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for Balancing...

UNITED STATES DEPARTMENT OF AGRICULTURE
Washington, D. C.

THE CAPACITY OF THE UNITED STATES TO SUPPLY
FOOD FOR DEVELOPING COUNTRIES

²
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Introduction

Iowa State University and the Center for Agricultural and Economic Development are to be congratulated for their efforts to focus major attention on the World War on Hunger. It seems especially important for us to think about the world food problem seriously. The United States has a leading role in this war based on our position as a major food supplier, as well as on our position of economic and political influence in the world.

The capacity of American agriculture has been the subject of much scrutiny and discussion in recent years. Four simultaneous developments have led many people to question the adequacy of American farmers and of our resources to meet our food and fiber needs at home and abroad.

First, agricultural output in many developing countries has lagged behind population and economic growth. This lag has resulted in an increasing flow of food from "developed" nations to "developing" nations. A very large part of this flow has taken place on concessional terms. Moreover, the need for food transfers on concessional terms might increase further with a lag between efforts to accelerate agricultural development and growth in need for increased output.

Second, commercial exports of agricultural commodities from the United States have expanded rapidly in recent years, reaching a total value this year of a little over \$5 billion. Expansion of our commercial markets abroad is likely to continue. Strong economic growth in traditional export markets and the evolution of new commercial export markets as a result of rapid economic development in many poorer nations have generated an expanding demand for United States agricultural exports.

Third, the combination of a rapid growth in total agricultural exports, expanded domestic demand, and domestic supply management programs have reduced our stocks of surplus commodities. These stocks were the major "ready reserve" of food and fiber in the world.

Paper presented at the Conference on Alternatives for Balancing Future World Food Production and Needs, sponsored by The Center for Agricultural and Economic Development, Iowa State University, Ames, Iowa, Nov. 8-10, 1966.

Fourth, a significant acreage of cropland that has been in reserve under government programs will be brought back into production in the coming year. Expanded acreage this year has been possible to rebuild adequate stocks of those commodities which were reduced below desirable levels by several emergency food situations in the world.

These four developments have led some people to conclude that the United States is rapidly approaching the limits of potential production of farm commodities and that our capacity to produce may not be adequate to meet domestic demand and foreign demands and needs. Such a conclusion leads to fear that we and the rest of the world will be running out of food, that widespread famine will occur in our lifetime with all the horrible consequences associated therewith.

Is this the case? To what extent are these fears justified? I am optimistic about meeting world food needs. I do not mean to imply that we should not be concerned about our own and the world's future supply of food. Certainly there is ample cause for concern--sufficient cause for us to take careful stock of our capacity to produce and to take wise actions to assure an ample supply of food in the future.

Much of the confusion about our own productive capacity stems from viewing capacity in a fixed, physical sense rather than in variable, economic terms. Let us analyze the farm capacity of the United States in dynamic and economic terms. In so doing, four factors should be kept in mind: (1) the time period under consideration, (2) the levels of prices received by farmers, (3) the mix of farm products that is desired, and (4) the amount of public and private investment in future productive capacity.

Short-run Capacity of American Agriculture

In recent years we have been harvesting crops from just about 300 million acres of land. Pasture and range lands have contributed also to our present flow of farm products. Until recently we had about 56 million acres of cropland in the United States withdrawn from production under government programs. Changes in the 1967 wheat and feed grain programs will bring a sizeable proportion of the idled acreage back into crop production. These program changes were called for because stocks of wheat and feed grains have been reduced below desired levels by a combination of programs designed to reduce stocks, yields of some crops in 1966 that were lower than anticipated, unusually strong world market demand for commercial exports, and an exceptionally large need for food aid that was significantly influenced by the crop failure in India. With more normal production conditions in the next few years, both at home and abroad, we will continue to need some restraint on crop acreage through voluntary supply management programs.

In the short run, additional production can be obtained at relatively low cost as long as we have idle crop acreages and under-utilization of other resources in agriculture. In a period of a few years a large part, but not all of the 56 million idle acres, could be brought back into production at about present levels of prices. Many farmers participating in land diversion programs have sufficient machinery and family labor to expand production with only small additions to costs. If we continue to limit the acreage in cotton and, at the same time relax restraints on production of food and feed grains, we could fairly readily add more than 60 million tons of grain to our current levels available for food aid. There is no indication that anywhere near this much will be needed for food aid in the near future.

Other farmers with land that has been reserved under programs in recent years could expand production only with additional capital investments and expenditures for hired labor. This added investment would commit these farmers to higher costs for several years. Therefore, they probably would expand production only with reasonable assurance of continued favorable prices for several years.

Finally, a significant part of our presently idle crop acreage would not come back into crop production at current or even modestly higher levels of price. The use of some of this land has shifted to forestry or nonfarm uses under conditions that would require substantial capital investments to bring it back into production, if at all.

As we have opportunity to expand acreage in crop use and production, a word of caution is in order. For many years one goal of agricultural policy and a goal of many farmers was to protect our land resources from misuse--to achieve conservation by shifting land out of crop use that was not suited to such use without deterioration. The goals of conservation must not be forgotten in our enthusiasm to meet expanding markets and needs. In my view, the goals of conservation need not be sacrificed. The needs for food are not growing fast enough to warrant wanton and misguided exploitation of our land base. Modern technology together with selective expansion of acreage can produce enough without endangering the hard-won gains in conservation achieved over the past 30 years.

In summary, our reserve potential for production affords us considerable flexibility in a short-run period of several years under present or modestly higher price levels. Additional production can be obtained at little extra cost. Current farm programs are flexible enough to permit production to be expanded or curtailed within fairly wide limits.

The Long Run

But what about the flexibility of our production capacity in the long run--say the next 5 to 30 years? This takes us well beyond the question of the additional output that could be obtained from reactivating all or a large part of the 56 million acres idled under supply management programs. There are fewer constraints in the long run; we can create capacity given enough time and money.

Our Conservation Needs Survey of a few years ago shows that we have 638 million acres of Class I, II, and III land in the United States. This is our land best suited for cropping. By comparison we are now harvesting crops from slightly more than 300 million acres, and a little of this is Class IV or poorer land. In addition, we have vast areas that could be made into productive cropland through drainage, clearing, or irrigation.

Thus, there is much more potential cropland available in the United States than the 56 million acres so frequently referred to. The real issues are (a) how much additional land could be brought into production and under what conditions, (b) what levels of commodity prices would it take, (c) what amounts of public and private investment would be required, (d) how long would it take, and (e) what would be the overall effects of a large expansion in crop acreage on cost of food and fiber in the United States, on farm incomes, and on our conservation and other resource use objectives.

As with land and capital, technology can also be treated as a variable in the long run. If we are looking ahead 20 years and are alarmed that the output of United States agriculture will be insufficient to meet our total needs, investments, particularly public investments, in the development of production technologies could be accelerated. Technological advance could be stimulated both in total and for selected commodities. For example, recent work on the development of high lysine corn holds a great deal of promise for virtually revolutionizing the production of vegetable proteins. Already, thought is being given to upgrading the protein content of other food crops through similar plant breeding developments. Within 5 to 10 years this work could very well have a significant impact on both the total food and the plant protein output capacity of United States agriculture.

Total farm capacity of the United States is just one measure of our ability to produce food for ourselves and for developing countries. We should also look at the composition of this output. Under what conditions can the United States produce the types of food and fiber that are required to fulfill our food aid commitments? In the past, our foreign food

assistance has been based chiefly on food grains (wheat and rice), high protein foods (namely nonfat dry milk), and vegetable oils. Thus, our food aid programs have drawn rather heavily upon the production resources devoted to a relatively few commodities. If one contemplated a significant expansion in the amount of food aid, based on the traditional commodity mix, we would eventually encounter very inelastic supply responses for these commodities with respect to either price or investments in productive capacity. However, we do not have to be bound by our traditional behavior. Changing economic and technological conditions over time can greatly broaden our capabilities to meet the food needs of developing countries.

Although we have traditionally used wheat and rice in our food aid programs, other grains, mostly sorghums and corn, have been found to be increasingly acceptable. In many developing countries corn and sorghums are commonly used as food grains by large segments of the population. This year we successfully used several million tons of sorghums in addition to wheat to help meet the high level food needs of India resulting from the failure of the monsoon in 1965. This unprecedented proportion of sorghums was well received. Sorghums can continue to make up a significant proportion of grain India receives from the United States under P.L. 480. Much is being done and can be done to substitute plentiful foods for scarce foods in meeting the aid requirements of receiving countries.

There is a great need for additional protein in the world. In the past we have met some of this need with nonfat dry milk, but the United States has a limited capacity to supply substantially larger quantities of nonfat dry milk at reasonable prices. This bottleneck is being broken in a number of ways. Chemists and nutritionists have developed food preparations high in protein derived from a variety of vegetable sources. The soybean has played and can play a significant role. The development of high lysine corn may also represent a technological advance that changes our production potential for vegetable protein. The protein yield per acre obtained from high lysine corn may be several times that of soybeans. These products greatly expand the resource base in the United States that can be drawn upon to supply high protein foods to developing nations.

It should be obvious from the above discussion that United States agriculture has considerable flexibility both in the short and long run to achieve production levels of food and fiber far above those that now prevail and can contribute significantly to the needs of developing countries. This does not mean, however, that the United States can, or should, or will "feed the world" indefinitely.

Let us come back for a moment to our land base and the question of what actions will be required to expand output, if it is needed. Some land, especially that which has been in reserve programs, could be returned readily to crop use without adding to unit costs and without need for immediate increases in capital equipment or labor. Farmers would simply use their land, machinery, and labor more fully.

Other acreages could come into production, again mostly land that has been cropped in recent years, with some added costs. These costs would be mostly for additional machinery and perhaps hired labor. Such land would come into production if farmers could expect favorable prices for a period long enough to justify their investment.

In the long run, a vast expansion of productive capacity could be achieved by more substantial capital investments in land reclamation and the ancillary investments required for operation. There is some speculation on how much of such land we have. My estimate would place the figure in the neighborhood of 150 million acres. Substantial public and private investment would be required to bring such land into crop use. Some of it requires irrigation at costs ranging from \$200 to \$2,000 an acre. Most of it requires clearing and drainage at costs that range from \$100 to \$500 an acre. These are rough estimates based on sample investigations. For an investment of \$30 to \$50 billion we could increase our cropland acreage by as much as 50 percent. This, together with increasing yields on present cropland, could conceivably more than double our productive capacity in the next 30 years.

I do not advocate or predict that such an all-out effort would be needed or desirable. I merely want to express the view that our eventual capacity for production far exceeds present levels. Despite our vast potential capacity to produce, the world food problem has to be solved largely in the developing countries. Food assistance can be a valuable resource in meeting this objective. We should not expect that the food production and consumption trends in developing countries that have given rise to growing food import needs in recent years will continue indefinitely. Such a conclusion really means that we condemn to failure the development efforts of the less developed countries and the foreign economic assistance efforts of the developed countries. This I am not willing to do and the historical evidence does not support it.

It is clear that action will be required to increase food production at a faster rate in the future than in the past even with the necessary, and I hope successful, efforts to limit the rate of population growth. The rate of growth in food production in the developing countries since World War II has been about 2.6 percent per year, or only slightly larger than the rate

of population growth. It is possible, however, for developing countries to substantially increase the rate of growth in agricultural production. A recent study of 26 developing countries shows that 12 of these countries have achieved an annual increase in agricultural production of more than 4 percent.^{1/} The 12 countries differ greatly in many of the factors generally believed to influence agricultural production, including climate, land availability, literacy level, cultural patterns, and governmental structures. Analyses of these countries indicate that the rapid rates of increase in output did not just happen; they were the result of aggressive group action generally directed specifically at improving agricultural production conditions.

Now let me turn to another dimension of the capacity of American agriculture to supply food for developing countries. This is the tremendous research, and industrial base that supplies our agriculture with an abundance of inputs and does such an efficient job in the processing and distribution of American farm products. In the long run this is probably the most important aspect of American agricultural production capacity in the war against hunger.

The big task in winning the war on hunger is for developing nations to transform their traditional agricultures into modern and progressive industries capable of sustained growth. This transformation will require policies that provide incentives for change and the inputs required to bring this change about. These inputs include research and education, improved crop and livestock varieties, such agricultural chemicals as fertilizers and pesticides, irrigation facilities, and improved marketing and storage facilities. American private enterprise has been a vital and dynamic force in American agriculture in this area. Private enterprise, both indigenous and foreign, can play a crucial role in agricultural development in the developing nations. American industries are already making a very large contribution to agricultural development around the world. They can play an even greater role.

Conclusions

In my view, American agriculture is in good shape to help wage the world war on hunger. We have some stocks of food on hand, although these stocks are far below the levels of recent years. We have a ready reserve of productive land, some of which is being brought back into production this year.

More importantly we have a tremendous strategic reserve of land that could, if needed, be brought into production over the next few decades but at substantial costs of both public and private investment.

^{1/} Changes in Agriculture in 26 Developing Nations, 1948 to 1963. FAER No. 27. Economic Research Service, U.S. Department of Agriculture, 1965.

In addition, we have an effective institutional system for American agriculture supported by public and private research and education and supported by a vast industry that supplies inputs to American farmers and assembles, processes, and distributes farm products. Without a viable system of research and education and the ancillary industries, American farmers could not have achieved the levels of production we now enjoy and would not have the capacity to expand production in the future.

Precise projections of the kinds and quantities of farm commodities we could supply for export depend on many factors. Growing needs at home must be met first. Then we must meet our commercial markets abroad and strive to expand them wherever possible. But even after these demands are met, we still can supply vast quantities of food for the hungry people of the world.

One of the chief problems is how to convert the needs of hungry people to effective economic demand for commodities. Farmers like to produce and can produce much more than they are now doing, but they must also make money at it. The food importing nations must be able to buy at commercial prices or the developed world must be prepared to provide the funds needed to channel food from American farms to final consumers. The new P.L. 480 Act demonstrates our willingness to do our share in waging the war on hunger.

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