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Regional Research: Lessons from North Central Dairy Marketing Researchers

North Central Regional Research
Publication No. 333
1991

**Regional Research:
Lessons from North Central
Dairy Marketing Researchers**

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Preface

The Research and Marketing Act of 1946, which reserved funding for regional research, ushered in a new era in organization and cooperation between the U.S. Department of Agriculture (USDA) and Agricultural Experiment Stations. Regional committees were formed to research specific topics. One of the first regional committees established was the North Central Dairy Marketing Committee, NCM-1, "Maintaining and Expanding the Market for Dairy Products," started in 1947. North Central regional dairy marketing research committees have continued to function for more than four decades. Regional research has focused on structural aspects of the dairy industry, producers' cooperatives, policy issues, changing demand and supply characteristics, and market forces shaping the industry. These committees developed appropriate research technologies and modeling techniques for conducting the research.

These committees have been recognized for their ability to identify timely research problems and issues, and for their productivity. Their research findings have been instrumental in bringing about orderly industry adjustments to changes that were both internal and external to the North Central dairy industry. For example, the current structure of dairy farmers' cooperatives in the United States as well as in the North Central region has been influenced by the research and activities of members of these North Central regional committees.

The aggregate experiences of these committees offer a unique opportunity to document and evaluate a successful regional research effort. The present study especially evaluated this research in terms of its timeliness and relevance in bringing about an orderly transition from the farm-separated cream/butter era to the modern dairy industry of today. An additional objective of this study was to examine the productivity of regional research vis-a-vis nonregional research.

The following steps were taken in the evaluation:

1. Describe the evolution and unfolding of changes and problems in marketing dairy products in the North Central region from 1945 to the present.
2. Evaluate research methodologies and approaches developed by these committees to analyze growing dimensions and complexities of dairy marketing problems.
3. Enumerate and describe the major accomplishments of North Central regional dairy marketing research and evaluate its impacts on the industry.
4. Appraise the implications of these findings as to the potential advantages of regional research to the organization, management, and conduct of dairy marketing and other research by agricultural experiment stations, USDA, and other federal agencies.

The Study Committee consists of current and former members of North Central regional dairy marketing research committees. Their combined tenure spans the entire period of regional dairy marketing research from 1947 to the present. Members and their affiliations are:

<u>Member</u>	<u>Institutional Affiliation</u>
Elmer F. Baumer	Ohio State University
Robert L. Beck	University of Kentucky
Charles E. French	Purdue University
Truman F. Graf	University of Wisconsin
Glynn McBride	Michigan State University
Gerald G. Quackenbush	Michigan State University
Sheldon W. Williams	University of Illinois

In addition, other former members of the regional committees provided data and suggestions for which the authors are grateful.

Executive Summary

Objectives

This publication recounts dynamic and important developments in the dairy industry since World War II. The record is developed mainly to evaluate the influence of a series of North Central regional dairy marketing research committees.

The analyses of the current study indicated that the projects of these regional committees resulted in more additive, less expensive, more relevant, and more significant research than would have been possible without a regional approach. The research results were widely used and the researchers were extensively consulted by representatives of industry, government, professional societies, and socially concerned groups. Overall the regional approach contributed importantly to the efficiency and progressiveness of the U.S. dairy industry with positive effects on society in general.

Background

The Research and Marketing Act of 1946 provided for regional research among groups of states. North Central dairy marketing researchers were among the first to use this approach. The North Central regional dairy marketing committees have proven that regional research can be timely, relevant, and important. Regional researchers in other fields also have done exemplary work; this dairy marketing group illustrates what can be accomplished by such a regional approach.

The research has been problem-focused in an operationally oriented methodological framework, reflecting a continuing effort to make highly diversified, innovative, and complicated yet carefully coordinated studies. Uniqueness of methodology was encouraged, with emphasis on complementarity, relevance, and contribution to professional knowledge.

Research on Developments in the Dairy Industry; Use of Results

Drastic developments and adjustments took place in dairy production and marketing during the period under review. Dairy farms decreased in number, increased in size, and became more commercialized in their operations. Though no research was devoted directly to these changes, they were implicitly taken into account.

A shift by farmers from the sale of farm-separated cream to the sale of whole milk largely caused the replacement of centralizers by production of butter and nonfat dry milk in large butter-powder plants. In the late 1940s, the regional committee studied butter pricing at country plants, and USDA pricing in central markets. These studies made statements describing the inade-

quacies of pricing practices and recommending improvements. These statements were complemented by findings of later studies of dairy marketing needs and adjustment problems in the Northern Plains states.

Massive merger and consolidation activities in dairy marketing resulted in major reductions in numbers and increases in size of dairy processing, manufacturing, and marketing firms of all types. Small local cooperatives were replaced by large regional and interregional dairy processing, manufacturing, and bargaining organizations. North Central regional studies of impacts of these changes were extensively used in advising enlarging cooperatives as to profitable changes in their structures, policies and practices, costs of tailoring supplies of milk to processors' needs, and providing services to processors. Cooperatives were also advised about the impact of these costs on their price bargaining activities, and about supply-demand adjusters as devices for reducing surpluses.

Far-reaching changes in the processing, packaging, and marketing of fluid milk greatly expanded distribution areas, largely replaced home distribution with store sales, and led to wide use of private-label brands and large volume contracting for supplies by food retailers. Early studies focused on outermarket distribution of milk in paper containers and merchandising of milk in retail grocery stores. Findings of those and later studies on milk marketing practices of food chains and adjustments to them by producer cooperatives and milk processors were used in counseling milk marketing firms.

Decreasing consumption of dairy products led to efforts to expand markets for milk through schools and to greatly increased farmer-financed advertising and promotion of dairy products. Regional research related to these activities included demand analyses, studies of the effects of school milk programs on dairy markets, and studies of the impact of various governmental dairy programs on the dairy industry. Additional research investigated the effects of federal and state orders and international trade on the North Central and U.S. dairy industries, with findings presented to concerned legislators and administrators.

Benefits of the Regional Approach

A major benefit of the regional approach is the stimulation of ideas and research techniques that results from interactions among researchers. Another benefit is the greatly improved understanding by committee members of developments in the dairy industry resulting from their participation on the committees. This interaction of committee members upgrades both planning and implementation of research.

Attainment of these benefits is facilitated by dedicated personnel, forward-looking leadership, and cooperation from USDA agencies. The North Central dairy marketing group was favored by such conditions.

Conclusions

1. Regional research can be highly productive, farsighted in problem selection, and forward looking in methodology.
2. The committees were highly successful in conducting relevant research and in disseminating findings useful to the industry in making necessary adjustments.
3. Under the regional committee arrangement, productivity and usefulness of findings are enhanced by:
 - Mental stimulation resulting from interaction among committee members in problem selection and in research methodology.
 - Committee size, which provides resources to conduct and coordinate research impacting both regionally and nationally in a more productive manner than if done by the same number of researchers independently.
 - Joint participation of members in problem definition, concentration of resources in problem areas, selection of appropriate methodology, and dissemination of results.
4. Side effects and miscellaneous benefits from regional committee work include:
 - Formal and informal communication concerning coordination of research among universities, increasing the quality and credibility of that research.
 - Informal, mutually beneficial educational processes among administrators, researchers, and others.
 - Strengthened communication lines with workers at the federal level, complementing their research.
 - Greater, more effective contact with the private sector than would otherwise be the case.
 - Wider availability and more extensive use of research findings by interested parties.
5. The productivity of a regional committee is influenced by the degree of commitment of state representatives and the interest and skill of its administrative advisor and of its coordinator, if it has one.
6. Although the work of these committees has earned positive marks, in the dynamic industry with which

they are concerned old problems persist and new ones continue to arise. These problems include:

- Chronic surplus production over a long period.
- Apparent shifting of comparative advantage in milk production from traditional areas to the West, particularly California.
- Serious regional differences in dairy policy, content, and formulation.
- An uncertain future for the dairy industry in relation to its products, marketing, and place in the world market scene.

Such problem areas as these provide continuing challenges to researchers to sharpen existing research tools and to devise new ones.

History of Regional Marketing Research

Prior to the regional approach, selection of research projects to be supported by an individual state was heavily oriented toward problems facing interests of that state. These problems, perceived to be local, were in many cases similar to those found in other states. Also, states were reluctant to support marketing research mainly because those problems were viewed as being regional or national in scope. This attitude continued until the mid-1940s. Then in the postwar period increased production from the application of new technology and the war effort resulted in large surpluses of several basic agricultural commodities. The problem of these surpluses stimulated new interest in research designed to increase consumption of and find new markets for the surplus commodities. A related problem was the costs associated with marketing, and research was conducted to find ways to reduce those costs. This related problem, often referred to as the "cost of the middleman," was of particular interest to farmers and policy makers.

The duplication of research by different states reflected the fact that the major role in research was played by individual investigators, who received most of the rewards for research activity. Their role was supported by state research administrators who preferred to highlight the results of research completed by their own faculties. While this situation was characterized by substantial overall progress in research, it raised questions as to whether the major problems were being addressed, whether some of the research was unduly duplicative, and so, ultimately, whether it was the best use of research funds.

In response to these concerns, the Research and Marketing Act was passed in 1946. This legislation stipulated that at least 20 percent of the Hatch Funds were to be used for marketing research. This legislation also provided for a regional approach to the research and set aside up to 25 percent of the Hatch Funds to be used in this new collective regional approach. The 20 percent provision also applied to the regional funds.¹ A regional approach responded to criticisms of duplication and the fact that most agricultural marketing problems were regionally oriented rather than state oriented. North Central dairy marketing researchers were among the first to use this approach.

During its first quarter-century, this regional research program commonly involved all 12 North Central states and Kentucky. Starting in the early 1970s, however, a number of states, primarily in the northern Great Plains, dropped out of the program. This reflected the limited importance of dairying in those states and a change in funding policies. There were also changes in personnel

at some institutions that brought about changes in the direction of research. For example, by the late 1980s, the Northeast regional dairy marketing committee merged with the North Central group. With drastic changes in the structure of the dairy industry and the many innovations that have been introduced, the regional research program, as might be expected, was of interest especially to those states in which the production and marketing of dairy products was a substantial enterprise.

Table 1. Average Annual Expenditures for Regional Dairy Marketing Research in the North Central Region by Periods, in Current and Constant Dollars

Period	Average annual expenditures	
	Current dollars	Constant (1982-84) dollars ^a
1948-50	38,885	162,071
1951-55	74,247	277,887
1956-60	117,193	409,503
1961-65	140,467	457,577
1966-70	168,027	477,454
1971-75	171,086	366,920
1976-80	161,227	243,182
1981-85	210,746	211,113
1986-88	364,566	317,533

Source: Cooperative State Research Service, USDA.

^aDeflated using consumer price index for all items as reported in *Statistical Handbook of the United States, 1990*, page 471, and *Historical Statistics, Colonial Times to 1970*, part 1, 1975, p. 191.

¹ Hatch funds refer to funds appropriated under the Hatch Act of 1887, which established the state agricultural experiment stations and provided a major part of their funding. The Research and Marketing Act of 1946 provided funds for research in marketing and for regional research. (U.S. Department of Agriculture, *Miscellaneous Publication 904*, [1962], pp. 52, 179, 196). These financial provisions were affirmed by Congress in 1955 when it amended the Hatch Act. (Babb, Emerson M., *Report to Cooperative State Research Service, U.S. Department of Agriculture, on Impacts of Federal Funding Requirements on Marketing Research at State Agricultural Experiment Stations*, [Cooperative State Research Service, U.S. Department of Agriculture, 1977]).

Expenditures from both federal and state sources by periods to support the North Central regional dairy marketing research program have been substantial (Table 1). These expenditures increased throughout the 40-year period, but in constant dollars they peaked in the 1960s and declined sharply in the 1970s and 80s. In part this decline reflected the participation of fewer states

after the early 1970s than earlier. But it also reflected a decrease in constant dollar support for North Central regional dairy marketing research.

Total annual cash receipts from milk sold to plants and dealers by farmers in the region, as defined in the 1960s and 70s, were just under 7.4 billion dollars. Consequently, the investment in research from both federal and state sources was only .002 percent of those cash receipts. In recent years part of the funding available for research has been allocated on the basis of competitive grants and therefore less has been available for regional work.

In the early days of this regional research, federal funds assigned to regional dairy marketing research were allocated among states by the administrative advisor, based on an evaluation of the respective contributions of the individual states. This policy was changed in 1964, after which regional monies were allocated directly to the states which divided the funds among the various regional projects in which they participated.²

²Kerr, Norwood Allen, *The Legacy: A Centennial History of the State Agricultural Experiment Stations, 1887-1987*. Missouri Agricultural Experiment Station, University of Missouri: Columbia, MO, 1987, 114.

North Central Dairy Marketing Research

Projects

North Central regional research in dairy marketing since 1947 has involved the following projects:

Project	Project Title and Years
NCM-1	Maintaining and Expanding the Market for Dairy Products, 1947-53
NCM-12	Adapting Dairy Marketing Systems and Practices to Changing Utilization and Technology, 1953-60
NCM-26	Changing Market Structure and Organization of Midwest Dairy Industry, 1960-65
NCM-38	Dairy Marketing Adjustment Problems in the North Central Region, 1965-71
NC-101	Alternative Solutions to New Problems of Dairy Marketing Cooperatives, 1971-77
NC-145	Impact of Public Programs on Market Performance of the Dairy Industry, 1977-83
NC-176	Implications of Emerging Policy Issues and Market Developments for the North Central Dairy Industry, 1983-89
NC-198	Analyses of Selected Economic Factors Affecting the Long Run Viability of the Northern Dairy Industry, 1989-94

NCM-1 initially proposed cooperation with selected states from the Northeast and West. Out of that phase came a publication which summarized information about factors affecting demand for dairy products. That publication was followed by studies in the North Central region primarily of (1) butter pricing and marketing at country points (accompanied by a study of central market butter pricing by the Dairy Branch of the Production and Marketing Administration, USDA) and (2) pricing and consumption of milk in Midwestern markets.

Research under project NCM-12 investigated such important innovations as the distribution of milk in paper containers over greatly expanded distribution areas, changed practices in the disposal of surplus fluid milk, and the rapidly growing school milk program. It also examined problems and needed adjustments in dairy marketing in the Northern Plains states, an area of

sparse production, and the operation of supply-demand adjusters in federal order markets.

Going beyond research in NCM-12, in NCM-26 the regional committee concentrated upon the character of and reasons for numerous major changes taking place in the structure, conduct, and performance of the dairy marketing industries in the Midwest; relationships to structure of such factors as dairy labor and its costs, and laws and governmental regulations; and coordinated research on phases of market structure, conduct, and performance—such as quality differences among brands, and firms' information needs and decision-making processes—that previously had received little or no attention.

Research dealing with the many important changes in industry structure, conduct, and performance culminated in project NCM-38, and was reported in a book. This phase included study of food retailers' marketing and branding practices for fluid milk and ice cream, the impact of retailers' new role and accompanying changes in market structure upon producer cooperatives and milk processors, and adjustments those groups were making in response.

Project NC-101 dealt with alternative solutions to new problems of dairy marketing cooperatives. It investigated different methods of distributing returns for milk among producers and of equitably allocating costs of services provided by cooperatives among milk processors and producers. It examined relationships between the role of federal orders and that of cooperatives, especially in pooling and pricing milk; and the applicability of existing regulations governing producer cooperatives to current problems generated by changes in the structure and functions of those organizations.

NC-145 was designed to analyze and measure the impact of federal and state market regulation and marketing institutions on the performance of the dairy industry. It dealt with such questions as what performance dimensions were affected by regulations and institutions, and how and to what extent performance was affected.

NC-176 analyzed the implications of current and emerging policy decisions and market developments on future adjustments in the North Central dairy industry. Market developments examined included the shift from grade B to grade A milk production and changes in demand for dairy products.

The current project, NC-198, is focusing on (1) factors affecting the location and structure of milk production, processing, and distribution, (2) consumer attitudes toward dairy products and the impact of those attitudes on consumption, and (3) an evaluation of the effects of changes in pricing milk, e.g., federal milk marketing orders and the price support program.

Timeliness, Relevance, and Use of Research Results

The dairy industry is known for its dynamic nature. Since World War II changes have taken place in production, processing, distribution, firm size, market structure, competition, pricing, regulations, administration, and supply and demand. Listings of major developments within these broad categories and of research done by the regional committees bearing on them will be given in this assessment of the performance of those committees.

Regardless of the quality of our understanding and diagnosis of the dynamics involved in the dairy industry, and regardless of how appropriate any prescriptive measures may be, such measures must be timely. This raises the question of whether the findings of the research committees occurred at suitable times and whether they were seasonal and opportune. Did they have relevance to and were they meaningful in relation to the changes which were taking place, and did they help the industry make necessary adjustments? Consequently, quality of performance of the regional dairy research is measured against the timeliness, relevance, and usefulness of the research output.

Dairy farms increased in size, became much more commercialized, but decreased in numbers.

The phenomenon of larger farms and herds, fewer farms and more commercialization, and market orientation was observable continuously over the forty years under study. Although no research project was exclusively devoted to a study of these trends, they were implicitly taken into account in studies of farm milk procurement costs, route consolidation, dairy plant location, and market structure. Dairy firms benefited from research findings in adjusting their operations to changes in the farming sector.

Product shift from farm-separated cream to whole milk sales by dairy farmers in all states was accompanied by the nearly complete elimination of centralizers for butter production and greatly increased production of butter and nonfat dry milk in large butter-powder plants.

Projects in the late 1940s provided timely and relevant information facilitating those changes. The regional committee studied pricing of butter at country points; USDA made a complementary study of pricing at central markets. These studies pointed out inadequacies and needed improvements in price quotations. Creamery managers were shown benefits that could be obtained by keeping in closer touch with market conditions and employing more aggressive marketing practices. Also, deficiencies in butter quality were brought into focus.

In studies of dairy marketing problems, adjustments, and prospects in areas of sparse production, one activity examined was

conversion to the sale of whole milk. Studies in South Dakota saved plants converting to whole milk large investments in needless equipment. Studies of milk assembly in the Wichita market saved the industry an estimated \$180,000 per year in hauling costs for that market.

Massive merger and consolidation activity resulted in major reduction in numbers and increase in sizes of dairy processing, manufacturing, and marketing firms, both cooperative and private. This brought about increased economies of scale, concentration, and marketing power for the survivors.

One facet of these developments involved elimination of small neighborhood cheese plants with limited whey disposal facilities and concentration of cheese production in large cheese-whey powder plants. Recent construction of very large cheese plants in Michigan and Texas reflects a trend in numbers and sizes of cheese plants which started 20 to 30 years ago.

Virtual elimination of small local dairy cooperatives resulted in massive shifts to large regional, interregional, and national dairy processing, manufacturing, and bargaining cooperatives, resulting in challenges to the practice of exempting cooperatives from some provisions of antitrust legislation.

In the 1950s and 1960s the merger-consolidation movement was probably the most significant, and certainly the most interesting development in the dairy industry. The need for information regarding this movement is evidenced by NCM-26, Changing Market Structure and Organization of the Midwest Dairy Industry, which was started in 1960. NCM-38, Dairy Market Adjustment Problems in the North Central Region, also provided timely information regarding the changes taking place.

These developments and the findings of a special survey of the impact upon cooperatives of changes in the marketing of fluid milk were carefully evaluated in the 1960s in the regional committees' comprehensive market structure research. Dairy marketing specialists used the findings in their roles of assisting in the formation of the newly enlarged cooperative organizations and in advising them as to structures, policies, and practices to use in dealing with the changed marketing situation.

In the 1970s regional project NC-101 was concerned with alternative solutions to new problems of dairy marketing cooperatives. There was a strong demand by cooperatives for information on costs of providing market services and the rationale for allocating those costs among producers and processors. Findings resulted in revised marketing policies of cooperatives, such as pricing on a differential (service) basis, as is discussed later.

Greatly increased mechanization and improved technology in dairy production, processing, and manufacturing led to the marketing of standardized products, largely

eliminating physical product differentiation in fluid milk.

These changes included a shift in packaging of fluid milk from glass containers, typically of quart size, to single-service plastic and paper packages, typically of gallon or half-gallon size; in the packaging of frozen dairy products in single-service containers; and in the prepackaging of cheese and butter. Together with improvements in refrigeration, transportation, and highway systems, the improved technology extended transportability and shelf life, especially of perishable dairy products. Along with these developments there was the virtual elimination of barriers to the free movement of milk by health department regulations and other devices, and a shift of consumer purchases of perishable dairy products from processors to regional or national food chains, supermarkets, food marts, and fast food outlets. This led to large regional processing and distribution centers, distribution over wide geographic areas, increased private labeling, and enhanced market power of food retailers vis-à-vis producers and processors.

In the early 1950s a regional committee surveyed the distribution of milk in paper containers outside the markets in which it was packaged, followed by a three-state study of the merchandising of milk in retail grocery stores. Use of findings from these studies was evident in the rapid consolidation of processing plants and the accompanying enlargement of distribution areas by cooperative and proprietary milk processors.

Food-chain integration into milk marketing included creation of their own private-label brands and, in some cases, ownership of processing plants. Private labeling and either contracting for large volumes of milk or else processing its own milk greatly increased a chain's market power. Regional market structure research in the 1960s investigated these developments at length, including surveys of food chains. This research provided valuable information on food chains' marketing and private labeling of fluid milk, their operation of milk processing plants, and the impacts of these developments upon both producer cooperatives and milk processors.

The effects of these developments on producer cooperatives and adjustments made by cooperatives in response to them were further evaluated in the 1970s in project NC-101. In the 1980s project NC-145 evaluated the impact of public regulations on the performance of the dairy industry. Extensive use of these findings was made by committee members and extension workers in counseling operators in the fluid milk industry, especially those of cooperatives.

Cooperatives took an increasingly important role in tailoring milk supplies to processors' needs, thereby increasing the standby surplus carrying function of cooperatives and its associated costs.

A basic by-product of the movement toward fewer and larger dairy processing firms was the problem of providing transportation, inspection, field services, etc. Under the previous structural

arrangement, each processor developed its own milk supply, provided on-the-farm inspection services, transported the milk to its dock, and paid its producers for the milk. It processed the milk and was responsible for its disposition.

As structural changes took place and processors, in their movement toward larger facilities, closed small processing plants, producers who had been sending milk to a plant which was closed were, at times, temporarily left without a market. In consequence, many became members of cooperatives and beneficiaries of the guaranteed market provision of cooperative membership agreements.

Services such as those previously supplied by each processor for its patrons took on a marketwide scope. Cooperatives assumed the task of delivering to each processor the amount and quality of milk needed at the time it was needed. All services were provided by the cooperative. Supplies were tailored to the needs of the processors, and arranging outlets for surplus milk was the obligation of the cooperatives. It was in this environment that the extremely interesting phenomena of superpools and bargaining-for-a-price emerged.

Studies in the late 1950s examined practices in disposing of surplus fluid milk in North Central markets. This research highlighted important relationships of cooperatives' control of milk supplies and disposal of surplus milk to their bargaining power. These were taken into account by committee members in counseling emerging large cooperatives. Additional research included budgeting and linear programming analysis of costs of disposing of surplus milk under alternative arrangements, and studies of supply-demand adjusters in federal order markets as devices to reduce surpluses.

Services associated with scheduling, transportation, and management of milk supplies and disposal of surplus were an important part of the new problems of dairy marketing cooperatives studied in the early 1970s. Many problem areas with sensitive dimensions were evident; for example, traffic management programs of cooperatives which benefited nonmembers, but which were paid for by members, posed a question of equity. Several alternative arrangements ranging from deductions from superpools to market service charges in Federal orders were examined. Studies of services performed by cooperatives and costs of providing them were of much interest to cooperatives. The findings of these studies were applied by cooperatives in the differing charges made to members and nonmembers and in differential pricing of milk to processors depending upon the services provided. These and other regional studies aided dairy cooperatives in developing pricing and operational procedures to reflect increased market service and standby-surplus carrying functions.

Declining per capita consumption of fluid whole milk, butter, cream, and overall milk equivalent was accompanied by increased competition from substitute and imitation dairy products, soft drinks, and fruit juices.

These changes were encouraged by price competition and rising concern by consumers about calories, weight control, and cholesterol. A general change in lifestyle was involved.

In response to these developments, efforts were made to expand markets for milk through schools and vending machines. There was a major increase in variety and diversity of dairy products, including a much larger role for low-fat "Lite" dairy products and cheese, which more than doubled in per capita consumption. New products were developed with or without dairy ingredients, which could be blended with dairy products to compete more effectively with substitute and imitation dairy products.

In 1948 a summary of then-existing information about consumption and demand was published and became readily available for all persons interested in adjusting to marketing changes. In the early 1950s a regionwide study of school milk programs provided practical suggestions for expanding milk consumption in schools. This program not only enlarged the market for milk but also contributed to development of milk drinking habits and improved nutrition of students. The information was disseminated to school administrators, school lunch supervisors, and extension workers.

Regional project NC-145 considered the impacts of public programs affecting the dairy industry upon consumption as well as upon other aspects of industry performance. An example is the impact of retail milk price maintenance on milk consumption; findings from a study of this issue were used in testimony in hearings about proposed state milk control legislation. Information from studies of dairy price supports, federal orders, effect of use of imported casein in making imitation cheese upon the level of natural cheese sales, and pricing of reconstituted milk was provided to personnel of the U.S. Department of Agriculture and Congress. Suggestions for changes in the treatment of agricultural cooperatives under the Copper Volstead Act and antitrust laws also were offered to governmental agencies.

Project NC-176 evaluated the implications for dairying in the North Central region of changes in the demand for dairy products and emerging relationships between the fluid milk and manufacturing milk producing industries. Information was provided to public agencies and the dairy industry about probable effects of the dairy termination program. A symposium on the changing pattern of demand for dairy products and the effectiveness of generic and brand advertising provided additional information on these topics. This regional work relating to dairy demand and consumption aided the dairy industry in achieving its current expanded promotion, merchandising, and research program, totaling over \$200 million annually.

Widespread use of administered pricing of milk, in conjunction with the dairy price support program, was accompanied by chronic milk surpluses and resulted in substantial adjustments in dairy marketing. Large govern-

ment expenditures for Commodity Credit Corporation (CCC) dairy product purchases led to continuing evaluation of dairy policy and programs by many segments of society.

Ultimately this evaluation resulted in substantial reductions in farm price support levels for milk, the imposition of dairy farmer assessments to help fund the program, and various forms of supply management.

These developments were accompanied by geographic shifts in milk production, with the Northwest, West, Southwest, and Central South gaining competitively relative to the Midwest and other areas. These shifts raised questions about the equity and correctness of Federal and State milk orders and of geographic milk price patterns. This questioning led to a need for increased evaluation and analysis of various pricing provisions in Federal and State milk orders, the Minnesota-Wisconsin basic formula, pricing of reconstituted milk, compensatory payments, allocation pricing provisions, basing points for pricing, transportation allowances, standby pools, component pricing, and mergers of orders.

In project NC-145 the dairy price support program was evaluated with respect to impacts on prices, production, consumption, social welfare, producer returns, and costs to consumers. Its apparent influence in stabilizing supplies may have benefited both producers and consumers in the long run. Nevertheless, in the short run the program is believed to have raised producer and consumer prices, increased milk production, and reduced consumption. If so, the cost of the imbalance between supply and demand was borne by taxpayers.

Also under that project, the impact upon the dairy industry of federal and state regulations and programs, including the federal order program and classified pricing, were evaluated. The comparative advantage of milk production in various regions was appraised. These findings were presented to and discussed with concerned legislators and government workers.

Project NC-176 identified factors, including price regulations, underlying the shift from grade B to grade A milk supplies and evaluated the impact of these and demand factors for dairy products upon the North Central dairy industry. Supply/demand models were developed. Research also was conducted on the use of milk quotas as a supply management tool.

Regional research assisted legislators in formulating dairy legislation, through direct testimony by committee members at legislative hearings, background work by committee members in helping to develop proposed legislation, and use of committee studies by legislators in drafting legislation.

Limited export markets for U.S. dairy products were associated with export subsidization, tariffs, nontariff barriers, and various import restrictions by the EEC and other dairy exporting countries.

This situation was one of several in agricultural trade that led to the General Agreement on Trade and Tariff (GATT) negotiations. Dairy policy has been one of the major issues in those negotiations at least since the end of World War II.

The basic position of the United States has been based upon comparative costs of production, competition, and free trade. This country's concern with subsidization and other tactics, especially by the EEC, is countered by the charge that our dairy policy with its program of price supports also constitutes a barrier to trade.

Under project NC-145 estimates were made of impacts on the dairy industry of import quotas, variable import levies, export subsidies, and other trade restrictions. The analysis provided detail on casein imports into the U.S. and their impacts on the manufacturing milk industry, domestic utilization of U.S. dairy products, and price consequences.

Dairy international trade studies by the regional committees were used by the dairy industry and committee members in testimony at legislative and U.S. International Trade Commission hearings, and in background work with legislators and regulatory agencies in formulating dairy trade policy.

Appropriateness of Methodology³

The North Central regional dairy marketing research effort historically has been couched in a philosophically and operationally oriented methodological framework. Some such methodological policy is a vital asset to a regional committee and probably few committees have developed such a policy as thoroughly as has this group. Thus, its example may be of value to others.

This framework was built around the efforts of its members to do highly diversified, innovative, and complicated research. The committees maintained an open forum of dialogue for innovation in research methodology which was not only relevant to their research but also to their classrooms and extension programs, since most also did some of one or both. This helped assure not only innovative but relevant research, both in content and in approach, while getting teachable results.

The committees also used this dialogue on methodology to teach both methodology and subject matter content to one another. This exchange was facilitated by the wide range of experience and background of the committees' members. The benefit to a group of having members of varied backgrounds is especially

evident in methodology seminars, which often include outsiders such as colleagues and supporting graduate students.

One of the most effective practices which utilized this variety of committee members' backgrounds was the usual one of having the general committee oversee the research project as a whole, including research involving a common procedure, while individual members or small groups of members would undertake specialized research efforts as part of the general research project.

Another effective practice was to build the regional research effort where possible so it would take advantage of methodological thrusts in members' home institutions. Often innovations were first tested at home and then adapted to committee problems. This enriched the committee research, and probably avoided loss of committee time, especially reducing inefficiency on high-risk methodology.

Uniqueness in methodology was encouraged in the committees. Members had a sincere interest and unique capability in methodology, reflecting wide diversity in education and subject matter interests. Membership changed over time yet continuity existed in the core group. Thus the distinct philosophical and operational framework discussed above was strong over time. This consistency and continuity of the methodological thrust provided a strong, long-term positive force in the committees.

Probably the most dominant characteristic of these methods was the fact that the *methodology was problem-driven, not methodology-driven*. Possibly this is why much of the methodology adaptation resulted in improved research as well as improved understanding of both the problems and methodology itself.

The breadth of the methodological approach resulted largely from three widely ranging conditions:

1. *A wide audience for the results was present, including other research and educational professionals, farmers, processors, marketers, public and private customers, policy makers and administrators, and the general public (especially a keen consumer interest).*
2. *A wide variety of researchers participated, resulting in multiple, objective, and cost-conscious research approaches.*
3. *A wide dynamic element was usually identifiable in the problems, necessitating new and versatile methods. But, probably more important, methodology was chosen specifically to assure additivity of the research results.*

There were a number of unique elements of the problems studied that also necessitated a broad methodological approach:

1. *Policy had implications for a wide range of regulations*

³Many regional research groups have reasonable claims for uniqueness of methodological variety and complexity. North Central dairy marketing researchers over time probably have made one of the strongest cases for uniqueness by demonstrating the effectiveness of using such unique and wide-ranging methods.

involving international trade, national price support programs, state laws, and local rules, especially in health matters.

2. *Pricing* had implications for classified pricing plans and the inelastic demand characteristics of fluid milk.
3. *Production characteristics* had implications, varying widely by region, for putting dairying in the forefront of farm management and technology adaptation.

The committees essentially used five classifications of methodologies to deal with the conditions laid out above:

1. *Policy analysis models* of many kinds were used, illustrated by system descriptions of early central market pricing problems in butter and cheese; of widening marketing areas for fluid milk as influenced by the use of paper containers, improved roads, and better refrigeration; and of farm management and policy implications of herd buyout programs for production control.
2. *Survey methods* were used for an almost unlimited variety of relevant respondents. These included, for example, surveys of fluid milk processors and cooperative managers with respect to methods of disposing of surplus fluid milk; managers of retail grocery stores with respect to merchandising practices for milk and other dairy products; and policy makers with respect to a range of federal order, price policy, and public interest questions.
3. *Synthesizing methods* were used, including time-series analyses for secular changes; market structure models for industry performance, conduct and structure issues; and econometric models for a range of behavior and predictive issues.
4. *Highly qualitative and specialized models* were used, including linear programming for fluid-milk-firm product line determination, interregional competition, and price alignment; spatial equilibrium models for institutional consolidation problems, product pricing, and federal order adaptation; and accounting models for simulated plant costing and optimum plant size recommendations.
5. *General public sensitivity models* were used for the issue of public concern about social costs of dairy programs, merchandising studies on shifting demand, and new technology efforts such as bovine somatotropin (BST).

All in all, methodology used by these committees was often advanced for its time and proved to be relevant and lasting for later research. The methodology was chosen primarily for problem solving, but committee members always were sensitive to methodological contribution. The variety of methods used is impressive, but complementarity of methods was more important than new method derivation. Methodology was always open to discussion and modification; no small group of committee members dominated methodological choice. Learning about methodology among members was of high priority. Methodological teaching was encouraged. Substantial analysis was made of the methods with regard to their relevance to the problem, not vice versa. Methodology selection was a priority function of the total committee.

Research Publications

Through 1990 the work of these committees produced, from regional and closely related research (Table 2):

- Two books and chapters in three books
- Forty-six refereed journal articles
- Eighteen North Central Regional Publications
- Two-hundred-three state and Economic Research Service (ERS), USDA research reports
- Twenty-six Ph.D. and thirty-six M.S. theses.

In 1970 the regional research group published the book *Organization and Competition in the Midwest Dairy Industries*, Iowa State University Press, Ames, IA, 339 pages. This book was a comprehensive report of the findings of the extensive investigations which constituted the regional committees' research on the changing market structure of the Midwest dairy industries.

The quality of the committees' work is indicated by the number of resulting professional publications. North Central Regional Publications and some state/USDA research reports as well as journal articles are refereed publications.

Dissemination of Findings

Through 1990 some 158 state extension publications based on findings of the regional committees were issued. In addition, at least 223 other presentations were made, either as articles issued in trade journals, or as talks given to industry conferences or other concerned groups. Numbers of both extension publications and reports to industry, including articles in trade magazines, were larger in the later years than during the terms of the earlier committees. This may have been due in part to the fact that a larger proportion of the committee members held joint research and extension appointments in the later years.

The close ties of members of the North Central regional dairy marketing committees to the Midwest Milk Marketing Conference provided a direct outlet for, and effective use of, the committees' research findings. As a corollary, committee members' participation in the Conference influenced their judgment as to industry problems needing research. There were similar mutual benefits from members' participation in state and other dairy industry meetings.

Table 2. Numbers of Publications from Work of the North Central Regional Dairy Marketing Research Committees, by Type

Committee	Books, chapters in books	Journal articles	Regional research publications	State publications		Theses		Reports to industry and in trade publications
				Research reports	Extension material	M.S.	Ph.D.	
NCM-1 ^a	–	1	3	20	5	1	1	–
NCM-12	–	3	8	26	13	8	5	8
NCM-26	2	3	1	55	5	5	6	1
NCM-38	1 ^b	15	3	20	15	10	7	9
NC-101	–	6	–	20	43	3	1	42
NC-145	–	15	3	21	49	2	2	94
NC-176	–	–	–	19	17	4	2	52
NC-198	2	3	–	22	11	3	2	17

^aData developed from the report *Ten Years of Regional Research in Dairy Marketing in the North Central States* and from annual reports of project NCM-1.

^bThis was the book *Organization and Competition in the Midwest Dairy Industries*. This extensive regional research report is not listed as a regional research publication in these data.

Enhancing Productivity

Administrative Advisors

The Research and Marketing Act provided for a "Regional Research Fund" from which two or more state experiment stations could receive funds to conduct research cooperatively. The Act also specified a Committee of Nine to recommend research projects to the Secretary of Agriculture for his approval. The Committee of Nine is elected by and represents the directors of the state experiment stations. The Secretary reports to Congress annually. He has delegated his authority to the Cooperative State Research Service (CSRS) of USDA. CSRS prescribes rules and regulations to carry out the research. It has ruled that each regional project have an "administrative advisor," who is appointed by the region's association of directors. The "administrative advisor" is an administrator (director, associate director, or assistant director) of one of the experiment stations. CSRS has also ruled that representatives of various USDA agencies and others (except private sources) may serve on regional committees under certain conditions.

Administrative advisors are in a position to play a crucial role in regional research. They have provided the administrative direction for each project. More specifically, the administrative advisors:

1. Encouraged a truly regional approach, whether it was in project selection, financing, work assignments, or other procedures.
2. Assisted with finances, especially in the early years. Project financing had to be arranged both with the USDA and the various stations in the region.
3. Took the lead in employing and housing a regional coordinator. This effort included the financing of the coordinator's work, and the drawing up of agreements between the USDA and one or more stations.
4. Stimulated researchers to allocate adequate time to regional projects, and to publish the results of the research promptly.
5. Stressed the importance of clarity in project outlines and proposals, encouraging the following format: problem, objectives, procedures, and research methodology.
6. Helped arrange for the financing and location of publications produced by the region.
7. Served as liaison individuals representing the regional association of directors when they dealt with the technical

committee; and in turn served the technical committee when they dealt with the regional association of directors, other participating agencies and institutions, the Committee of Nine, and CSRS.

The Study Committee for this report acknowledges the contributions made by the regional committees' administrative advisors. Their direction, guidance, support, and discipline contributed importantly to the success of the work.

Cooperative State Research Service Representatives

A CSRS representative is assigned to each regional project. This representative, like the administrative advisor, plays an important role in providing administrative direction for and coordination of the research. In many instances, the CSRS representative also has knowledge and professional expertise that is helpful to researchers as they define directions of work, consider methods, initiate collaborative arrangements, and establish liaisons with researchers in other regions and agencies. Additionally, the CSRS representative is responsible for preparing reports which, after review by and concurrence of the administrative advisor, are used to advise the Committee of Nine and CSRS staff on project status, progress, and problems.

Contribution of a Coordinator

The coordinator is an additional person—often the only person—available to work full time on the regional project. For state and USDA members of the technical committee, the regional project is commonly only one among several activities for which they have responsibilities. Thus the coordinator has severalfold as much time to devote to the regional research as a typical member of the technical committee. Moreover, it is in the coordinator's professional interest to make the regional work as productive as possible.

Through phone calls, correspondence, and visits to members of the technical committee, the coordinator periodically reminds them of the regional research and their obligations to it. This has a salutary effect. While in some cases assisting in state-contributing projects, the coordinator emphasizes central tendencies and responsibilities, helping to keep the research truly regional in character.

Quite commonly the coordinator is responsible for tabulation and analysis of regional research findings. By doing this and preparing early drafts and revisions of manuscripts for regional research reports, the coordinator facilitates the publication of findings.

The coordinator often prepares drafts of the annual and terminal reports of the regional project, arranges for meetings, and performs other administrative chores. Because the coordinator performs these tasks, the chairman of the regional committee is allowed more time for planning and other important leadership activities in the regional project. Likewise, the coordinator assists subcommittee chairmen in lesser ways.

The coordinator frequently has an important role in developing and pretesting questionnaires for regional surveys. In addition, the coordinator's assistance to state workers, often graduate students, in starting field work on regional surveys promotes uniformity in data collection and often gets the work under way more promptly. This assistance enriches the understanding of all concerned, including the coordinator, not only as to procedures to use in the research but also as to the nature of and regional variations in the various aspects of the subject being investigated.

The experience of these regional research committees in dairy marketing confirmed that members were much more responsive in reacting to specific material, such as preliminary drafts of manuscripts, tentative project statements, and early drafts of questionnaires, than they were in reacting to general requests to provide ideas. To the extent the coordinator was timely in circulating specific materials among committee members for reactions, their thoughts and interactions were stimulated. These interactions were a major benefit of the regional approach, as well as a factor in expediting the research.

The North Central regional dairy marketing committees had a long-term coordinator who added appreciably to the valuable contributions both of individual committee members and their joint efforts.

Participation of USDA Research Agencies

USDA research agencies have participated in regional research from the beginning, although not in regional research funds. The Economic Research Service (ERS) and Agricultural Cooperative Service (ACS) had representatives on North Central dairy marketing committees and often had contributing projects.

For many years ERS largely supported a full-time employee who acted as a coordinator for the regional project. Since he was the only researcher devoting full time to the regional research project—all the others having additional duties—the regional coordinator carried out a significant part of the research. At times, other researchers—almost entirely graduate students—were jointly employed by ERS and a university.

Esprit de corps of Committees

The high level of productivity of the North Central regional committees on dairy marketing research grew out of the enthusiasm and commitment of their members. Those of us preparing this report cannot adequately measure the devotion to purpose and ability they contributed, except to say that it was of a very high order. No attempt to evaluate the committees' contributions and reasons they were substantial would be complete without recognizing the dominant role members' zeal played in the committees' success.

Potential Benefits of Regional Research

A major reason provision was made for regional research in the Research and Marketing Act of 1946 was to eliminate needless duplication in research among the states. The intent was to replace similar yet uncoordinated studies with coordinated, and in some cases complementary, research. That objective was accomplished by the regional research program in dairy marketing in the North Central region. Researchers exchanged information about developments in the industry and their ideas and plans for research. This resulted in coordination of research and elimination of needless duplication.

The improved coordination of the region's dairy marketing research was in no sense limited to that encompassed by the regional project. Out of their improved knowledge of research activities in other states and conditions in the dairy industry, members of the regional committee modified plans for non-regional as well as regional studies so they would most effectively complement research in other states of the region. Because all North Central states and Kentucky were involved, for a long period this resulted in *all* dairy marketing research throughout the region being coordinated.

A much greater, possibly unanticipated, benefit of the regional approach is the stimulation of ideas and research techniques, as well as the greatly improved knowledge and understanding of developments in the industry, that results from discussions among committee members. As committee members come to know each other well, dividends from this interaction increase substantially. Two other evaluators of regional research have stated "A major contribution of regional research has been the stimulation that results from the opportunity of station and USDA personnel to meet and discuss research problems of mutual interest."⁴

This interaction upgrades both planning and implementation of research. For example, in the North Central group's market structure studies, members became aware of the changing milk marketing practices of food retailers and their possible impact upon the marketing of fluid milk. The resulting regionwide survey of the milk marketing policies and practices of corporate, voluntary, and cooperative food chains not only added substantially to knowledge of developments in dairy marketing but also materially affected conclusions as to the relative market power and problems of the various types of agencies involved in marketing fluid milk.

Another contribution of the interaction among committee members is that it spreads new concepts and training in research methodology not only among members of the committee but also from them to their professional colleagues. This may be accomplished not only through committee-sponsored seminars, but also through continuing teaching within the committee by those members best informed about the methodology.

Among other benefits, the regional approach provides enough resources to conduct research which can have effects both regionally and nationally. It does this more effectively than research done by the same number of workers operating independently. This effect is intensified when a carefully planned and coordinated approach is employed.

A valuable side effect of regional research is improved communication with workers in both government and private sectors, making research techniques and findings more readily available and widely used. Closely related is the fact that the credibility of groups such as these regional committees is recognized even in such places as administrative courts of justice and legislative halls. The credibility of this work has had substantial impact on decisions in legislation and in litigation, both public and private.

The consequence of better information, stimulated thinking, improved research techniques, more adequate resources, and improved communication is not only research of higher quality and larger quantity but also greater likelihood of giving attention to the most urgent problems of the industry. These benefits add up to a very substantial contribution from the regional approach.

The organizational arrangements that have characterized regional research suggest the validity of such an approach for research efforts on a broader scale. The regional format has already been adopted and used for several national research committees. As agricultural research takes on global dimensions, there is reason to recommend the regional approach (format) for international research committees composed of members from the various participating countries.

⁴Harris, Marshall and R. J. Hildreth, "Reflections on Regional Research Activities." *American Journal of Agricultural Economics* 50, No. 4, (1968):823.

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