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Will There Be Enough Food?

The ancient prayer, "Give us this day our daily bread," may have a desperate urgency for hundreds of millions of human beings during the next few years. World demand for cereals and plant proteins has been soaring, in part because of population growth in the poor countries and partly because of the use of beef in the rich countries as their per capita incomes rise. World grain reserves have fallen to their lowest level in two decades, equal to only about 27 days supply. At the same time the rise in petroleum prices has created a worldwide shortage of nitrogen fertilizers and has greatly lessened the ability of farmers in the poor countries to pump water for irrigation.

The United States, the leading supplier of food exports for the rest of the world, has brought all its idle cropland into production and with luck will produce a bumper crop this year. But most of our surplus will be sold to the other rich countries at prices the poor ones cannot afford, and food aid shipments are being severely reduced. Mankind may be drawing closer to a precipice where mass starvation occurs whenever drought or plant disease results in less-than-average crop production.

How can we draw back from the precipice? An obvious, difficult, but in the long run absolutely essential, way is through reducing rates of population growth. Supplies can be increased by three lines of action: for the short term, a world food bank; for the longer term, a modernization of agriculture in the poor countries; and finally, a sharp intensification of agricultural and food research.

A world food bank should have several components—stores of wheat and other cereals and of soybeans and other legumes; stores of fertilizers to enable crop production to be quickly expanded; reserves of land which can be put under the plow in emergencies; a bank of information and technology which can be used to increase crop yields; and stores of crop genes to enable seeds of new varieties to be quickly multiplied when the old varieties are stricken by pests or plant disease.

The modernization of agriculture in the poor countries has been shown to be technically feasible by the limited successes of the Green Revolution. But it requires much more than technology. The farmers must be able to buy the fertilizer, irrigation water, high-yielding seeds, plant protection, and knowledge necessary to increase their production; and benefits they receive from selling crops must be enough greater than the cost of inputs to provide incentives for increased production. Transportation, storage facilities, markets, and profitable prices are all essential components of modernization, as are reforms in land tenure systems, greater opportunities for rural employment, and mechanisms for transfer of technology to the farmer.

The modernization of agriculture depends on continuing agricultural research not only to produce new disease-resistant crop varieties but to increase the efficiency of water use, to find ways to combat soil deterioration and erosion, and in the long run to increase the efficiency of photosynthetic conversion of solar energy to food energy, proteins, and other nutrients that are acceptable components of human diets. Equally important are research and development on improved methods of food storage and processing, plant protection against pests and disease, and research which would permit crop diversification and lead to improved diets.

The United States has become the breadbasket of the world, in large part because of successful programs of research and application of research results. American agricultural researchers need to face an even greater future task—to use their methods and their insights to make possible a vast increase in food and fiber production throughout the world. In meeting this challenge they need reinforcement from the entire scientific community.—ROGER REVELLE