopus" and "economic Darwinism" have been used to describe the nature of the multinationals' operation. Business is competitive, and he who has the flexibility and extended reach of an octopus, or he who can run rings around national or international regulations, is more likely to survive.

There are many ways in which a multinational corporation has exactly the opposite effect on the developing country from the aims of development as we have defined them. They exploit the economy of the country by taking out more than they return. They avoid paying taxes on their profits by a system of intricate bookkeeping; they transfer those profits to subsidiaries in countries with more lenient tax laws. They lend money to the host country to build those facilities they need - power grids, roads, apartment houses - and do not invest in those projects which would bring more direct benefits to the poor. The wealth they create does not trickle down beyond a middle class elite in the developing country, who thus become as interested as the corporation itself in maintaining the status quo.

As the previous article pointed out - the presence of a multinational corporation in a developing country need not be bad. However, in the process of food production there is a more sinister element. Foods that should be grown for people are not, and demand for imported food is deliberately encouraged.

At one time the staple foods in Zaire were maize and cassava (manioc). They are cheap and adequately nutritious when eaten in sufficient quantity. But, they are time consuming to prepare and so wheat was imported to make bread. Wheat was more convenient, more nutritious, and it carried with it the prestige of being the food of the developed nations. The people of Zaire have now acquired a taste for bread and have lost both the art of and the desire for maize and manioc production. Dependency on wheat imports has been growing steadily since 1974. In that year, when the price for wheat rose and copper prices fell, the Continental Grain Corporation threatened to cut off all further sales of wheat to Zaire because they defaulted on payment. New bank loans were negotiated; wheat began to flow and Zaire's burden of debt increased. There is little possibility of paying off this debt when the money is used for further importation of food rather than for investing in food self-sufficiency.

Many multinationals with subsidiaries in the food processing industry are looking to the Third World for new markets. It seems the height of absurdity to persuade Africans to eat packaged food when they could eat fresh food from their farms. The process becomes criminal when nursing mothers are persuaded to use infant formula or tobacco companies use every trick of advertising to turn Latin American youths into chain smokers.

Agribusiness is a term used to describe corporations engaged in some form of activity centered around agriculture. These corporations are involved in the production and distribution of cash crops; they control the production of chemical fertilizers and pesticides, tractors and farm machinery, pumps and irrigation pipes. They own the storage facilities and merchant fleets

to transport these goods. They have become deeply involved in production of the hybrid seed needed for the Green Revolution. One cannot develop far without them!

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This vast reliance on multinational corporations has caused a distortion in the food and trade policies of the developing countries. In growing cash crops they are not becoming food self-sufficient. In fact, many of them are becoming dependent on imported food at an ever accelerating pace. Mexico imported 12 million tons of food this year. The figures for 1979 were 3.7 million. However, this imbalance is not merely a plot on the part of the exporting countries to retain their markets, nor does the solution lie in returning the plantations to the little farmer to grow his own food as Frances Moore Lappe and Joseph Collins propose. Lester Brown points out that only a fraction of the world's arable land is used to produce cash crops and the sale of these crops on the world market provides the capital needed for other development projects. It is important that these cash crops receive a fair and steady price and that the governments of the countries where they are grown share in the profits, but they cannot be eliminated altogether.

Many corporations are beginning to realize that concentration on profits alone is to nobody's advantage in the long run. The Industry Council for Development brings together international corporations willing to give funding and expert knowledge to small scale projects that will directly benefit the local people. A community-run asparagus growing and canning industry in Lesotho is one example. The people can earn more money and are able to raise their standard of living by becoming consumers of some of the many goods that the world market offers. Another alternative is that proposed by Dr. Magobunge of the University of Ibadan. Host governments must control multinationals. If the political will exists on the part of the developing country's government, a system of controls can be established which is beneficial to both sides. The United Nations Commission on Transnational Corporations is working to establish a Code of Conduct for these corporations which could become the basis for a new relationship between the multinations and the Third World.

WORLD FOOD SECURITY

World Food Security is the existence of surplus food which assures that, in time of food shortage, each country will have an adequate supply of food. There are two types of food security: reserve cropland, and grain reserves. Reserve cropland is land which, in the event of food shortage, can be used to grow food. The vast majority of reserve cropland exists in the US under farm programs. Grain reserve is the amount of food remaining in storage bins when the new crop comes in. Grain reserves are mostly

concentrated in the major exporting countries such as the US, Canada, Australia, Argentina, New Zealand and Thailand.

The FAO estimates that these reserves should constitute 17-18 percent of the world's food consumption, in order to be an adequate surplus in times of crisis. In 1979, food stocks reached a global peak of 265 million tonnes. In 1973 food stocks had dipped to a low of 100 million tonnes - enough to feed the world's population for one month. This year, reserves are a mere 14 percent or so.

In the past, many countries had a surplus of food, giving them an export status. However, because of the growth in population and the distortion in food production, many countries have become net importers rather than net exporters of food, and none have emerged as significant exporters. Countries which now import over half their grain supply are Japan, Belgium, Switzerland, Saudi Arabia, Lebanon, Libyan Arab Jamahiriya, Algeria, Senegal and Venezuela. Portugal, Costa Rica, Sri Lanka, the Republic of Korea, and Egypt are becoming increasingly dependent upon food imports.

The result of this is that North America holds almost all of the world's exportable grain supplies. Should there be a food shortage, the US and Canada would have the power to decide who would and would not get their extra food.

The United States has had a problem with food surplus since American farmers were urged to expand production during World War I. The same problem of surplus occurred after World War II, and the United States Congress passed Public Law 480, authorising low interest long term loans for governments wishing to buy American grain. There were three groups who supported PL 480: the humanists who wanted to ease the plight of the poor and hungry; the farmers who wanted to keep up the price of their produce by finding a market for it; and the foreign policy experts, who saw the political value of being able to withhold grain shipments. Between 1970 and 1973 the US worked to overthrow the Allende government in Chile by creating economic chaos - there were no food shipments to Chile in those years. After the fall of the socialists, the new government applied for American food aid, and got it.

The rich and powerful will not necessarily be hurt by a politically motivated embargo in the grain trade. The USSR bought food from Argentina when, after the invasion of Afghanistan, they were prevented from buying wheat in US markets. The multinational grain corporations have no allegiance to any particular government - they are prepared to transfer stocks from one country to another whenever possible. Nonetheless, the use of food as a weapon remains reprehensible because it hurts those least able to find other resources.

It has been pointed out that OPEC uses oil as a weapon; but such slogans as "Food for Crude" and "We Freeze, They Starve" suggest the grimmest form of "justice".

The best protection against the use of food as a weapon is food security. Yet, the existence of surplus stocks alone does not ensure such security. Someone must still decide when to release surplus stocks, and when not to. The International Wheat Council in London, a group of major grain exporters, would like to keep control of that decision. Whether a surplus in their hands will ensure security for others is unclear. Ultimately, world food security depends upon a system of international trust that does not yet exist.

Developing countries, painfully aware of their utter dependence on major developed country exporters, now seem inclined even more to set up their own (South-South) food security system, as a basic tenet of Economic Cooperation between Developing Countries (ECDC).

AID, TRADE AND SELF-SUFFICIENCY

The topic of Food and Development is a difficult one because there are two different and possibly contradictory ways of tackling the problem, producing more, or sharing what there is more equitably. Not everyone agrees that there is enough to go around, especially if the increase in population is not slowed. It could also be argued that the two approaches are mutually exclusive. Producing more food concentrates on the supply side of development, while concern with the nutrition of the poor leads to questions of fair and just distribution. There are arguments in support of both approaches. If the aim is adequate nutrition for everyone and the income with which to ensure it, what is the best route?

1. Food Aid. This is obviously necessary in an emergency. It can be used very constructively by paying workers on a project in food, as the World Food Program does. But aid implies dependency not development and it can only be a temporary solution.

2. Trade. The exchange of food in the world market is done most efficiently if every country produces what it does best. If North America is the granary of the world, why divert investment to agriculture in developing countries when they could import food more cheaply?

3. Self-sufficiency. The supporters of this strategy consider that it makes countries less vulnerable to economic disaster, changes in world trade and political pressure. No country can be completely self-sufficient, but there are advantages to some degree of self-sufficiency.

   - guaranteed food supplies at guaranteed prices. The production of US agriculture is going down and the prices are going up.

Over-fertilization and loss of top soil is causing growing concern among American farmers. If the price of the US grain surplus goes up, then only countries such as the USSR will be able to afford to buy it.

- guaranteed equity of food distribution within a country. More food is produced and more people can buy it.

Nonetheless, achieving food self-sufficiency is doubly expensive. First, money must be found for rural development (to induce a farmer to produce a surplus he must be given high prices for his crops). Then, government funds must be spent on some form of food subsidy to enable the urban workers to buy what they need.

Developing countries could cooperate among themselves in an attempt to achieve food self-sufficiency. OPEC countries, with money but not enough arable land, could finance food production projects in certain African countries where there is the potential but not the money for investment.

The problem of the production and distribution of food centers around land - who owns it, how much food it produces and who works on it.

LAND REFORM AND RURAL DEVELOPMENT

In Asia and Latin America the land has traditionally belonged to a few families. Its redistribution with compensation is expensive and politicallly difficult; land reformers have been shot in El Salvador; peasant activists have disappeared in Guatamala. In some parts of the world, like the state of Bihar in India, land redistribution would give everybody one square yard to stand on. Land redistribution is the presently popular idea, but it is not necessarily, or most likely, the best solution to hunger and poverty.

Large farms have certain advantages over small farms. They can introduce technical innovations more easily. They can respond more quickly to market changes and central planning. They create a larger surplus and have better storage facilities for it. The small farmer needs support services in the form of regional cooperatives for machinery, credit and storage facilities. He needs help in getting his surplus to the cities beyond his village.

However, there are advantages to the small farm. Because it is worked so intensely by the family it is actually more productive per acre than the large farm. It provides better nutrition for the family members and gives women better status and security. Nonetheless, two problems remain: since there is not enough land to go around, what happens to the landless? And can small farms create sufficient surplus to feed the cities?

The landless laborer is a permanent factor in agriculture. He may own or rent a small plot, but still has to supplement his income by working for wages on the farms of others. The wages are low, but he is helpless, because there is no other form of local employment, and other men are willing to step into his place.

The collectivization of land is a possible solution to the problem of the landless. It has been tried in socialist countries, with the aim of creating efficient and large units that can absorb the rural poor and provide surplus food for the cities. However, these collectives have not always been either efficient or surplus producing. China is experimenting with food and pay incentives to production teams that exceed their quota. Algeria has developed a mix of land ownership consisting of private and state farms and collectives.

Privately owned large estates tend to be more efficient and need not necessarily increase rural poverty. If fair wages are paid, and a curb is put on labor saving machinery, the rural worker would be neither hungry nor unemployed. Some multinational corporations run their estates in cooperation with local farmers. They offer them advice, credit and marketing facilities. However, too many large estates are not run in a way to benefit the local community and host country. Labor saving machinery is more often introduced and rural unemployment increases. The profits that the private family or corporation make on the sale of their cash crops are not always taxed or re-invested in the country, but find their way elsewhere.

Land ownership itself is not the only basis for rural productivity. Development is needed to provide the villages with such services as transport, credit, storage and marketing facilities, clean water, health clinics and schools. The rural unemployed must be able to find work in local industries such as food canning, textile work and machinery repair. It is the combination of all these elements, rather than any one singly, which can have the greatest benefit.

Finally, the people themselves must participate in the planning and decision making of these development projects. Of all the recommendations made by the FAO Conference on Agrarian Reform and Rural Development in 1979, perhaps this was the most crucial. Development carried on with the participation of the people whose lives it is designed to improve will continue as an active process even after all the specialists have returned to their steel and glass offices.

LAND RECLAMATION - THE ALTA FLORESTA PROJECT IN BRAZIL

In addition to making the existing arable land more productive, there is the possibility of putting new lands under cultivation. This can be seen as an exciting pioneering venture or as a way of diverting the landless from land redistribution by offering them resettlement instead.

The Indicative World Plan (IWP) prepared by the FAO estimates the world's arable land at 1,430 million hectares as of 1970. But with present technology that area could be increased to 2,501 million hectares. Most of that land lies in the tropical areas of Latin America and Africa. Clearing the jungle is environmentally dangerous. There is very little top soil, since the vegetation depends on the humus provided by the leaf cover of the jungle. It takes a leaf only a few hours to decompose in a tropical climate. If the leaf cover and the root system of the trees is removed, what soil there is will be washed away by torrential rains. The Jari project, the size of the state of Connecticut, is an attempt to use every available technology to make the Amazon estuary productive without inflicting environmental damage. It is capital intensive and has benefitted a few thousand people, though its pioneering research into both industry and agriculture could benefit more.

A different kind of settlement is going on in the state of Mato Grosso in Brazil. Mato Grosso is a region south of the Amazon basin. It is an ideal place for farms and farming. The soil is very rich, there is abundant land and there is enough rainfall. But the land is completely forested and the people need help clearing it. There is also the problem of being far removed from any town with medical or other facilities.

A private company, Indeco, is trying to develop this land. It has started to build up small centers in two towns, Alta Floresta and Paranaita. It has also built a road connecting Cuiaba, the capital of Mato Grosso, and Santerem, a port city, on the junction of the Amazon and one of its tributaries.

Government land grants and private corporation aid are not enough to ensure that this land is settled by people who really need it. There is much room for voluntary organizations. One of these is MAPE (O Movimento de Apostolado dos Pioneiros do Evangelho - Apostolic Movement of the Pioneers of the Good News). They have several projects already built and in the planning stage:

- a regional center for the training of Christian social leaders
- a community center in each of the 75 communities of the region
- construction of a newspaper and radio station and family center in Alta Floresta

- two community health centers in the two main towns working together with existing facilities but offering free care to the poor.

Also planned is a lumber yard and warehouse. With the abundance of wood in the region, some of which must be cut down to clear the land, these facilities would be a great help to the new farmer. The new settlers are doing much of their work cooperatively and the warehouse would be used to store their farm produce until it can be transported to market and get the best prices.

MAPE will help new settlers clear their land and encourages them to build their houses from local wood. MAPE is also in the process of buying land on which to develop a farming cooperative for poor settlers from the overcrowded cities of southern Brazil. They have found that the people have initiative and are very enthusiastic to succeed in their new lives. There is some concern that those who most need to make a new start are too ill and too depressed to use this new opportunity.

Financing for these projects comes from international organizations, private banks and corporations. They are prepared to lend soft loans on a long term, low interest basis. The aim of this project is to help the migrants from southern Brazil become self-reliant and to show private capital the eventual profitability of making such loans.

ENVIRONMENT

The earth is the only planet in the universe that is known to sustain life. However, extensive human activities are depleting the planet of its resources. The two main reasons for the increasing strain on our environment are population growth and the methods we use to exploit the earth's resources.

The soil, the very basis of agriculture, is actually a renewable resource. Animal, human and plant waste decompose and enrich the earth. But rather than using our technological ingenuity to enhance this natural cycle, we have chosen to speed up the soil's productivity with extensive use of fertilizers, pesticides, irrigation and land clearing projects. None of these methods need be harmful, and some are even necessary. It is a matter of degree.

The extensive use of fertilizers depletes the soil. For a time the crop yields increase; then an ever-increasing amount of fertilizer is needed to sustain that increase, until finally the yield decreases. Pesticides pose

problems previously discussed. Irrigation poses health and environmental hazards also. Water-borne parasites - carrying diseases such as schistosomiasis and river blindness - are spread over areas previously immune. In some areas, like the Nile valley, the salinity of the soil increases and makes it difficult for some plants to grow. In some parts of the Amazon valley land clearing is done by hooking a large chain between two even larger tractors and sweeping through the jungle, ripping up giant trees by the roots.

In order to feed the world's growing population, land capable of sustaining agriculture must increase, especially in developing countries. Instead, this land is decreasing at an accelerating rate. The two greatest dangers to arable land are deforestation and desertification.

Deforestation

The world has lost half of its woodland since 1950. An area the size of Cuba is being denuded annually. Farmers slash and burn undergrowth to extend farming and grazing lands. Firewood, the fuel of the world's poor, is becoming more expensive than the food it cooks. One member of the family must spend a whole day finding that fuel as people must go even further beyond the village and its denuded neighborhood. People and machines are destroying trees at a faster rate than they can be replaced. The resulting bare earth washes away, whole mountain sides in Nepal collapse, eventually to end as silt in the river Ganges estuary. Six billion tons of topsoil annually disappear in this way in India. Where there were once farms there is now dry baked earth, unable to retain moisture and sustain growth.

Deforestation poses an emergency that must be met in two ways. New, fast growing trees must be developed, and the number of forestry experts to supervise and protect the new plantings must increase. These new "miracle" trees exist. They can grow 50 feet a year. Some belong to the legume family (beans), have edible leaves and enrich the soil. They also produce what one expects from most trees - wood and paper! They are the gmelina and leucaena trees, planted experimentally in the Amazon region and Africa. Their cultivation is complicated but holds much promise for the future.

Desertification

The desert has always been a cause of concern because it is difficult to maintain life in its environment. About a third of the earth's land area (48 million square kilometers) is arid or semi-arid. Dry-land ecosystems are particularly fragile. They have too little water, too much solar energy for life ever to become truly comfortable.

However, there are degrees of desert; and parts of it, with proper care, can sustain pasture and farming. During the past few decades under escalating

needs for food, land has had shorter fallow periods, longer cultivation periods and generally greater demands from the soil. The grasslands were also important for animal grazing, but the increase in the size of the herds (with the increase in the size of population) caused over-grazing. Desertification has also occurred where the land has been denuded of trees for fuel.

Thirty million square kilometers, 19 percent of the earth's land surface, is threatened by desertification. Man-made deserts already occupy a region larger than Brazil. One sixth of mankind - 600 to 700 million people - live in the dry lands. Annually the world is losing to desert an area the size of the state of Maine. In the Sudan the southern edge of the Sahara is marching south at the rate of 6 kilometers a year; in places, its border is 100 kilometers south of where it was 17 years ago. Other deserts are spreading in Southern Africa, in Australia, in both Americas, and in the Middle East and elsewhere in Asia. At the present rate of degradation we will lose one third of the planet's arable land by the end of this century.

Various ways of desert reclamation are currently being tried out. By employing plastic mulches, greenhouses, and trickle irrigation, and by practicing controlled grazing, reclamation projects have greened vast areas so far. However, such technology is not unflawed, and it presents some ecological hazards itself. It requires technology, experts and planning to win the cooperation of local villagers. They must be supported in fulfilling present needs while they wait for the land to be reclaimed for future needs.

UNITED NATIONS AGENCIES AND AGRICULTURAL DEVELOPMENT

There are many relief, development and food agencies within the family of the United Nations. At first glance there are those that deal specifically with food and agriculture, such as the Food and Agriculture Organization (FAO), the International Fund for Agricultural Development (IFAD) and the World Food Programme (WFP). There are many more agencies that have broader programs and deal only partly with the problems of hunger. UNICEF, for example, (the United Nations Children's Fund) was founded after World War II to provide emergency relief for children suffering as a result of the destruction of the war. In 1953 the General Assembly decided UNICEF should continue its work indefinitely. UNICEF is concerned with projects that directly affect the lives of children in the many villages where hunger and malnutrition are desperate problems.

The FAO is by far the largest organization concerned with food and agriculture. It provides technical help, field projects, research and funding. It is

concerned with the problem of developing countries and the ways to best serve their needs of development in agriculture.

The World Health Organization (WHO) works to improve both the physical and the mental health of people. WHO has been closely involved in reducing the incidence of malaria, tuberculosis, yellow fever, measles, yaws and other diseases. It recently marked the eradication of smallpox. WHO is involved in the problem of nutrition as an aspect of good health.

The International Fund for Agricultural Development (IFAD) makes grants and loans to governments to finance various agricultural development projects. It is funded by both developing and OPEC countries and is heavily weighted in its system of voting where development grants are to go towards the Third World.

The United Nations Development Programme (UNDP) is the umbrella organization through which much financial and technical aid is funelled to developing countries. It has many field projects concerned with agriculture.

The World Bank is a major international investment agency for development. It has put agricultural development as one of its priorities. Third World countries criticize its lending policies as being too cautious, and prefer the greater readiness of IFAD to take long term risks.

The World Food Council was formed as a result of the World Food Conference (1974). WFC serves as a coordinating mechanism to encourage the implementation of policies concerning food production, trade and aid.

One wonders why there are so many agencies dealing with a universal problem. In the aftermath of World War II a few relief agencies were founded. These agencies became more and more involved in specific areas of work. As the world changed, with the continuing decolonization of Africa and Asia, the agencies had to adapt themselves to the changing needs of the developing nations. If a new problem arose, or there was some dispute in how to deal with it, a new agency would be created.

The existence of a multiplying bureaucracy creates other problems. Work is duplicated, effort is misdirected away from practical work in the field. The problem is compounded by the many national and voluntary agencies all adding their effort and expertise. No one really knows how many groups in the world are involved in agricultural aid and development. A list of such groups and how their work can be coordinated is needed.

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All questions of development lead eventually to disarmament. Are we trying to build or to destroy? Can the world long tolerate this waste and survive?

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DISARMAMENT AND DEVELOPMENT

Suppose you are the leader of a developing country. You possess little technology and little foreign currency with which to import outside technologies. You are faced with the image of a pie to represent the amount of currency you have. And you have a problem. You are suspicious of your neighbours and of violent insurgent forces inside your country. Here is the paradox: you wish to spend some of your pie for the defence of that pie but the more you spend on defence the less you have to defend. On the other hand, you suspect if you spend too little on defence your pie will be violently taken from you. This paradox can be called "Guns or Butter", and it is as old as the existence of nations. It not only affects developing nations but it has a particularly devastating effect on them.

The choice that is made, it seems in both developed and developing countries, is guns. Worldwide it is estimated that the equivalent of well over 400 billion US dollars is spent each year on arms and arms-related technologies: this figure works out to nearly 1 million dollars per minute. (This is 60% more than is spent on health worldwide). This 400 billion includes, of course, spending on the nuclear and space programs of the US and the USSR. These two powers accound for 60% of world defense spending. The 93 developing nations account for 18%. If this figure seems small, think of the standard of living in these countries and remember also that 18% is roughly equal to 65,000,000,000 US dollars each year. These countries do not have the technologies to build arms on their own soil so even the argument of defense spending to stimulate the economy is inapplicable in these nations. These arms exist only as a means of ensuring the power of those in power. These 93 developing countries are responsible for 75% of the world's arms trade. Between 1968 and 1978 the developed world sold to the developing 30,000 missiles and 12,000 aircraft.

Recent trends show that a developing nation spends on an average between 5 and 6% of its annual budget on defense. There are nine Third World countries that spend more than 1000 million dollars each year on arms: they are Argentina, Brazil, Indonesia, Iraq, Kuwait, the Libyan Arab Jamahiriya, Nigeria, the Democratic People's Republic of Korea, and the Republic of Korea. Between 1960 and 1977 the US spent 1,179 billion on arms, and the USSR finished a close second in spending with 996 billion. As the table continues, however, there are two developing nations in the top twenty (Iran, at number 9 with 33 million, and India at number 11 with 31), five in the top 30 (including Brazil 15, Viet Nam 14, South Africa 10), and 10 among the top 45 (including Iraq, Pakistan, Argentina, Nigeria and Indonesia).

As former President Carter put it, "... when you spend money for defense, you don't spend it on education or health or other services or goods."

These are good words from an American President; yet, in the developing world, where five times as much foreign exchange is used to purchase arms as is used to buy agricultural machinery, the US is the number one salesman. In 1976 when the world arms trade totalled 13 billion, US companies such as Northrop and Lockheed accounted for 5.2 billion of that amount. The industries of the USSR supplied 3.7 billion and were followed by France, the United Kingdom and the Federal Republic of Germany. All of these nations are pledged to peace but seem to have overlooked this in their supplying of the Third World arms race. It is these nations that must ultimately halt this deadly game. There is another organization that should be allowed to play a more important and powerful role as well, an organization whose motto says, in part: "They shall beat their swords into ploughshares".

CONCLUSION

When we consider the problem of food, we must recognize the fundamental importance of development. The role of development is to provide for the basic human needs by providing a means of self-sufficiency and income. The question is how to develop. The range of potential aids to development include everything from multinational corporations to local, small scale organizations. However, while some methods of development allow a country or village to become self-sufficient, others require the country or village to remain dependent upon its source of aid. There is an old Confucian saying: "you can feed a man a fish and he'll eat for a day. But teach a man to fish and he'll eat for a lifetime".

The problem of food is a human one. While we discuss the problem intellectually, people are dying. We must remember the individual. Those who are affected by these development strategies must have direct influence on them. Culture and social structures must be respected and the environment in which these individuals live must be preserved.

Not all of this development should, or can be handled by large organizations - although on a global scale, such organizations can be highly important. Methods exist for individuals in the developed nations to have a significant impact on a small scale.

A prime example of this exists in our own school: the Neel Bagh Committee. Run by Mr. Kahn and a few students, the Neel Bagh Committee sends approximately $1000 a year to a school in the village of Neel Bagh, India. The school then uses the money to educate the children of the village (who often, in turn, teach their parents) and to send materials to nearby schools whose aim is similar.

"Plenty" is an example of a more food oriented organization. Centered in a communal farm in Tennessee, its aim is to encourage self-sufficiency through creating an agricultural society based on the use of the soy bean (which has an especially high protein content). "Plenty" founded farms in places like Guatamala, which are managed on a communal basis, and encourage the self-reliance of the people.

The essay competition to celebrate FAO's first Food Day on October 16, 1981 gives an opportunity to students to show their support of all efforts to solve the problem of world hunger.

Something is being done to alleviate the problems of world hunger. And more can be done.

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