

Agricultural Economics

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Dynamic changes in our economic environment are accelerating making prediction more difficult and timely adaptation more critical for economic survival. Technological changes produced by research in agricultural production are described in other sections of this report. Many of these will have substantial economic consequences and will result in reorganization of the farm firm; they are not all neutral in this respect.

We are in the midst of massive changes in the entire food production and assembly of agriculturally produced commodities. Included are deregulation of the farm finance industry and reorganization of the Farm Credit System, deregulation of the rail industry and resultant rail rate adjustments, wild swings in export demand, sudden shifts in farm policy, and the more sedate move toward a bimodal distribution of farm size (more small, part-time, and large farms). Corresponding changes are taking place among the firms that serve agricultural production. In the mid-1970s the grain merchandising industry was clogged and observers were complaining about lack of move-store capacity. Now there is chronic excess capacity.

These changes reshape industry cost structures, competitive environments, and institutional relationships. These changes create a need for new services and an end to old ones.

Research in agricultural economics will focus on ways to capitalize on these changes, to minimize losses which are often linked to such changes, and continue to work on traditional problems that continue to plague us. North Dakota farmers need to be more competitive in international markets in the decade ahead. To be competitive, farmers must make optimum use of their resources, have available and adopt advanced technology, and have favorable farm and export trade policy.

Farm Management

A critical key to accomplishing a competitive position for North Dakota farmers will be the ability to gather, organize, and use information to guide management decisions. For example, optimum rates of fertilizer and herbicide use can be achieved through computerized monitoring of fertilizer and weed populations with automatic adjustments in rates as the applicator goes across the field. Similar computer technology is being used to adjust feeding rates of dairy cat-

tle based on milk production. Development and refinement of the economic components of automated optimum input use as well as the economic feasibility of these developments is a challenging research area.

Specialization and division of labor is a classic way of achieving more efficient resource use. Its application has resulted in larger and less-diversified farms. Efforts to determine the most efficient range in farm size using current and emerging technology will continue.

Technology adoption and its economic ramifications on individual farms represents another increasing research area. New technology not only involves improved plants and animals but also includes information-handling technology as embodied in modern computers. Farm management research in the decade ahead will focus on farm decision-making software utilizing the data storage and manipulation capacity of modern computers. Through research and development, the farm of the future will not only have accurate up-to-date records of past and current performance but also optimizing farm plans which explicitly consider future income and risk levels based on present and forecasted weather, governmental, and economic conditions. The development of the models and data to make them operational are challenges researchers face in the decade ahead. Interdisciplinary cooperation will be necessary to analyze the farm business as an integrated unit involving input levels selection, enterprise combinations, marketing, and investment decisions under uncertainty about the future.

Environmental issues to be addressed are the impact on soil erosion and ground water of tillage and high levels of chemical inputs which will likely result from an effort to be internationally competitive. The trend toward more small, part-time farms and large commercial farms with fewer medium-sized farms raises a number of issues. The implications for efficiency and an information system to best serve these different clientele groups represents a challenge to the agricultural research and education community.

Farm Finance

Two issues will likely dominate research in agricultural finance during the next decade. The first involves general deregulation of North Dakota's financial institutions and the restructuring of the Farm Credit System. Implications for

both in-state and regional competition among institutions, credit availability, terms, and interest rates are of concern.

The second issue relates to the financial structure of firms and management skills of operators. The financial stress recently experienced by many farm businesses raises several familiar questions: What ownership forms reduce exposure to business and financial risk? Should debt or equity capital be used for investment? And, will the farm family continue to be directly involved? Given an increased demand for information pertaining to a farm's financial health, future research will study farmers' financial management skills, materials relied upon, and their interpretation. These questions and needs will be met differently than in the past as a result of the credit situation of the 1980s.

Farm Policy and International Trade

North Dakota agriculture has been and will continue to be impacted by farm programs. Analysis of the differential effects of alternative programs on farmers, input, and product marketing firms and rural communities is an area scheduled for increased emphasis. The information will not only help legislators in the process of policy formulation but also help farmers, businesses, and rural community leaders adjust to likely economic impacts of farm policy changes.

Export markets are very important for North Dakota crops and, although North Dakota is not the largest exporter in quantity, it has the largest proportion of production which is exported compared to other states. Important researchable issues in international trade that should be addressed are export demand analysis, export competition and product differentiation, implications of aggregate trade policies, and market share analysis.

Marketing and Agribusiness

Many of the crops produced in North Dakota have unique characteristics or are "specialty" in nature. Consequently, future research should address associated problems including thin markets, substitutability/complementarity, price spreads, and economics of quality. Demand for grains, oilseeds, meats, and dairy products have become an important issue. Research must identify changes in demand for agricultural commodities produced in North Dakota. Furthermore, market development alternatives should receive considerable attention.

Our grain marketing system is heavily dependent on rail transportation because North Dakota is located relatively long distances from major domestic and export markets. Important researchable issues include rationalization of the grain handling and transportation system, railroad deregulation, impacts of pricing and competition, excess capacity problems, economics of grain shipping on the Great Lakes, and financial viability and competitiveness of farmer-owned cooperatives.

Many questions are currently being raised concerning the market structure of the livestock industry, especially pertaining to cattle. Of particular significance will be how the increasing concentration in meat packing and cattle feeding

will affect North Dakota cow-calf producers. New research in biotechnology, especially genetic engineering, may have a profound impact on livestock and milk production. Researchers must address the short-run and long-run impacts on the livestock industry of dramatic increases in production or efficiency due to new technology.

U.S. agricultural policy has a significant impact on North Dakota because participation rates in farm programs by producers exceed all other states. There is a limited use by farmers of futures markets, forward contracts, and options, partly because of the protection offered by farm programs. Because of the high participation rates by producers in wheat and barley, production of alternative crops including livestock may be seriously impacted. As debate on future agricultural policy unfolds, the impact of important issues should be addressed by researchers.

The current and emerging environment of deregulation and excess capacity in the agribusiness sector will intensify price and nonprice competition. To effectively negotiate and establish pricing policies, farmers and agribusinesses need to know what criteria, costs, and potential benefits are associated with different pricing policies.

If leaders are truly going to address diversifying the basic economic sectors in North Dakota, research should be directed at identifying entirely new enterprises and organizational forms and marketing strategies to enable businesses within the state to compete in the domestic and international markets. Critical areas such as profitability, risk management, possible linkages both forward and backward, organizational structure, ownership and new methods for financing startup businesses, growth and expansion should be addressed.

Community-Resource Development

An objective of research in community-resource development is to increase the state's real per capita income. Most residents of the state would prefer to accomplish this by increasing the size of the economic base of the state's communities. Research should facilitate expansion of the economic base. However, not all communities will be successful in this effort and many small communities will continue to experience outmigration. Future research must be increasingly concerned with prosperity for people as opposed to merely increased prosperity for places.

Research efforts are needed to improve or widen the window of profitability for the basic sectors of the state's economy. This would involve feasibility studies and the design of policies and entirely new institutions to deal with changes in technology and evolving international competition and markets. Some markets dissipate and others emerge that may have substantial depth, breadth, and duration. Research is necessary to devise mechanisms to better anticipate these changes and to develop sound strategies to capitalize on these dynamic forces.

It is increasingly important to formulate research programs to improve economic, social, and political linkages between rural and urban people, regions, states, and countries. Pilot research programs should be initiated to help lead

the way in fitting entirely new government organizational structures for delivery of rural public services that adapts emerging technology to changing demographic patterns.

Legal, social, economic, and political mechanisms for allocating both surface and ground water will need increasing attention throughout the coming decade. A wide range of social and technical issues regarding use and management of ground water will need to be addressed. Alternative uses of wetlands will continue to be important during the next decade, given recent state and federal legislation. Finally, alternative sources of revenue from rural lands, such as hunting leases or game ranching, will become important research issues. Recreation, both from a public and the private perspective, will be a growing force requiring analyses to assist both businesses and communities.

Rural Sociology

The research agenda in rural sociology during the next decade will, most likely, reflect our need to better understand the dramatic sociodemographic and economic shifts which have occurred and are in progress in our state during the latter half of this decade. For example, communities under 250 population (45 percent of all incorporated places in North Dakota) experienced a 50 percent decline in taxable sales from 1970 to 1985.

Much of the upcoming research will revolve around three major themes of population redistribution, changing structure of agriculture, and shifts in family/household and labor force composition.

Residential movement in North Dakota has accelerated our state's urbanization. In fact, North Dakota is now an urban state. More than half of our population resides in 21 urban (*i.e.*, city with a population of at least 2,500) places in the state. The implications of this movement are important.

For example, small towns distant from major urban centers are becoming less viable. The consequences of population redistribution are also felt in the place of destination. The destination cities in our state will face important policy decisions regarding institutional (*e.g.*, social services, education, protective services, religion) and infrastructural support. These issues, which range from fiscal planning to innovative programming for volunteer services, will be important topics for researchers of our state.

The scale of our farm operations continues to increase at a rapid rate, altering the structure of agriculture. The financial condition of our farms continues to force farmers to seek alternative employment. Spouses of farmers are entering the work force in record numbers. These trends pose serious problems for our state's labor force, social services agencies, and general economy. Research will focus on answering such questions as: What are the consequences of changing agricultural structure? How does the current farm crisis influence the ambitions of our youth? How has the downturn in agriculture and energy affected various community organizations?

Finally, important shifts have occurred in the composition of our households/families and our labor force. More families in our state are headed by single parents, many of whom are in poverty. Nearly one in three impoverished families in our state are single women with their children. The elderly are becoming a more important concern for North Dakota policymakers. Residents above the age of 65 represent more than 12 percent of our population, many of whom live alone on rural farmsteads. What social service needs should we be addressing (*e.g.*, rural transportation programs, meal services) with regard to our rural elderly? More women and youth are entering our state's labor force. Additionally, youth below the age of 20 are entering the work force in record numbers. What consequences do these trends hold for our state?