

Expanding International Agricultural Research And Development to Meet the World Food Crisis

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Abstract

At current rates of population increase it will be impossible for the developed nations to feed the less developed countries of the world. The alternatives are to increase food energy yields on all available agricultural lands and to expand agricultural research and development worldwide. International research centers for developing new, high-yielding varieties of food crops and new techniques in livestock production are a step in this direction. In addition, less developed countries must be assisted in becoming more nearly self-sufficient in food production.

World Food Situation

There is an impending world food crisis that could result in serious famine on a widespread scale unless population growth is brought under control and food production is increased in the less developed countries. Until recently it has been difficult for Americans to realize this because we have been troubled with surplus production. Adverse weather conditions in 1972-73 on a global scale reduced world food supplies to a dangerously low level. This along with other inflationary trends resulted in rising prices for foods. There were even some instances of temporary food shortage in the United States. The American public suddenly realized that there could be a problem even in the United States, the land of plenty. This change of attitude has resulted in greater respect for agriculture.

The World Food Conference in November 1974 assessed the food situation as follows:

"Taking a conservative view, it would appear that out of 97 developing countries, 61 had a deficit in food energy supplies in 1970. In the Far East and Africa, 25 and 30 percent of the population is estimated to suffer from significant undernutrition. Altogether in the developing world (excluding the Asian centrally planned economies for which insufficient information is available) malnutrition affects around 460 million people; a less conservative definition might give a much higher figure."

Future Trends

At current rates of reproduction the world population (3.9 billion) will double in 38 years. In the less developed regions (Africa, Asia, and South America) population will double in 25 years. Thus there is a need to double the food availability in the less developed countries by the year 2000, just to maintain current inadequate levels. It is highly improbable that this can be achieved unless food production capabilities within the

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less developed countries can be greatly improved. Clearly it will not be possible for the United States and other highly developed agricultural countries to feed the world. This responsibility must be shared to a greater extent by the food-deficient countries themselves.

The Food and Agriculture Organization has established a goal of increasing food production by 4 percent per year in the less developed countries. Whether this is realistic remains to be seen. During the past two decades food production has increased at the rate of 2.5 percent per year in these countries. Much of this increase has resulted from expansion in land use rather than from adoption of improved technology.

More Land or Higher Yields

The public is often misled by statements to the effect that only one-half of the potentially arable land is now under cultivation. It is true that vast new acreages of land, especially in Africa and Latin America, could be developed for cultivation. However, most of the good agricultural lands of the world are already being farmed. There is very little undeveloped land in the United States and similar countries. There is relatively little undeveloped land in Asia, the region of highest population density in the world. Furthermore, it will be extremely costly to develop the land in Africa or Latin America for cultivation because of heavy jungle, rough terrain, or inadequate water supply.

Thus it will be necessary to increase very substantially our yields of food energy per acre on all available agricultural lands. This will require a large expansion in agricultural research and development in all parts of the world. Concurrently it will require an expansion and upgrading (especially in the less developed countries) of the agricultural education and training programs.

Agricultural Research and Development

The most promising development in recent years has resulted from the establishment of international research centers such as the International Rice Research Institute (IRRI) in the Philippines and the wheat and corn research center (CIMMYT) in Mexico. Improved varieties of wheat and rice resulted in the so-called "green revolution" during the 1960s. The concept of international research centers was initiated and developed by the Ford and Rockefeller foundations. Within the last 10 years this concept has expanded to include new research centers supported by many more donor agencies.

In 1971 a worldwide consultative group was created to coordinate the development and funding of the international research centers. This group is known as the Consultative Group on International Agricultural Research (CGIAR). It represents 31 member countries and

donor agencies, 22 of whom are contributing funds to support this research. By 1975 the overall budget provided to support these centers amounted to \$48 million. The consultative group is advised by a Technical Advisory Committee (TAC) made up of prominent international agricultural scientists. The purpose of this committee is to advise on the need for a research center and where it should be located. Ten of these centers are now functioning and several more are under consideration. These 10 are:

- IRRI —rice research, Philippines
- CIMMYT —wheat and corn research, Mexico
- CIAT —livestock and tropical crops, Colombia
- IITA —tropical food crops, Nigeria
- CIP —potato research, Peru
- WARDA —rice research, West Africa
- ICRISAT —sorghum and millet research, India
- ILRAD —livestock disease research, Kenya
- ILCA —livestock production research, Ethiopia
- IBPGR —plant genetic research, Rome

The main purpose of these centers is developing high-yielding varieties of food crops and new cultural practices primarily oriented toward application in the less developed countries. Most of the institutes have developed outreach programs which are essentially field testing stations to test and adapt new varieties in various parts of the world where that particular crop may be grown. Each of the centers has assembled a highly competent group of international scientists representing the various disciplines needed to study a particular commodity or problem area. These might include plant breeders, entomologists, plant pathologists, soil scientists, economists, and so on. This network of international centers is proving very effective in developing new agricultural technology for application in the less developed countries.

In addition to supporting the centers, the U.S. Agency for International Development (USAID) provides funds to universities and other research agencies located both in the United States and in some of the less developed countries. In the American institutions funds are provided on a contract basis for a specific well-defined research project. These projects are directed toward improvements of mutual interest to the U.S. farmer and the farmers in the less developed countries. Examples include projects designed to improve the nutritional quality (especially protein content) of the food grains, studies on crop protection, plant diseases, insect damage, weed control and soil fertility problems.

'Adoption of New Technology

In the United States and other highly developed agricultural countries the gap between the findings of the experiment stations and what is practiced on the farm has become relatively narrow. Many of the better farmers use new technology as quickly as it is produced. The closely coordinated research and extension system has

been highly effective in stimulating increased agricultural production. However, none of this would have been possible without having well-trained farmers and professional agriculturists. The agricultural education system of the United States is among the best in the world.

Unfortunately, this is the heart of the problem in the less developed countries where relatively little of what is known about efficient agricultural practices is used on the small subsistence-type farms that predominate. New technology is needed but there is an even greater need for stimulating the adoption of improved agricultural practices.

Each of the less developed countries must overcome a number of major problems before substantial improvement can be expected in agricultural production. Foremost among these is the general level of education for there is a high degree of illiteracy — but this is gradually improving as educational services expand. There must be greater emphasis on agricultural training, particularly at the secondary and intermediate levels. The agricultural extension services must be improved. Even though there are twice the number of extension workers per million dollars of farm output in the less developed countries, the extension performance has not been effective. This is due partly to poor training of extension workers and partly to the system, which requires extension services to perform the regulatory as well as the educational functions.

Undoubtedly the most serious constraint to increased agricultural productivity is poverty. Very little commercial farming exists in the less developed countries. Most farming is at the subsistence level and the average farm size is about 2 or 3 acres. Per capita income is low, averaging less than \$100 per year in many of the less developed countries. Under these circumstances farmers are reluctant to adopt new technology. In fact, they are incapable of doing so, for they simply cannot afford to purchase fertilizers, chemicals, and improved seed.

Government Programs in Less Developed Countries

Urgently needed is a more vigorous approach to agricultural development by the national governments in the less developed countries. Agriculture must receive top priority in their long-range development plans and farm production must be subsidized by assisting farmers in obtaining purchased agricultural inputs. National systems of government regulated farm credit are needed. Improved marketing systems, including roads, transportation, handling, storing, and processing of farm products should be fostered. Research and educational systems must be strengthened. In short, it will be necessary for each country to realize that they must become more self-sufficient in food production.

Equally important is the need for stronger government programs involving population control. Given the present knowledge of the potential for increasing world food supplies it appears impossible for the world to feed its population if the present rate of growth continues.