American Agriculture's Capacity To Meet Future Demands*

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In embarking upon a topic that is full of uncertanties, the only thing I am sure of is that agriculture's capacity to produce is an important subject to many people. Consumers, shell-shocked by the rise of food prices of the past two years and facing the consequences of a bad drought, would like to know if relief is ever in sight. Concern about inflation of prices in general -- not just food -- is high; stability of food prices seems a necessary if far from sufficient condition for getting it under control. Faced by prospects of heavy outlays for imports, especially for oil, the nation hopes that high exports of farm products will help to balance its international account. Persons and agencies concerned about sources of food for hungry people in poor countries turn inevitably to the United States, already by far the leading net exporter of food and one of the most promising sources of export expansion. Farmers would like to know future output in order to form better judgments about prospective economic conditions in their industry.

Production or capacity figures by themselves are not very meaningful. What one wants to know is how potential production compares with amounts likely to be demanded at specified prices. Consideration of possible demands, however, makes an already complex problem especially difficult, for great uncertainty attaches to demands to be made on American agriculture as well as to agriculture's capacity to produce. Especially for a paper that must be listened to rather than read, it seems necessary to simplify the analysis rather severely.

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One way to simplify is to focus upon a date sufficiently far in the future so that agriculture's production could be markedly different from its present level. The date should not be so remote, however, that we have no useful ideas about demands to be made on agriculture or about the determinants of farm output. I have chosen 1985 as a convenient target date. Another way to simplify is to choose two contrasting situations that seem enlightening about the many outcomes that might possibly develop. I shall try now to be explicit about the two benchmark situations to which I intend to give special attention.

Two Benchmark Situations

The first benchmark I call the standard situation because it represents the unfolding of trends that were established prior to the turnaround in food and agricultural affairs two years ago. One can reasonably argue that the basic determinants of supply and demand for agricultural products, especially in the aggregate, are such things as population, income, the flow of new production technology, and land devoted to agricultural uses. None of these characteristically changes direction abruptly or moves to new long-term levels overnight. Despite the deviant behavior of the past two years, it may turn out that the situation in 1985 is largely determined by the working out of forces already well established and clearly observable prior to 1972.

Several projections of future agricultural conditions have been made in the United States in the past half-dozen years [1-7, 10]. Though the target dates usually were not quite so far away as 1985, the studies strongly suggested what the situation in the mid-1980's would be like if past trends or relationships were to persist. The studies all pointed to adequate capacity on agriculture's part to meet prospective demands at ordinary prices. Usually, some excess capacity was identified or implied.

Now, it is easy to overlook indications that trends are changing, that a new set of basic relationships is emerging. The dramatic events of the past two years prompt a re-examination of the past decade or two to see if a new era has been clearly foreshadowed. I have, therefore, made my own projections for 1985. I should say at once that I have no startling new conclusions, though perhaps a somewhat different interpretation emerges.

The estimates for the standard situation in 1985 are build on assumptions that the U.S. population will grow at 0.8 percent per year, that the average income of consumers will rise as in the 1960's and early 1970's, and that past trends in consumer preferences will persist. Exports, including food aid, are assumed to change in ways typical of the years prior to 1972; in particular, the huge agricultural exports of the past two years are not treated as the starting point for projection into the future. On the supply side, government controls on production are considered to be absent. The flow of improved production practices serving to increase crop yields and livestock production is assumed to continue, though the particular forms it will take are not specified in detail.

Price relationships to which consumers, foreign buyers, and producers respond in the standard situation are assumed to reflect trends underway prior to 1972. Here there is a difficulty of exposition, for inflation is likely to have proceeded considerably further by 1985. In referring to standard or normal prices in 1985, I do not mean that the dollar-and-cent prices of the past will return. I mean, for example, that retail food prices will bear the relationship to the Consumer Price Index that was typical prior to 1972. I mean the relationship of farm product prices (supplemented, if necessary, by payments) to production costs will be consistent with pre-1972 trends. If one agrees that farm and food prices prior to 1972 were generally low to modest, then farm and food prices projected for the standard situation are low to modest.

Only by coincidence could all these assumptions be consistent. If it turned out that agriculture would produce more than was demanded at assumed prices, then agriculture would have excess capacity. If it turned out that demands exceeded output, then capacity would be deficient. Thus the projections are suited to looking at the capacity question but are not intended to show what the actual level of prices or production might be.

The second benchmark is intended to be illuminating about an alternative situation for 1985, one in which high demand puts a severe strain on agriculture's capacity to produce from now to 1985. A conclusion soon reached is that one of the most important variables for consideration is the future strength of export demand for farm products. Export demand might be great because our regular customers abroad bought much more, because Russia and China became large importers, or because the United States undertook to give vast amounts of food aid to poor countries. Very high export demand, provisionally of unidentified source, is the distinctive feature of the high-demand situation.

High demand is assumed to hold crop prices approximately as high in relation to costs as crop prices have been, on average, for the past two years. A strong economic incentive would exist, therefore, for expansion of farm output. High prices would reduce domestic consumption somewhat below levels projected for the standard situation. A large volume of agricultural products would be available for export. The system would be in neat balance if the strong export demand assumed for 1985 happened to be just sufficient to absorb the export quantities available.

No effort is made to concoct such a neat balance, however. Without it, the projections are useful for indicating the expansion in output of major crops that might be forthcoming in response to highly favorable prices to producers. The projections also suggest the volume of exports available for

commercial sale or food aid and permit speculation as to how much could be accomplished with them.

The two benchmark situations by no means exhaust the potential outcomes for 1985. It is possible that energy shortages or restrictions on agriculture to protect the environment will materially impair agriculture's ability to produce. It is also possible that demand will be considerably weaker than projected even for the standard situation. A few comments will be made later on about the effects of such developments.

The Standard Situation

A large increase in demand for agricultural products is projected even for the standard situation in which forces at work prior to 1972 dominate the outcome in 1985. If the assumptions already described held true, the United States would have 11 percent more people than in 1973.[1] The average family, though by no means all families, would eat abundantly. Calorie intake would substantially exceed the amount needed if every person were to get the recommended dietary allowance defined by the National Research Council. Much more protein would be consumed (again, by the average person) than considered essential for good health, and a much larger proportion of the protein than a person usually needs would come from animal products. Per capita consumption of red and poultry meats would be 18 percent above the record set in 1971. Consumption of dairy products and eggs, however, would be down. The index of per capita consumption of all foods collectively would be 6 percent over the 1971 record.

A substantial increase in livestock feed would be required to produce the larger volume of animal products. Domestic use for feed grains for this purpose would exceed the 1972 level by one-fourth; feeding of soybean oilmeal would rise more than one-third. Hay acreage, while down, would take nearly one-fifth of the cropland in use.[2]

Added to enlarged domestic utilization would be exports following trends established before the 1972 spurt. Projected exports for feed grains, wheat, cotton, and rice in 1985 would be below peaks reached in the past two years. Soybean exports, however, would be far higher. Both abroad and at home, rising demand for protein feed for livestock is focussed on soybeans, of which the U.S. is the pre-eminent source. The perhaps surprising conclusion is that even for the standard situation, total exports of nine leading crops in 1985 would be 15 percent higher than the recond set in the crop year just ended. Exports of grain for assistance to poor countries would be a significant but not dominant part of total exports.

Agriculture's capacity to meet demands for food, feed, and fiber crops will depend mainly on the amount of land and water used for crops, on the level of technology used in crop production, on the availability of inputs such as fertilizer, machinery, and fuel from industry, and on restraints on production methods that might be imposed to protect the environment. For the standard situation, I assume that production problems connected with energy shortages or environmental protection will not be serious enough to modify total output appreciably. Questions about production in the standard situation, therefore, center on the acreage likely to be used for crops and on yields per acre likely to result from water availability and changing technology.[3]

Estimates of land ready at hand for crop production have been somewhat uncertain because land was withheld from production by one government program or another from 1956 to 1973. A rule of thumb that worked fairly well was to say that 10 acres signed up in programs reduced total cropland harvested by seven acres. Estimates of land ready at hand for crop production indicate a slow downward trend since about 1950. Total cropland harvested is projected to be 325 million acres in 1985, slightly below the amount

that would be harvested this year with normal planting and growing weather. This acreage, 325 million, seems likely to be cropped in 1985 even if crop prices are rather unfavorable to farmers. A larger acreage probably would require distinctly favorable prices.

Crop yields per acre have been rising for four decades because of a complex combination of improved varieties, more fertilizer, more effective protection against diseases-insects-weeds, improved cultural practices, more irrigation, and so forth. The process producing the persistent upward trend in over-all yields is by no means ended if energy and environment do not become important restrictions, the assumption for the standard situation. In projecting yields per acre for the leading field crops, I tried to recognize any apparent slowing down of the rates of increase, and I made rough adjustments for the past effects of acreage diversion and changes in location of production on crop yields. The average projected yield per acre for 10 crops in 1985, with normal weather, was 20 percent above the 1971-73 average. The projected increase is only a little more than half the percentage increase in yields achieved in the preceding period of equal length.

Those of you with a strong interest in production will want to know some of the key yields estimated for 1985. They are: corn, 122 bushels per acre; wheat, 39 bushels; soybeans, 32 bushels; and cotton (the only crop for which no increase was projected), one bale per acre.

Though farmers are unlikely to make important changes in <u>total</u> harvested acreage unless prices depart widely from the standard level, farmers (given time) will shift land from one crop to another in response to rather modest changes in price relationships. On this assumption, enough land was assigned to each crop other than grains to produce as much as the market was expected to take in 1985. The remainder of the 325 million acre total was distributed among the grains.

It turns out that agricultural production capacity in the standard situation would exceed demand by a small margin. Surplus capacity, as a result of the way the calculations were made, would be concentrated in grains. Excess grain production would amount to 20 million tons, which would be 6 percent of total grain utilization in 1985. Or, put another way, the excess capacity would be equivalent to 2 or 3 percent of total utilization of all crops.

The projected excess capacity for 1985 is smaller than the actual excess capacity usually estimated for the 1960's. The excess is sufficiently small that it might be obliterated or doubled by a moderate error in projecting crop yields, domestic demand, or exports even if the favorable assumptions about energy supplies and environmental measures proved to be correct.

The High-Demand Situation

I next turn to the high-demand situation featured by huge exports that proceed upward from the high levels reached in the past two years. Estimates made for the standard situation suggest that agricultural capacity at standard prices would be deficient. Thus the assumption of crop prices generally as favorable to farmers as those of the 1972 and 1973 seasons might well be justified. The central question is, if such favorable price relationships persisted until 1985, how much might agricultural capacity be expanded?

A land inventory made in 1967 by the Soil Conservation Service of USDA [9] indicates that a surprising amount of land in the United States is not cropped but could be cropped, according to soil conservation criteria. On the other hand, some land now cultivated should not be cropped, from a conservation standpoint. One might infer from the inventory data[4] that harvested cropland could be increased 60 percent over the current level without violating soil conservation criteria.

This is an upper limit, however, that must be heavily discounted in appraising potential production capacity. More than one-third of the additional land is now in range and pasture and producing livestock feed that would have to be replaced if the land were put under the plow. This land and other potential crop acreage now in forestry are earning economic returns in their present uses and would not readily be shifted to wheat, feed grains, and similar field crops. Much of the land would require substantial investment to be brought into crop production.

The Economic Research Service of USDA recently made projections of agricultural production in 1985 under assumptions closely approximating those of my high-demand situation [8][5]. Drawing upon a much wider range of expertise than is available to me, ERS concluded that 350 million acres might be harvested in 1985. This is an increase of 25 million acres over the 325 million I projected for the standard situation. It seems to be a reasonable estimate of how much expansion high prices might generate in a decade.[6]

Favorable prices not accompanied by shortages of fertilizer or other inputs would stimulate more rapid increases in yields per acre than otherwise would be expected. On the other hand, much of the new land added to the cropped area would be less productive than the land already cultivated. I made two adjustments in my standard-situation yields to represent the high-demand situation: first, yields of grains other than wheat were increased 5 percent; and second, yields of wheat, which would be much expanded in acreage, were reduced from 39 to 36 bushels per acre. Yields thus estimated for 1985 in the high-demand situation averaged a little higher than ERS projections.

Total grain production thus estimated for the high-demand situation was, in the aggregate, 12 percent higher than for the standard situation. Larger output sharply increased the amounts of crops available to meet high export demand. Another source of greater export availability was reduced consumption

at home. Faced by higher prices resulting from huge exports, consumers would cut back to some extent on food consumption and thus would release resources to meet demands from abroad.[7]

Some Other Situations

Before going on to consider what the projections for the two benchmark situations may tell us, I should say a few words about other possibilities.

The energy situation is very much on our minds now. Clearly, any substantial failure to supply agriculture's growing needs for fertilizer, fuel, or other essential inputs will reduce agriculture's future capacity to produce. The small surplus projected for the standard situation could readily become a deficiency whose size depended on the extent of the energy shortage. Consumers would find less food on the market, prices would be higher, and agricultural exports would decline. Most such effects would be heightened if reduced energy supplies for agriculture happened to be combined with the high-demand situation; then food prices would reach highs not yet approached.

Similar comments would apply to substantial restraints on agriculture's production capacity for environmental reasons. Unless restraints took a general form such as across-the-board reduction in fertilizer use, environmental measures probably would be more selective than an energy shortage -- effects would hit particular kinds of farming in particular areas especially hard. But inability to reach production levels projected for 1985 would have the types of consequences already outlined.

There are ways by which energy and environmental restraints can be partially countered by changes in agricultural production methods. In general, however, these would mitigate but not eliminate the effects described. New technology, yet to be developed, may be especially helpful on the environmental problem. But some popular notions about what can be done with organic farming or low-energy agriculture are merely romantic.

The remaining situation to be touched upon is the possibility of low demand, especially for export. It is disturbingly conceivable, for example, that the Arabian oil monopoly will hold together and that consequent internal and foreign exchange problems will seriously reduce other countries' buying power for American farm products. Food aid for poor countries could turn out to be trivial either because it was not needed or because the American public declined to pay for it. The projections for the standard situation showed a little excess agricultural production capacity. If demand were materially lower than projected, surpluses would, of course, be larger. The long history of excess agricultural production capacity in the United States would be extended.

Applications, Meanings, Conclusions

The alternative agricultural situations discussed for 1985 could be much expanded, but it is time to turn to meanings we might draw from them for the future.

Forecasts

First, to what extent can any of the projections be regarded as forecasts? For forecasting, we face the common problem in economics of being able to say something about what would happen within the system being analyzed if we knew what external forces were going to bear upon the system. But no one knows for sure how the policies of the European countries will affect their demand for American farm products a decade hence, how effectively poor countries will deal with food production and population problems now confronting them, whether protracted periods of poor weather will hit agriculture, or what will be the outcome of the Arabian oil monopoly. It must be admitted, also, that high margins of error apply to predictions of what would happen within American agriculture even if external circumstances could be accurately foreseen.

Nevertheless, some outcomes seem more likely than others, and I should like to suggest the order of the subjective probabilities I attach to future developments. The standard situation, in which the circumstances of 1985 are largely determined by trends established prior to 1972, seems the most likely outcome. There is one important modification. The small size of the surplus projected for the standard situation in 1985, together with two recent food scares, one in 1966 and the other in the past two years, indicates that we can expect occasional shortages in the future. In this interpretation of what has been happening, the episode we are now in is a particularly severe instance of shortages at unpredictable intervals even though production is adequate or slightly excessive most of the time.

Very strong export demand on the order of that implied by the high-demand situation seems less probable for several reasons. The recent price experience should stimulate agricultural production in other developed countries and thus tend to hold down demand for American agricultural exports. Prospects that importing countries will substantially reduce protection for their domestic agricultures, never very bright, seem diminished by the recent high prices paid for imports. Unfavorable balances of payments also are likely to be a brake on agricultural imports of some countries.

Prospects that poor countries will need massive, continuing food aid from the United States are perhaps commonly overstated at present, but such prospects are by no means negligible. A further uncertainty is U.S. policy with regard to supplying food aid should the need be great. I want to mention this later in another connection. Here I shall only say, as a prediction and not as an expression of what ought to happen, that food aid is not likely to be a principal reason for huge agricultural exports on a continuing basis.

Higher energy costs than we once considered normal and some restrictions on agricultural production practices in the interests of environmental protection seem certain. If we manage our affairs reasonably well -- and I would rather not have to show the plausibility of that assumption -- agriculture's overall capacity to produce should not be much affected. Probably we shall have fertilizer bottlenecks for another two or three years, but they need not be enduring. Again, however, the probability of much less favorable outcomes is too high to ignore.

It is always difficult in one extreme circumstance to imagine that its opposite will eventually occur. I do not attach a high probability to the low-demand situation mentioned earlier, but the present tightness of supplies is no indication that it could not happen.

My treatment of the forecast question may strike noneconomists, at least, as evasive. But the important reason for forecasting is to make plans, private and public, for dealing with the future. Uncertainty about the future is an inescapable fact of life. We need to be prepared to deal with outcomes likely to occur, with special attention to those that could be especially unsatisfactory to us. It could be disastrous to make a specific forecast, to prepare to deal only with one outcome, and to find ourselves locked in when a very different outcome in fact develops.

Feeding ourselves

One of the surest conclusions in an uncertain world is that the United States can feed itself for a long time to come, probably indefinitely. One margin of safety is the current excess of food exports over food imports, an excess that could be used for our own consumption in dire circumstances. A second margin of safety is the ability to expand food production through technology and allocation of proportionately more resources to agriculture if necessary. A third margin of safety is the high level of consumption of

animal products. Even if some disaster cut crop production capacity in half, the nutritional needs of our people could be met by shifting toward plant-derived foods and giving up a large portion of our animal-derived foods. The resulting diet would be most unsatisfactory to consumers; extremely high food prices or tight rationing would be necessary; and animal agriculture would be devastated. But the people could be fed.

Feeding poor countries

Feeding the poor countries of the world is an entirely different matter. The projections for the standard situation showed a small surplus of crop production in 1985. If this is added to the food aid included in projected exports, about 30 million tons of grain would be available for feeding poor countries. Thirty million tons is about 5 percent of total grain consumption of the less developed countries, including China, at the present time. If population grows at the recent rate, 30 million tons of grain, by 1985, would be absorbed by only one year's population growth in the poor countries.

The projected 30 million tons of grain would nonetheless be useful for dealing with individual, limited instances of food shortages around the world. In the past history of food aid by the United States, peak shipments were made in the crop years 1964 and 1965 when India was having particularly severe droughts. The grain and other farm commodities exported under government programs in those years amounted to the equivalent of 25 million tons of grain annually. The 30 million tons projected to be available for food aid in the standard situation would be roughly the same relative amount as at the peak of past programs.

More grain would be available for aid if a deliberate effort were made to raise prices as assumed for the high demand situation and to give all of production in excess of commercial demand to poor countries. There would be three sources of greater food aid in this situation than in the standard

situation. First, increased output in response to high prices could be channeled into food for aid, principally grains. The kind of grain poor countries would accept would make some difference: maximum tonnage could be shipped if they would take large amounts of corn and sorghum, but probably they would want mostly wheat and rice. Second, high feed prices in the United States would reduce domestic consumption of animal products, freeing some land from feed crops for use, instead, for food aid. Third, high prices would reduce commercial exports and make more products available for aid shipments.

The tonnage of grain that could be available in the aid-induced, high-demand situation would vary with too many factors to consider in detail here. The projections suggest 100 million tons, about three-fourths in wheat, as a representative amount for 1985.[8] This would be four times as much food aid as we have ever given to date. One hundred million tons of grain could provide the food energy needs, though not all nutritional needs, of more than a quarter-billion people, greater than the U.S. population will be in 1985. Even so, the vast amount of grain would only delay famine if poor countries of the world ceased to expand their own food production but continued with the present high rates of population growth. One hundred million tons of grain would feed only three years' population growth in the less developed countries, including China, in the late 1980's.[9]

The food problem of the poor countries of the world is not hopeless, but food aid from the United States can play only a part, albeit a valuable one, in working out a solution. One can suggest ways by which even more aid could be given than discussed here. Prospects are, however, that the costs, frustrations, and awareness of the ultimate inadequacy of food aid would result in far less aid than the 100 million tons of grain taken here to illustrate the potential. Costs to the American public would include, (1)

reduced domestic consumption of prized foods, principally animal products, (2) higher prices and larger food bills for consumers for the reduced amount of food actually purchased, (3) higher taxes, to pay for raw food materials sent abroad and for costs of simple processing, transportation, and handling, and (4) reduced foreign exchange earnings from commercial exports of farm products (foreign demand, in contrast to domestic demand, probably is elastic). The case for some food aid is strong enough to support an aid program; the more success agriculture has in expanding production, the easier it will be to have a large aid program; but prospective production capacity is not large enough to provide massive food aid without burdens on the public that the public probably will not choose to bear.

Research and development

The projections for 1985 highlight the importance of higher crop yields and improved conversion of feed into animal products as means of increasing agricultural output. Even the small surplus in the standard situation is dependent upon substantial further progress in improving production methods; a small defect in performance would convert the surplus into a deficiency. The projections for the high-demand situation show the need for greater production than usual trends would generate. These projections further show the difficulty of compensating for static technology by bringing more land into production.

In a broader sense, the ability of all countries, especially the poor countries, to deal with the rising need for food is crucially dependent on the expansion of scientific knowledge and its application through technology tailored to local conditions. Strong leadership of the United States in this effort, working in part through international agencies, probably has more potential for feeding the poor countries of the world than does aid in the form of food shipments.

Inadequacy of information about production potential

Anyone seeking to make estimates of how much the United States could increase its agricultural production under strong incentives for more output will be impressed by how little solid information is available on the subject. Surpluses characterized agriculture until two years ago; no systematic attention was given to what could be produced if need for expanded output were high. We do not know much about the economic barriers to cropping all the land considered available according to soil conservation criteria, nor do we know clearly the net addition to output to be realized by cropping that land. The interesting subject of double-cropping under strong production incentives remains highly speculative; we do not even have direct measures of how much of what is double-cropped at present. The feasibility of now-unused production practices at prices higher than customary price ranges is highly speculative.

Our knowledge is limited because in the past the prevailing opinion among farmers, in Congress, in agricultural supply firms, and among most researchers was that the information was not very practical for meeting here-and-now problems. This is a common misfortune afflicting applied research in general. It is clear now that we should have been doing more research in agriculture to show the full range of our production potential and in the energy field to determine how best to utilize energy sources that were not economically feasible while oil was so cheap. The public can well afford to pay for applied research that examines possibilities outside of immediately perceived needs and should not reserve only to pure or basic science the task of exploring questions of little current concern.

Price and market policies

Tonight's topic is full of implications concerning policies for farm income support, market stabilization, foreign agricultural trade, and the rate of output expansion. I have time for only a few comments. Willard Cochrane covered much of the ground this morning.

One point that emerges is the vulnerability of our future food and agriculture system to instability. The most likely prospect is that agriculture will have a thin excess capacity much of the time, will experience continual variations in output because of weather, and will occasionally be shocked by exceptional surges of export demand. Prospects for stability are also poor if high demand causes constant strain on agriculture's production capacity. A leading policy need, therefore, is purposeful stabilization of market supplies and prices of leading crops -- not stabilization of dollar-and-cent prices in a time of inflation, but holding particular agricultural prices near the paths required to obtain needed production. Given the size of export disturbances that may occur, stabilization stocks of the size ordinarily mentioned in the past decade may be incapable of giving protection when it is most needed. The United States perhaps should abandon the role of residual supplier on world markets, specify conditions under which it will not export freely, and through its own policies put pressure on other countries to carry stabilization stocks. Though income protection for farmers is not now a cause for much concern, the likelihood of significant surpluses, especially over intervals of a few years, is high enough to make limited income support at times of low prices a part of the total farm policy package.

It is possible that the nation would want to stimulate farm production more than the market would do in order, for example, to have massive amounts of food for poor countries or to more nearly assure an abundance of food for itself. Government policies could do this in various ways. One would be to

reduce uncertainty, which now hinders investments needed to expand agricultural output, by long-term guarantees of favorable returns to producers of desired crops. Another way would be cheap credit for land development. My own appraisal of the future supply-demand balance does not suggest such measures should be adopted. I do want to suggest that the public should shoulder a large part of the risk involved if it wants rapid expansion of agricultural capacity and that public assumption of the risk would be instrumental in obtaining expansion.

Summary

The leading conclusion, I think, is this: the most likely prospect for the next decade or so is that American agriculture will ordinarily have a little excess capacity to meet demands upon it if farm prices go back to their old relationships to other prices, but at unpredictable intervals temporary surges of export demand will turn the small excess into a deficit. We are now in such an episode, to be extended by a bad drought. From this outlook flows the prospect of an instability that will be particularly difficult to deal with. The future, always an enigma, is particulary uncertain now. Very strong export demand could cause exceptionally high food prices to continue despite a production increase induced by those high prices. Or inability to obtain sufficient fertilizer, fuel, or equipment might cause shortages even if demand were only normal. More than has usually been the case, we now need food and agricultural policies that take the interests of all segments of society into account and are highly flexible to deal with events as they unfold.

Table 1. Standard situation[1/] projections for crops, 1985.

Crop	Acres	Yield	Production	Domestic Use	Exports	Excess
	mil.		mil.	mil.	mil.	mil.
Corn, bu.	61.0	122	7,442			
Gr. sorghum, bu.	16.5	70	1,155			
Barley, bu.	11.0	55	605			
Oats, bu.	9.1	61	555			
Feed grains, tons	97.6	2.70	264	219	36	9
Wheat, bu.	53.7	39	2,094	850	900	344
Rice, cwt.	1.8	52.6	95	36	48	11
All grains, tons	153.1		331	246	65	20
Soybeans, bu. 2/	71.5	32	2,288	808	1,480	--
Cotton, bales	12.0	1.0	12	7.5	4.5	--
Hay, tons	57.0	2.33	133	133	---	---
All other 3/	31.4	---	---	---	---	---
Harvested Acreage	325.0	120 4/		---	131 4/	

1/ Projection of pre-1972 trends in demands, yields, total acreage readily available for crops, etc. Usual pre-1972 price relationships assumed. Excess capacity assigned to grains in such a way that, if the excess were all exported, exports of the three classes of grains would be in the same proportions as in the 1972-73 crop years.

2/ Soybean equivalent of exported soybean meal included in exports of soybeans rather than domestic use.

3/ Harvested acreage of other crops minus acres double-cropped.

4/ Index numbers, 1971-73 crop years = 100. Includes the nine listed crops (but hay omitted from export index) and tobacco.

Table 2. High-demand 1/ projections for crops, 1985.

Crop	Acres	Yield	Production	Domestic Use	Exports
	mil.		mil.	mil.	mil.
Corn, bu.	60.8	128	7,782		
Gr. sorghum, bu.	16.4	73	1,197		
Barley, bu.	11.0	58	638		
Oats, bu.	9.2	64	589		
Feed grains, tons	97.4	2.83	276	202	74 2/
Wheat, bu.	80.9	36	2,912	850	2,062 2/
Rice, cwt.	2.4	55.2	134	36	98 2/
All grains, tons	180.7		370	229	141 2/
Soybeans, bu. 3/	68.9	32	2,200	720	1,480
Cotton, bales	12.0	1.0	12	7.5	4.5
Hay, tons	57.0	2.33	133	133	---
All other 4/	31.4	--	---	---	---
Harvested Acreage	350.0	121 5/	---	---	188 5/

1/ Standard situation domestic demand, with feed grain and soybean utilization reduced to reflect higher prices, plus foreign demand high enough to raise real farm prices 30 percent and to take all output available for export; exports of three classes of grains proportionate to 1972-73 crop year averages.

2/ Available for export; exports of other commodities as in the standard situation.

3/ Soybean equivalent of exported soybean meal included in exports of soybeans rather than domestic use.

4/ Harvested acreage of other crops minus acres double-cropped.

5/ Index numbers, 1971-73 crop years = 100. Includes the nine listed crops (but hay omitted from export index) and tobacco.

Footnotes

[1] Domestic demand projections applicable to crops in 1985 were for 1986 since most of the utilization of 1985 crops will be in 1986.

[2] See Table 1 for projections of crop utilization and production in the standard situation.

[3] The emphasis on crops rather than on crops and livestock is partly for expositional purposes. Prospective changes in the efficiency of livestock production were taken into account in projecting feed requirements and are, of course, important. Additional export demand in the high-demand situation is considered to be concentrated on crops.

[4] And from appropriate assumptions about summer fallow and crop failure.

[5] I am grateful to ERS for making available to me unpublished details about its study.

[6] See Table 2 for projections of crop utilization and production in the high-demand situation.

[7] The contrast between the projections for the standard and high-demand situations implies a supply elasticity for total crop and total agricultural output well below unity. If "long-run" supply elasticity exceeds unity as some studies have suggested, the difference between the standard and high demand situations is understated. Working on the projections revealed examples of the importance of the demand pattern to which agriculture responds, since this much influences the output mix.

[8] Possibly commercial export demand would be high enough in 1985 to take all of the crops available for export at the high prices projected for the high-demand situation. In that event, no food would be available for aid unless aid was given priority over commercial sales. If demand (in the schedule

sense) foreign purchasers was no greater than in the standard situation and if commercial foreign purchasers responded to high prices by buying less grain and soybeans, about 100 million tons of grain would be available for food aid largely in the form of wheat exports. If recipients of aid would accept huge amounts of corn and sorghum grain, aid exports could be increased 25 percent or more.

[9] The tonnage of grains available for export in the standard situation is 48 percent of, and in the high demand situation 80 percent of, the "most probable" excess of production over domestic utilization projected for 1985 by Blakeslee, Heady, and Framingham [1]. The difference lies mainly in the latter's low projection of domestic utilization of grains for 1985 (less than actual utilization in the 1973 crop year). Projected exports in 1985 in the Blakeslee et al. study were only 53 percent of the potential amount because of lack of demand abroad; thus, they were roughly equal to the amount projected to be available in the standard situation of the study reported here.

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