STRUCTURAL CHANGES IN AGRICULTURE IMPORTANT TO PUBLIC POLICY

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This paper addresses the complexities and interrelationships within the agricultural-food sector and between the agricultural sector and other sectors of the economy from both a domestic and global perspective. Emphasis is on structural changes since World War II.

Throughout the 1950s, direct payments (1) to farmers amounted to 1 percent of cash receipts from farm marketings. This percentage rose steadily to a peak of 8 percent in 1968-70 as rising farm surpluses became everyone's albatross. Thereafter surpluses diminished and so did direct payments to farmers until 1981 when they were again about 1 percent of cash receipts from farm marketings.

Although U.S. farmers have benefitted handsomely from past programs, U.S. agricultural policy has not been all one-sided as its critics often imply. For example, farm policies of the past three decades have permitted U.S. crop and livestock producers to operate relatively free of destabilizing or chaotic market forces. The resulting stability has enabled the U.S. food sector to provide consumers with a wide variety of food products with only minor shortages. Furthermore, U.S. consumers spend less of their disposable income for food than do consumers in any other country of the world (2).

Nevertheless, it is argued that the policy agenda for agriculture needs to be reshaped. Some would emphasize consumer concerns in order to force a comprehensive "food" policy rather than continuing an allegedly single-constituent "farm" policy. Another perspective is a policy that gives land conservation and land preservation more prominence. Finally many would seek policies that are more sensitive to the needs of the smaller scale farm operators than are current programs.

These views are not necessarily indicative of dissatisfaction with past policies. More typically they are offered in recognition of the fact that agriculture is vastly different, more interrelated with other sectors of the economy, and generally much more complex as we approach the 21st century. Reshaping the policy agenda in such an environment will not be easy. A first step is to unravel the complexities of agriculture and food in order to comprehend important interrelationships.

TRENDS IMPACTING U.S. AGRICULTURE

Changing Political Climate

During the Great Depression, enactment of legislation favorable to farmers was of foremost concern. This was based on the premise that agriculture — the source of the nation's food and fiber, and an employer of a large proportion of its people — was of vital importance to economic prosperity and should be free of economic disruptions. Ensuring the viability of farming as an economic activity was deemed to be in the interest of society as a whole, even if the legislation required to do so favored farmers at the expense of the urban sector.

Subsequent legislation took a variety of forms as the problem was tackled on many fronts. Because of their small size, individual operaters were subject to economic exploitation by the buyers of farm products and sellers of farm inputs unless special protection was afforded. Enabling legislation providing for farmer cooperatives and marketing orders afforded some protection (3). As farmers were high-risk borrowers, capital available from the private sector was limited and expensive. Consequently a publicly supported farm credit program was enacted.

Farm incomes were generally lower than were incomes of nonfarm workers. In 1950, for example, per capita disposable income of the farm population was only 55 percent of that of the nonfarm population. Thus price support programs were devised and maintained. Demand expansion programs were encouraged. Production control programs were instituted since it was — from a gross farm income perspective — in farmers' best interests to restrict output (4). Finally, American society has long clung to the agrarian fundamentalist position espoused by Jefferson and before him by the French Physiocrats. Hence there was generally pressure for legislation that would help preserve the "family farm."

As the 1980s unfold, the case for legislation favorable to farmers is not as easily made. First, farm population in the United States declined from 23 million in 1950 to 5.8 million in 1981, that is, from 15.1 percent of the total U.S. population to 2.5 percent. This decline has had a negative impact on the relative political power of farmers in securing favorable legislation (5).

Second, the need for farm-income enhancement is much less evident despite feature articles to the contrary in the popular press. Although farm incomes in the 1950s were low by nonfarm standards, 1979 per capita disposable income of the farm population was 102.4 percent of that for the nonfarm population. This relationship is highly variable — it will be lower in some years and higher in others. In 1981, for example, per capita disposable income of the farm population was only 88 percent of that for the nonfarm population and probably will fall slightly below this level in 1982. Nevertheless, it is clear that great strides have been made toward farm-nonfarm income equality. There is now less economic justification for the farm income-enhancing policies of the past.

There is no evidence suggesting a move away from agrarian fundamentalism. None-the-less, pressures for preservation of the small, "family farm" as a viable commercial unit seem to have eased. This is due to the fact that most viable commercial farm units are no longer small "family" operations. Over the last two decades the number of farms with annual gross sales of $40,000 or more has increased nearly six-fold while the number of farms with annual gross sales of less than $5,000 has decreased three-fold (Table 1).

A more salient factor may be that operators of many of the small farm units have found that they need not depend on farming for the sole source of their livelihood. In 1981, the smallest farms earned an average of over 100 percent of their net income from off-farm sources (Table 1). Even farms that may be considered fairly large — those with annual gross sales of $40,000-$99,999 — earned on the average, almost 70 percent of their net income from off-farm sources! In total, nearly 67 percent of the income of farm families in 1981 came from off-farm sources.

Industrialization of the Agricultural Sector

Recent reports have documented a number of other striking changes bearing directly on the agricultural sector (6). I have previously noted the trend toward larger and fewer farms and the declining number of small, "family" farms. In large part this was attributed to industrialization of agriculture and/or specialization. Not only have farmers specialized, but some tasks previously done by farm operators are relegated to other sectors. Farmers were once largely self-sufficient providing their own horsepower, fuel, seed, and other raw material, with financing from internal equity capital. Not so today. In 1950, for example, the ratio of purchased inputs to farm supplied inputs was 0.47 (based on a ratio of quantity indexes). In 1981 that same ratio was 1.55. Along with specialization came a substitution of purchased inputs for labor as farmers sought to increase productivity and capitalize on economies of scale. Between 1950 and 1980, for example, the ratio of chemical use to labor use increased from 0.13 to 2.82, and the ratio of machinery use to labor use increased from 0.39 to 1.92! (Based again on a ratio of quantity indexes.) Tractor horsepower used per farm increased from 16.5 to 104.2 over this same period! Farmers are heavily dependent on the nonfarm sectors for their inputs. Economic conditions impacting these nonfarm sectors quickly trickle down to impact on the farm sector as well. Thus farm policy cannot be developed independent of nonfarm considerations and policies.

Use of Coordination Devices

Production, processing, distribution, retailing and consumption activities must in some way be coordinated so that proper signals are sent through the economic system to guide output and consumption decisions. In a perfectly competitive system this coordination is done through the open market — by the "invisible hand." When operative, this system is highly effective, does not stifle innovativeness and progress, and prevents abuse of one market participant by another. It is operative, however, only when there are numerous buyers and sellers who interact for the purpose of exchanging information and establishing a truly "competitive" price.

Other coordinating devices used in agriculture are grower-processor contracts and vertical integration. Contractual agreements take on a variety of forms depending on the commodity. Basically they specify the nature of the buyer-seller relationship. Some specify the date of product delivery, some the price at which the transaction is to be made, and some the type of production practices to be employed. In vertically integrated operations, decision-making at more than one stage in the marketing channel (e.g., apple production and apple processing) is in the hands of a single firm. Highly perishable commodities that use land and capital intensively are prone to be produced under contract or vertical integration.

Formal coordination as opposed to open market coordination of production and processing ranges from 100 percent for sugar beets and cane to less than 1 percent for feed grains. Formal coordination is quite extensive in milk, broilers, turkeys, fruits and vegetables. About one-fourth of cattle feeding involves some type of formal coordination (7).

In highly perishable commodities, contracts that are entered into before the crops are planted can control quantity and timing of production as well as eliminate expensive storage and handling operations. Contracts reduce price risks and ensure a market. However, formal coordinating devices require farmers to relinquish some (or all) of their independent decision-making responsibility to larger and more economically powerful nonfarm firms. Furthermore, when these devices are used extensively, there are too few buyers and sellers using open markets to establish a competitive price. It is thus difficult for the market to reflect all of the forces of supply and demand. The limited market information under these circumstances is often insufficient to serve as a base for rational resource allocation decisions.

Erosion of Infrastructure

Food processing and retailing firms are fairly numerous. These firms are becoming larger at the expense of small local firms that are no longer able to compete. Larger firms are national or regional multi-product firms that do not depend solely on any one production area for raw materials. On the contrary, they obtain their supplies anywhere they can get the volume and quality necessary to support a nationwide or regionwide marketing program. With ready access to markets thus reduced, small-scale producers for local markets are at a serious competitive disadvantage. Also, due to the decline in transportation services (particularly rail) some rural areas do not have ready access to production inputs or product markets.

Of perhaps greater significance is the fact that for a production activity to be viable at all in a particular area, it must be undertaken on a large enough scale such that support services and processing capacity can be provided at an economically justifiable scale. Given the scale economies in fluid milk processing, for example, a plant processing less than 50 million pounds of milk per year is not cost competitive. Thus, a minimum of 4,500 good producing cows must be in the region

supplying such a plant. A New Jersey study (8) suggests that the minimum number of cows needed to support a feed mill is in the range of 26,000 or more -- more than the dairy cow population of some states. Similar constraints exist for the production of such commodities as broilers, eggs, vegetables, and fruits.

Increases in Agricultural Exports

A most significant development of the 1970s was the growth in exports of U.S. agricultural products. One consequence has been a growing interdependence between U.S. agriculture and the world economy. The value of agriculture exports as a percent of cash receipts from farm marketing has increased from 10 percent in 1950 to over 30 percent in 1980-81. Foreign food demand has outpaced supply, making food-importing countries increasingly dependent on the U.S. as residual supplier. The U.S., in turn, depends on foreign countries to provide a major market for farm products. As a result of the growing importance of exports, a major crop shortfall or crop surplus elsewhere in the world can have substantial repercussions on the U.S. food system. As expanding export demand encourages output expansion in the U.S. Extra pressure is exerted on land resources (particularly fragile or marginal land), on the inputs needed to produce the extra output, and on the transportation needed to handle this extra output.

Program Conflicts

It has become increasingly apparent that programs designed to achieve a particular objective or solve a specific problem often have unintended side effects or long-term impacts. Commodity price support programs have, for example, had the stated objective of enhancing incomes of farm families, and to a considerable extent have achieved their objective. But much of the benefits of these programs have been capitalized into higher land values. This was an unintended benefit to landowners. Thus one side-effect was a maldistribution of benefits. Other unintented effects include an increase in the difficulty of entry into farming, increased cost of production, increased debt capital required to maintain ownership, and reduced resiliency of heavily indebted farmers to cope with income fluctuations and high rates of inflation.

Expansion of output to meet expanded export demand is certainly in the interests of farmers. But expanding production to meet increased export demand has longer-term ramifications. As most of the U.S. prime cropland is already in production, higher crop prices will bring marginal land into production that is more susceptible to erosion and loss of future productive capacity. Thus, policies are needed to deal with soil erosion, water pollution, water conservation, and other forms of environmental degredation.

Food Security

Concern about the issue of food security for specific regions has also surfaced. The South has a somewhat more favorable food production-consumption balance than do other U.S. regions. The South, however, is by no means self-sufficient in all products. For example, this region is estimated to produce only about 45-50 percent of its meat and dairy product needs (9). Given the recent population shift to the South, the problem may well become excerbated in the future.

It might be instructive, then, to consider how various elements of a comprehensive food policy would impact on the goal of food security for the South (10). The most important contributor to food security in any region is that region's capacity to produce food. That capacity is a function of the resources available, their productivity, and the capability of producers to make the best use of these resources. All this is enhanced by policies that reduce risk in production, assure the availability of adequate production and investment capital, assure farmers access to input and output markets, and otherwise provide economic incentives to produce. Hence traditional "farm" policy programs contribute to the goal of food security.

Over 80 percent of the farms in the South have annual gross sales of $40,000 or less. Quite clearly, most if not all of the operators of these farms are part-time farmers. If they were to lose their off-farm jobs, they would likely also abandon part-time farming. Similarly if they were to lose a market for their farm produce, they would likely abandon part-time farming. The resources now employed on these farms would be transferred out of agriculture, thus reducing the region's capacity to produce food. A policy of neglect would most certainly enhance this prospect.

Clearly if other regions have a comparative advantage in producing certain commodities, purchasing those commodities rather than trying to produce them locally represents a wise and economical use of resources. Nevertheless it is in the region's best interest to adopt policies that reduce the region's vulnerability to instability in supplies and prices.

One way to do this is to increase local production. Given the limited resources available for production of food ingredients in deficit regions such as the South, this does not appear to be a promising alternative. Some gains might be made through some of the current efforts at developing alternative production systems (e.g., double-cropping). It is not likely, however, that large inroads into the aggregate production-consumption imbalance will be made via this route.

A second way to reduce the region's vulnerability is to encourage food processing firms to locate in the region or to stay in the region so that at least the region produces as much of its processed food products locally as is possible regardless of where the raw materials are produced. Policies impacting on food processing firms' decisions to locate or remain in the region, then, are relevant to the food security issue.

A third way to reduce a region's vulnerability to food shortages is to ensure that adequate transportation facilities are available. Transportation facilities are needed to ensure that 1) finished food products can be imported from any other region of the country, 2) that agricultural products produced outside the South and needed for processing locally can be obtained by the region's food processing plants, and 3) the raw materials needed by the regions' farmers can be imported from the regions in which

they are produced. The South should, then, be vitally interested in transport policies for the nation as well as for the region.

IMPLICATIONS

The ramifications of these trends are many and varied. Certainly the agricultural sector is much more closely interrelated with other sectors and with the world economy than ever before. Increased awareness of the changing character of agriculture has revealed inherent conflicts in past policies and spurred questions about the need for these policies.

Rural economies in the nation now have a mix of income sources. Farmers have a better opportunity for supplementing their incomes with off-farm jobs. Hence they are better able to sustain a recession in the farm sector and at the same time earn a living. A decline in farm activity relative to nonfarm activity in some areas, however, means that the volume of production of a given commodity in an area may be insufficient to support effectively functioning input or output markets for commercial production. Farmers who attempt to produce such commodities in the area are at a serious competitive disadvantage. Thus, when the production of a competing commodity becomes economically unattractive in the area because input costs rise or output prices fall, adjustment of resources into an alternative enterprise may be thwarted because the alternative is not viable.

Increased use of formal methods of market coordination — contracts and vertical integration — and the decline in numbers of buyers and sellers in open markets, especially for livestock products, vegetables, and fruit is also troublesome. The concern here is lack of access to open markets and lack of market information with which to make rational resource allocation decisions. Decision makers may be forced to rely on near term futures markets for such information.

The phenomenal growth in exports of U.S. farm products has implications of critical importance to domestic food policy. One relates to the U.S. role as a major international supplier of food. Higher levels of exports of farm products are certainly in the interests of U.S. farmers. They are also in the interests of society as they provide earnings with which the U.S. can purchase needed products from other countries. Credibility in world markets requires dependable supplies. Thus we must develop trade policies that help maintain this credibility. At the same time as we deal in world markets, large trade fluctuations will likely ensue in response to production variations around the world. Thus we will need to develop policies that protect producers and consumers from excessive price fluctuations.

The longer term capability of meeting increased export demand is also a critical issue. Most of the prime cropland is in production. Higher prices will bring marginal land into production that is more susceptible to erosion and the loss of future productive capability. Thus we will need policies to deal with soil erosion, water pollution, water conservation, and possibly other forms of environmental degredation.

Future food and agricultural policy must recognize a multitude of interrelationships that are much more critical than in the past. Urban as well as farm people can be expected to play a role in forging this policy. Both groups will need to recognize, however, that there are conflicts among the goals to be achieved by this policy and that tradeoffs will have to be effected. The following illustrates the breadth of the goals to be considered, including: 1) allocating efficiently available resources in farming, processing, marketing, and retailing, 2) conserving basic land and water resources, 3) preserving the quality of the environment, 4) assisting with the food problems of the disadvantaged or destitute both here and abroad, and 5) restraining government costs. Of primary concern to the farm population includes: 1) maintaining farming as a means of earning a living commensurate with incomes of nonfarm people, 2) reducing producer risk and uncertainty so that efficient allocation decisions can be made, 3) maintaining effective, viable, and accessible markets, 4) encouraging the expansion of agricultural exports, and 5) encouraging research needed for the development of new technologies, varieties, and practices leading to productivity improvements.

Finally, a set of goals of primary concern to the consuming public includes 1) providing an adequate and safe supply of food at reasonable prices, 2) providing a reasonable but not excessive variety of food, and 3) providing sufficient information about the quality, quantity, and price of food available so that rational consumption decisions can be made.

Conflicts among these goals are fairly self-evident. Trade-offs can and must be effected as new policies are forged.

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End Notes

(1) Total cost of estimated non-farm benefits (domestic and foreign food aid). See W. W. Cochran and M. E. Ryan. American Farm Policy 1948-1973. University of Minnesota Press, 1976 for 1949-73 costs and for the method of updating these costs to 1980.

(2) U.S. Department of Agriculture. Food Costs and Wages the World Over. December 1979.

(3) Farmer cooperatives permit farmers to join together and market their product or purchase inputs as a collective and in this way offset the superior market power of commodity buyers or input dealers. Marketing orders are regulatory programs issued and supervised by the Secretary of Agriculture that legally obligate commodity buyers to abide by specified trade practives, sales restrictions, or pricing rules.

(4) That is because the elasticity of aggregate demand for farm products is such that as the quantity marketed increases, all else equal, gross farm income falls.

(5) Special commodity groups, however, still wield

much political clout - e.g., dairy, tobacco, and peanuts.

(6) See, for example, Lyle P. Schertz and Others. Another Revolution in U.S. Farming? U.S. Department of Agriculture, 1979, and Bob S. Bergland. A Time to Choose: Summary Report on the Structure of Agriculture. U.S. Department of Agriculture. January 1981.

(7) See Ronald L. Mighell and William S. Hoofnagle. Contract Farming and Vertical Integration in Farming, 1960 and 1970. U.S. Department of Agriculture ERS-479. April 1972.

(8) Lee D. Schneider, et al. "Issues in Agricultural Land-Use Management in New Jersey." Department of Agricultural Economics and Marketing, Rutgers University Special Report #17. February 1973.

(9) For the methodology used to make these estimates, see M. C. Hallberg. "Competitive Position of Food Production in the Northeast." in Hugh C. Davis (ed.) Proceedings of the Northeast Agricultural Leadership Assembly. Center for Environmental Policy Studies. Univ. of Mass. Amherst. 1979. pps. 163-179.

(10) For a similar discussion relating to food security for the nation see John E. Lee. "Food and Agricultural Policy; A Suggested Approach." in U.S. Depart. of Agriculture. Agricultural-Food Policy Review—Perspectives for the 1980s. Economics and Statistics Service, AFPR-4. April 1981. pps. 136-148.

Table 1. Income per farm operator family in the United States by major source and by sales class, 1960 and 1981.

Annual Gross Sales[a]	Number of Farms		Average Farm Operator Family Income[b]		Percent Farm-Operator Family Income from Nonfarm Sources	
	1960	1981	1960	1981	1960	1981[c]
	(thousand)		(dollars)		(percent)	
$100,000 or more	23	298	34,444	80,562	10.5	17.1
$40,000-$99,999	90	396	15,621	12,356	11.6	69.1
$20,000-$39,999	227	278	10,758	9,285	15.6	105.5
$10,000-$19,999	497	286	6,353	12,999	19.8	107.9
$5,000-$9,999	660	335	4,786	17,430	32.9	105.7
$2,500-$4,999	617	332	3,779	20,831	48.9	106.7
Less than $2,500	1,849	511	3,538	21,443	77.2	104.6
All Farms	3,963	2,436	4,946	24,187	43.3	66.8

[a]Includes cash receipts from the sale of farm produce, government payments to farmers, and other farm income.

[b]Includes government payments to farmers, the value of farm products consumed on the farm, and the rental value of farm dwellings in addition to commercial farm sales and income from off-farm sources.

[c]Figures exceeding 100 percent in this column indicate that net income from farm sources was negative.

SOURCE: U.S. Department of Agriculture, Economic Indicators of the Farm Sector. August 1982.