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Land Use Patterns Towards Which Adjustments May Be Directed

THE PRELIMINARY program for the seminar on which this book is based described the scope of this chapter as follows:

An ideal land use pattern will be developed. This includes the location of production patterns for particular crops with indicated productions.

Most of the preceding chapters develop information absolutely basic to mine, while most of those following present the institutional arrangements through which desirable land use adjustments can be accomplished.

Janus was the Roman god who could see in both directions simultaneously. Could I but emulate him, and add to these god-like attributes that of divine insight into the future, I might be reasonably well equipped to tackle the problem of an ideal land use pattern for future agriculture in the United States.

If the preceding chapters had accomplished their assignments perfectly and in great detail, if their results had been available to me before this writing, if I had a large staff of able economists and computers — not to mention a better brain — my contribution might have come reasonably close to the mark. In these unlikely events, my chapter might well have sounded the death knell for the Center for Agricultural and Economic Adjustment, for I should have solved the major problems to which it is dedicated. With this thought in mind, I have been content with a less ambitious objective and with a presentation along broad and general lines which should leave at least a modicum of future work for the Iowa staff.

THE CONCEPTUAL MODEL

While this book focuses on land resources, particularly the agricultural uses of land, it is clear that any serious attempt at

solution must involve general equilibrium — interrelations between agricultural and nonagricultural sectors of the economy, between land and other resources and between farm and nonfarm uses of land. We visualize a complex interaction of available resources, technology, alternative uses, consumer demands and preference — all in a spatial context with appropriate interconnections in the form of transfer, processing and marketing costs. The model should be dynamic, of course, to allow for changes in technology and tastes, for interactions between and within major sectors and for all the serial interconnections of these variables.

Despairing of our ability to specify or to manipulate such a complex model, we are forced to rely on a simplified and partial analysis. Attention is directed to adjustments within agriculture. Demand is considered an exogenous variable, in the form of a projected consumption pattern for farm products. Technological change is also taken as exogenous, incorporated in a projected pattern of production functions. The model itself is static and competitive — the latter because we want an “ideal” pattern rather than an estimate of what may occur, and because the competitive norm appears to be as consistent with production efficiency criteria as any we can devise.

My land economics colleagues may visualize this in terms of economic rents for parcels of land, with land and markets interconnected in a multiple von Theunen framework, and with the desirable utilization patterns emerging from supply-demand interactions which in equilibrium assign each parcel to its highest rent-earning use. In the language of the programmers, this is an elaborated transportation model; each parcel of land is characterized by production coefficients and costs for all alternative uses, connected to all possible markets for all alternative products by transfer-processing costs, with a final solution which minimizes costs, maximizes rents, satisfies all consumption requirements, allocates land by product and among markets and determines the structures of product prices and land rents.

That this is oversimplified cannot be denied, but our knowledge is hopelessly inadequate even for this model.¹ Our approach must be in very broad terms, therefore, with only a fraction of the detail suggested above. First, we consider future prospects for the aggregate demand for farm products — primarily domestic but with some allowance for exports — and the composition of this demand by major commodity classifications. We assume that

¹ The Egbert-Dumenil models, while limited to food and feed grains, represent a good first step in this direction. See: A. C. Egbert and L. C. Dumenil, “Nature, magnitude and physical areas of potential supply-demand imbalance,” Chapter 11, this volume.

desirable future production patterns will be closely correlated with these consumption projections and, by contrast with present production, obtain general indications of desirable changes in aggregate output and in the product mix. When these desirable changes are viewed against the background of geographic production patterns and type-of-farming areas, they suggest the dominant production adjustment problems for the major agricultural regions. This can be modified by a consideration of differential population growth by regions and the probable impact on production patterns for market-oriented commodities. Finally, we add the general effects of some technological advances in production and handling on the location of production. The end product will be a far cry from an ideal land use pattern, but it will exhaust my abilities in that direction.

PROJECTIONS OF CONSUMPTION AND PRODUCTION

Many excellent studies of consumption trends and requirements are available, the details of which I shall not reproduce here (see Chapter 3 by Nathan Koffsky). In general, however, such studies involve the following steps: (1) projections of population growth; (2) projections of income and purchasing power; (3) projections of per capita consumption rates — in total and for commodity classes — based on changes in income and on trends in consumption habits; and (4) from the above, projections of future domestic consumption requirements. To these are added guesses as to possible exports of farm products, usually at levels about equal to those of the mid 1950's.

Projections of the 1975 population for continental United States now range around 220 to 230 million, or more than 35 percent above 1955 levels. Per capita real income is assumed to increase during this period by 40 to 60 percent. With this increase in income and with a continuing shift away from cereals and to livestock products, it appears that the aggregate per capita consumption of farm products might increase by 8 or 9 percent. Thus, domestic consumption of these products might rise by roughly 45 percent. Exports in the mid 1950's amounted to 10 to 12 percent of domestic consumption. If the absolute level of agricultural exports could be maintained, total utilization of farm products in 1975 — at home and abroad — apparently would stand at some 40 percent above the 1955 levels. Requirements by commodities would range from roughly 10 percent increases for wheat, potatoes and beans to 50 percent or more for most of the livestock products, feed grains and fruits and vegetables.

Table 13.1. Output of Major Agricultural Products
To Meet Projected 1975 Requirements

Commodity	Actual 1959 ^a (1953 = 100)	Projected 1975 ^b (1953 = 100)	Projected 1975 ^c (1959 = 100)
Livestock and products	112	149	133
Meat animals	112	153	137
Poultry products	124	155	125
Dairy products	105	135	128
Wool	96 ^d	124	129 ^d
Crops	115	130	113
Feed grains	142	142	100
Food grains	96	86	90
Fruits	109 ^d	148	136 ^d
Vegetables	102	148	145
Potatoes	110	107	97
Dry beans	96 ^e	104	108 ^e
Sugar	126	106	84
Fats and oils	154	144	94
Cotton	90	123	137
Tobacco	88	158	180
Total farm output	115	138	120

^aBased on statistics published by the USDA, especially Agricultural Outlook Charts, 1960, Table 44.

^bBased on Rex F. Daly, "The long-run demand for farm products," *Agr. Econ. Res.*, Vol. VIII, No. 3, July, 1956, Tables 9 and 10. Projection II data have been increased by 5 percent to allow roughly for 1975 population forecasts of 220 to 230 million rather than 210 million.

^cProjected 1975 divided by actual 1959.

^d1958 data; 1959 estimates not available.

^e1957 data; 1959 estimates not available.

Because of agricultural surpluses during the 1950's, production would not need to expand as much as utilization to satisfy 1975 requirements. Rex Daly's classic study, modified for somewhat higher population forecasts, suggests increases in production between 1953 and 1975 of 49 percent in livestock products, 30 percent in crops and 38 percent in total farm output (Table 13.1).² But output has already expanded materially; the index of farm output is 15 percent higher for 1959 than for 1953. With allowance for this, the production job facing agriculture in meeting 1975 requirements involves an expansion of only 20 percent over present output, with an increase of 33 percent in livestock products and only 13 percent in crops.

Viewed from the 1953 base, the modified Daly projections indicate needed production expansions of more than 50 percent for

² Rex F. Daly, "The long-run demand for farm products," *Agr. Econ. Res.*, Vol. VIII, No. 3, July, 1956, pp. 73-91.

meat animals, poultry products and tobacco. Feed grains, fruits and vegetables and fats and oils requirements were up 40 to 50 percent, dairy products 35 percent, and cotton and wool about 25 percent. The output of potatoes, beans and sugar would increase less than 10 percent, while food grain production should be curtailed by nearly 15 percent. The 1953-59 production changes were amazing, however, for some commodity classes — 54 percent for fats and oils, 42 percent for feed grains, 26 percent for sugar and 24 percent for poultry products. At the other extreme, output of wool, food grains and dry beans each declined 4 percent, while cotton and tobacco production fell 10 and 12 percent respectively. It is significant that the crops with output decreases are primarily those subject to production control and that expansion in such crops as feed grains and oilseeds was encouraged by the restrictions on controlled crops. The increase in sugar crops — primarily sugar beets — involves less-than-quota output by the industry in the mid 1950's, increasing profitability of sugar beets relative to other alternatives, the availability of diverted acreage and, especially since 1956, an increase in the domestic allotment. The combination of these factors increased the proportion of sugar consumption supplied by domestic beet and cane producers from 26 to 32 percent of the total.

From the standpoint of land use, the projected one-third increase of livestock products from 1959 to 1975 is already encompassed in the projection of a 13 percent increase in crop production. Within crops, it appears that present production is already adequate or slightly overadequate for 1975 requirements for feed grains and potatoes. Fats and oils need to be curtailed by 6 percent and food grains by 10 percent. The calculation suggests a restriction of 16 percent for sugar crops, but this does not allow for the recent changes in domestic quotas. With this modification, it would appear that the 1953 to 1975 requirement would be at least 130, so that 1975 would require a further increase of 5 percent as compared with 1959. Moreover, there is some evidence that total per capita use of sugar is holding constant rather than declining; if this is correct, the 1975 projections would be further increased in line with population changes.³ Major production increases will be needed for fruits and vegetables (36 and 45 percent), for cotton (37 percent) and for tobacco (80 percent).

In the past, I have been known to argue that the future production job confronting United States farms will represent a more

³ Leonidas Polopolus, U.S. Beet Sugar: A Study of Industry Structure and Performance Under Protection and Control (Ph.D. dissertation manuscript, Department of Agricultural Economics, University of California, March, 1960).

substantial effort than the record-breaking performances of the past because of certain nonrepetitive factors.⁴ I still believe this to be true, but with actual 1959 levels of crop output only 13 percent below 1975 projections it seems clear that there will be "surplus" land in this immediate future. When allowance is made for the possibility of adding new and improved land equivalent to 5 percent of total cropland, it seems certain that an ideal land use pattern for 1975 would involve the retirement of some marginal lands as well as major shifts among crop uses.

REGIONAL ADJUSTMENTS

We now come to the section where we try to outguess or second-guess the regional experts. Let us start by considering population statistics. Nielson has projected 1975 population for the continental United States at 221 million.⁵ His estimates for major census regions are given in Table 13.2. While substantial growth is to be expected in all regions, the rate of change is expected to be lowest in the East South Central (12 percent between

Table 13.2. Population of the United States and Census Regions, Actual 1954 and Projected 1975

Region	Population		Increase
	1954	1975	
	(Thousands)		(Percent)
New England	9,843	12,850	30.6
Middle Atlantic	31,463	40,500	28.7
East North Central	32,529	45,300	39.2
West North Central	14,579	17,300	18.7
South Atlantic	23,035	32,523	41.2
East South Central	11,682	13,100	12.1
West South Central	15,571	20,200	29.7
Mountain	5,762	9,582	66.3
Pacific	16,733	29,439	75.9
Continental United States	161,999 ^a	220,794	36.3

^a Adjusted to include count of children omitted by the census.

Source: Howard C. Nielson, *Population Trends in the United States Through 1975* (Menlo Park: Stanford Research Institute, 1955), p. 5. Processed.

⁴R. G. Bressler, Jr., "Farm technology and the race with population," *Jour. Farm Econ.*, Vol. 39, No. 4, Nov., 1957, pp. 849-64.

⁵Howard C. Nielson, *Population Trends in the United States Through 1975* (Menlo Park: Stanford Research Institute, 1955), 57p. Processed.

1954 and 1975) and the West North Central regions (19 percent), while it will be highest in the Mountain States (66 percent) and the Pacific States (76 percent). I report — with more horror than pride — that the California projection is 23.6 million.

Population and its geographic distribution are roughly synonymous with the geographic patterns of markets for farm products and so are important factors in the location of farm activities. By far the dominant forces shaping the regional patterns of agriculture, however, have been differences in soils and in climate. I have admired the USDA maps showing major type-of-farming areas for more than a quarter century. Two things have especially impressed me about these maps. First, in more than two decades, there have been only minor changes in the general regional character of American agriculture. Second, the broad type-of-farming areas strongly support the above statement as to the dominant influence of soil and climatic factors. The Cotton Belt lies across the southern tier of states because of climatic conditions — not proximity to market — and it has expanded west into Texas and California because of a combination of climate, soils, irrigation and topography, plus farm size amenable to mechanization. Feed grains and livestock dominate the Corn Belt in large measure because the climate favors corn, and this organization gives way to small grains in the Great Plains because rainfall permits small grain growing where many other crops cannot survive. Similarly, grazing is dominant in the Mountain States and Intermountain States because of a combination of rainfall and topography. Specialty crop areas — potatoes in Maine and Minnesota; fruits and vegetables in Florida, along the Gulf and in California; apples in Washington — find their locations in spite of, rather than because of, the geographic pattern of markets. Perhaps only in the major dairy areas are location principles clearly evident, with fluid milk regions in the Northeast, manufacturing milk in the Lake States, and with smaller fluid milk areas in the vicinity of large cities throughout the country.

Possible implications of the projected trends in population and in United States agricultural production are explored below.

New England

From the standpoint of land use, the dominant agricultural enterprise is milk production for metropolitan markets. Specialty crops such as potatoes, vegetables and tobacco occupy much of the better land. Fruit production is important. Eggs and broilers have become an important component of the agricultural

total, but these enterprises have little impact on land use. With an anticipated 31 percent increase in population, major changes in agriculture should be in market-oriented enterprises. Dairying might expand 20 to 25 percent, largely through higher production per cow and imported concentrate feeds. Population growth will provide an increased market for locally produced truck crops in season, but the availability of suitable land limits this possibility. The agricultural margin has been contracting in New England for more than a century, and this will continue. Recreational uses and suburban residential expansion will continue to remove land from commercial agriculture, while the gradual shift of poorer lands from crop-livestock uses to brush and forest uses should continue.

Middle Atlantic States

Population increase of 29 percent means 9 million more persons in this three-state region. As in New England, the land use pattern is dominated by dairying. Fruits are important along the Great Lakes, vegetables for fresh markets and for processing are a major enterprise in southern New Jersey, and there remains a considerable amount of "general" farming in Pennsylvania and upstate New York. In spite of continuing "surplus" milk problems in the New York-New Jersey pool, 1975 should see a substantial increase in fluid milk production in this region. In this connection, it should be emphasized that aggregate projections of increases in dairy production at a rate less than the rate of population growth reflect a further decline in consumption of manufactured products; per capita consumption of fluid milk and cream is expected to increase nearly 10 percent over this period. With increased demands from population growth and from higher per capita consumption, it seems probable that vegetable production for the fresh market will expand, probably at the expense of processing crops.

East North Central

This census region includes segments of three major type-of-farming areas: (1) the eastern part of the Corn Belt, extending from mid Ohio across Indiana and Illinois; (2) the Michigan-Wisconsin-northern Ohio dairy area; and (3) general farming with livestock, dairy and some tobacco in the southern parts of Ohio, Indiana and Illinois. Fruit and truck crops are important along

the eastern shore of Lake Michigan and the southern shore of Lake Erie. With the Detroit-Chicago complex of manufacturing industries, total population is expected to increase nearly 40 per cent between 1954 and 1975. Because of natural factors, dairy production will continue to be important and should expand, but with a continuing shift from manufacturing to fluid outlets. The Corn Belt section of this region represents an efficient, concentrated agricultural area. With projected increases in requirements for meat animals of 37 percent, there would seem to be little change for this area except in terms of increasing efficiency in livestock feeding. This would also be true of the southern section of the region, with the possibility of some small expansion of tobacco production.

West North Central

This region encompasses the westward extension of the Great Lakes dairy area, the Corn Belt through Iowa and Nebraska, the small grain regions centered on the Dakotas and Kansas, and it extends into the grazing lands of the northern Great Plains. Population is expected to increase by about 3 million, or only 19 percent. As in the case of the East North Central Region, dairy production should continue or even expand, with some shift towards local fluid market outlets. The butter industry, centered especially in Iowa and Minnesota, has already made a substantial adjustment but may well decline further with shifts into other livestock enterprises. The primary adjustment problems, of course, are in the small grain areas. Large wheat surpluses now exist, and present levels of food and feed grain production are either at or above projected 1975 requirements. Ideal adjustments of small grain production would not contract acreages in the Corn Belt or in the eastern sections of the wheat areas but would call for a substantial shift of acreage along the western "frontier" from small grains to permanent grass where low and erratic rainfall results in agriculture that is unstable both physically and economically.

South Atlantic States

The South Atlantic Region extends from Maryland and West Virginia to Florida. Broad agricultural uses range from general farming — livestock, dairy, fruit and truck crops — and tobacco, through the Old Cotton Belt, and into the special fruit and

vegetable areas of Florida. Population is expected to increase by 7.5 million by 1975 at a growth rate higher than the national average. With projected United States production requirements showing increases of 45 percent in vegetables and 80 percent in tobacco, it seems clear that the region will have opportunities for expansion along these lines. Citrus acreage should also expand, since consumption requirements are projected at more than 80 percent above 1953 levels. The downward trends in cotton acreage in the face of low-cost competition from Texas and the West should continue. Population growth and a gradual increase in per capita income will put a premium on the expansion of livestock and especially dairy production.

East South Central

The agriculture is dominated by livestock and tobacco in the north and by cotton and peanuts in the south. Projected population growth is the lowest for the entire country — an estimated increase of only 12 percent. Tobacco acreage should increase, although this will mean little more than the enlargement of existing small acreage allotments. There should be some moderate expansion in cotton acreage, especially in western sections.

West South Central

Farming varies from wheat and small grains in the north through cotton in the central sections to range livestock in the southwest. The Gulf Coast area is devoted to rice, sugar cane and truck crops. With population growth of nearly 5 million, there should be some expansion in dairy production. This region also should participate heavily in the 37 percent increase in needed cotton production, with expansion both in delta and highland sections. There is little prospect for economical expansion of rice or sugar cane, but truck-crop acreages should increase. Wheat and small grain acreages should decline, especially in the transition zones with permanent grazing.

Mountain States

From the standpoint of agriculture, this large region is an extensive grazing area with cropland limited to the western fringe of the Great Plains and a sprinkling of irrigated and

non-irrigated valleys. Population density is very low, and even with a projected increase of 66 percent, the 1975 population will be less than 10 million. Principal land use adjustments should be an expansion of range livestock and of livestock and dairying on present and potential irrigated land; an increase in acres in cotton, fruits and vegetables and dairying on irrigated land in the southern states; and the conversion of small grain areas to permanent grass east of the Rocky Mountains. With the exception of Idaho and Utah, where surpluses will be available for manufactured products, the dairy industry of the region will be keyed to the fluid milk requirements of its expanding population.⁶

Pacific Coast

This three-state region is characterized by large nonagricultural areas but with intensive agriculture in irrigated and non-irrigated valleys. Land use in Washington and Oregon includes dairying and general farming near the coast, fruits and specialty crops in irrigated valleys and wheat in the Columbia River Basin. In California, cotton in the San Joaquin Valley is the most important field crop in the state; hay and feed grains are important in support of the dairy and livestock industries; and large areas are devoted to the production of fruits, vegetables and nuts. Regional population is expected to increase 75 percent by 1975, with most of this in California. Projected regional production adjustments include expansion of fruits and vegetables in line with national requirements, some increases in livestock and an increase in cotton acreage in California. The dairy industry and related hay-feed crops are expected to increase by 60 percent, largely to satisfy fluid milk needs but with some manufacturing uses in the Columbia Basin in Washington.

SUMMARY AND MODIFICATIONS

To summarize, projections of crop production to meet 1975 requirements call for an expansion of only 13 percent above 1959 levels. Aggregate output per acre of cropland increased very little from 1944 to 1954 but now stands 25 percent above the 1947-49 base. While the recent rapid increases may be abnormal, it

⁶Richard L. Simmons, *Optimum Adjustments of the Dairy Industry of the Western Region to Economic Conditions of 1975* (unpublished Ph.D. dissertation, Department of Agricultural Economics, University of California, 1959), 352 pp.

seems clear that yield increases, coupled with potential new and improved crop acreage additions of as much as 5 percent, should provide a land base substantially above 1975 requirements. Projections of the magnitude of this land surplus must be in the nature of "wild guesses," but it is quite possible that the figure would range as high as 30 to 50 million acres.⁷ Food and feed grains now occupy some 60 percent of total harvested acres in the United States, and production already equals or exceeds 1975 requirements. It seems evident, therefore, that the major land use adjustment for the immediate future in American agriculture is a substantial reduction in grain acreage, with most of this taking the form of transfers to permanent grasses in the low-rainfall areas.

The Corn Belt is our most productive and concentrated agricultural area, and efficient land adjustments would certainly not call for reductions in this region; this will intensify the adjustments necessary in the grain-range areas of the Great Plains. Population growth in the Northeast and the Lake States stresses the need for increases in the production of fluid milk and fresh fruits and vegetables. The South Atlantic States should see an increase in tobacco acreage to meet rapidly increasing demands, although this may mean little more in the over-all land use pattern than enlargement of the presently very small tobacco allotments. Other adjustments for this region should involve increases in fruits and vegetables and livestock and dairying, with a continuing decline in cotton acreage.

Even with increasing yields, cotton requirements 37 percent above present output will call for acreage expansion, especially in the Delta, Texas and the irrigated areas of California and Arizona. Expanded needs for fruits and vegetables will stimulate these enterprises in the Pacific States, while rapid population growth will encourage expansion in dairy-livestock enterprises and the associated hay and feed crops.

Technological changes can have marked effects on the aggregate situation and on the competitive position of the several regions. Failure of aggregate crop yields to increase significantly above the high levels of 1958-59 would create a cropland shortage rather than a surplus in 1975. Failure of livestock feeding efficiency to continue its relatively rapid increase could have a similar effect. Competitive advantages of states and regions can be

⁷Under varying assumptions, it has been estimated that 1959 wheat and feed grain acreage would exceed 1965 requirements by 15 to 25 million, with 25 million acres in the Conservation Reserve Program. R. P. Christensen, S. E. Johnson and R. V. Baumann, Production Prospects for Wheat, Feed, and Livestock, 1960-65, USDA, ARS 43-115, Dec., 1959.

changed materially and in a relatively short time. The development of a commercial strawberry that was a heavy bearer over a long season gave California advantages both in production and in processing, for example, and resulted in very rapid increases in production. The perfection of plants with similar characteristics adapted to Washington and Michigan, on the other hand, could easily reverse this trend.⁸ External forces are also important: The development of nonfarm employment opportunities and a consequent increase in farm wages in the Southeast could significantly alter the competitive position of this area in broiler production.⁹ In spite of such possibilities, however, it seems probable that the major picture of regional specialization in agriculture will not change materially between 1960 and 1980.

Adjustments in land use, and especially the removal of large blocks of land from crop production, are most difficult to accomplish. Perhaps for that reason, past agricultural programs have emphasized two approaches: (1) spreading any required acreage reduction over all producing areas in an "equitable" but inefficient manner and (2) avoiding the adjustment problem through attempts to stimulate domestic and foreign consumption. We have already seen that projections of rapid population growth and substantial increases in per capita income do not mean substantial increases in needed crop production. Prospects for expanding commercial exports of farm products are not bright. At the 1958 conference of the Iowa Center for Agricultural Adjustment, Cochrane pinned his hope for important increases in the demand for farm products on the use of agricultural surpluses in a long-term program to finance economic development in the impoverished areas of the world.¹⁰ I quite agree that such a program would have many virtues and also that it could eliminate the bothersome problem of shrinking our agricultural productive plant. I leave to the following chapters, however, the task of devising programs and institutions to cope with either the land adjustment problem or the use of farm commodities as an effective instrument in international diplomacy.¹¹

⁸Carleton C. Dennis, *Interregional Competition in the Frozen Strawberry Industry* (unpublished Ph.D. dissertation, Department of Agricultural Economics, University of California, 1959), 236 pp.

⁹William R. Henry, "Broiler Production Regions of the Future," *Jour. Farm Econ.*, Vol. 39, No. 5, Dec., 1957, pp. 1188-98.

¹⁰Willard W. Cochrane, "Demand expansion — opportunities and limitations," in *Problems and Policies of American Agriculture*, Iowa State University Press, Ames, 1959, pp. 272-91.

¹¹While the Seminar was in session, the U.S. Government announced the signing of an agreement with India calling for the shipment of some 600 million bushels of wheat during a four-year period, for development purposes. At average yields, this is equivalent to roughly 10 million acres of wheat land.

While the projections presented in this volume strongly support the idea that there will be substantial surpluses of farm lands and of agricultural productive capacity during the 1960's and 1970's, it should be emphasized that these are not forecasts of the probable future. The truth is that we know little about the future, and that the 1975-80 situation may differ substantially from the "medium" projections; this is true for population, for general economic growth, for trends in per capita consumption, for yields per acre and for general agricultural productivity. If we should have more rapid than projected growth in population and in per capita demand, coupled with less rapid growth in agricultural productivity, current surpluses would disappear in the near future. Under such conditions, the land use solution for an essentially temporary problem might well resemble past and present programs. If population and demand lag while productivity increases rapidly, on the other hand, then agricultural surpluses will be long term and this will call for major adjustments at the intensive and the extensive margins of agriculture. Confronted with such uncertainty, wise planning for the future calls for flexible programs that can be adjusted readily to meet changing and developing needs.