FINAL REPORT

THE FUTURE OF THE DAIRY INDUSTRY IN WISCONSIN:

SERIOUS CHALLENGES, TREMENDOUS POTENTIAL

BY THE
WISCONSIN DAIRY TASK FORCE, 1995

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Sponsored by the Wisconsin Department of Agriculture, Trade and Consumer Protection, and the University of Wisconsin System Consortium for Extension and Research in Agriculture and Natural Resources.

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The Wisconsin Dairy Industry Task Force 1995

July, 1987

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I. INTRODUCTION

Wisconsin is the leading dairy state in the United States, and dairying accounts for more than two-thirds of the state's cash farm income. Dairying's total impact on Wisconsin's economy exceeds $10 billion. Hence, there is statewide concern about the current lack of profitability in Wisconsin's dairy sector, and about how well the industry can compete with other regions.

To a large extent, the current problem of relatively low Wisconsin dairy farm income reflects the situation for U.S. agriculture as a whole: low prices, caused by chronic overcapacity, stemming from declining export markets. Until recently, the dairy sector had escaped the full impact of falling farm prices because it was insulated by relatively high dairy price supports. But the 1985 Food Security Act cut support prices, placing the dairy industry squarely in the middle of the farm crisis.

Concern extends beyond the immediate crisis, however. Dairy sectors in other areas of the country, especially the South and West, have grown tremendously. Part of this growth has been spurred by milk prices that are high relative to Wisconsin's, and part has been due to more profitable production. There is concern that Wisconsin's long-held regional advantage in dairying may be eroding. Wisconsin cannot afford to lose the economic viability of its dairy industry.

WISCONSIN DAIRY TASK FORCE 1995

It was this concern over the competitiveness, profitability and economic viability of Wisconsin's dairy industry that lead to the appointment of the Wisconsin Dairy Task Force 1995. The task force was appointed on August 1, 1985 by Katherine Lyall, then Acting President of the University of Wisconsin System, and LaVerne Ausman, then Wisconsin's Secretary of Agriculture, Trade and Consumer Protection.

The overall objective of the Task Force was to develop a comprehensive plan and action strategy to maintain and further develop a profitable and viable Wisconsin dairy industry. In support of this overall objective the following specific objectives were addressed:

-To encourage research, education and legislative programs to improve profitability and efficiency of milk and meat production; dairy farm business management and finance; and farm taxation and economic policies.

-To improve dairy processing, profitability and efficiency including procurement, plant and transportation costs, regulations, legislation, sanitation, finance, credit, product quality, new product development, storage, research and development, and environmental concerns.

-To increase dairy marketing effectiveness at every level, from farm to consumer, including transportation, advertising, economic and legal barriers; to analyze competition from nondairy products; and to analyze exports, imports, regulations, legislation, research and development, product use, nutrition education, and environmental concerns.

-To maintain leadership in the nation's dairy industry.

The Task Force consisted of 31 individuals: 16 dairy farmers, seven milk processors and marketers, and eight from allied organizations -- farm credit, artificial insemination, farm supply, livestock marketing, etc. A representative of the Governor and four state legislators served as ex-officio members. Working with the Task Force was a Technical Steering Committee drawn from the University of Wisconsin (UW), the Wisconsin Department of Agriculture, Trade and Consumer Protection (WDATCP), and Wisconsin's Vocational, Technical and Adult Education System (VTAE).

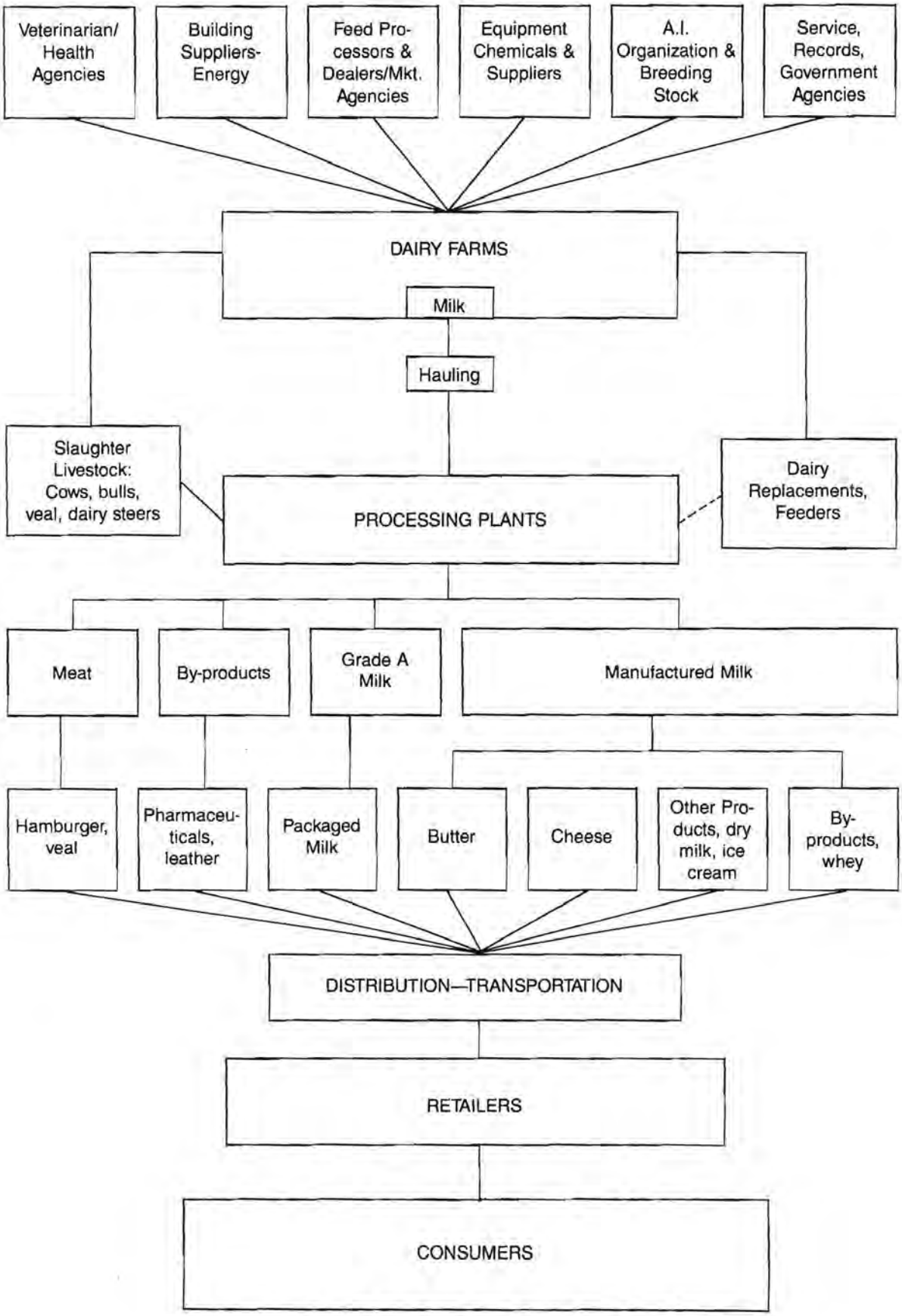
The Task Force was chaired by Phil Peterson, an Oregon, Wisconsin dairy farmer. Tom Lyon, General Manager of 21st Century Genetics, served as Vice-Chair until he was appointed to the University of Wisconsin Board of Regents. Don Storhoff, General Manager of Wisconsin Dairies Cooperative, was then selected as the Vice-Chair. Robert Cropp, Professor and Agricultural Marketing Specialist, University of Wisconsin-Extension and UW-Platteville, served as Executive Director.

DAIRYING'S CONTRIBUTION TO WISCONSIN'S ECONOMY

Wisconsin's economy depends heavily on the state's dairy industry. In 1986 over 39,000 Wisconsin farms produced 25.2 billion pounds of milk, 17.5 percent of the nation's milk supply. With a value of over $3 billion, this milk represented 59 percent of Wisconsin's cash farm income. Adding in sales from calves, culled dairy cows and dairy beef, 66 percent of Wisconsin's cash farm income comes from dairying. But the economic impact is actually more than three times as great if the inputs purchased by farmers, processors and marketers of milk, dairy and meat products, and the service industry are taken into account. In total dairying contributes at least $10 billion per year to Wisconsin's economy.

The state's dairy industry includes some 284 cheese plants, 25 butter plants, 40 ice cream manufacturers and 11 powdered milk plants.

THE WISCONSIN DAIRY INDUSTRY



Wisconsin cheese plants alone employ over 10,000 people and produce 40 percent of the nation's cheese. Wisconsin's 340 meat processing plants slaughter over 520,000 cull cows, 450,000 dairy steers and 300,000 calves, supplying 10 percent of the nation's hamburger for retail and fast-food consumers. Other key agribusiness employers include 1,300 feed mills, 85 feed manufacturers, 4,700 commercial trucking firms, 6,000 meat retailers, 1,150 dealers and brokers, 800 veterinarians, 1,650 farm supply firms, 450 farm financial service firms and banks, 600 equipment dealers and 250 farm builders. The list also includes services for dairy farmers such as insurance, power, fuel, machinery, trucks, vehicles, hardware, artificial insemination, chemicals, seed and fertilizers and others. Wisconsin is the nation's leading manufacturer of dairy equipment and supplies. Wisconsin also has four major bull studs, producing semen for distribution throughout the world. There are extensive economic ties between the dairy industry and the state's agribusinesses and rural and urban communities. Dairying is also the best use of much of the state's land resources. Moreover, the enormous investment in dairy buildings, plants and manufacturing facilities can only be utilized if Wisconsin's dairy industry survives.

Clearly in terms of economic importance in Wisconsin nothing compares in size and significance with the multi-faceted dairy industry. Its continuing growth and development are of utmost importance to the revitalization of the state's economy.

THE CHALLENGES

The Wisconsin dairy industry is, however, approaching a crossroads. The direction it takes now will determine whether the industry will prosper or decline. Competition from the West, South, Southeast and even the Northeast is increasing rapidly.

The Task Force starts with the basic premise that in the future, milk prices will not be insulated by costly government programs from the forces of supply and demand . On the contrary, the Task Force assumed that milk prices will be under constant downward pressure as technology lowers the cost of production. Consequently, the state's dairy sector will thrive only if Wisconsin dairy farmers, processors, and marketers stay at least as progressive as their counterparts in other regions, and only if a conducive institutional climate can be maintained.

The Wisconsin Dairy Task Force 1995 is a response to this challenge. The Task Force realizes that significant changes are coming within the next decade and that the dairy industry needs to adjust. This report is the result of an industry-wide effort to develop a plan of action for maintaining and enhancing the profitability and competitive position of Wisconsin's dairy industry.

MAJOR TRENDS

Several significant trends have occurred within the dairy industry over the 10-year period of 1977-1986. Dairy farms in Wisconsin decreased in number and increased in size. In 1977 there were 49,000 dairy farms

with an average of 36.8 cows. The number of herds declined by 10,000 to 39,000 by 1986 but milk cow numbers increased by 60,000, and the average herd size increased to 47.7 cows. Wisconsin dairy farm numbers declined 20.4 percent during this period, slightly less than the national rate of 23.4 percent. A continued decline in farm numbers and an increase in the average herd size is imminent for Wisconsin over the next decade.

Major regional shifts in milk production have taken place during the fifteen-year period of 1972-1986. The location of U.S. milk production gradually shifted to the West and Southwest from some of the more traditional dairy states, particularly those in the nation's midsection (Appendix A). During the 15-year period milk production increased almost 64 percent in the Pacific region, 59 percent in the Mountain region and over 15 percent in the Southern Plains. The traditional dairy states in the Northeast and Lake States region also increased production during this period, but to a lesser degree (20.1 percent and 22.0 percent respectively). Wisconsin, however, increased production 31.1 percent during this period. Milk production decreased in the grain states of the Northern Plains (by 24.3 percent) and Corn Belt (1.7 percent) and in the Delta states (13.1 percent).

Due to relatively greater increases in milk production over the past 5 years, the Pacific Region increased its share of the nation's milk supply from 11.4 percent to 15.6 percent. This came at the expense of the grain states. The share of U.S. milk production held by the Lake States and Northeast remains rather constant (over 28 percent and 20 percent respectively). Some studies conclude, however, that further regional shifts will occur within the next decade. In March, 1986, the U.S. Office of Technology Assessment concluded that there will be "... a major regional shift in milk production: the Midwest and the Northeast will lose their competitive advantage to the Southwest." (p. 189). This was the challenge that prompted the appointment of the Wisconsin Dairy Task Force 1995.

THE OPPORTUNITIES

Wisconsin faces a major challenge in retaining its rank as the leading dairy state. It is evident that not all of Wisconsin's existing 39,000 dairy farmers will remain in dairying. Even with a conservative forecast of U.S. per-unit milk production (18,725 pounds per cow by 2000), the U.S. will need substantially fewer dairy cows. Assuming U.S. commercial use expands to 160 billion pounds -- 20 percent above current levels -- only 8.5 million dairy cows will be required to meet milk needs. This is two million fewer than our current inventory.

However, the Dairy Task Force finds unsupportable and unacceptable the OTA conclusion that with the advent of emerging technology, Wisconsin's dairy industry will migrate to such states as California, New Mexico or Texas. This prediction assumes a stagnancy in the Wisconsin dairy industry that simply does not exist. It presumes that Wisconsin dairying is either unwilling or incapable of adapting to change. However, the Task Force concludes that if the recommendations contained in this report are implemented, the industry can and will remain profitable and competitive.

To appraise the nature of the competitive challenge facing Wisconsin, it is necessary to review the state's dairying assets and liabilities. On the positive side of the ledger, Wisconsin can produce large volumes of high-quality forage, some on land with terrain or climate unsuitable for production of other commodities. Feed grains and soybeans, major dairy feed inputs, are also in good supply. The state possesses good soils and adequate rainfall. Dairying represents the highest and best use of many of Wisconsin's abundant natural resources.

Wisconsin has a long dairying tradition and a well-developed production, processing and marketing infrastructure. Capital assets are already invested and partly depreciated. It has a strong manufacturing milk industry. Wisconsin produces nearly 36 percent of the country's cheese, and sales of cheese are growing faster than those of any other dairy product. The state's location relative to major population areas is ideal for national distribution of cheese and other manufactured dairy products. Wisconsin dairying has a good image: 72 percent of respondents in a nationwide survey by the Wisconsin Milk Marketing Board thought Wisconsin produced the best cheese. There is good potential for expanding the market for Wisconsin's milk and milk products, about 90 percent of which must be marketed out of state.

The state's dairy farmers are less sensitive to changing feed prices -- a key advantage in this era of uncertain international grain markets. Its best dairy herds are just as efficient, if not more so, than the best herds in other parts of the country.

On the negative side, Wisconsin's dairy sector has several serious problems. Average production per cow is low relative to many other dairy states. In 1986, Wisconsin ranked 18th among all states in yield per cow. Low yields are caused by several factors. Wisconsin farmers as a group have been slow to adopt management strategies proven to be effective in increasing yields. For example, only 45 percent of the state's cows are on Dairy Herd Improvement test -- a recordkeeping program that provides farmers with information on each cow's performance. Only 15 percent are on a supervised records system that provides data for genetic and educational programs. Wisconsin has a large number of very small herds, many managed by farmers who resist change and show little interest in improving their skills. There is a clear need for improved management, not only in production, but also in the financial and recordkeeping sides of the dairy farm operation. Wisconsin has too many small, inefficient dairy plants. There is too much duplication of milk pickup routes. Wisconsin is too far from population centers to sell more fluid milk (which is priced higher than milk used for manufactured dairy products) -- at least under current marketing regulations .

Wisconsin's dairy industry is fully capable of reducing its disadvantages as well as exploiting its advantages. Wisconsin will undoubtedly have fewer dairy farms in 2000, but it will still produce 17 percent to 20 percent of the nation's milk supply in a very competitive fashion. The recommendations and action plan contained in this report are efforts to assure the competitive and profitable position of Wisconsin's dairy industry.

II. FINDINGS AND RECOMMENDATIONS

MILK PROCESSING AND MILK AND DAIRY PRODUCT MARKETING

CONSUMPTION TRENDS AND PROJECTIONS

For the 10-year period of 1974-1983 U.S. commercial milk sales were rather static, increasing only 9.4 billion pounds (8.3 percent). However, since then commercial sales have increased rather dramatically, from 122.5 billion pounds for 1983 to 134.2 billion pounds for 1986 -- an 11.7-billion-pound increase (9.6 percent) in just three years. Sales are expected to keep climbing for the next decade, although at a slower rate (annual increases between 1 percent and 2 percent). This would put commercial milk sales in excess of 162 billion pounds by the year 2000 compared to the 134.2 billion pounds for 1986.

Growth in cheese sales is the major contributor to this growth in milk sales. Almost 85 percent of the growth in commercial milk sales since 1980 is the result of increased cheese sales; less than 5 percent comes from increased fluid milk sales and 10 percent from other manufactured milk products. Although demand for other dairy products can also grow, improved cheese sales is likely to be the primary factor behind increasing commercial milk sales in the decade ahead.

According to Business Trade Analysts, a New York-based research firm, per capita consumption of cheese could nearly double by the year 1995. Although many view this as an overly optimistic projection, the study does indicate a real growth potential. Per capita commercial cheese sales increased from 14 pounds in 1975 to 19.6 pounds in 1985 -- a 40-percent increase. Sales of other than American-style cheeses have been increasing faster than American cheeses, and since 1983 sales have exceeded American cheese sales. Since 1980, total American cheese sales increased 19.1 percent, while sales of other cheese types increased 45.6 percent. Although all cheese sales look promising, the greatest potential for future market growth appears to be with the non-American cheese varieties.

Implications for Wisconsin

Wisconsin is number one in the production of all major types of cheese except Swiss, where it ranks second. In 1985, Wisconsin produced 1.778 billion pounds of cheese, 36 percent of total U.S. cheese production.

The optimistic projections for further growth in cheese sales, and particularly for non-American varieties, point out a growth opportunity for Wisconsin's dairy industry. The wide variety of cheese types produced here is an advantage for capturing a good share of cheese demand

growth. Even if cheese consumption increased by 50 percent by 1995 -- just half of the optimistic projections mentioned above -- and if Wisconsin just maintains its share of production, the state's cheese industry would have to produce approximately 2.7 billion pounds of cheese. This would require 27 billion pounds of milk for cheese production alone. Wisconsin produced 25.2 billion pounds of milk in 1986. So there is real potential for Wisconsin's dairy industry to grow. But to reach this potential, Wisconsin must continue to capitalize on the following advantages:

1) Wisconsin has nearly half of the cheese plants operating in the United States.

2) Wisconsin cheese plants have very diverse production and the cheesemakers know how to adapt to changes in demand. Wisconsin makes good cheese because it has very high standards and licensing requirements for cheesemakers.

3) Wisconsin has a stable producer and quality milk-production base.

4) Wisconsin has a national image among consumers for high-quality cheese and other dairy products. Other states must spend millions of dollars to establish a favorable consumer image for their dairy products.

5) Wisconsin has a strong promotion effort which concentrates its efforts on the state's principal dairy products.

Cheese production and marketing, however, will become even more competitive. It is quite possible that a large portion of the Western (California) cheese markets could be lost because of transportation disadvantages. Nevertheless, the balance of U.S. cheese markets should be accessible and available to Wisconsin cheese because it is doubtful that any state other than California can develop enough milk production and plant capacity to produce the variety of cheese the future market will demand.

Recommendation:

1) Anticipated growth in cheese sales in general and for non-American varieties in particular offers an excellent growth opportunity for Wisconsin's dairy industry. Wisconsin should strongly emphasize and commit resources to producing and marketing cheese and expanding cheese varieties.

WISCONSIN DAIRY PLANTS AND CAPACITY*

Data for 1985 shows Wisconsin had 284 cheese plants, 25 butter plants, 11 plants producing food-grade nonfat dry milk, and 35 whey plants. Since

* Data used in this section was obtained with the assistance of Myron Dean, Professor Emertitus in the UW-Madison food science department.

Wisconsin currently utilizes 73 percent of its milk for cheese and this is the area of potential growth, an analysis of the state's cheese production capacity is of particular interest.

A 1986/87 University of Wisconsin Consortium research project analyzed the existing capacity of Wisconsin's manufacturing milk plants. It is essential to understand current capacity before considering additions to that capacity. Unnecessary plant capacity reduces processing efficiency, creates unnecessary overhead expense, reduces operating margins, and could lower farm milk prices. On the other hand, a reasonable amount of excess capacity is necessary to adequately handle the seasonal and year-to-year variation in milk production and demand, to meet future growth in demand, and to assure a healthy, competitive and progressive dairy industry.

Cheese Plants. The 1986/87 data suggests that considerable excess cheese production capacity exists within the state, with some variation by type of cheese. Of the 284 Wisconsin cheese plants, 198 were American cheese plants producing cheddar, colby and monterey jack. About 61 percent of current Wisconsin cheese production consists of American varieties. Cheddar alone constitutes half of all cheese produced. Cheddar cheese plants currently operate at an average of 28 percent below maximum plant capacity -- 14 percent below capacity at peak production and 41 percent below during short milk supplies. Almost 80 percent of cheddar cheese plants never reach maximum plant capacity. Even more excess capacity exists for colby and monterey jack plants, which were operating at an average of 35 percent below maximum capacity.

Italian cheeses are second in Wisconsin cheese production, accounting for over 27 percent of total cheese produced. Italian cheese continues to offer some of the greatest potential for growth in Wisconsin cheese sales. These plants were operating on the average at 24 percent below maximum plant capacity (11 percent under during peak production and 37 percent below during the short-supply period). About 58 percent of these plants never reached maximum capacity.

The overcapacity figures for other types of cheese were similar: 28 percent for Brick and Muenster, 28 percent for Swiss, and Blue Cheese with 38 percent (the greatest excess capacity).

Although excess plant capacity currently exists within the state, if cheese sales increase by just 50 percent by 1995 (half of the most optimistic prediction) and Wisconsin can simply hold its market share, existing cheese plant overcapacity will be eliminated and additional capacity will be needed. Current capacity will be exceeded ever sooner for the faster-growing Italian cheese market.

On average, Wisconsin cheese plants operated at about 72 percent of maximum capacity in 1986, and produced 1.78 billion pounds of cheese. Although it is virtually impossible for plants to operate at 100 percent of plant capacity year-round, if they could have done so, they could have produced around 2.5 billion pounds of cheese. If Wisconsin's cheese market increases around 50 percent by 1995, the state would need to produce approximately 2.7 billion pounds of cheese.

These projections also assume that Wisconsin dairy farmers can profitably

produce enough milk to fulfill the needs of cheese and other milk plants.

Despite the optimism about future growth in the cheese market and the likely need for additional plant capacity, extreme caution is called for in planning additional plant construction. Before undertaking any expansion, each plant should analyze its market growth potential, the variety and style currently being produced, and how efficiently it is utilizing its existing plant and equipment.

Considering the state's current excess cheese production capacity and plans for continued expansion, competition among plants for available milk supplies will remain keen. This will help hold prices for manufacturing milk higher in Wisconsin than for other major cheese-producing states. So unless plants operate efficiently, their profit margins could be lower. Wisconsin plants must continue to update their equipment to take advantage of efficiencies that may be derived. Unfortunately, this may be difficult for small-volume plants, whose costs and volume may not justify the purchase of such equipment. The viability of smaller plants may depend on their abiility to manufacture high-quality specialty cheese at premium prices.

The excess plant capacity has meant rather stiff competition for milk in the state. The state's dairy farmers have benefited from this through higher milk prices. But at the same time, future investment in Wisconsin's cheese industry could be discouraged by manufacturing milk prices that are relatively higher than in nearby states and other potential cheese manufacturing areas. Production of milk at a competitive price with other states is essential to maintaining a competitive and viable cheese manufacturing industry in Wisconsin.

BUTTER AND POWDER PLANTS. Although Wisconsin only utilizes 3.6 percent of its own milk production for butter, this volume, along with out-of-state cream supplies enables the state to produce 24 percent of the nation's butter. So Wisconsin stands to gain substantially from any growth in the butter market. Nevertheless, butter and nonfat dry milk have traditionally been considered the balancing wheel of the dairy industry. That is, butter and powder are produced during periods of surplus production (particularly the spring flush) and any quantity in excess of commercial demand and reasonable inventories are sold to the CCC under the dairy price support program. Because of this seasonal variation the state has considerable excess butter plant capacity. Even at peak production Wisconsin butter plants operate 28 percent below maximum capacity. They operate at 72 percent below capacity in the off-season and average 50 percent below maximum capacity for the year. Because butter plays a balancing role, more excess capacity is needed than for other cheese plants. Although one-third of Wisconsin butter plants said they plan to expand over the next three to five years, there appears to be sufficient plant capacity for the near future.

In contrast, nonfat dry milk plants have little excess capacity, despite rather seasonal production patterns. At peak production, virtually all of the plant capacity is utilized. Nonfat dry milk plants operate at 43 percent excess capacity in the off-season and average just 21 percent below maximum plant capacity.

RECOMMENDATIONS

- 2) Any new investment in new dairy plant facilities or plant expansion should be preceded by careful analysis of existing plant capacity, technology and market potential.

- 3) To ensure the economic survival and expansion of Wisconsin's many small cheese plants, and to expand the number of cheese varieties produced here, small plants should concentrate on manufacturing high-quality, premium-priced cheeses, and should seek out innovative ways to efficiently market their product nationally.

- 4) Consumers are buying new varieties of cheeses, many of them imported from Europe. As these markets develop, Wisconsin must produce a greater share of these varieties. Where knowledge and production expertise is lacking, consideration should be given to seeking foreign investments in Wisconsin. Existing plant capacity should be carefully studied before considering any new plant construction. The WDATCP, along with the University of Wisconsin, should provide information and assistance to potential foreign investors.

PRODUCT DEVELOPMENT

New product development is a key to the survival any industry that provides goods to consumers. As consumer lifestyles change, so must the nature of goods offered in the market. The dairy industry is no exception. It is in a position to provide many of the food needs of the future, but to do so it must continue to expand its product development efforts so that opportunities will not be lost to competing segments of the food industry. While food uses for dairy products and derivatives provide the key to economic viability to the dairy industry, opportunities for non-food uses of dairy derivatives also need to be continually investigated.

Traditional Dairy Products

Traditional manufactured dairy products -- cheese, butter and powder -- will continue to be the dairy industry's main market and source of revenue. Based on the foregoing market projections, Wisconsin needs to continue to focus on cheese. No other product will have a greater economic impact on Wisconsin. This is not to say that Wisconsin should ignore efforts to expand markets for other dairy products. The state must be conscious of any market opportunities that may enhance the well-being of its dairy industry.

Wisconsin cheese industry faces several specific challenges:

1) The need to further diversify cheese varieties.
2) The need to respond to changing nutritional needs and demographic distribution of the U.S. population.
3) The need to use more cheese in processed foods.

4) The need to develop a more comprehensive, basic understanding of the physical, chemical, microbiological and nutritional characteristics of cheeses so that cheese can be more easily adapted to future uses.

Wisconsin's manufacturing plants need to be as innovative, efficient and market-oriented as those in competing states in order to be competitive and profitable. For example, the competitiveness and profitability of the state's cheese industry may be enhanced by further research on the development of rennet substitutes, better dairy starter cultures, improvement of flavor development or flavor acceleration in aging cheese, the making of new cheese varieties, and new manufacturing technologies. Spreadable butter, low-cholesterol butter, low-fat cheese, low-sodium cheese and other variations of traditional dairy products are examples of products that may expand the market for Wisconsin's dairy industry.

Non-Traditional Products

Dairy Foods as Ingredients. Research efforts to increase milk sales must seek to develop new means to get milk and milk-based ingredients into foods that are emerging as the bright stars of the market, and to discover new ways to attract consumers to these products. Research must be devoted to improving the compatibility and functionality of dairy ingredients for specific uses in formulated foods. Consumers will continue to demand fresh and natural foods rather than highly processed or refined foods. New, nutritionally modified foods that can be prepared from milk or milk components with a minimum of rigorous processing will be attractive to the consumer.

Food-use patterns are undergoing continued changes, with conventional foods yielding to new or convenience foods. Milk and milk-derived components have excellent nutritional and functional properties that are well-suited to convenience foods.

Consistent areas of growth in the U.S. food market have included snack foods, high fiber foods, light or low-calorie foods, and alternatives to meats. Unfortunately, these are areas where dairy products are either not involved or have a static market share. Research is needed to find ways to obtain a larger market share in this area, at the same time benefiting the consumer through improved nutritional value.

The dairy industry is faced with an overabundance of milkfat. Surplus milkfat may find alternative uses in either food or non-food applications. In an era where non-dairy fats are finding their way into traditionally dairy-based foods (e.g. margarine), it is time to explore ways in which milkfat can infiltrate product markets that are traditionally of non-dairy origin.

Despite the considerable effort expended in the area of whey utilization and abatement, this chronic problem remains because one of the impediments to whey utilization or disposal is the lactose it contains. A portion of the total whey produced can be processed into products suitable for use as food ingredients. Other applications for

whey must be explored if more of this by-product is to find its way into foods.

Non-food uses. Additional non-food or industrial uses of milk and milk by products must be found. For example, it may be appropriate to focus greater effort on the utilization of whey for non-food products. The potential offered by industrial fermentation of whey/permeate is limited only by imagination. Valuable end products such as pharmaceuticals, enzymes or specialty chemicals can be selected in a whey fermentation based on the choice of inoculum and operating conditions. Lactose may be converted into an energy source for the dairy processing plant or other uses.

Glues, adhesives, and plastics are just a few of the myriad possibilities for expanding into non-food uses of milk and milk by-products goes on and on.

RECOMMENDATION

- 5) To ensure an expanding market, the Wisconsin dairy industry should increase its research into manufacturing efficiency and technology in product development, both for traditional and non-traditional uses of milk, milk products and milk by-products. The UW-Madison food science department, the Walter V. Price Cheese Research Institute -- a part of the UW Center for Dairy Research -- and the UW Consortium should expand their research efforts in this regard. Funding should be partially the responsibility of the Wisconsin Milk Marketing Board, the National Dairy Promotion Board and other industry sources.

MILK QUALITY AND FOOD SAFETY

The concern over food safety has never been greater, and dairy foods are no exception. In fact, much of the concern over food quality has centered on the dairy industry -- a consequence of recent reports of chemical and bacterial contamination of milk, ice cream and cheese (aldicarb, heptachlor, salmonella and listeria are among the reported contaminants). Future demand for milk and milk products depends heavily on consumer confidence in the quality and safety of these products.

The responsibility for milk quality and milk product safety starts on the farm and carries all the way through the marketing channel. Wisconsin's dairy industry has identified milk quality as a high-priority area.

In the future, more information will likely be required about the raw milk supply before it is shipped. Since Wisconsin is a milk surplus state, it is essential that appropriate quality factors be identified to maintain a high demand for the milk and milk products produced here. Producing the highest-quality milk is also in the best interest of the state's dairy farmers. Farmers must recognize that anything less than the highest quality will decrease their profitability and revenue as it decreases consumption, product yield and shelf life. Every dairy farmer has access to the information and technology needed to provide our milk

plants with a consistent, safe supply of milk that has the desirable attributes for flavor, yield, and shelf life. A reasonable goal for every farmer would be to consistently market milk with less than 200,000 somatic cell count, less than 10,000 bacteria plate count, less than 50,000 PI count, and no antibiotics, added water or residues.

To assure quality milk, the WDATCP needs look for ways to streamline and target dairy farm and plant inspections. This includes certifying inspectors, or contracting with the private sector for some aspects of inspection. Inspections should be implemented only where necessary in order to help make dairy products more cost-competitive. But the state must not lower the quality of dairy products or take unjustified risks with that quality. If Wisconsin is to be recognized as a supplier of quality milk and a leader in the dairy industry, its milk and milk product quality standards must be as high or higher than those of competing states. A review of regulations in other states that are innovative and effective in protecting and fostering the development of the dairy industry may prove useful. The key point is that the efficiency and profitability of Wisconsin's milk producers and processors, as well as the dairy industry's ability to keep its share of the food market, depend on high-quality milk and milk products.

RECOMMENDATIONS

- 6) Wisconsin's dairy industry must have high-quality, safe milk and milk products in order to maintain and enhance its markets. The state's dairy industry should be the leader in quality and food safety standards for its products, from the farm level all the way through the marketing system. The University of Wisconsin should continue research on improving the quality of milk and milk products. UW-Extension, VTAE and the industry should provide educational programs to teach dairy producers, processors and food handlers the principles for producing safe dairy products and dairy ingredients.

- 7) A single quality standard should be implemented for all milk produced within the state, and the following timetable should be followed in implementing that standard:

	1987	1990	1992	1995
Somatic cell count	700,000	600,000	500,000	400,000
Bacteria plate count	25,000	20,000	15,000	10,000

- 8) The dairy farm inspection program should be critically reviewed with an eye toward factors related to production of quality milk. Mandatory annual inspections of each Grade B dairy farm should be implemented. Milking-time review and inspection should be conducted on farms failing to meet quality standards. When cow and udder health problems are observed, the analysis should be shared with the farmer's veterinarian for advice. The WDATCP should be provided with sufficient resources to conduct farm inspections.

- 9) Eliminate any duplication with inspection/certification programs conducted by the state Department of Health and Social Services or the federal Food and Drug Administration (FDA).

Improve, through careful study and planning, Wisconsin's efforts and involvement in the Pasteurized Milk Ordinance and Interstate Milk Shippers Conference with the objective of reducing or eliminating existing barriers to interstate milk shipments. As a minimum, inspection frequency should be reduced, based on milk quality test results, for producers who consistently produce good quality milk.

MARKETING STRATEGIES

The overall future of Wisconsin's dairy industry depends upon its ability to effectively market its milk and milk products competitively and profitably. Wisconsin dairy industry needs to strengthen and place more emphasis upon marketing. Almost 90 percent of Wisconsin's milk needs to be marketed out of state, either in a fluid or manufactured form.

Farm milk prices are determined under supply and demand conditions with the added factor of the dairy price support program. The dairy industry has been plagued in recent years by a surplus of milk. Several changes in dairy price support legislation have attempted to address this situation. But an increase in commercial milk sales may be as effective or more effective in eliminating the milk surplus, and potentially have a greater economic pay-off to Wisconsin's dairy industry.

Markets are constantly changing, and the dairy industry must be on top of these changes. Changing demographics will affect commercial milk sales over the next decade. The away-from-home food market continues to grow, now accounting for 43 percent of the consumer expenditures for food. The food service industry offers an opportunity to expanded sales of both beverage milk and manufactured dairy products, but the dairy industry has been slow to exploit this market. Imitations and substitutes will continue to affect the dairy industry. While the Western market (California) is a major market for Wisconsin cheese, it is evident this market will not be growing because California's dairy industry is spending large sums on the production and promotion of its own cheese. Wisconsin therefore needs to be more aggressive in other regions, particularly in the growing Southern markets.

A number of Wisconsin cheese plants are relatively small. Many lack the personnel, marketing knowledge and other resources needed to expand existing markets and capture new ones. Yet many produce a variety of high-quality cheese with considerable market potential.

RECOMMENDATIONS

- 10) Marketing is a top priority if Wisconsin is to remain a strong dairy competitor. The Wisconsin dairy industry needs to maintain and develop an effective marketing and promotion strategy. The responsibility for keeping abreast of changes in milk and milk product markets and their implications for Wisconsin, and for developing appropriate marketing strategies, should be shared by the University of Wisconsin, the Center for Dairy Research, the Wisconsin Department of Agriculture, Trade

and Consumer Protection, the Wisconsin Milk Marketing Board and Wisconsin dairy firms.

- 11) The WDATCP should conduct market research and product feasibility studies for smaller producers and dairy firms; improve the linkage between buyers and sellers so existing markets are more effectively served and new markets established; assist in identifying financing options; provide technical business advice, market plan and strategy development for small and medium-sized dairy firms; and assist in identifying new product opportunities.

- 12) To remain competitive and in a leadership role, dairy cooperatives and other dairy firms in Wisconsin and the Upper Midwest should consider increased coordination, joint ventures, centralized marketing systems, possible mergers and consolidation to improve the joint utilization of processing facilities and improve the marketing system.

DAIRY ADVERTISING AND PROMOTION

With the establishment of the Wisconsin Milk Marketing Board in 1984, Wisconsin dairy farmers significantly expanded their efforts to increase sales of Wisconsin's milk and milk products. There is strong evidence that this effort is paying real economic dividends to the state's dairy industry.

Based upon future projections of sales trends, it appears that Wisconsin's future depends heavily upon cheese sales. Therefore, Wisconsin dairy farmers should be putting a substantial part of their advertising and promotional resources into cheese. Cheese is a product in which Wisconsin milk can be sold in all markets and it has the strongest "Wisconsin" identity in the marketplace. As a result, Wisconsin should concentrate on promoting Wisconsin cheese rather than just "generic" cheese. An appropriate "Wisconsin" identification, along with a minimum grading standard for "Wisconsin" cheese and greater use of the "Real Seal," should be adopted.

The Wisconsin image is less important to fluid milk and butter consumers. Therefore, Wisconsin's promotional efforts for these products should be generic in nature. Thus, Wisconsin needs to participate in both generic and more specific state promotional programs. The Wisconsin identity should be applied where appropriate, .

The Wisconsin Milk Marketing Board should work closely with and through the Wisconsin cheese companies to increase consumer purchases of cheese. The Wisconsin Milk Marketing Board should also work closely with food retailers, fast-food establishments and other away-from-home marketers. Demonstrations of profitable marketing opportunities for Wisconsin dairy products to these food establishments offer market expansion opportunities.

Although producer-funded promotional budgets are more than twice as large as a few years ago, they remain relatively small in comparison to

other food products. Therefore, it is essential that promotional money be spent as effectively as possible. The Wisconsin Milk Marketing Board should coordinate its promotional efforts with other state and national programs.

RECOMMENDATIONS

- 13) Based on future projections of sales trends and the fact that Wisconsin utilizes 73 percent of its milk for cheese, Wisconsin should concentrate its advertising and promotional efforts on cheese. Decisions as to whether Wisconsin's advertising and promotional programs should be generic or Wisconsin-specific should be based on the nature of the program as dictated by the marketplace. Since Wisconsin commands an excellent consumer image for cheese, it should concentrate efforts on promoting Wisconsin cheese rather than supporting generic cheese promotions. An appropriate "Wisconsin" identification, along with a minimum grading standard for "Wisconsin" cheese, should be adopted. Expanded use of the "Real Seal" should be encouraged.

- 14) Promotional budgets are relatively limited compared to those for other food products. Therefore, to achieve maximum efficiency and market impact the state's promotional activities should be developed as a part of a complete marketing program and coordinated with Wisconsin dairy processors and marketers. The Wisconsin Milk Marketing Board should work closely with dairy processors, marketers, food retailers, fast-food establishments and other away-from-home marketers and wherever feasible coordinate its promotional efforts with other state and national programs.

- 15) The Dairy and Tobacco Adjustment Act of 1983 established a mandatory 15-cents-per-hundredweight check-off for dairy promotion. Individual state programs may retain up to 10 cents of this 15 cents if producers agree. Wisconsin could benefit if its producers apply the full 10-cents-per-hundredweight to an effective state promotional program. Therefore, the Wisconsin Milk Marketing Board should continue to improve upon and demonstrate the effectiveness of its programs, and producers should be encouraged to apply the full 10-cents-per-hundredweight to the state program.

NUTRITION EDUCATION

The dairy industry has learned that nutritional information can help sell its products. However, the industry must put more emphasis on the importance of accuracy of this information. Therefore, further nutrition-related research deserves high priority.

The dairy industry also needs to establish more effective means of communicating with health professionals, legislators, policymakers and consumers. UW-Extension and the Center for Dairy Research and could perform these services but they will need support for additional staff in

order to be effective in this type of role. The Wisconsin Milk Marketing Board should continue its support of nutrition education including the funding of the Dairy Council of Wisconsin, Inc. and the Dairy Nutrition Council, Inc. as well as provide funds for nutrition research.

RECOMMENDATION

- 16) Consumer nutrition research and education should be given greater priority. The Wisconsin Milk Marketing Board should continue providing research funds for nutrition research and continue its funding support of the Dairy Council of Wisconsin, Inc. and the Dairy Nutrition Council, Inc. UW-Extension should expand nutrition educational programs for consumers, food service personnel and the general public. Nutrition education should be incorporated in the curriculum at the primary, secondary, post-secondary and college levels.

DAIRY EXPORTS AND IMPORTS

Wisconsin dairy farmers and dairy manufacturers are concerned about imports of dairy products into the U.S. This is justified, since Wisconsin's dairy industry depends heavily upon the sale of manufactured milk products, particularly cheese. In recent years, cheese has comprised from 86 percent to 89 percent of annual dairy imports (on a milk fat equivalent basis).

Dairy imports on a milk fat equivalent basis increased from 2.30 billion pounds in 1979 to 2.78 billion pounds in 1985, an increase of 20.9 percent. Nevertheless, during this period dairy imports remained at 1.6 percent to 2.0 percent of U.S. milk production. However, these totals do not include the imports of casein and other milk proteins. As a result, the impact of dairy imports is larger than the figures indicate. The exact impact has been an issue of debate.

During this same period, U.S. dairy exports on a milk fat equivalent basis were rather minor -- about 3 billion pounds or less annually. The majority of U.S. dairy exports are not commercial sales. Rather, they result from efforts by the U.S. government to dispose of growing CCC stocks of surplus dairy products through special concessionary export programs. It will be difficult to increase commercial exports since U.S. support prices of cheese, butter and nonfat dry milk are at least two-to-three times higher than subsidized world market prices. Yet by producing a high-quality, specialized product, Wisconsin cheese producers have the potential to develop a niche in the developing markets of Asia and the Caribbean.

There is evidence that some dairy imports have actually benefited the U.S. dairy industry. Imports of some cheeses, mainly non-quota varieties, have stimulated the overall U.S. demand for cheese. U.S. consumers have been introduced to and intrigued by new cheese varieties, with new flavors and uses. This has also benefited the demand for domestically produced cheeses. The Wisconsin dairy industry should expand the production of cheese varieties that are presently imported that have market potential.

While the dairy industry has experienced relatively good import protection as a result of the 1979 International Trade Agreement, this protection is now being threatened. The U.S. and the 120 other member nations of the General Agreement on Tariffs and Trade (GATT) are now engaged in a new round of trade negotiations. U.S. dairy quotas and other import protection will be under strict review. The dairy industry must coordinate its efforts to ensure continued dairy import protection, particularly against those countries that either subsidize the production of milk or directly subsidize their exports.

Casein imports continue to be an issue of concern to certain segments of the dairy industry. Casein is classified as a non-food product and therefore does not come under dairy import quotas. However, over 75 percent of the casein is utilized in food products and over 12 percent in animal feed. Casein imports have been on a steady upward trend, increasing from 58.4 million pounds in 1975 to 231.4 million pounds in 1985.

The impact of imported casein on the U.S. dairy industry and its interference with the dairy price support program is much debated. Several studies have been completed by the U.S. Department of Agriculture (USDA) and the International Trade Commission (ITC). Each study, the latest in 1986, concluded that the volume of casein imports is not statistically related to Commodities Credit Corporation (CCC) purchases of cheese or nonfat dry milk, nor does it render ineffective or materially interfere with the price-support program for milk, or reduce substantially the amount of any product processed in the U.S. from domestic milk. Yet, many within the dairy industry disagree with this conclusion and are calling for casein import restrictions.

Casein imports, however, cannot be completely eliminated or severely restricted unless the U.S. government heavily subsidizes domestic casein production. This is because casein is a necessary or very desirable ingredient for certain food and nonfood uses. No suitable substitute is available. Casein has not been produced in the U.S. since 1966. Under the dairy price support program nonfat dry milk at the support price is more profitable to produce than casein. As a result, all casein utilized within the U.S. has been imported. The Food and Security Act of 1985 provided for government subsidization of domestic casein production through the use of CCC inventories of surplus nonfat dry milk and more recently through a program of furnishing skim milk as an alternative to nonfat dry milk. Further research programs that may allow for domestic production of casein and casein substitutes should be pursued.

RECOMMENDATIONS

- 17) Quotas established under the 1979 International Trade Agreement have kept dairy imports at reasonable levels -- less than 2 percent of domestic production. A new round of GATT international trade negotiations is now underway. U.S. dairy quotas will be under strict review. Therefore, the Wisconsin dairy industry should make known to their respective Congressman and Senators and U.S. trade negotiators the importance of maintaining Section 22 of the Agricultural Adjustment Act of 1935, which provides for import restrictions. GATT negotiators

should also be instructed to negotiate for restrictions on export subsidies that displace commercial export markets.

- 18) If, as a result of an ITC investigation or USDA study, imports of casein are found to render ineffective or materially interfere with the dairy price support program, an import quota should be imposed on casein and mixtures of casein to prevent a continued expansion of imports.

- 19) Although the Food and Security Act of 1985 provides for limited subsidization of domestic casein production through the use of surplus nonfat dry milk or an equivalent amount of skim milk, the government should further study the economics of subsidizing the manufacturing of casein in the U.S. to the extent of making domestic casein price competitive with imported casein. Research should also be conducted on the feasibility of casein substitutes such as whey proteins.

- 20) Since U.S. dairy farmers are subject to a mandatory 15-cents-per-hundredweight assessment for dairy advertising, promotion and research, 15 cents per hundredweight of milk equivalent should also be assessed against importers of dairy products.

EXPORTS OF DAIRY CATTLE, SEMEN AND ALFALFA

The political and economic conditions within international markets have been unstable during the past 10 years, causing considerable fluctuation in the volume of heifers, frozen semen and alfalfa Wisconsin has been able to export.

Until 10 years ago, many bulls also were exported, but now semen is exported instead. In 1986, over 1,531,202 ampules of frozen semen were exported from Wisconsin. This figure has been rising steadily since 1979 with its only lapse in 1985. Europe was traditionally the best market for this product due to its established dairy industry.

The export of processed alfalfa, used as feed for the dairy industry, has also been rising steadily since the early 1970's. The largest markets for this product are Japan, Canada and the Netherlands, each of which has a developed dairy industry.

The future for these three products appears extremely bright. Latin America and Far Eastern countries are trying to solve chronic dairy product shortages by boosting milk production through increased herd size and quality. This makes countries such as Mexico, Columbia, Venezuela, Brazil and Saudi Arabia excellent target markets for each of these products in the near future.

RECOMMENDATION

- 21) The WDATCP's International Agribusiness Center, in cooperation with the Wisconsin Department of Development, the Wisconsin Dairy Expo, the Animal Health Division's Foreign Trade

Center, and Wisconsin's dairy and livestock industry, should expand the export of Wisconsin's dairy cattle, semen, embryos, alfalfa and other agricultural products.

FARM MILK PRICING

MODIFYING FEDERAL MILK MARKETING ORDERS

Federal marketing orders have been used to price Grade A milk in the United States since the early 1930's. Orders use classified pricing and pooling to promote equity and stability in fluid milk markets. Regulated handlers are obligated to pay minimum prices for milk at the farm level according to how the milk is used.

Order prices for Grade A milk used for manufacturing are the same throughout the country, the Minnesota-Wisconsin Price Series (M-W Price). But Class I milk, used to make fluid products, is priced higher than manufacturing milk, with the difference increasing with distance from the Upper Midwest. Class I differentials for the 44 federal orders currently in effect increase by about 20 cents per hundredweight for each hundred miles from Eau Claire, Wisconsin, which is the basing point for Class I prices.

The M-W Price Series has served the order system well. But it has become less reliable as an indicator of "manufacturing" milk value. Grade B milk supplies are diminishing. Hauling subsidies distort manufacturers' pay prices. Some plants cross-subsidize between Grade A and Grade B patrons. A measure based on the actual value of manufactured products or some other method may better reflect milk value.

Pooling under federal orders assures dairy farmers a blend price that is a weighted average of class prices. The weights are the percentage utilization by class. Hence, blend prices vary positively according to Class I utilization. Because of this pricing system, farm milk prices are substantially higher in markets where fluid use and Class I differentials are higher than they are in Wisconsin, which has the lowest fluid utilization and Class I differentials in the country. This, in turn, has created incentives for producers in distance markets to expand milk production even though milk production costs in some of these markets are substantially greater than in Wisconsin.

The shift from Grade B to Grade A will continue and even accelerate if a single milk quality standard is adopted. This will increase the volume of Wisconsin milk eligible for Class I use and reduce the percentage of milk utilized for Class I and the blend price. Expansion of milk production in the South and Southeast will limit milk shipments from Wisconsin to these areas, further eroding Wisconsin blends prices. With no changes in federal orders, these factors will substantially diminish the economic benefits of federal orders to Wisconsin dairy farmers.

Federal orders do not prohibit handlers in distant markets from buying and using Wisconsin milk for bottling if it is cheaper than local supplies. But the cost of transporting whole milk from Wisconsin to

Miami, for example, is higher than the difference in fluid prices as set by marketing orders. A logical strategy to reduce hauling costs is to remove some or all of the water from milk prior to shipment, and add it back at the point of consumption. While this process is technically feasible and has been used, the orders impose penalties on reconstituted milk in the form of "compensatory payment" and "down-allocation" provisions. These penalties make reconstituted milk more expensive than locally-produced milk, effectively preventing handlers from even considering such sales. This serves to maintain the relatively high Class I prices in southern markets.

It is important to note that widespread use of fluid milk products made from concentrated or dry ingredients would not, in the short run, cause a major increase in Wisconsin fluid milk sales nor improve Wisconsin farm milk prices to any great extent. In fact, there is likely to be no increase in Wisconsin farm milk prices in the short run. But current Class I differentials could not be maintained if reconstitution was a viable option. This would lessen incentives for expanded milk production outside the Upper Midwest and would serve to increase Wisconsin's share of the national milk market in the long run.

The federal milk marketing order system has generally served its intended purpose of providing adequate supplies of fluid milk at reasonable prices. But changes in milk production patterns and technology support the need for major amendments to orders. These amendments are crucial to the long-run competitive position of Wisconsin's dairy industry.

RECOMMENDATIONS

22) The University of Wisconsin, in cooperation with the dairy industry, USDA and other universities, should initiate research to find an alternative to the Minnesota-Wisconsin Price Series (M-W) as the order pricing base for measuring "manufacturing" milk value.

23) Merge orders to create a limited set of regional orders reflecting national marketing areas based on common production and distribution characteristics.

24) Replace the system which makes Eau Claire, Wisconsin, the single basing point for all federal milk orders with a multiple-basing-point pricing system for setting Class I differentials, in light of the fact that the Upper Midwest is not the only area that has reserve Grade A milk available to fill deficit needs. Multiple-basing points are particularly important under regional orders.

25) Amend federal orders to remove pricing restrictions on milk shipped in concentrated form for use in fluid products. Reconstituted milk should be priced according to its Class I value in the source market.

26) The UW Center For Dairy Research, involving University of Wisconsin food scientists and agricultural economists, should

conduct further studies on consumer acceptability and economic feasibility of various reconstituted products made from alternative forms of milk concentrate and study the economic impact of such practices on the Wisconsin and U.S. dairy industries.

COMPONENT AND QUALITY PRICING

"Component pricing" prices milk according to one individual component (usually butterfat), rather than volume. "Multiple-component pricing" prices two or more components of raw milk. Because the ratio of fat and solids-not-fat varies considerably between individual cows (and herds), and because the yield of manufactured dairy products is determined by both the fat and solids-not-fat content, the same amount of milk from two cows or two herds with identical butterfat tests can yield different amounts of manufactured products.

This means that Wisconsin's dairy industry could reap considerable economic benefits from well-designed multiple-component pricing plans. This is because 82 percent of Wisconsin's milk is used for manufacturing -- 73 percent for cheese alone. Such pricing plans would pay premiums or take deductions based on butterfat, protein, total solids, and solids-not-fat content, or pay for milk according to the amount of product it yields (end-product pricing). This should provide an incentive to Wisconsin's producers to breed and feed for a milk composition that best meets the needs of the state's dairy industry. Improved efficiency and competitiveness of Wisconsin's cheese industry will depend heavily on genetically increasing protein yield of the Wisconsin dairy herd. Consumer image of milk and milk products may also be enhanced if producer payment plans consider components of milk other than just fat. Using only volume and butterfat pricing of milk for dairy products does not provide the needed incentive or remuneration for genetic improvement of protein yield.

Industry-wide multiple-component pricing will not enhance producer income as a whole in the short run, but it will distribute money to individual producers in a more equitable manner. In the long run, total producer income may be enhanced as producers select cows for higher composition milk, share in returns from improved cheese manufacturing efficiency, and benefit from higher milk product prices resulting from greater consumer acceptance of milk and milk products.

Although most Wisconsin producers already have multiple-component pricing plans available to them, the state dairy industry should encourage industry-wide adoption of such pricing. In doing so, the following issues and concerns should be addressed:

1) Adequate control and regulation to assure fair trade practices.

2) Higher protein content milk usually increases the yield of manufactured milk products but does not increase the retail value of fluid (beverage) milk. The incorporation of multiple-component pricing in federal milk orders needs to recognize this problem.

3) Federal order plants cannot pay producers less than minimum blend prices. Federal orders now only provide for butterfat content premiums and deducts from these minimum prices. So federal order plants cannot deduct for below-average content of protein or other components or for poor quality.

4) Research indicates that mastitis increases somatic cells and changes the protein composition of milk. As milk increases in somatic cell count, the ratio of casein protein to whey protein decreases, leaving total protein about the same. For cheesemakers this change is undesirable because cheese yield depends upon casein content. As a result, a milk quality program should be incorporated into any multiple-component pricing program to assure fairness to producers and plants.

5) Any multiple-component pricing system must recognize that the components of milk have different values depending on their final use.

6) Producers need to be informed and educated to respond appropriately to multiple-component pricing.

RECOMMENDATIONS

- 27) Multiple-component pricing should be incorporated into farm pricing by all the state's milk plants. Wisconsin should support amending federal milk marketing orders to accommodate multiple-component pricing.

- 28) Any multiple-component pricing plan or milk quality program that pays premiums for milk above an established standard of composition or quality should deduct for composition or quality below that standard. WDATCP should monitor payment plans to make sure they are fair and cost-justified. WDATCP should have adequate staff to investigate unfair pricing charges and to enforce non-discriminatory pricing where necessary.

INCREASING MINIMUM STANDARDS OF FLUID MILK PRODUCTS

Federal standards of identity for fluid milk products, as set by the FDA, establish the legal characteristics of packaged fluid milk moving in interstate commerce, including product names, ingredients, and label information. Since 1962, California's fluid milk standards have been higher than the federal standards. Because of these higher standards and because California's per capita consumption of fluid milk products is above the national average, there is considerable interest in increasing the federal standards accordingly. Advocates say that increasing the federal standards not only would improve the flavor and thus consumer acceptance and sales of fluid milk products, but also that more solids-not-fat would be consumed, reducing the government costs of purchasing surplus nonfat dry milk. The interest in raising minimum standards for fluid milk products is also related to the current interest in incorporating multiple-component pricing, particularly protein premiums, into federal milk marketing orders.

Wisconsin passed legislation in 1983 (Wis. Act 536) that would raise the minimum solids-not-fat of packaged whole milk from 8.25 percent to 8.75 percent, and establish the minimum solids-not-fat content of lowfat milks at 10.0 percent and skim milk at 9.0 percent. However, these higher standards would not be established until all states bordering Wisconsin adopt identical standards.

The Dairy and Tobacco Adjustment Act of 1983 required USDA to submit to Congress a report on the effect of applying national standards similar to those of California. This study raised serious questions about the net benefit of raising minimum standards. The impact on consumer acceptance and commercial fluid milk sales was unclear, because high standards would increase retail prices. Approximately half of the milk cows would not produce milk at or above these higher standards. The study concluded that while there is considerable interest in raising federal fluid milk standards, it is not yet clear that consumers, dairy farmers, processors and tax payers would be better served by such a change.

RECOMMENDATION

- 29) Although raising federal standards for fluid milk solids has considerable merit, there remains much uncertainty as to the net impact on consumer sales of fluid milk products, government costs of purchasing nonfat dry milk and butter, and net producer pay prices. Further research is needed to assess the net impact on the dairy industry of raising federal standards for fluid milk before pursuing further the adoption of higher standards on a national basis. Wisconsin should take a lead in this area, not only because higher standard for fluid milk solids may improve fluid milk sales, but also because higher standards may eventually help get multiple-component pricing incorporated into federal milk orders and thus hasten component pricing on an industry-wide basis.

FARM MILK PROCUREMENT

Wisconsin farm-to-plant milk hauling costs are substantial, totaling more than $80 million dollars annually. To maintain the competitiveness of Wisconsin's dairy industry, the efficiency of farm-to-plant milk hauling must be improved. There is considerable overlap in procurement routes, because farmers have the freedom to select their hauler, and haulers are free to solicit their own business from farmers. As energy costs increase in the future, efficient milk procurement will become even more necessary.

Although Wisconsin farm-to-plant milk hauling costs average around 30 or 40 cents per hundredweight, actual charges paid directly by producers range from no charge (free haul) up to 40 cents per hundredweight. Even recognizing that actual hauling costs vary due to such factors as volume per pickup and distance from plant, zero and relatively low hauling costs are difficult to substantiate. It appears that plants are frequently subsidizing farm-to-plant milk hauling.

Healthy competition between plants, including competitive hauling, may benefit the state's dairy industry. But two major problems surface from this subsidization practice. First, producers are misled when comparing net pay prices offered by alternative markets. Second, and more importantly, subsidized hauling understates the Minnesota-Wisconsin Price Series (M-W Price) which includes all premiums except hauling subsidies. The M-W Price is used as a base for pricing Grade A milk under federal milk marketing orders. This understatement allows unregulated milk plants that charge patrons the actual cost of hauling to pay less than Wisconsin manufacturing plants. This in effect gives the non-subsidizing plants an advantage in raw product costs.

RECOMMENDATIONS

- 30) Since farm-to-plant milk hauling costs account for 1 percent to 4 percent of the cash cost of producing milk, and are an important factor in the net raw product cost to plants, the Wisconsin dairy industry should consider various alternatives for improving the efficiency of milk hauling. These include improved routing, further reduction in route duplications, and exchange of producer milk among competitors.

- 31) Wisconsin farm-to-plant hauling costs should not be regulated, but it is recommended that the WDATCP be adequately staffed to address unfair hauling practices when deemed necessary. In addition, the procedure by which milk plants report producer pay prices for the M-W Price Series should be changed to require plants to include all premiums and hauling subsidies in their report, so that the M-W Price is a more reliable indicator of "manufacturing" milk value.

POLICY

Federal dairy policy has a major influence on the profitability of Wisconsin's dairy industry. Since the price of milk has been supported through the purchase of butter, cheese and nonfat dry milk at specified prices, Wisconsin farm milk prices have been directly affected by the dairy price support program. The price support level is critical to the state's farm pay prices and thus to dairy farm profitability. Wisconsin depends heavily on the commercial marketing of cheese, and the negative response of consumers to an increase in cheese prices is about four times greater than the negative response to increased fluid milk prices. Therefore the price support level should not be set so high that it adversely affects Wisconsin cheese sales or restricts milk production so much that Wisconsin is less able to take advantage of growing cheese markets.

The State of Wisconsin does not have any agency systematically reviewing proposed federal legislation rules and standards which impact dairy, or agriculture in general. Someone should be assigned to review the Federal Register for items that pertain to agriculture and dairy, and to identify the priority issue areas soon enough to be able to influence the outcome of proposed regulatory or legislative changes of importance to Wisconsin agriculture. These proposed rules in aggregate have

significant, wide-ranging effects in Wisconsin. Important rule changes in other states affecting Wisconsin's competitiveness could also be monitored.

RECOMMENDATIONS

32) Wisconsin should support dairy legislation that will maintain its competitive position and profitability in dairying and will allow the state to exploit its advantages in a growing cheese market.

33) The state should create within the WDATCP a unit responsible for systematically reviewing proposed federal and state policy, rules and standards which affect Wisconsin's agriculture and competitiveness. UW policy and marketing specialists should work closely with the WDATCP in impact analysis and in formulating appropriate action.

34) The University of Wisconsin should develop an economic model to analyze the impact of dairy price policy and related milk pricing and marketing issues. Research funds should come from the Wisconsin Milk Marketing Board, the dairy industry contributions, and the state.

DAIRY MARKETING EDUCATIONAL PROGRAMS

Wisconsin needs to encourage innovative and progressive pricing and marketing techniques that will improve the efficiency, competitiveness and profitability of its dairy producers, processors and marketers. But at the same time, reasonable competition should be preserved through monitoring and enforcement. The WDATCP and the University of Wisconsin's research and extension programs both have a role in this area. The WDATCP has a regulatory role and marketing and market information expertise. The University of Wisconsin has research and extension responsibilities at the producer, processor and marketing levels.

The pricing of milk and milk products is complex. Few dairy producers and others in the industry fully comprehend the milk pricing and marketing system. As a result, producers have difficulty evaluating net producer pay prices among the alternative market outlets for their milk. If producers don't understand the economic value of milk quality and milk composition, they can't make milk production and marketing decisions that will maximize their own profitability, and provide the quality and composition of milk that will maximize profitability and efficiency of processors and marketers. Also, because producers don't understand milk pricing and marketing -- particularly the economic value of milk quality and milk composition -- some plants can use plant premiums as a gimmick to attract producers, rather than as a way to compensate farmers for the actual economic value of their milk. Improving producer understanding of the pricing and marketing of milk would be an effective way to discourage plant premiums that are mere competitive gimmicks.

Producers must also understand milk pricing and marketing if they are

to be involved in analyzing and working for or against proposed changes in milk pricing and dairy policy.

RECOMMENDATIONS

35) The pricing and marketing of milk and milk products should be a part of the curriculum of high school vocational agriculture, vocational and technical education, UW short courses, and undergraduate agricultural programs of the state's three colleges of agriculture. UW-Extension should provide information and educational programs to help milk plant operators and field staff, handlers and farmers understand milk pricing, marketing and policy.

SECONDARY, POST-SECONDARY, AND UNIVERSITY LEVELS OF EDUCATION

Wisconsin's dairy industry cannot be efficient, competitive and profitable without well-educated, highly trained and skilled individuals to meet the industry's employment demands. Highly qualified individuals will be needed to efficiently operate and profitably manage modern dairy farms, to process and market milk and milk products, to supply farm inputs and services, and to fulfill the roles of educators, researchers, consultants and industry leaders.

AGRICULTURAL ENROLLMENT TRENDS AND EMPLOYMENT NEEDS

From the early 1970's until 1980, enrollment grew in Wisconsin's colleges of agriculture, high school vocational agriculture programs and post-secondary vocational-technical programs. But this trend has since reversed.

Between 1970-71 and 1980-81, total enrollment in the state's three colleges of agriculture climbed from 3,259 to 6,384 -- a gain of 95.9 percent within the ten-year period. But from 1980-81 to 1986-87, enrollment decreased 20.5 percent, and even larger decreases are anticipated. Enrollment in high school vocational agriculture reached an all-time high of 26,745 in 1975-76, but dropped dramatically to 19,093 in 1985-86, a decline of 28.6 percent. There have been substantial declines in VTAE farm training and agriculture/agribusiness programs. Between 1980-81 and 1985-86, enrollment declined 25.5 percent in VTAE's one-year vocational diploma agriculture/agribusiness program and 51.9 percent in the two-year vocational diploma program.

Numerous factors have influenced enrollments in all of these agricultural education programs. One is the potential number of youth available to be educated. Wisconsin's "pool" of 18-year-olds has been declining substantially since 1979. For the 10-year period of 1975-85, the number of 18-year-olds declined by 21.4 percent. That trend is continuing. Wisconsin had 75,797 18-year-olds in 1985. By 1991 there will be 13,001 fewer -- a decrease of 17.2 percent.

A 34.9 percent decrease in the "pool" of 18-year-olds between 1975 and 1991 will obviously have a very significant effect on possible enrollments at the university level as well as for post-secondary agricultural education programs. Unless a much larger share of Wisconsin's 18-year-olds sign up for agricultural education programs than has been the case in the past, enrollments will continue to decline.

A decline in high school vocational agriculture enrollments will spill over into the recruitment of youth into agricultural programs at the post-secondary and university levels. Several nationwide assessments of education attribute the decline in high school vocational agricultural

enrollment to such factors as the increased requirements for high school graduation and the greater emphasis placed upon college admission requirements. Budget cuts prompted by declining land values as well as loss of other revenues (including federal cutbacks) have diminished the resources for vocational agriculture. The decreasing farm population, the perception that there are fewer opportunities to farm and farming's current unfavorable image have also led to decreased enrollments in vocational agriculture.

Although the amount of federal money appropriated for vocational education has increased through the last decade, the effective funding for agriculture has declined. Mandated "set-asides" and a redirection toward "expanded or innovative" programs has meant an erosion of support for agriculture. One hundred twenty-five of Wisconsin's 271 vocational agriculture departments qualified and applied for federal vocational funds in 1985-86. They shared an allocation of approximately $140,000. During the peak enrollments of the 1970s and before passage of the Perkins Bill in 1984, the corresponding allocation was $500,000. To be attractive to students who must choose among several alternatives, courses in vocational agriculture require adequate funding.

Agriculture enrollment trends are crucial in respect to recent assessments of employment needs in agriculture, including dairy, for the 1990's. Indications are that for many areas employment opportunities will exceed the supply of qualified individuals. This appears to be true at both post-secondary and university levels.

The Wisconsin Vocational, Technical, and Adult Education System does not have enough graduates to meet current demand in such areas as food processing, dairy herd management, farm management and agricultural equipment servicing. Without an increase in enrollment the shortage of graduates with the technical training required by the dairy industry will intensify in the 1990's.

Graduates from the Farm and Industry Short Course at UW-Madison are also finding excellent employment opportunities in dairy and related areas. Again, there more requests than available graduates for positions as herdspersons, farm managers and sales/service workers.

Wisconsin's three colleges of agriculture (UW-Madison, UW-Platteville and UW-River Falls) cannot meet the demand for graduates in several employment areas. There is a real shortage of graduates who can fill jobs as dairy farm managers, herdspersons and dairy consultants. Because Wisconsin dairy operations must apply efficient management practices to remain competitive and profitable, the need for managers, herdspersons and consultants will grow in the 1990's.

Graduates in dairy food science and dairy technology are also in short supply. Positions are available in quality control, quality assurance, production management and technical sales. Demand for such graduates will increase. The dairy manufacturing industry is faced with increasing complexities and with safety and health problems exemplified by the Jewel Foods <u>salmonella</u> incident and recent concern over <u>listeria</u> in ice cream and soft cheeses. New dairy product development and testing will require an increasing number of graduates as well.

In summary, there will be an increased demand in the 1990's for technically trained individuals from the VTAE System and as well as for university-educated professionals. There are not enough youth within the pipeline to fill the job openings anticipated by Wisconsin's dairy industry for the 1990's.

RECOMMENDATIONS

- 36) The University of Wisconsin, in cooperation with VTAE should conduct research to assess Wisconsin's future needs for human resources and expertise in the food and agricultural sciences. The project should be funded jointly by the educational institutions, the Department of Public Instruction and the Wisconsin VTAE system with support from agribusinesses.

- 37) Educational institutions, agricultural businesses and agency representatives should cooperate to devise marketing strategies to recruit talented youth and adults into educational programs where expertise is most needed. Joint programming such as the "Agribusiness Seminar on Wheels," sponsored by Wisconsin Farm Progress Days, Inc. should be continued and strengthened. Science teachers should be included in such activities. An effort is needed to improve the image of agriculture so that more students select a career in the food and agricultural sciences.

NEEDED REVISIONS IN AGRICULTURAL CURRICULA

Secondary Level. One factor that likely contributes to the enrollment decline in high school vocational agriculture programs is the curricula of those programs. The original purpose of such programs (mandated by the Smith-Hughes Act in 1917) was to "prepare young boys for the work of the farm." The Vocational Education Act of 1963 changed the purpose, directing educators "to prepare young people for any occupation requiring knowledge and skill in agriculture." With direction from the Department of Public Instruction, a series of pilot programs in 1968-73 brought the first curricula changes in many years. But the vocational agriculture curricula in most Wisconsin schools are still rather traditional.

Basic production agriculture is the foundation upon which the total curriculum is built. But the time is past when all or most of a four-year course-of-study can be devoted to production agriculture alone, especially considering the current economic situation on farms and the attitudes that situation has spawned. For the dairy industry in Wisconsin, this means the high school vocational-agriculture curricula must go beyond the selection, care and management of dairy cattle to encompass farm management, dairy processing and marketing, and the career opportunities these areas entail. Curricula should also be able to prepare workers and entrepreneurs for the dairy input and supply industry.

Post-Secondary Level-VTAE

Off-campus VTAE farm training programs are oriented toward production, and principally toward dairy production. More emphasis needs

to be placed on farm management, marketing and decision making, including the use of computers.

The dairy industry should look to the VTAE system to prepare skilled workers who do not need a baccalaureate degree to perform skilled tasks such as quality control and dairy processing. The industry can play an advisory role in the development of appropriate curricula.

University-level curricula now have a strong subject-matter core in the areas of agricultural technology, agricultural economics and business, in the conservation and natural resources, and in the natural sciences. Most of these have achieved a healthy balance between theory and practice. A somewhat marginal area of strength is the field of communications (although strong agricultural communication courses do exist), including computer skills. Communication skills and practical computer training should be emphasized in existing agricultural courses. There is evidence that U.S. colleges of agriculture are deficient in teaching students rational approaches to problem solving and ethics in agriculture. The demands placed on graduates by their careers frequently involve dealing with problems that are complex and require sound decision making.

A major problem for agricultural teacher education is the fact that one-third of the credits required for graduation and teacher certification are specified by agencies outside the university. It is increasingly difficult to educate teachers for agricultural sciences because so much of the curricula must be in education, liberal arts, and the social and behavioral sciences. Agricultural education majors may soon have to complete a five-year program of study in order to be adequately prepared to teach. Such a move would likely create a shortage of qualified teachers of vocational agriculture in short order. Every effort must be made to retain a four-year program in order to attract capable young people. Universities should have authority to set professional and degree requirements with a minimum of outside interference.

Curricula also need to adjust for students' changing demographics. An increasing number of agriculture students come from urban backgrounds. More of them are women. A smaller share of undergraduate and graduate students have been enrolled in high school vocational agriculture programs.

In summary, curricula for future college graduates should be stronger in written and oral communications, computer and statistical knowledge, international aspects of agriculture, increased management and marketing knowledge, biotechnology, problem solving and decision making.

RECOMMENDATIONS

38) Each level of agricultural education and each educational institution should assess its curricula to provide an analytical base for curricular innovations for the 1990's and beyond. Educational institutions should carefully assess course content and, where necessary, revise, expand, eliminate or create new courses or modules. High school vocational agriculture

curricula must move away from a narrow, traditional emphasis on production agriculture to a more contemporary approach that also includes processing, marketing, management, agribusiness, and computers, as well as strengthening the science emphasis. Educational institutions, the Department of Public Instruction and the Wisconsin Board of Vocational, Technical and Adult Education should provide funds for curricula development.

- 39) As high school vocational agriculture curricula give stronger emphasis to science, mathematical and computer technology, at least one credit of vocational agriculture should apply towards graduation requirements in applied science, mathematics, or computer science.

- 40) Legislation should be drafted to reduce the number of required credits in education, liberal arts, and social and behavioral science for vocational agriculture teacher certification, and to give universities more authority to set professional and degree requirements.

Supplies, Capital and Laboratories

Adequate supplies, capital and modern laboratories are essential for properly educating youth to meet future opportunities and challenges of an ever-changing dairy industry, and of agriculture in general.

Supplies, capital and laboratories appear inadequate for suggested curricula at the secondary level. Additional funding for capital and equipment may be possible as vocational agriculture curricula change and gives more attention to the dairy industry beyond the production level. This could satisfy the intent of the Perkins Bill, which calls for "new and innovative" efforts.

Buildings, laboratory space and supplies are probably adequate in the VTAE system, but some updating will be required. Since it is not likely that the state will provide the additional capital and supply funds needed for increased emphasis in the dairy and food industry, internal transfers would likely be necessary. The possibility of shared funding with industry should be explored.

Although a program of laboratory modernization is underway throughout the UW System, there is a need for further improvement. Funds will be required to fully computerize classrooms and laboratories. Supply and expense budgets are at marginal levels.

RECOMMENDATION

- 41) Adequate supply, expense and capital funds (operating budgets), and faculty and support staff should continue to be provided for instructional programs in the food and agricultural sciences at the high school vocational, post-secondary and university levels. Institutional laboratory modernization should remain a top-priority budget item.

SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAMS AND INTERNSHIPS

Supervised occupational experience programs at the secondary vocational agricultural level and internships at the university level provide a valuable practical work experience that complements classroom learning. The internship serves to foster professionalism in students and helps the student choose elective courses that prepare them for professional careers. The internship program is becoming increasingly important to the non-farm youth who have little practical background in agriculture.

RECOMMENDATION

- 42) Educational institutions, business and industry, and agencies should cooperate to expand supervised occupational experience programs at the secondary level and internship programs at the post-secondary and university levels.

CONTINUING EDUCATION PLAN FOR THE DAIRY INDUSTRY

Today more than ever, Wisconsin farmers and agribusiness personnel need research-based information and management skills. The dairy industry is very competitive. Low profit margins and the depressed agricultural economy, coupled with stiff competition at home and abroad, make profitability (and for many farms, survival) difficult at best. There are no easy answers for farmers and other agriculturists; only difficult questions.

Wisconsin's dairy farmers will need to know how to profitably produce and market milk, meat, replacement animals and breeding stock. The farm economy will not tolerate inefficiency and poor management. There will be little room for error. Dairy producers will need relevant educational programs and reliable information sources to help them keep abreast of new technological developments and marketing strategies, as well as to sharpen their farm management and business skills.

Sound educational programs and continuing education for agriculture remains an important key to economic viability. Answers to the difficult questions can only come from skilled and informed farmers and agribusiness personnel.

The two major public institutions involved in post-secondary continuing education for agriculture are the University of Wisconsin Cooperative Extension Service (CES) and the Vocational, Technical and Adult Education System (VTAE). Each is a separate entity with a described mission.

CES staff conduct research-based, continuing education programs in agriculture. They organize a wide variety of short-term programs -- conferences, seminars, workshops, tours and general meetings -- which present the latest agricultural research information to dairy farmers, businesses that supply inputs to farmers, firms in dairy processing, distribution and marketing, rural leaders and public policymakers. These programs emphasize production efficiency and product quality, soil and water management, management of agricultural chemicals and livestock wastes, and farm business and marketing skills. The goal is to increase the profitability and competitiveness of Wisconsin's dairy industry.

VTAE system staff teach regularly enrolled full- or part-time students how to use demonstrated and improved methods. Farm training is designed for farmers becoming established in farm operations and includes on-farm instruction. Programs are developed and implemented according to needs identified by the industry. Programs deal with dairy herd management, dairy farm operations, farm training, livestock management technology and food science technicians. The clientle include dairy farmers as well as vocational students preparing for jobs in dairy-related agribusinesses and on dairy farms.

CES and VTAE program relationships are currently facilitated by State Agriculture Programming Guidelines established by the UWS-VTAE Joint Academic Committee on Continuing Education. A six-member committee of CES and VTAE personnel is monitoring implementation of the guidelines helping to resolve program overlap between the two agencies. The guidelines are intended to encourage effective communication, coordination and cooperation among CES and VTAE staff members at county and district levels as they plan and implement educational programs. They have minimized program duplication where both agencies serve the same potential clientele -- especially farmers. Programs of the two agencies have become more complementary, and the agencies' resources -- staff, facilities, educational materials and activities -- are being shared, to the benefit of the agencies and clientele alike.

Nevertheless, in light of the agencies' limited resources, the magnitude of educational needs in the dairy industry, and the need for more in-depth programming and staff specialization, there is need for more cooperation and coordination between CES and VTAE agricultural educators. Both agencies have had staff reductions due to budget cutbacks. Staff and other educational resources can be shared on an area (multi-county) basis through purchase of service arrangements, memoranda of agreement or other terms consistent with the respective missions of the two institutions (Appendix B).

Future Plan For Continuing Education

CES and VTAE, the public continuing education institutions, will be the primary providers of educational programming aimed at dairy farmers and related clientele. These agencies will be augmented by information-delivery activities by professionals and technicians in the private sector and media.

Educational Goal and Objectives. The primary goal of coordinated CES and VTAE dairy education programming will be to help dairy farmers improve the profitability of their enterprise through effective management of controllable resources. Objectives contributing to this goal include:

- Productivity and Management -- improve the efficiency of farm production, farm product quality and financial and business management.

- Conservation and Management -- maintain the quality of the natural resource base (soil and water) upon which sustained agricultural productivity and profitability depends.

- Marketing and Public Policy -- improve agricultural marketing skills and strategies, and understanding of public policy development and its implications.

The primary clientele will be dairy farm owners and operators. Other clientele will include dairy-related business, agency and organization personnel and federal, state and local policymakers.

Program Emphasis. Programs will be research-based and designed to serve the high-priority educational needs of targeted dairy producers identified on the basis of producer experience, management skill, and level of knowledge and understanding. Content will focus on the following: integrated systems management, feeding and nutrition, breeding and genetics, animal health and disease control, reproductive and lactation physiology, financial and business management, marketing, feed crop production, management, harvesting, storage and handling, soil and water management, farmstead planning, facilities and equipment, power and machinery, personnel management and time management, and public policy and government programs.

Program Delivery. Programs will use an extensive array of delivery methods, chosen according to the objective, target audience, subject-matter content and other factors. Delivery methods will include: long and short courses, meetings and tours, publications and newsletters, demonstrations, one-on-one instruction and consultation, self-tutorial programs, mass media, computer technology and software programs and electronic communications (video tapes, satellite programs, Educational Telephone Network (ETN), InfoText, etc.). Face-to-face instruction is usually most effective, but it carries a high cost compared with other teaching methods. Nonetheless, this method will be used where it is cost-effective -- particularly in farm financial management programs where teacher credibility, trust and confidentiality are critical. At the same time, since staff resources will be limited, programs must seek to multiply the impact of CES-VTAE programs by reaching key dairy-related clientele -- professional and technical people who regularly contact thousands of dairy farmers on an individual basis. CES-VTAE staff will work closely with these "multiplier" clientele to plan and implement dairy education programs.

Professional Staff. Effective dairy education programs depend on CES and VTAE competent professionals who are committed to educational excellence and service to the dairy industry and who are located to serve clientele cost-effectively.

State Specialist Staff who provide the link between researchers and the field staff will be needed to keep the producer-oriented programs on the cutting edge of knowledge. Located on UW campuses and at UW research stations, these staff will monitor and interpret research findings from the USDA, land-grant colleges and the private sector. Appendix C lists the statewide dairy specialist staff needs in agricultural economics, dairy science and veterinary science.

Area (county and district) Professional staff, located in county UW-Extension offices and VTAE districts, will be needed to develop and deliver effective producer-oriented educational programs at the local level. CES and VTAE field staff would be clustered by county (CES) and district (VTAE) into geographic areas (Appendix D), so they can specialize in specific subjects and teach their specialties to farmers throughout these wider areas. This will let them better handle producers' complex needs.

Current CES county-level and VTAE district-level staffing reflects staff cutbacks due to budget retrenchment. Programs have suffered

accordingly. While better coordination of staff resources and increased specialization will make programs more efficient and effective, staff will still have to be built to effective levels to achieve the dairy program objectives.

RECOMMENDATION

43) CES and VTAE agricultural education programs should be coordinated at the state, district and county levels to provide the most efficient educational and informational system to improve the profitability of the dairy industry of Wisconsin. Adequate funding must be provided to hire, retain and support qualified professional and technical support staff.

44) UW-Extension and VTAE and other educational resources can be shared on an area (multi-county) basis through purchase of service agreements, memoranda of agreement or other cooperative arrangements consistent with the respective missions of the two institutions (B).

45) UW-Extension should provide educational programs and VTAE should provide instructional classes that are research-based to serve the high-priority educational needs of targeted dairy producers as identified on the basis of producer experience, management skill and level of knowledge and understanding.

46) More dairy farmers should take advantage of ongoing educational programs. UW-Extension and VTAE must actively publicize their educational services to tell dairy industry clientele what opportunities and benefits are available and how to take advantage of them.

FUTURE RESEARCH NEEDS

Wisconsin must expand and accelerate dairy research and educational programs if its dairy industry is to survive in the competitive environment of the 1980's and 1990's. Research has demonstrated that profitability can be achieved with fewer cows and less total milk production. The solution is to produce more milk per cow under management systems that focus on profitability for the producers. It is also important to recognize that many new advancements in technology are already affecting the nation's dairy industry, and more will follow. Wisconsin's dairy industry must take advantage of these new technologies, including biotechnology, soon after they become available. Wisconsin dairy researchers have responsibility for generating the best dairy technology possible. UW-Extension has the primary responsibility for transferring this technology to producers in a prudent and timely fashion. The Wisconsin Agricultural Experiment Station, University of Wisconsin Consortium and UW-Extension recognize dairying's central role in Wisconsin's agricultural future.

The Wisconsin Dairy Task Force fully endorses five initiatives which could have dramatic, long-range impacts on the state's dairy industry.

1. Restore research and extension positions and operating budgets ravaged by recent cuts in state and federal funding.

2. Strengthen the Center for Dairy Research so that accelerated, interdisciplinary research can take place on dairy product development, marketing and nutritional concerns.

3. Establish a Farm Financial Analysis Program that can better assess the financial and economic health of Wisconsin dairy farmers, and guide farm management and policy decisions in the future.

4. Create a Center for Dairy Profitability to coordinate and integrate research and extension resources to investigate systems of dairying applicable to Wisconsin.

5. Enhance research into animal efficiency and disease control to better address the serious health and reproductive threats facing Wisconsin dairy herds.

Together, these five initiatives could go a long way toward ensuring that Wisconsin will remain America's Dairyland. They would have a highly significant impact on the ability of Wisconsin's dairy industry to survive and prosper in this nation's increasingly competitive dairy industry.

Specific Research Initiatives

In addition to these broad dairy research initiatives, several specific research problems demand greater attention. The following sections look at those specific research areas where greater resources are needed.

Milk Marketing

1. Evaluate marketing margins for dairy products and identify means of reducing farm-retail spreads.
2. Determine how changes in federal milk marketing orders will affect various regions -- especially Wisconsin.
3. Evaluate how the milk supply of various regions will respond to various feed grain policies.
5. Analyze the long-run effect of dairy policy options on the profitability of dairy farming in Wisconsin.
6. Assist in measuring the market potential for new and existing dairy products.
7. Refine measurements of the demand for milk and dairy products.
8. Evaluate component pricing plans with respect to equity and their relationship to final product values.
9. Evaluate how hauling subsidies, volume premiums, quality premiums and other plant pricing practices will affect farm prices and price reporting.
10. Measure cost savings associated with eliminating redundant milk pickup routes and plants.

Input Marketing

1. Assist in measuring cost savings and revenue increases that result from herd testing and other production services.
2. Estimate demand and supply relationships for major dairy inputs.

Management Strategies

1. Estimate how much farmers could save by specializing in various aspects of dairy farming, or by adopting other management practices.
2. Refine estimates of economies to size and scale. Identify ways that large-scale practices can be modified to fit smaller operations.

Farm Management

1. Assist in estimating production functions for milk and forages.
2. Identify means of reducing fixed costs in the dairy operation.
3. Identify "profitability factors" -- characteristics and practices of profitable dairy farmers that can be generally adopted.
4. Help develop improved farm record-keeping and record analysis methods, including computerization.

Socioeconomic Issues

1. Analyze ties between farm and nonfarm economies. Refine estimates of multiplier effects of dairy farming.
2. Identify means to improve the quality of rural education and to equitably share costs of public education.
3. Find ways to ease the transition of dairy farmers who may be forced out of business into acceptable alternative employment.
4. Evaluate the economic and social effects of new technology and the effects of public policies aimed at coping with these changes.

Crops and Soils

1. Identify ways to maximize nitrogen fixation in forage legumes in order to increase forage yields and decrease production costs, with emphasis on technology that can be rapidly transferred to the producers.
2. Undertake long-term research on starch utilization by forage plants as it relates to winter hardiness, regrowth after cutting and forage quality.
3. Determine how relationships between cell wall digestion and cell wall composition in forages influence the availability of digestible energy to the dairy cows.
4. Investigate the chemical basis for near-infrared-reflectance prediction of cell wall composition and the specification of wavelengths useful in discriminating among forages varying in nutritional value and forage quality.
5. Investigate cyclic selection for use in improving alfalfa populations.
6. Investigate reproductive methods that maximize hybrid vigor in alfalfa.
7. Evaluate effectiveness of drying agents and preservatives in reducing weather- and harvest-related forage losses.
8. Develop crop management systems which will result in high-quality forage and forage-stand persistence.
9. Measure impact of climatic and soil conditions on fiber constituents of forages.
10. Conduct population improvement and inbred development programs in corn to increase yield and adaptability to northern cornbelt.
11. Examine use of grassy-tiller and brown midrib mutants for producing novel, high-quality silages in corn.
12. Examining use of high-sugar endosperm mutants in corn as additives to improve silage from high-protein forages.
13. Select for high and low lignin, silica, and total structural carbohydrate content in corn leaf and leaf sheath tissue, and examine associated changes in pest-resistance and nutritional quality.
14. Evaluate low-cost chemical treatments for quackgrass suppression in alfalfa.
15. Utilize of NIR technology to predict effects of weeds on quality and animal utilization of forages.
16. Improve weed control in direct-seeded alfalfa, including no-till direct-seeded alfalfa planted into corn residue.
17. Improve weed control in established legumes.

18. Evaluate and improve yield and quality of small grain-field pea mixtures use for forage.
19. Study effect of various small grain harvest dates on alfalfa production.
20. Continue research on forage management and harvest systems which will lead to high-quality forages.
21. Develop and refine procedures for predicting intake potential of ruminants using artificial mastication and volume measurement procedures.
22. Evaluate the influence of mineral nutrition on forage quality and yield.
23. Study the interaction of soil fertility, insects and diseases on weeds and weed control in alfalfa.
24. Characterize and select improved maized genotypes for silage production .
25. Identify and select corn genotypes best-suited to alternative cropping systems.
26. Develop small-scale, high-production methods for alfalfa seed production in Wisconsin.

Plant Diseases

1. Expand research in gene regulation and detection of genes that are important for productivity and protection against plant stress.
2. Refine techniques for plant growth modeling, by improving knowledge of how various environmental and biological factors influence plant growth, and developing a better weather forecasting system.
3. Evaluate crops which have done well in other agricultural systems for potential use in Wisconsin. Examples include rape for oil, various cabbage-type plants for fodder, and possibly mushrooms.
4. Develop biological control procedures that reduce the amount of money producers must spend on fertilizer, fuel, equipment, pesticides and other inputs.
5. Quantify effects of plant pathogens as constraints to plant productivity.
6. Develop rapid, economical, and reliable methods for detecting and identifying pathogens and other plant-associated microbes.
7. Develop improved methods for measuring epidemics in natural or managed ecosystems, in order to be able to better forecast disease incidence and evaluate management strategies.
8. Develop means of controlling disease by managing the interaction of biotic and abiotic plant stresses.
9. Improve the durability of disease resistance in important crops.
10. Use biotechnology to better understand genetic control and biochemical mechanisms of disease resistance in plants.
11. Find ways to avoid the development of pathogens that resist disease control agents.
12. Develop improved plant disease control chemicals.
13. Develop microbial controls of plant disease.
14. Improve strategies for reducing mycotoxins in food and feed.
15. Integrate effective plant disease control practices into crop production systems.

Dairy Nutrition

1. Find ways to maximize feed intake during early lactation by altering feed processing and the genetics of feed plants and better understanding the metabolic processes involved in appetite and "off feed" problems.
2. Find ways to control the distribution of nutrients and the within-tissue partitioning of nutrients to maximize the efficiency of specific production functions.

Breeding

1. Reexamine the goals for selecting of genetic traits under changing dairy farm economic conditions.
2. Develop an understanding of the variations in gene action and interactions from natural and genetically engineered genomes (molecular biology and other biotechnologies).
3. Develop statistical systems (population genetics) for detecting and evaluating superior genotypes, and plans for getting these genotypes into the commercial cattle population most effectively.

Dairy Physiology

1. Better understand the fundamental biological processes that limit milk production and find ways to use that knowledge to optimize milk production.
2. Better understand processes of ovulation and fertilization in order to make superovulation more predictable and so that biotechnologies such as nuclear transfer and gene transfer can be used in dairy production.
3. Improve methods of detecting estrus by use of cow-side procedures for monitoring biochemical rather than behavioral changes.

Information Transfer

1. Expand use of computers and other decision aids to make dairy farming more profitable. Make dairy farming a business-like way to earn a living as well as a way of life.
2. Establish regional demonstration farms to implement new technologies (for example, have a continuous program for estrus detection operational in a herd, rather than depending on extension personnel to convince producers it's a good idea).
3. Employ regional specialists with MS degrees. For example, each UW-Extension district could have a reproductive physiologist to provide expertise and demonstrations in that subject matter.

Animal Health

1. Conduct animal health research to improve production profitability and insure wholesomeness of Wisconsin dairy products.
2. Develop control programs for specific diseases such as bovine

leukemia and Johne's disease, which impede cattle, semen and embryo sales nationally and internationally.

3. Conduct research into control of diseases which affect milk quality and wholesomeness, such as mastitis and listeriosis, in order to maintain consumer confidence in Wisconsin dairy products.

Stray Voltage

Expand efforts to learn about the causes of stray voltage and its impact on herd health and milk production, and to develop effective solutions.

Food Science

1. Study and evaluate effect of new production technologies (i.e., embryo transfer and bovine growth hormone) on the production, processing and marketing of milk products.
2. Undertake an integrated study of marketing and production and processing, including economic analysis of markets for milk products and milk components.
3. Find ways to modify cheese and cheese products to produce flavor and textural profiles for specific uses.
4. Find ways to accelerate ripening of cheeses.
5. Investigate use of ultrafiltration and other membrane techniques in cheese manufacturing.
6. Investigate use of permeate from ultrafiltration of milk and whey.
7. Evaluate quality of cheese produced from ultrafiltered milk and relationship of ultrafiltration to new product development.
8. Study the physical, chemical and functional properties of whey protein.
9. Investigate possible uses of enzymes and microorganisms in producing unique dairy products.
10. Evaluate and improve stability of frozen concentrated milk.
11. Investigate production of dairy products to meet consumer demands (i.e., low cholesterol, low fat, low sodium).
12. Study use of dairy ingredients as functional ingredients in foods and methods to modify dairy ingredient functionality.
13. Find new uses for milk fat.
14. Research the contribution of milk and milk products to diet and health including nutrient quality and availability and cardiovascular relationships to lipid, protein and cholesterol metabolism.
15. Expand research to enhance appearance, flavor characteristics, consumption of milk and milk products and to reduce microbiological spoilage of those products.
16. Identify the source and mode of infection of key diseases and develop preventative and management procedures to reduce and control contamination.
17. Improve dairy product fermentation.
18. Increase process efficiency.
19. Reduce cleaning and sanitizing costs associated with dairy product processing.

20. Research waste management in dairy processing.
21. Find ways to ensure quality and safety of dairy foods.

Nutritional Science

1. Compare dairy foods to imitation dairy products and supplements as sources of nutrients, including calcium, riboflavin, protein and magnesium.
2. Evaluate relative bioavailability of nutrients from fortified dairy products. Identify other risks and benefits of fortified dairy products.
3. Determine whether routine use of very large amounts of dairy products, fortified dairy products or calcium supplements adversely affects certain individuals (the industry needs facts to support advertising of dairy products as the best source of calcium.
4. Develop new or improved dairy products that have reduced levels of fat and total calories for those consumers concerned about weight control.
5. Evaluate the efficiency of energy utilization of milk fat and other fats in animal models and humans. (It is possible that research could demonstrate that dairy products provide fewer usable calories per gram fat than fats in some other foods.)
6. Determine relationship between calcium, vitamin D, protein, and phosphorus intake in relation to the incidence and severity of osteoporosis. The dairy industry needs to verify its current claims of benefits of dairy products in regard to osteoporosis.
7. Assess the relationship of dairy products to chronic and degenerative diseases (i.e. cancer and coronary vascular disease) in research settings that better approximate real-life eating habits.
8. Evaluate components of milk and dairy products (other than essential nutrients) which may be protection (or harmful) in relation to disease processes.

RECOMMENDATIONS

47) Support efforts of the Wisconsin Agricultural Experiment Station and the UW Center for Dairy Research to meet and increase demand for high-quality dairy products, new food products, products which are nutritionally acceptable and safe, and non-food uses of new dairy products, and to improve marketing and distribution.

48) Promote research into systems that minimize dairy farm production costs by integrating the best practices for maintaining soil structure and fertility, crop selection and management, and herd management. Such systems must also satisfy consumer demands, maximize profitability and ensure conservation of natural resources and environmental quality. Research should encompass related problems affecting profitability on Wisconsin dairy farms, particularly the current problem of stray voltage.

49) Integrate the basic and applied research carried out at the Wisconsin Agricultural Experiment Station, the U.S. Dairy Forage

Research Center, UW Center for Dairy Research, UW-Extension Center for Dairy Profitability and the UW Consortium (Madison, Platteville, River Falls and Stevens Point) into programs that increase profitability for the Wisconsin Dairy Industry.

50) Develop integrated information delivery systems in order to effectively transfer information from basic researchers to basic knowledge users, from basic knowledge users to knowledge-transfer specialists (e.g. extension) and from transfer specialists to users (producers). Knowledge must be available through an expert delivery system which is linked to a research base.

ANIMAL HEALTH ISSUES

Improved animal health can help increase profitability in the Wisconsin dairy industry in several ways. Cattle diseases erode narrow profit margins. Many obvious, well-recognized diseases are still with us. Other, more subtle diseases are surfacing as important problems that will require attention in the 1980s and 1990s. New markets must be found for animals and animal products in order to increase farm receipts. Wisconsin must become more competitive in world markets. This means our exported animals and animal products must be as disease-free and competitively priced as any in the world. The state must protect its cattle population and industry from foreign or exotic diseases, and must draw up effective contingency plans so that these diseases can be promptly and economically dealt with should they appear.

Improvement of animal health in Wisconsin will require a highly effective network for dissemination of information. Reducing disease losses requires that producers and veterinarians apply the knowledge that is currently available. When new approaches and techniques are needed, they must be provided through basic or applied research done by state (usually universities) and federal agencies and by industry. State and federal governments also provide diagnostic support to producers and veterinarians in the field, and develop programs to eliminate serious diseases and prevent others from becoming established. More attention must be paid to improving this informational network in order to increase profit margins, improve product quality and protect the industry from diseases from outside the state's borders.

Although Wisconsin producers spend more on veterinary services, drugs and other treatments than producers in other states, a number of long-standing animal health problems continue to significantly erode profits. It is difficult to mount effective farm-level, regional or state-wide attacks on complex disease problems because it is so difficult to set priorities based on cost/benefit analyses. One of the best examples of a very expensive, long-standing disease control problem is mastitis. Mastitis can cost up to $225 per cow per year. Conservative estimates put the total cost to Wisconsin producers at more than $400 million annually. Perhaps there is no better example of the need for an effective information network. Obviously, most of the basic preventive and remedial actions need to be taken by the producer, with active help of the practicing veterinarian. It has been said that mastitis losses could be greatly reduced by application of information already available. This information must reach the producer and the veterinary practitioner via university outreach and professional continuing education activities. Another important, active participant in the informational network is the diagnostic laboratory, which helps producers and veterinary practitioners recognize mastitis (particularly its subclinical forms) and provides diagnostic support for identifying the causes. Besides the three-way flow of information between producers, veterinarians and the state diagnostic lab, there must be a direct

connection between the diagnostic laboratory and researchers, who can help develop better diagnostic tests.

There are other examples of complex disease problems. Reproductive and respiratory problems cost the Wisconsin dairy industry an estimated $51 million per year. Johne's disease costs Wisconsin an estimated at $59 million annually. Losses to milk fever are estimated at $6 million per year.

Wisconsin farmers draw significant income from the sale of replacement stock, calves and cull cows to both national and international markets. To compete in these markets, animals and animal products must be of high quality and disease-free. Nothing reduces an export market more quickly than shipping diseased or inferior animals or animal products. Assurance of freedom from disease requires rapid, reliable and low-cost testing by diagnostic laboratories. Potential buyers can be assured of freedom from important diseases through effective state-wide disease control programs. These programs require very close cooperation among producers, practicing veterinarians, and state and federal regulatory agencies.

The threat of foreign animal diseases is ever-present. If the state's dairy industry remains totally unprepared to deal with them, the results could be devastating. The question is not <u>whether</u> such an occurrence will happen, but <u>when</u>? Emergency programs must be closely coordinated with federal programs, and with all sectors of the industry. Contingency plans should be developed before these these diseases appear (with the hope that they will never have to be used) rather than afterwards, when immediate response is required.

If Wisconsin dairy products, animals and other products are to be fully competitive in the national and international market, attention needs to be paid to product quality and wholesomeness. Any implication that Wisconsin animals or products are substandard will place them at a serious disadvantage in the marketplace. The full and willing cooperation of producers, processors and state animal health diagnostic facilities will be required if we are to assure consumers that Wisconsin products are of the highest quality and are safe to eat.

<u>RECOMMENDATIONS</u>

51) The University should disseminate the latest information about disease prevention and control in a form useful to producers and practicing veterinarians. It is clear that current staffing is not adequate. One faculty position in dairy herd health extension/outreach should be added in the UW-Madison Department of Veterinary Science. This would clearly require cooperation between the Wisconsin Agricultural Experiment Station, the College of Agricultural and Life Sciences Department of Veterinary Science and the UW-Madison School of Veterinary Medicine.

52) The legislature should promote animal health and disease research (as embodied in SB 920 of the 1985-86 Legislative Session) drawing together producers, field veterinarians, the

university research community, other researchers, and the Wisconsin Department of Agriculture, Trade and Consumer Protection, to establish research priorities and ensure that funds are directed appropriately. An annual budget of at least $500,000 is recommended, given the magnitude of the losses and the complexity of the problems.

53) Professional staffing of the Wisconsin Animal Health Laboratory (WAHL) should reflect the level of training and expertise required in a modern diagnostic laboratory. The professional staff should be reorganized and positions redefined and redescribed to reflect the needs of a modern diagnostic service. The WAHL budget must be adequate to meet changing needs, modernize diagnostic testing, and to meet normal inflationary costs. To implement their modernization plans, the WAHL must have streamlined access to revenues generated by user fees, without having to justify individual purchases to the Department of Administration. The WAHL should be computerized as part of its modernization plan.

54) A faculty position in dairy herd health/economics/epidemiology should be added to the UW-Madison School of Veterinary Medicine. A joint appointment with the WATCP Office of the State Veterinarian should be seriously considered.

WISCONSIN DAIRY FARM STRUCTURE, FACILITIES AND EQUIPMENT

Contrary to popular perception, the Wisconsin dairy industry is not highly specialized. Many Wisconsin dairy farms consist of five main operations: (1) forage production, (2) grain production, (3) milk production, (4) replacement stock production, and (5) breeding stock production. This distributes the risk, but also requires that dairy producers have several operational skills and forces them to spread their management skills over many areas. Smaller, diversified dairies in the Upper Midwest and Northeast will find it increasingly difficult to match the management skills of the larger and more specialized dairies in the South and West. The need to reduce or overcome this competitive disadvantage must be addressed.

ECONOMIC VIABILITY OF WISCONSIN FARMS BY SIZE

Wisconsin's dairy industry is characterized by a large number of relatively small farms. The average size herd is 47 milk cows. Almost 28 percent of the state's dairy farmers have fewer than 30 milk cows; 40 percent have 30-39 milk cows; 28 percent have 50-99 milk cows and less than 5 percent have 100 cows or more.

Farms with Fewer Than 35 Milk Cows. There is no one specific size of Wisconsin dairy farm that will necessarily be most profitable and have the best chance of surviving over the next decade and beyond. Economic viability will hinge upon individual farmers' management practices, investment per cow and debt load, and state and federal policies. Nevertheless, unless there is substantial income from other enterprises or off-farm sources, milk sales from Wisconsin farms with fewer than 35 milk cows will not likely support an acceptable standard of living. However, many of these small farms are operated by older farmers with little or no debt who will be retiring within a decade. Others are operated by part-time farmers with substantial off-farm income. In these situations the dairy farm is considered more of a way of life and source of supplemental income than an economical business unit that will by itself provide an acceptable standard of living. Some of these operator may also hope to eventually expand to a more commercially feasible size.

Farms with fewer than 35 milk cows will, however, face increasingly higher input costs, including machinery and equipment, because they can't purchase in volume. Also, their small volume won't let them afford relatively expensive new technologies such as computerized records, automatic and computerized feeding, and embryo transplants, and higher costs of milk marketing and other ancillary services.

Operations With 35 to 49 Cows. This is now the typical size for a dairy enterprise in Wisconsin, encompassing almost 40 percent of all dairy operations. These are mostly single-family units. If they employ skillful operational and management practices, these operations will remain economically viable. Most will continue with existing facilities,

perhaps with minor capital changes. They will keep their stanchion barns, upright silos and the other more traditional Wisconsin technology until they terminate their businesses. Debt level and production efficiency will be the key factors determining their profitability and survival.

If milk prices don't improve over the next decade, a farm might yield a satisfactory level of income for family living if the family has 100 percent equity and produces an average of 13,500 pounds of milk per cow (the state average). But families with less equity and average production will find that their income from dairying won't be sufficient for family living and debt reduction.

Increased productivity will significantly improve the economic viability of the 35-to-49-cow farms. Such families can generate more income by increasing milk sales to 18,000 pounds per cow or more (a readily achievable goal) and holding down operating expenses. As milk sales per cow increase and expenses are kept at reasonable levels, income for family living and debt service improves significantly at all equity levels. But it must be stressed that the bottom line is profit per cow, not just pounds of milk per cow.

Generally speaking, 35-to-49 cow operations with modest investments, average performance levels and a low debt load will generate modest levels of cash for family living and plant maintenance but will not be able to service much debt. Increasing productivity and efficiency will let them service a modest amount of debt. Smaller farms with high debt loads and modest productivity will not have sufficient cash flow over the long run. Adding off-farm income will allow them to service more debt or raise the level of family living. All in all, few high-equity dairy farms will be forced out of business over the next decade, even at average production and efficiency levels. Moreover, these farms can be readily transferred to the next generation with very little or no erosion of the farm investment. So we are not likely to see the rapid demise of these farms. This could change under certain circumstances, such as a major change in the family's goals, or some major economic event such as another dairy termination program, or if the farm expands to accommodate another full-time person, or if major capital investments ($50,000 or more) are needed.

It is important to note that farmers in this size class who are facing financial problems and have average management ability and production levels are not likely to improve their financial situation by expanding. They will probably realize more financial gain by improving their management and milk production per cow.

Operations With 50 or More Cows. Continued economic pressure and new technology will move Wisconsin's dairy industry toward dairy operations with 50 or more milk cows, many of them operated by more than one family. Over the past 15 years average Wisconsin herd size has increased at the rate of one cow per year. The rate of increase will accelerate slightly during the next decade as smaller herds are replaced by larger ones. Herds of 50 or more cows already comprise one third of all Wisconsin dairy farms. By 1995 it is estimated that over half of the herds will have more than 50 cows, and that 75 percent to 80 percent of

the state's dairy cows will be in herds of this size.

Many of these larger herds will be former 35-to-49 herds that expanded. These larger operations will have expanded or retrofitted their physical plant to meet changing conditions. But most will stay with more traditional technology because they will incorporate existing facilities into the ongoing operations. Some will construct new, but traditional facilities. Because of economies of size, properly managed 50 to 99 cow operations with efficient production will have lower per-unit production costs than smaller operations. As a result, they will remain very competitive in the foreseeable future.

The 100-plus category will experience the greatest relative growth as most of the new facilities constructed will be for herds of 150 cows or more. Larger units have substantial cost advantages in housing and feed storage facilities.

Reduced capital investment costs aren't the only economic advantages which these 100-plus-cow operations will enjoy. Most will be able to buy inputs and ancillary services at a lower cost. Thus, there are significant economies of size for larger herds especially if complete new housing and feed storage investments are required.

There are some human advantages to increased size as well. Many one-family Wisconsin dairy operations do not have a reliable back-up operator (or are unwilling to properly compensate one). This leaves them without options in the event of sickness or accident, let alone a vacation. Further, farmers and other small business operators play three vital but conflicting roles: labor, capital, and management. In a multi-person operation these roles -- particularly management and labor -- can be more easily shared, . This allows for more specialization, which can improve management and operational efficiencies, leading to improved profitability. (To achieve the fullest benefit, of course, individuals must be able to effectively work together.) All in all, from both a business and human perspective, there are strong positive arguments dairy enterprises operated by from three to five persons.

For most situations in Wisconsin there is an upper limit to the optimum or maximum size for a dairy operation. While size will be partly governed by personnel management concerns, the physical limitations will be at least as important. Because so much forage is harvested as low-moisture silage, and large quantities of manure must be disposed of by field spreading, the workable farmstead-to-field distance is limited. In Wisconsin, most of the economies of size will probably be reached somewhere between 200 and 300 cows. As a result, the percentage and absolute number of over-100-cow herds will increase, with 200- to 300-cow herds becoming more common. But these large herds will not likely dominate for Wisconsin dairying within the next decade.

RECOMMENDATIONS

55) Professional assistance should be provided to ease the exit of farmers whose operations which are uneconomical and unprofitable and who don't have the potential to significantly improve their profitability.

56) Multiperson operations, which are better able to apply specialized management and greater management efficiency, should be encouraged. All Wisconsin dairy operations, regardless of size, should make greater use of management assistance from UW-Extension -- and from VTAE, industry representatives and private consultants where appropriate -- to maintain and improve profitability, learn about new technology and adopt technology that is economically feasible.

57) Single-family farms should consider the following strategies for reducing machinery and equipment costs (in turn reducing cost per hundredweight), and to free up labor and management: hire custom operators to do field operations where feasible; buy reliable used machinery and equipment; share expensive or infrequently used equipment with neighboring farms; raise their own forages and buy all grain (or even rent or purchase just the dairy facilities and buy both forages and grain).

58) Farm families should aquire the skills they need to do short- and long-term planning, readily adopt new, cost-justified technology, and to improve their overall efficiency and profitability. To this end the University of Wisconsin should expand programs which offer economic outlook and information on effective use of records systems, business and enterprise analysis, profitable production and management practices and new technology.

59) Since the success of dairy operations, and particularly multiperson dairy operations, depends heavily on human resource management, UW-Extension and VTAE should expand their educational programs on stress management, decision making, goal setting, and time and personnel management.

DAIRY FACILITIES AND EQUIPMENT

Wisconsin's dairy industry has long been characterized by single-family farms milking 30-50 cows, and dependence on a single family's labor. Consequently, the facilities have included a multi-purpose building where the cows are housed, fed and milked. Generally, the farm family not only milks cows, but also raises the feed and the replacement animals. Locking the family's labor and management resources into a multi-enterprise farm has protected family income from rapid shifts due to changing input prices. But this diversified arrangement for both business and farmstead design has diminished the farm's ability to change in response to new technologies.

Buildings and equipment. How much a farmer can afford to invest in buildings and equipment depends on many factors. The potential investment increases as returns per cow increases. It decreases as the desired rate of return to the investment decreases, and how much long-run costs of raising feed and replacement heifers fall below the market value of these inputs. University of Wisconsin-Madison research (based on a $10.50 per hundredweight milk price) concluded that farmers could afford

an investment in buildings and equipment of anywhere from $1,438 per cow (assuming 12,000 lbs. of milk sold per year) to $2,478 per cow (assuming 20,000 lbs. of milk sold per year).

Researchers used these figures on affordable investment to compare investment requirements and annual costs of three different types of systems: (1) a tie-stall barn with a pipeline milking system and vertical feed storage; (2) a conventional free-stall barn with a non-automated milking parlor and vertical feed storage; and (3) an automated free-stall barn with an automated milking parlor and vertical feed storage. The tie-stall system was designed to hold from 40 to 135 cows, while the two free-stall systems were designed for herds of 90 to 335 cows. The required investment ranged from $2,153 per cow for a 335-cow conventional free-stall set-up to $4,355 per cow for a 40-cow tie-stall system. Clearly, very few of these systems represent affordable investments given the dollars generated by the enterprise.

The researchers also combined each enterprise's operating costs, the annual facility ownership costs and the system-specific labor costs to determine the total production costs. Assuming 16,000 pounds of milk sold annually per cow, these costs ranged from $9.51/cwt. for 335 cows in the conventional free-stall system to $12.36/cwt. for 40 cows in the tie-stall system (see Appendix E). These costs were developed under the assumption that all feed and replacement heifers were purchased at market prices. In addition, lower-cost feed storage facilities (horizontal silos) had not been included in the cost analysis. When horizontal silos are substituted for the vertical silos, the savings in cost per hundredweight ranged from about $0.30 (for 90 cows) to $0.50 (for 335 cows) in the free-stall systems. Total costs of the conventional free-stall system fell to a low of $9.00/cwt.

A similar cost analysis was conducted for annual production levels of 20,000 pounds per cow, resulting in production costs ranging from $9.19/cwt. (conventional 335-cow free stall) to $11.57/cwt. (40-cow tie stall). As in the example based on 16,000 pounds annual production per cow, switching from vertical to horizontal forage storage brought savings ranging from about $0.30 to $0.50 per hundredweight. This reduces the minimum cost of production to around $8.70/cwt. in the 335-cow conventional free-stall system.

Two cautions about these results. First, they apply only when new facilities are being considered. Farmers utilizing existing facilities may realize greater profits and lower costs. Second, the profitability of these systems depends on several critical assumptions about the returns of the enterprise, system design, system costs, and relative profitability of the crop and heifer enterprises. Each farm is unique and requires its own intensive analysis before decisions can be made.

Two types of dairy farmers will be making these types of decisions in 1995: those who enter the industry and those who are already engaged in dairying. For new entrants, the analysis is relatively straightforward. They may buy or lease an existing unit, or build a completely new system. If they're picking out a new system, they must consider the relative profitability of the many alternatives and make their decision.

Those already engaged in dairying or who are buying an existing business must determine the most profitable long-run strategy. Likely options include: Continuing the existing enterprise as is; increasing returns to the dairy enterprise without new major investment; reduce the size of the operation and increasing milk per cow; or expanding. If the efficiency and net income are already as good as they can be, then the existing operating unit is the preferable alternative and few changes are required.

Buy or raise inputs. The question of whether to raise or buy feed crops and replacement heifers is a big one for operators who are assessing their dairy facility needs. For those who can produce these inputs relatively efficiently or can produce a high-quality product, the costs of raising these items is likely to be competitive with purchasing them. This is especially true for the production of high-quality alfalfa. For farmers who are considering switching from raising these inputs to purchasing them, corn is the logical first choice, followed by replacement heifers, then alfalfa.

Upright or horizontal feed storage. Feed storage facilities last a long time, so farmers rarely have to make decisions about replacing them. But when it comes time to replace or expand them, the key question is whether to choose vertical and horizontal forage storage (in other words, upright silos versus bunkers or trenches). The advantage of horizontal storage increases with herd size. UW-Madison research shows horizontal systems have the cost advantage, by $0.30 to $0.50 per cwt. of annual milk production. The cost difference will narrow as forage values increase, and as the percent feed storage loss in the horizontal silos increases. But these values would have to be extreme to change the general results.

Storing and grinding grain. Whether to store corn and grind and mix grain rations on or off the farm is another key decision. Farms with large herds may benefit from on-farm corn storage, as opposed to off-farm storage and bi-weekly feed delivery. The opposite is true for smaller herds: High per unit on-farm storage costs make the off-farm system cheaper, even if the corn must be hauled to and from the off-farm facility and dried and stored off the farm. This fact, along with the costs and other problems of raising corn on farms with small herds, suggests that such farms might improve their profitability by foregoing corn production and having a mixed-grain feed delivered to the farm. But dairy farmers who raise corn as part of their crop rotation and already have on-farm storage would not likely find the off-farm approach profitable. Costs and benefits of participation in government grain programs also must be considered.

Manure-handling can represent a major capital investment on Wisconsin dairy farms. Typical systems include solid manure/daily haul, liquid manure/daily haul, and liquid manure/annual storage.

UW-Madison research shows the annual costs of the daily-haul systems are far lower than those of the storage system. For example, on a 90-cow farm averaging 16,000 lbs./cow, annual costs ranged from $50.63/cow for the solid manure/daily haul system to $204.20/cow for the liquid manure/annual haul set-up. Adding in the manure's fertilizer value

reduces these annual costs per cow to $5.71 and $147.86, respectively.

Major expansion of a dairy herd usually requires major capital outlays for new facilities and equipment. Dairy farmers should consider expanding only if they have reached maximum efficiency (given their management skills) on the existing unit, if the family would not be better off with a smaller, more efficient operation, and if the family thinks expansion is the best alternative for increasing net income.

Whatever the magnitude or rate of expansion, it should be carefully planned in light of (1) facility needs and location and (2) budgets that assess the expanded operation's profitability under several sets of price and efficiency assumptions. Expanding without both types of planning can be financially disastrous, given the large capital outlays required and the fact that these decisions are irreversible.

A minor expansion occurs when the herd is expanded by up to 50 percent. In this case, farmers should give due consideration to the functional and technological viability of their current facilities. This expansion may take one of three forms: (1) increasing cow numbers with the same facilities, (2) adding cows and changing part of the facilities (barn addition, new silo, heifer barn addition, new bulk tank, etc.), and (3) adding cows with a major change in the facilities. Before making minor adjustments, it is important that the family have a clear idea of where it wants to be in the future. Incremental adjustments can be quite expensive.

An intermediate expansion can be classified as an increase of 50 percent to 100 percent in herd size. Expanding this much can involve large capital outlays and require more human resources. This can make an intermediate or major expansion very risky. A large expansion might bring a temporary decline in milk production and possibly net income. Careful thought must be given to the financial and technological value of the existing facilities. In the short run it may be possible to remodel existing facilities slightly in order to generate enough cash flow to pay for a new system. But in the long run, these existing facilities may become a hindrance to the operation and require replacement.

A major expansion can be defined as one in which the operation is more than doubled in size. Unless this expansion had been planned earlier, the site of the current farmstead may not be large enough to accommodate the facilities needed for such a large operation. This is especially true in hilly terrain. Such an expansion will often involve a major change in technology to take advantage of lower facility costs and labor-saving equipment.

In summary, increasing dairy income is a major objective of most Wisconsin dairy farm families. A typical dairy farm is comprised of many enterprises where small investments in capital accompanied by increased management can lead to high payoffs. Improving feed efficiency, milk quality, calving intervals, age of heifer freshening, and crop efficiency are among the areas where improvements can be made without significant capital outlays. When these avenues have been exhausted, changing the size of the farm operation becomes the appropriate decision.

Although many of Wisconsin's dairy facilities are technically obsolete and depreciated, many remain functional. These existing facilities should be utilized whenever possible to hold down investment and debt per cow, especially in operations with fewer than 50 cows. Operations with fewer than 50 cows will not be competitive if major new facilities must be built and if debt per cow must be increased. Significant economies of scale exist with new dairy and feed storage facilities. When major remodeling or replacement is deemed necessary, considerable planning is needed to minimize capital investment and debt per cow.

Farm families need to take advantage of public resources that can be utilized in making decisions about capital expenditures for facilities and equipment. In particular, UW-Extension and others have decision aids -- including enterprise budgeting and long-range planning publications, worksheets and software -- that can be quite useful. These aids are available at county UW-Extension offices.

RECOMMENDATIONS

60) Dairy farmers should get better before getting bigger. Before making any major or minor capital investments in feed storage or manure handling facilities or equipment, farmers should thoroughly analyze their current production efficiency. The amount farmers can afford to invest in buildings and equipment varies widely according to pounds of milk sold per cow per year.

61) The best type of dairy, feed and manure-handling facilities and equipment differs widely from one dairy enterprise to the next. Hence, no general recommendations can be made. Each dairy enterprise must carefully evaluate their management ability, labor supply, debt, capital and land resources to determine facility and equipment requirements. The feasibility of different types of facilities and equipment also depends on the adequacy of existing facilities, and current and contemplated herd size. Farm families should take advantage of public information resources in making financial decisions. In particular, UW-Extension others have useful decision aids.

62) Every effort must be made to minimize the capital investment costs in facilities and equipment without sacrificing reasonable production efficiency.

LOCATION OF THE WISCONSIN DAIRY INDUSTRY

As farm size grows and farm numbers drop, the most likely places for attrition are the northern two bands of counties. These counties rank lowest in percent of farmland in cropland, percent of farmland in row crops, percent of land area in farmland, and have the shortest growing seasons. Farm numbers in these counties are all relatively small and the farms are more scattered. These counties have fewer natural resources favorable to agriculture and higher costs for ancillary services.

Dairying has and will continue to move out of the top agricultural areas of the state. Farms with large flat fields suited to intensive row crops and large machinery will continue to shift over to row crops and alternative livestock enterprises that fit with row crops. Dairying will continue to concentrate in wide belt across the state of Wisconsin where alternatives to forage are limited.

Land prices may continue to drop somewhat for relatively small farms with smaller fields and soils or climate which dictates a heavy forage rotation. Prices of such land are not expected to recover much. In concentrated dairy areas the capital improvements on the farm will likely contribute more to its sale value. But overbuilt facilities will continue to be severely discounted.

RECOMMENDATION

63) Farm families wishing to rent or purchase a dairy farm in Wisconsin should consider those farms where land is best-suited to forages and where ancillary services are readily available.

EXIT, ENTRY, FINANCING AND ALTERNATIVE DAIRY FARM BUSINESS ARRANGEMENTS

The topics of exiting and entering dairying, financing and alternative dairy farm business arrangements are so interrelated that they are difficult to discuss separately. There is no single recipe of recommendations for this process. Each individual situation is different. With the current milk surplus situation and many Wisconsin farms operating at below optimal levels of employment, more than one person must retire or go out of business before another can able to start. Thus, aspiring entrants need to take a hard realistic look at their true opportunities. The topics of entry and exit are very closely tied.

EXIT FROM DAIRYING

Those approaching retirement have two major concerns -- financial/income tax and psychological/sociological. Their challenge is to turn a relatively small, highly capitalized business into retirement funds without much or any other income source except social security.

Most retiring dairy farmers have the bulk of their financial assets in farm real estate and personal property. The personal property can be liquidated by auction or private treaty sales on fairly short notice. Real estate is another problem. In the present farm real estate market it may take months, if not years, to finalize a sale and collect the money. Consequently, retiring farmers can face a liquidity problem if they can't sell enough capital goods to generate cash for living expenses and retirement activities.

Those with little equity and much debt may have very few savings to use. They may have to continue to seek employment to generate cash to supplement their social security income. Income supplemental programs will be required for those who cannot keep working.

A second financial problem at retirement is income taxes. Since most farmers have used cash basis accounting, they have postponed their income tax liability. Depreciation recapture, investment tax credit recapture, the sale of zero basis raised assets, and the prospect of realizing a large amount of income in one or two years makes for some serious income tax problems. Proper tax management and long-run planning can help some. But, farm assets that have been shielded by favorable tax rules may yield tax problems at liquidation. Further, recent tax legislation took away some of the advantages of installment sales of personal property, changed capital gains treatment rules and repealed income-averaging rules. Clearly, more emphasis must be given to tax planning in selling a farm.

The second retirement issue deals with psychological and sociological concerns. It involves how very active people move from a regular and demanding business into a complete retirement mode. Research and educational programs need to address this vital issue.

ENTRY/EXIT, FINANCING, FARM BUSINESS ARRANGEMENTS

As farms grow larger and become more capital-intensive, it is increasingly difficult for beginning farmers to gain control of enough resources to acquire an economic unit through the traditional fee-simple ownership method unless they inherit a significant piece of wealth. Therefore, more innovative ways must be devised to transfer people into economic dairy farm units.

Traditional methods. The more traditional methods of transfer include gradually working one's way into the home farm, using the home farm as a "spinoff" station, wage and sharing agreements, enterprise agreements, joint ventures, leases (cash or share), partnerships (general and limited), corporations (Subchapter S or Subchapter C), or some combination of the above. For many situations (especially the sole proprietorship) these traditional methods have worked quite well, especially if they have been used in combination, and have allowed the business and participants move gradually through the entry, growth and exit phases. But with more multiperson operations, less-favorable tax rules for farm sales, and the need or desire to reduce risk through equity rather than debt financing, there is a need to look beyond the traditional methods.

Nontraditional methods. Agriculture is using more and more "outside" capital. Outside capital has traditionally consisted of loans (debt capital) from credit organizations to "traditional" business arrangements.

The Wisconsin dairy industry needs innovative, well-conceived financial programs that attract adequate capital into the business. Dairy farming should be viewed as a business and not just as a way of life. Dairy farmers must view the farm as a business to which they can contribute labor, management and equity capital but not necessarily large amounts of all three. There needs to be a change from the traditional idea that dairy farmers should supply all the labor and management and use debt capital to add to their own equity capital. Innovative means of providing more equity, rather than debt capital, into the dairy business, and thereby spreading the financial risks among several individuals, needs to be explored. This may allow different people or institutions to contribute the labor, management and equity capital. For example, a means for nonfarm investors to participate more directly in agriculture should be studied. Traditionally outside investors in agriculture participate by putting money into savings banks or buying Farm Credit System bonds. This provides loan or debt money to farmers. It is indeed "outside" money. Alternatives for attracting this outside capital more directly in the form of equity capital should be studied.

Some financing and business arrangements that might be studied include equity financing, shared appreciation, lease/financing, pooling, securitization policies, umbrella landholding organizations with

long-term lease programs, and limited partnerships. Obviously this list is not all-inclusive. Consideration should be given to bringing people from both the private and government sectors together to view various alternatives.

The need to study these innovative financing alternatives is apparent in light of the recent agricultural financial situation which has pointed out shortcomings of the traditional methods. Easy credit at lower than market interest rates tends to get capitalized into the price of farm assets, driving up asset values and attracting or retaining more resources in farming than are needed. Financial organizations with a majority of their loans in agricultural investments are finding this specialization may be a disadvantage. Some creditors have loans on farms that are not economically viable unit because of size; or on farms where there are inadequate production, business, financial, and marketing skills; or on farms that were so highly levered that the farm value is below the market price.

The method used to enter, grow with and exit the dairy business has a profound impact on the profitability and viability of the business. It affects how farm families live and progress on their farms, and affects the Wisconsin dairy farm structure. So it is extremely important to study ways to improve traditional financing methods and to devise alternatives by studying non-traditional financing methods.

INSURANCE NEEDS

Insurance is an important factor in reducing the risk in dairy production. Adequate insurance coverage, chosen from reliable carriers, can protect dairy farmers from financial loss of facilities, liability and assist in providing health care for families and employees. Developing an adequate insurance program requires careful study, consultation and selection from alternative sources. At stake are real and personal property, health and estate considerations.

RECOMMENDATIONS

64) Research, teaching and extension programs should be aimed at innovative alternative agricultural financing and business arrangements. Concerns about how farmers can enter, improve, expand and exit Wisconsin's dairy industry should all be included.

65) Further research should address the psychological and sociological problems that arise as dairy farmers enter retirement.

66) Wisconsin dairy farmers should receive adequate information on availability, adequacy and cost/value benefit from available sources to help them make a sound decision on reducing risk through the development of an insurance program.

FARM MANAGEMENT PRACTICES FOR PROFITABILITY

More than ever before, the profitability of Wisconsin dairy farms depends on economically sound production and business management practices. Simply maximumizing production will not assure profitability. But certain management practices and minimal levels of production are essential for long-run competitiveness, efficiency, and profitability. Forage production and harvesting, feeding, breeding, herd health, milk quality, farm records and enterprise budgets all must be part of the management package.

FORAGE PRODUCTION AND HARVESTING

Wisconsin farmers must make an all-out effort to improve the yield and quality of home-grown forages if they are to increase profitability and improve their competitive position in the dairy industry. They must recognize that improving forage quality and using that quality forage in computerized balanced rations is one of the most effective ways they can respond to the current farm financial squeeze.

Improving yields and quality will also significantly reduce forage feed costs and increase profitability, both in the short and long run. Over half of Wisconsin farmland is used for growing forages, so dairy management practices should be geared toward maximum use of forages in the rations of the dairy herd and herd replacements. Farmers should set up a forage and feed inventory system so that feeds of varying quality can be tested, identified and inventoried for future use. This lets producers plan their feeding program so that they can feed higher quality forages to their high-producing and early lactation cows, while feeding lower quality forage to late-lactation cows, dry cows and heifers.

Improving forage quality also contributes to soil conservation by reducing the need for corn. A farm that feeds high-quality forage can generate 18,000 to 20,000 lbs. of milk sales per cow; the same cows, fed the same amount of corn, will yield 2,000 to 4,000 pounds less if fed poor quality forage.

Improving forage yield and quality requires that farmers adopt a complete production, harvest and storage program. The "Wisconsin Profitable Forages Handbook" is an excellent guide to these practices. Farmers should monitor their progress through forage testing using NIRS (near-infrared-sensing) analyses for crude protein, acid detergent fiber and neutral detergent fiber.

They should also have soil and plant analyses conducted every two to three years to determine needs for lime (pH) and corrective and maintenance fertilizer. These recommendations are based on specific yield goals and plant species, and can help farmers reduce costs by

figuring in the nutrients added by manure and legumes. Correcting pH deficiences is the first place to invest money in building this production base for legumes such as alfalfa, red clover and birdsfoot trefoil. UW-Madison researchers estimate that each 0.1 pH point below the desired 6.9 pH adds 4 to 6 cents to the cost of feed needed to produce a hundred pounds of milk.

Optimum levels of fertilizer and lime will help improve forage stands, ensure against winter injury and drought, help new high-performance varieties achieve their potential, speed regrowth, permit a more intensive harvest schedules, and achieve greater yield and quality.

Wisconsin dairy farmers should plant legume varieties recommended for winter hardiness and resistance to all known diseases, and aim for a dense forage stand. Alfalfa is recommended where adapted, but red clover may be best for silage on imperfectly drained soils, and birdsfoot trefoil/grass mixtures are best-adapted for pasture. Farmers should cut alfalfa at the mid-bud stage of maturity for top plant and animal performance. Forage quality is closely associated with legume content, stage of maturity at harvest, and field harvest losses. Frequent cutting at mid-bud rather than the first-flower stage has resulted in a gain of over a thousand pounds more milk per acre. This management change alone could generate an additional $35 million for Wisconsin farmers.

Growing alfalfa is not a low-cost enterprise. But since most forage production costs are fixed, increasing yields by one ton per acre will increase net forage costs by only about $22 per ton, while decreasing the per-cow cost of forage. Low yields and quality are expensive.

Harvesting as low-moisture silage and using drying agents and preservatives in a "hay in a day" system will help reduce weather and field losses, and will preserve forage quality so the animal can make use of it.

Since quality is such a major consideration in a dairy-forage system, it should be measured in terms of pounds of milk produced per ton of forage, or in pounds of milk produced per acre. Computer simulations of diets with varying forage/grain ratios demonstrate that at an intake of 25 lbs. forage per day, a 1-point decrease in acid-detergent fiber will add $6 million in additional dairy income to Wisconsin farmers, while a 1-point decrease in non-detergent fiber will add $9.4 million.

Wisconsin dairy farmers now have the opportunity to increase income and profit by marketing surplus hay. Based upon average price per ton paid at hay auction in recent years (1983-87), more farmers are becoming alert to the quality measures, and are willing to pay 91 cents per point of RDF (relative feed value based on digestibility and intake) over that of full-bloom alfalfa. But to take full advantage of this income opportunity, farmers must produce quality forage. They should also inventory their hay early in the year to identify available supplies.

MANAGEMENT PRACTICES AND POTENTIAL PROFITABILITY

Feeding. Wisconsin leads the nation in the production of forages. It also leads in the number of dairy cows, because dairy cows are most efficient in converting forages into edible food products. However, efficient conversion of forage to milk demands a balanced ration. Thus, there is an inseparable link between forage quality and profitability.

Farms with good forage sell more milk per ton of forage and more milk per acres with lower feed cost. High production per cow can be achieved with low quality forage only if missing nutrients are furnished through purchased feeds. But the usefulness of this practice is limited not only by cost, but also by the cow's inability to consume enough grain or protein supplements, especially in early lactation, to make up for nutrient deficiencies of the poor quality forage.

Surveys show that dairy farmers who have used forage testing and ration balancing have increased labor and management income an average of $100 per cow. Some income improvement has occurred on 90 percent of the farms surveyed. This demonstrates that Wisconsin dairy farmers can profitably adopt this new method of computerizing rations and allocation of grain to individual cows. Help in implementing these practices is available at local county UW-Extension offices, and from many feed dealers. Getting an additional 400 50-cow farms on a forage testing/ration balancing in the next four years could mean an additional $8 million dollars in dairy farm income. Farmers must also adopt a system of identifying the different lots of forage by source, cutting, and storage areas so they always have an up-to-date analysis of the forage currently being fed. They must also pay more attention to managing feed inventories, to how they select and use purchased feed, and to when they buy it. Being able to buy feeds at their seasonal low price can have a major impact on dairy profit margins.

In summary, Wisconsin's competitive advantage and profitability lies with producing and feeding high-quality forages and limiting dependence on purchased feeds.

Dairy Herd Improvement Records. Membership in the DHI records program generates a data base of facts upon which to make decisions about feeding, breeding and manageing the herd. These records also document the results of such decisions, and so become a tool for improving management skills.

A recent field study in Georgia showed how DHI records increased production. Combining DHI with other recommended practices made an even bigger difference. It nearly doubled the milk response from balancing rations based on forage tests, and doubled the benefit of feeding those balanced rations to genetically improved cows. Clearly DHI records are a key tool for improving the profitability of Wisconsin dairy herds. As an investment or as a value-added program, the dollar return would range from $10 to $22 per dollar spent to obtain DHI records.

Statistics show that Wisconsin's DHI cows also produce more milk per year than cows not on DHI test records. That difference has been

doubling each decade since 1930. In 1985, the difference was 4,534 pounds more milk from cows on DHI records.

Wisconsin "Farm Enterprise Budget" data suggest that survival in the dairy business depends upon increasing milk sold per cow rather than on milking more cows. Milking more cows to increase gross income, without increasing farmers' spendable income, simply contributes to the surplus problem, lowers milk prices and encourages legislation which may or may not be in the best interest of Wisconsin farmers.

Concern has been expressed over the ability of Wisconsin's dairy industry to compete with that of the West and Southwest, especially California. In 1985, average yearly milk production of DHI cows in Wisconsin, compared with those in California, New Mexico, Arizona, Oregon and Washington averaged close to 2000 lbs. less milk per cow. This suggests that the following changes in DHI records need to be made to keep Wisconsin competitive:

- Get more cows on test. Currently, fewer than half (46.7 percent) of Wisconsin's cows are on DHI test. Each of the states named above exceed Wisconsin in percent of cows on test by a very substantial margin.

- Official (supervised) DHI records provide data needed for genetic improvement and many educational programs. Currently 18 percent of the cows in Wisconsin are on standard DHI; this number must be at least maintained.

- Wisconsin DHI members must become much more cost-conscious by reporting complete monthly feed cost data and using this new information in making feeding and management decisions.

- Wisconsin DHI members must do a better job maximizing calving interval and reducing days dry and days to first breeding. Currently, only 23 percent of the DHI members are enrolled on the Herd Management Option that addressed these management problems.

- Less than 5 percent of all DHI members use the Milk Production Forecast Option, which projects herd milk sales monthly for the twelve months and provides a very useful tool for making debt payment projections.

- Too much emphasis is given to recognition of high herd averages and to high cow records. Dairy farmers must focus on profitability and increasing labor income in all testing plans available.

- The cost of DHI services to dairy farmers must remain competitive and members must learn how to make the DHI program more cost-effective for their herds.

- Programs must be developed to incorporate data from in-line milking parlor computer systems to maximize the return on

investment made on these farms without the need for extra DHI services.

- A new system for visual identification of cows, heifers and calves such as freeze branding, should be provided to make interpretation and application of DHI information more convenient.

- If more DHI members would change to AM/PM test, more herds could be served by the same supervisor. This would increase income of those staff retained, reduce turnover of personnel, reduce cost and improve service to producers. Currently less than 5 percent of cows on Official DHI and only 12 percent of Unofficial test herds are on this plan.

- With a new and complete management package available to DHI membership, educational needs have increased substantially, while available UW-Extension personnel have been reduced. This will not help farmers use these new tools to improve profitability or stay competitive.

Artificial Breeding (AI). The goal of the sire selection on dairy farms should be to produce herd replacements with the highest possible genetic ability so that they generate more profit than the cows they replace in the herd. Wisconsin farmers enjoy the best AI services available anywhere. Yet best estimates show that only about two-thirds of all cows and only 20 percent of heifers are bred to AI sires. This is a problem, considering results of a survey of DHI herds in nine Midwestern states which showed that herds which used all AI services produced an average of 1,255 lbs. of more milk than herds using their own bull.

The most recent USDA report shows the "Predicted Difference Milk" and "Predicted Difference Dollars" for available AI sires was superior by a margin of 1,123 lbs. of milk and $130, respectively. USDA research shows that each 100 lb. difference in "Predicted Difference Milk" of the service sire results in a 120-pound increase in herd average.

Recent reports from the USDA show Wisconsin is below the national average in the use of high PD sires, while farmers on the east and west coasts consistently use genetically superior sires. So a portion of the difference in average milk produced per cow on Wisconsin farms is of genetic origin and must be corrected as soon as possible.

Wisconsin DHI members can now benefit by the availability of genetic information on DHI reports. Average sire PD milk and fat for mature cows, first-lactation cows and for service sires currently used will be provided monthly. This will let farmers measure progress in improving the genetic potential of their herd. Sire summary information is provided monthly by the USDA for all AI sires available throughout the country. So the tools are available to help improve the genetic potential of Wisconsin's dairy herds.

Herd Health. Mastitis continues to be one of the most expensive diseases affecting dairy herds. Testing milk for its somatic cell count

(SCC) has proven to be an effective way to monitor the losses from mastitis. Nearly half of all the cows on DHI test are now enrolled in the SCC Option, which makes it the fastest-growing part of the DHI program. Based upon benefits demonstrated, percent of cows on SCC should be increased as rapidly as possible, at least 5 percent per year. Wisconsin DHI studies have shown an average gain of 400 lbs. more milk per cow by halving the SCC average for the herd. The National Mastitis Council estimates the annual cost of mastitis to be $180 per cow per year.

Based upon estimates of the National Mastitis Council and reports from plant test, the average SCC for all Wisconsin cows is 600,000 while DHI herds average only 370,000. Assuming 400 lbs. of milk is worth about $40, cutting average SCC to 300,00 by 1991 would increase gross income by $72 million and labor and management returns by $40 million for Wisconsin's dairy farmers.

Another important index of herd health involves reproduction. Studies have demonstrated that shortening the calving interval by only two weeks increases income over feed cost by approximately $18 per cow. Current average calving interval for Wisconsin dairy farmers is estimated at 13.5 months. Reducing this figure to 13 months by 1991 on 1.8 million cows could increase income over feed cost by $324 million for the state.

Calf losses represent an important cost to Wisconsin dairy farmers. While veterinary and medical expenses are obvious direct costs, death losses represent the largest variable cost in the heifer-raising program. Calf losses erode the opportunity for selection of the best heifers as herd replacements. Currently, calf losses are estimated at 18 percent yearly.

Another health issue is the need to maintain the level of calves vaccinated for Brucellosis. It is estimated that only 5 percent of heifers are now being vaccinated. The goal is to increase this figure at least 5 percent a year to protect Wisconsin herds from a disease outbreak and to maximize the sales value of replacements.

Farm Records, Enterprise Budgets, Computers. Electronic farm records, which provide full accounting and measures of return, enterprise analysis, only cover 1,005 out of 81,000 Wisconsin farms -- barely more than one farm in a hundred. Improved records are essential for business and financial management and for keeping a handle on profitability of Wisconsin dairy farms. Farmers must realize that profit margins are more easily influenced by factors under their control (costs of production) than by the price which consumers are willing to pay. Farmers are more likely to generate a profit by improving record keeping and analyzing farm records than by increasing volume of output. Most Wisconsin farmers will find the use of available computer systems, such as DHI, farm account records and other services, to be a more feasible option than investing money in their own computers and related software. Farm enterprise analysis is extremely important for profitability. It gives answers to basic questions about production alternatives, such as whether to grow or purchase feeds, raise or purchase replacements, how to respond to government programs etc. These questions are especially critical for dairy farmers just getting started, or those who must respond to a debt situation.

Use of Consultants. Larger dairy operations in the South, Southwest and West typically have different personnel in charge of breeding, health care, feed purchasing and formulation, etc. To remain competitive, Wisconsin dairy farmers must obtain management expertise, either on their own efforts or by purchasing services. Multi-person farms may develop this expertise but single-family farms may need to purchase these services. UW-Extension and VTAE should also remain as a primary source of information and management assistance.

New Technologies. Researchers continue to develop new methods. It is UW-Extension's job to bring research findings from the laboratory into use on farms. Early adopters usually gain financially if the new idea succeeds. The next to adopt keep abreast, while the late-adopters are forced to make changes just to remain in the business. New technologies will keep coming on stream and will affect Wisconsin dairy farmers ability to improve profitability and remain competitive. Wisconsin cannot afford to lag behind in the adoption of economical and profitable technology.

Perhaps the single most important means of improving milk potential and profitability of Wisconsin dairy herds is breeding more heifers to AI, high-PD sires -- especially sires known to be superior for calving ease. Currently, less than 20 percent of heifers are bred AI, usually because they are housed away from the milking herd. New technology is available for heat synchronization to enable AI breeding of heifers without the time and inconvenience of natural heat detection. The current loss of offspring from these heifers when bred to beef sires or young dairy bulls seriously restricts the rate of genetic improvement in Wisconsin dairy herds.

Embryo transplants and embryo splitting are new technologies with benefits similar to that of breeding more heifers to top AI sires. Their cost is greater, but they allow faster multiplication of top animals and the opportunity to market these gains. This technology would have long-term impact when sexed embryos are available at an acceptable price.

Few developments have evoked the emotional furor than the possible introduction of Bovine Somatotropin (BST), also known as Bovine Growth Hormone, largely because of the milk surplus and the debt problems of many midwest farms. Some have characterized BST as a threat for survival of the family farm, claiming it would be adopted largely by the operators of large herds in the south and west.

New research data show that BST can increase milk by less than half of original projections. More importantly, this research has demonstrated that the potential of BST to increase milk production is no more dramatic than many other management techniques, including DHI, use of top AI Sires, halving SCC count, three-times-a-day milking and producing more high-quality forage. It is important to note that if BST becomes commercially available, it will be as adaptable, if not more so, on Wisconsin's smaller dairy farms than on the large operations in the South, Southeast and West. This is because Wisconsin dairy farmers have ample supplies of feed at relatively low cost. BST will increase feed consumption as it increases milk production. Optimum profitability from BST will depend upon the ability to measure response of individual cows

and to feed accordingly. Wisconsin farmers with smaller herds have a marked advantage in providing individual care and attention to dairy cows.

RECOMMENDATIONS

67) Wisconsin dairy farmers must apply economically sound and efficient management practices and be leaders in adopting profitable new technology. The following management goals for 1995 should be adopted. To achieve them, farmers should increase their use of UW-Extension, VTAE and private consultants.

Current Status		Goals for Improving Forages and Feeding	Needed by 1995
40%	1.	Increase the percentage of acres planted to recommended varieties of alfalfa.	60%
4.5 tons/acre	2.	Increase alfalfa yield	6.5 tons/acre
15%	3.	Triple the percent of forage harvested by first flower.	45%
50%	4.	Increase the percentage of alfalfa fed as low-moisture haylage	75%
150,000 annually	5.	Triple the number of forage samples tested.	450,000 annually
20%	6.	Increase the percentage of farmers using well-balanced rations.	75%
15%	7.	Triple the number of farmers who segregate herds by level of production and feed protein and grain accordingly.	45%
		Goals for Improving Dairy Management	
41%	1.	Enroll more herds on DHI record programs.	60%
840,000	2.	Enroll one million cows on DHI records.	1,000,000 cows
346,000	3.	Maintain adequate cows on on Official DHI records for genetic improvement and educational programs.	400,000 cows
16,799	4.	Increase average yield of milk for DHI cows	19,000 lbs.
13,800 lbs.	5.	Increase average yield of milk of all cows. by 200 to 300 pounds per year.	16,000 lbs.
13.6 mo.	6.	Reduce the average calving interval.	13 mo.

28 mo.	7.	Decrease the average age of heifers at first calving.	26 mo.
		Goals for Improving Dairy Breeding Practices	
65%	1.	Breed more cows to AI sires.	75%
400 lbs.	2.	Increase the average PD Milk of service sires.	750 lbs.
20%	3.	Increase the percent of heifers bred to AI sires.	50%
13,845 lbs.	4.	Increase the average milk yield of first-lactation cows in DHI herds.	16,000 lbs.
		Goals for Improving Dairy Cattle Health	
60%	1.	Increase the percent of DHI herds using the SCC Option.	90%
700,000	2.	Reduce the Somatic Cell Count (SCC) of milk sold.	400,000
15%	3.	Reduce death losses of calves (birth to 6 wks).	10%
15%	4.	Double the percentage of dairy calves vaccinated for Brucellosis.	30%
25%	5.	Increase the number of DHI herds using the Herd Management Option to improve efficiency of reproduction.	75%

ADJUSTMENTS IN THE DAIRY FARM INPUT AND SERVICE INDUSTRY

Structural change over the next decade will not be limited to the dairy farm sector of Wisconsin agriculture. Agribusinesses that furnish needed inputs and services -- feed, seed, fertilizer, chemicals, farm structures, equipment and machinery -- to dairy farmers have will also continue to undergo considerable structural change. The current farm financial situation has reduced sales volume, increased problems with accounts receivable and reduced net margins for the farm input and service industry. As a result, many relatively small agricultural businesses and cooperatives must continue to fight for survival. Structural change is necessary for economical survival and improved efficiency and service.

Wisconsin has a relatively large number of cooperative and non-cooperative agribusinesses that provide inputs and services to dairy farmers. It is not uncommon for a rural community to have three, four or more firms furnishing the same type of farm inputs or services to the same geographical area. Such competition is good to an extent. But if it results in duplication of expensive services and unnecessary overhead in terms of personnel and capital facilities, prices of farm inputs and services will be higher than necessary. This appears to be the situation in Wisconsin. Many supply and service firms will not survive over the next decade if they choose to remain as independent entities. Their net margins will remain low and could decline further. They will have difficulty offering competitive prices while supporting overhead, capital replacements, etc.

Businesses need some means of providing farm inputs and services at even more reasonable costs, not only for their own survival, but also to enhance the competitiveness of Wisconsin dairying. Dairy farms will demand more services such as feed and nutritional consultants. Smaller farm-supply businesses will be unable to provide such services economically by themselves. Mergers, consolidations, joint ventures or other innovative business arrangements may be necessary. Regional supply cooperatives have recognized the need for greater coordination of efforts. They have entered into mergers, consolidations and joint ventures to reduce duplication of services and overhead and improve efficiency of distribution. These steps have enabled them to improve their own net margins and offer better input and service prices to their farm customers.

Study of mergers, consolidations and joint ventures of the farm input and service industry at the regional and national level needs to continue. More importantly, more of this type of activity should be considered at the local level.

In certain areas of the state, particularly some northern counties, businesses often have trouble getting fertilizer and other inputs to farm

customers on time, particularly during the spring rush. This situation stems both from transportation and inventory problems. Suppliers take on considerable price risk in carrying large inventories from fall to spring. One possible solution would be for input suppliers to adopt pricing policies that encourage farm customers to apply some of their fertilizer needs in the fall. This would lessen the pressure during the spring planting rush and allow more efficient utilization of labor, plant and equipment. Farmers should also study the feasibility of jointly purchasing their own fertilizer spreaders and crop sprayers. Likewise, input suppliers should also study the feasibility of jointly purchasing expensive equipment such as custom fertilizer spreaders and chemical applicators.

RECOMMENDATIONS

68) Cooperatives and other firms that provide farm services, and marketing should consider additional mergers, consolidations, joint ventures and other innovative business arrangements at the national, regional, state and local levels, both to ensure their own economic viability and to be able to offer farmers competitive prices.

69) UW-Extension should expand educational programs that help Wisconsin input suppliers with management, long-range planning, mergers, joint ventures and other innovations that will enable them to supply inputs and services to dairy farmers more efficiently.

PRODUCTION AND MARKETING OF VEAL, DAIRY BEEF AND DAIRY REPLACEMENTS

Wisconsin dairy calves are an important economic resource and offer a strong potential for expanding income from dairying in Wisconsin. It is estimated that the dairy calf replacement, special veal and dairy steer industry has an annual economic impact exceeding $795,000,000 in Wisconsin.

Special Veal

Wisconsin produces over 300,000 special-fed veal calves for markets nationwide. The calves are either slaughtered in five Wisconsin plants or shipped live to slaughtering plants in neighboring states. Production of special veal has developed into an important industry that makes use of surplus calves, milk and animal products.

Competition for replacement bull calves for veal feeding has significantly raised the price of newborn calves, benefiting dairy farmer in the state. It is conservatively estimated that 65 to 70 percent of all young bull calves are purchased by the fed-veal industry. Proper handling of veal calves can have an immediate payoff for Wisconsin dairy farmers. Quality calves bring higher competitive prices and attract more buyers. Currently over 170,000 young dairy bull calves are being shipped to veal barns for feeding in other states.

The veal industry provides an important market for 46,500 tons of solid milk by-products manufactured by plants in Wisconsin. It also supports several veal suppliers and marketing agencies and slaughter plants, creating jobs throughout the state.

Barriers to expansion of this important industry include cyclical price swings, financing, availability of quality calves and consistent markets. Because of market support on prices of newborn calves, the health of this industry is critical to every dairy farmer in the state. Additional research is needed in calf management, medication and marketing.

The primary means by which Wisconsin's special veal industry could expand would be by reducing mortality of newborn calves and by retaining the replacement veal calves now shipped to neighboring states. Expansion in Wisconsin would require a major industry effort to provide financing, education, research, slaughter facilities and market promotion.

Dairy Beef

Wisconsin currently has a shortage of fed cattle to maintain the Wisconsin meat packing industry. Because of the excess slaughtering

facilities, Wisconsin imports an estimated 350,000 fed steers from other states.

Increased feeding of Holstein steers and surplus heifers would provide additional markets for surplus corn and forage production. Wisconsin has several large slaughter facilities and over 200 smaller plants that slaughter and process dairy steers. The state also has modern sausage and fast-food processing plants to add value to cattle processed in the state. Successful programs have been developed by packers, wholesalers and retailers for marketing lean beef from dairy steers.

Continued research is needed on the management and economics of feeding Holstein cattle. Major progress has been made by marketing agencies and packers in reducing financial risk. But cyclical price swings and lack of sufficient profit margins have restricted growth in this industry during the past few years.

Expansion of dairy beef feeding in Wisconsin will require several important programs with the following goals:

1. Develop more professional growers and backgrounding operations to provide uniform calves for feeding.
2. Develop production-marketing systems that coordinate feeding, financing and marketing.
3. Conduct research and field demonstrations to determine the most profitable production and marketing methods.
4. Reduce calf mortality through improved management and health programs to provide more calves for feeding.
5. Develop an effective educational program for feeding and management of Holstein calves and steers to provide alternative sources of income for milk producers and part-time farmers.

Dairy Herd Replacements

Wisconsin farmers have historically provided quality dairy cattle replacements in the national and international trade. During the past year Wisconsin exported 169,342 dairy cattle to other states and 13,649 cattle to other countries. Recent dairy legislation that encouraged the reduction of dairy herds has affected replacement markets. It is difficult at this time to predict how future dairy policies will affect replacement sales.

Expansion of dairy herd replacement sales will depend on maintaining strong and effective health programs and a quality image. Selling replacements also requires sufficient promotion and advertising through national and international programs.

The Wisconsin dairy industry will need to continue to expand promotional efforts, including the World Dairy Expo. Wisconsin also needs to maintain sufficient transportation facilities for out-of-state and international shipments.

In summary, the greatest potential for expanding dairy beef income is

in the marketing of surplus calves not needed for herd replacements or the dairy heifer replacement market. Several critical problems must be solved and significant actions taken to capitalize on this opportunity.

Recommendations

70) The Wisconsin dairy industry should develop accelerated programs to reduce calf mortality, to improve quality, quantity, uniformity and marketing conditions of calves utilized by veal and dairy beef industries. To achieve this goal, the following should be considered.

- A statewide educational program supported by research should be initiated to reduce the death loss of baby calves estimated to exceed 15 percent or 300,000 calves.

- Eliminate the discrimination against fed Holstein beef and veal because of color quality, texture, tenderness and conformation, perceived or actual that results in price differential to producers and packers.

- Increased emphasis must be provided to improve the managerial techniques for starting, growing and backgrounding calves.

- Statewide research based educational programs should develop management systems and demonstrations to increase the availability of uniform started calves.

- Research should be conducted on uniform nutritional ingredient guidelines, labeling, standards and certification required to produce high-quality veal.

- Emphasis should be given to the development of safe, effective and approved medication for calves.

- Efforts should be expanded to provide additional financial support, incentives, market coordination and risk reduction to improve the profitability of the veal and dairy steer feeding industry in the state.

- That the State of Wisconsin continue to encourage the maintenance and expansion of an effective competitive marketing and processing system for dairy calves, replacements, special veal, dairy steers, and cull cows and access to national and international markets for dairy herd replacements.

- The Wisconsin dairy industry should develop an accelerated program to reduce dairy calf mortality and improve the quality, uniformity and market condition of Wisconsin calves.

FARM TAXES - PROPERTY, INCOME AND DEATH

FARM PROPERTY TAXES*

The Wisconsin agricultural property tax has increased dramatically over the past decade. The agricultural property tax increased 202 percent from 1973 to 1984, compared to the state average increase of only 122 percent. Between 1973 and 1981 the agricultural property tax increased by almost 10 percent or more per year, a more rapid increase than the total state property tax in every year. As a result, the agricultural property tax as a percent of the total state property tax increased from about 9 percent in 1973 to about 13 percent in 1981, and agriculture's share remained at about 13 percent through 1985.

The important question is, "Are Wisconsin dairy producers at a competitive disadvantage because property taxes are too high?" Although it is somewhat difficult to compare agricultural property taxes among various states because of differences in definitions of a farm, land values and productivity of land, the various state comparisons indicate quite clearly that property taxes place Wisconsin dairy producers at a competitive disadvantage with other key dairy states.

Property tax as a percentage of gross farm income was fairly constant in Wisconsin over the period 1970-1982. Except for 1971 and 1983, the agricultural property tax has been about 4 percent of gross farm income. When data for 1985 are released one would expect to find the property tax increased as a percent of gross farm income simply because farm income fell in 1985. For this same period, Wisconsin agricultural property tax was about 13 percent to 16 percent of net farm income. Thus, property tax takes a significant bite out of net farm income in Wisconsin.

In comparison to other states, Wisconsin property tax as a percent of gross farm income is among the highest in the nation, but by no means at the top. The tax as a percent of gross income is higher in many northeastern states and in such midwestern states as Michigan and Illinois. Of the five leading dairy states -- Wisconsin, California, New York, Minnesota and Pennsylavnia -- only New York is higher than Wisconsin. Wisconsin is higher than other growing dairy states,

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* Material drawn from "The Property Tax and Agriculture," by Richard Barrows, Department of Agricultural Economics, University of Wisconsin-Madison, Cooperative Extension Service, University of Wisconsin-Extension.

including North Carolina, South Carolina, Georgia, Florida, Texas, Idaho and Washington.

Wisconsin producers also pay more property tax per acre than producers in most other states. For 1983, all neighboring states except Michigan had lower property taxes per acre (Appendix G). Again, except for New York, Wisconsin property taxes per acre were higher than the other five leading dairy states. Property taxes per acre were considerably higher than all of the southern and southeastern states.

When measuring property tax per dollar of property value, Wisconsin is again among the highest in the nation.

Property tax may also be expressed as a percentage of cost of production. In 1983, the property tax was a larger percentage of the costs of production in Wisconsin than in all other states except for Michigan, Illinois and a few northeastern states. Compared with other dairy states, the tax as a percent of cost of production was twice that of California, over 50 percent higher than Florida and Minnesota, and comparable only to New York.

In conclusions, the higher level of agricultural property tax in Wisconsin means Wisconsin producers are at a competitive disadvantage compared to producers in other states. Since the largest share of the property tax is used to finance public schools, any possible solution must consider alternatives to financing public education. But reducing property taxes does not reduce the cost of public education nor state costs of other public programs and services. Reducing the overall tax burden will require holding state government spending by prioritizing spending needs and funding accordingly, and studying the feasibility of additional user fees.

RECOMMENDATION

71) Wisconsin property tax puts Wisconsin dairy farmers at a competitive disadvantage compared to other dairy states. Therefore, the state legislature should reduce this tax burden on Wisconsin farmers. Since the largest share of the property tax goes to finance public schools, and since Wisconsin relies more heavily on the property tax to fund public elementary and secondary education than most other states, Wisconsin should find other means of funding public education. The Wisconsin Dairy Task Force supports in principle the tax reform approach of the Wisconsin Coalition For Property Tax Reform.

INCOME TAX

Tax legislation signed into law in October, 1986 will have a significant impact on dairy farmers. Some of the changes will cause some painful short-run adjustments, but on balance probably will be good for the industry over time. More business decisions will be made on the basis of economies rather than income taxes. Some outside investment by non-operators may be discouraged and capital may not flow as freely toward agriculture. Thus, federal tax changes may be an advantage to

Wisconsin dairy farmers in the long run. At least they will not be at a competitive disadvantage.

RECOMMENDATION

72) Wisconsin should simplify its income tax by more closely following the federal regulations or taking a percent of the federal tax. In addition, Wisconsin should use the income tax as a revenue-raising device and not to attempt to direct social and economic change.

DEATH TAXES

Neither federal estate tax nor the Wisconsin inheritance tax puts a major strain on modest estates, which would include the total investment required to put one family into the dairy business debt-free if the farm passed to a family member, and would incur only a modest debt load to a non-related person. It is highly unlikely that any Wisconsin farms would have to be sold because of death taxes if there is a reasonable group of people receiving the bequest and the farm is a viable economic unit.

Nevertheless, recent data indicates Wisconsin ranks 8th among the states in per capita inheritance and gift taxes and that its per capita inheritance/gift tax collections were 72 percent higher than the national average.

The negative effect of our inheritance tax is out of proportion to the revenue it generates. By encouraging those with larger estates to change their legal residence, the state loses both human capital and revenue generated from other sources.

At the same time, some holders of large estates, particularly farmers, find it difficult to escape the inheritance tax. How does one move a business derived from the land? In effect, farmers are captive victims of the inheritance tax, while others can easily escape.

Positive changes have been made in recent years, but Wisconsin is still not competitive with other states in its inheritance tax burden.

RECOMMENDATION

73) To gain a competitive edge and to retain capital and human resources, Wisconsin should adopt a "pickup tax" or "gap tax" designed to capture the state death tax credit against the federal estate tax.

ESTABLISHING A CONSENSUS FOR WISCONSIN'S DAIRY INDUSTRY

The profitability and competitiveness of Wisconsin's dairy industry will continue to be influenced by state and national legislation and regulation as well as by the debate on other key issues, including food safety, animal welfare, waste management, international trade negotiations and the like. The state's agricultural industry must have adequate and effective input into policy issues, legislation and regulation. It must also be able to respond effectively to other issues that have an economic bearing on the industry. To have this kind of influence, Wisconsin's dairy industry must be able to reach a consensus, and speak with a more harmonius voice.

There are distinct differences in philosophy and a diversity of opinions regarding policy and related issues among producers, dairy organizations and other groups. Yet all are primarily interested in the profitability and economic well-being of Wisconsin's dairy industry. A diversity of opinions and ideas is healthy and can generate constructive solutions to problems. Yet at some point there needs to be more of a consensus on what action will be best for the state's dairy industry. Currently, the state lacks a mechanism for bringing about such a consensus. As a result, policy makers, and state and federal legislators get mixed signals and may be confused as to what action should be taken.

There is also a lack of involvement on the part of farmers and dairy-related industries in both state and national issues that may affect the economic well-being of the state's agriculture. Farmers need the opportunity to provide input on policy, regulatory decisions and related issues. In many cases this opportunity already exists through the various organizations. But there are many farmers who either choose not to belong to any farm organization or choose not to take an active part. There no doubt are several reasons. Some farmers don't fully understand the complex problems facing agriculture, nor do they understand the alternative solutions. Others lack the time to get involved, or believe that the various farm organizations will never agree on one common approach. There are other reasons as well.

RECOMMENDATIONS

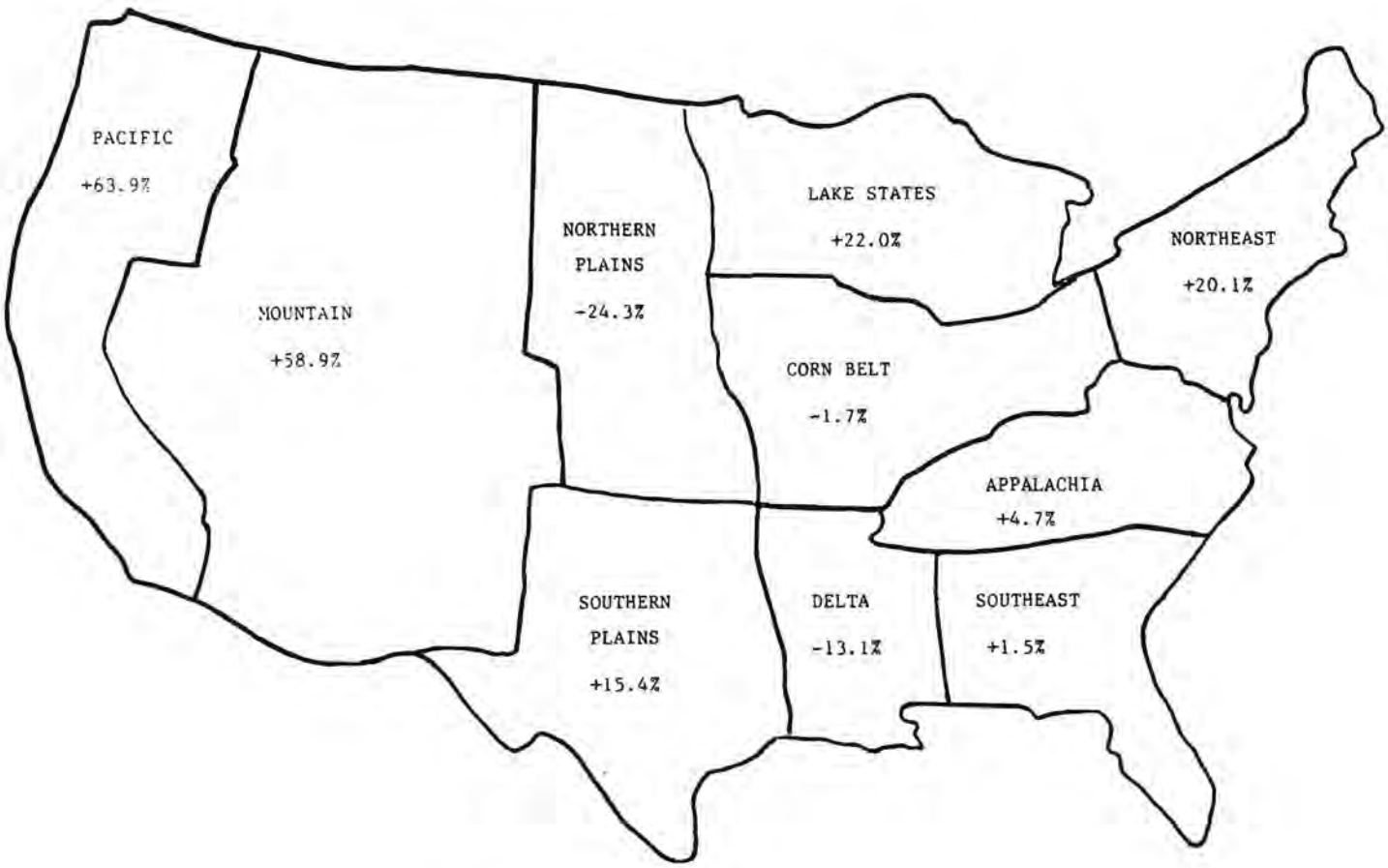
74) Wisconsin's educational, research and extension programs should place a high priority on marketing and policy issues. Additional marketing and policy should be incorporated into the curriculum of high school vocational agriculture, VTAE and four-year collegiate educational programs.

75) The Wisconsin Secretary of Agriculture, Trade and Consumer Protection should establish a dairy council composed of producers, processors and marketers, suppliers of inputs and

services, representation from University of Wisconsin's colleges of agriculture and other dairy-related interests. The purpose of the council would be to improve the communication and create a useful dialog between those who have a major interest in and directly depend upon the economic well-being of Wisconsin's dairy industry. The council should establish a common agenda of important dairy issues at the state and national level with the objective of establishing a more harmonious voice for Wisconsin's dairy industry.

APPENDIX A

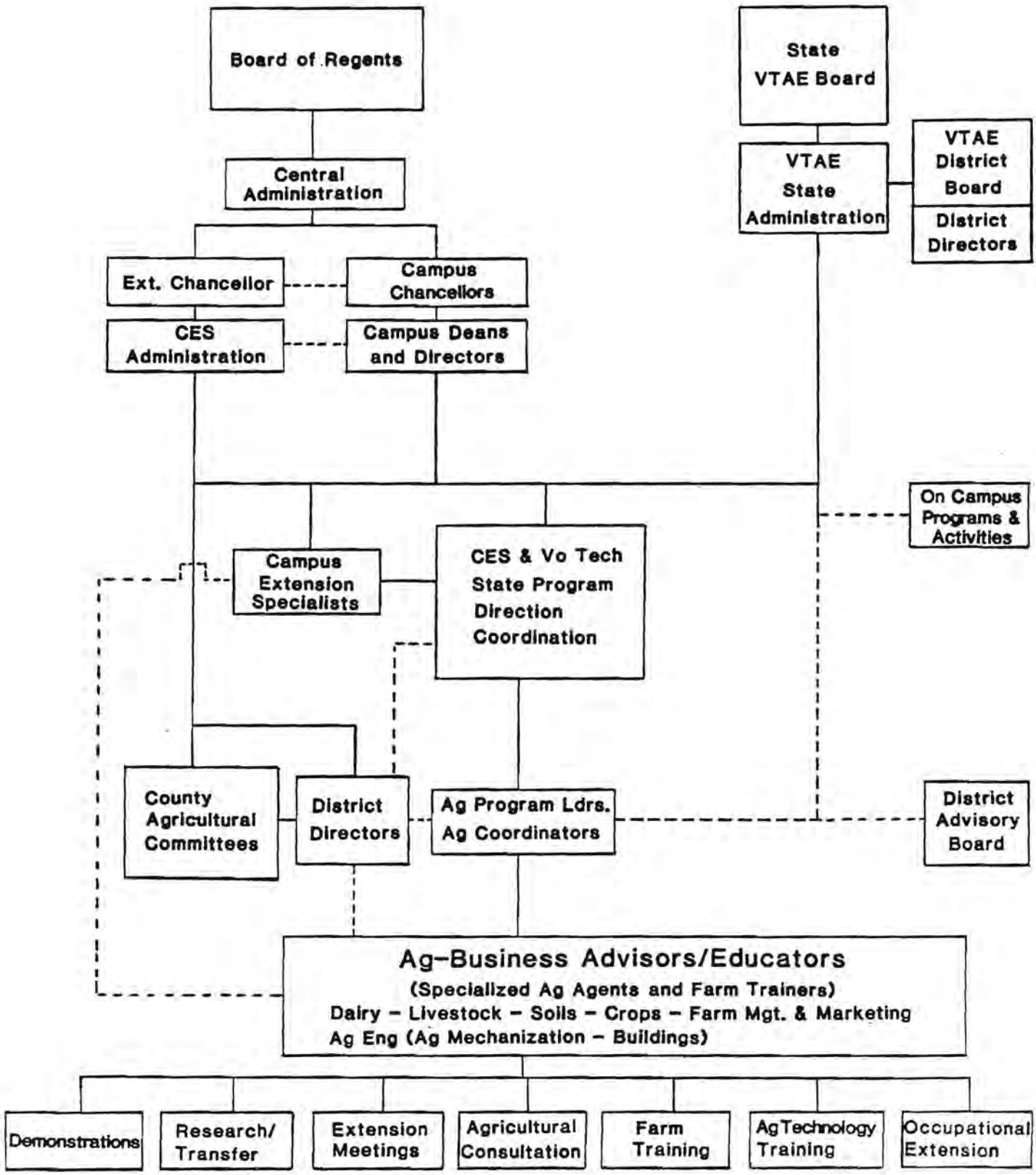
1972 - 1986 CHANGE IN MILK PRODUCTION



1972-1986 U.S. Change = 20.2%.

APPENDIX B

COORDINATION OF AGRICULTURAL EXTENSION - EDUCATION - TECHNICAL TRAINING



Contractual Arrangements and Memoranda of Agreement will be Completed to Facilitate Coordination and Meet the Missions of the Agencies Involved.

APPENDIX C

STATEWIDE SPECIALIST STAFF NEEDS IN AGRICULTURAL ECONOMICS, DAIRY SCIENCE AND VETERINARY SCIENCE

Subject Matter	Full-Time Equivalents (FTEs) Current (1987)	Need
* feeding/nutrition	2.12	3.00
* breeding/genetics	1.36	1.50
* reproductive physiology	--	1.50
* lactation physiology	.70	1.50
* cattle/herd management	--	1.00
* systems management/production economics	--	1.00
* animal health/disease control	.40	1.50
* business/financial/legal management	2.10	2.50
* marketing/public policy	1.00	2.25
* youth programs	1.00	1.00
	8.68	16.75

In addition, faculty/staffing dairy-related disciplines including agronomy, agricultural engineering, entomology, food science, meat and animal science, nutritional science, plant pathology, and soil science will contribute importantly to the accomplishment of the educational goals and objectives.

APPENDIX D

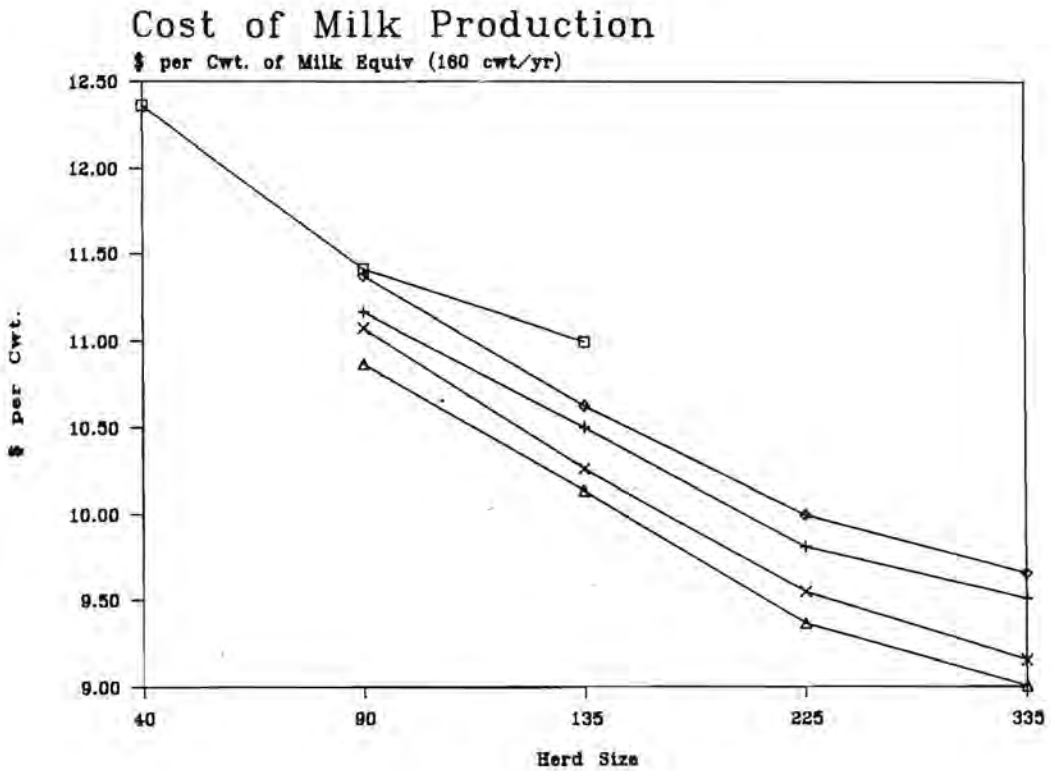
PROPOSED CES AND VTAE FIELD STAFF GEOGRAPHIC CLUSTERS

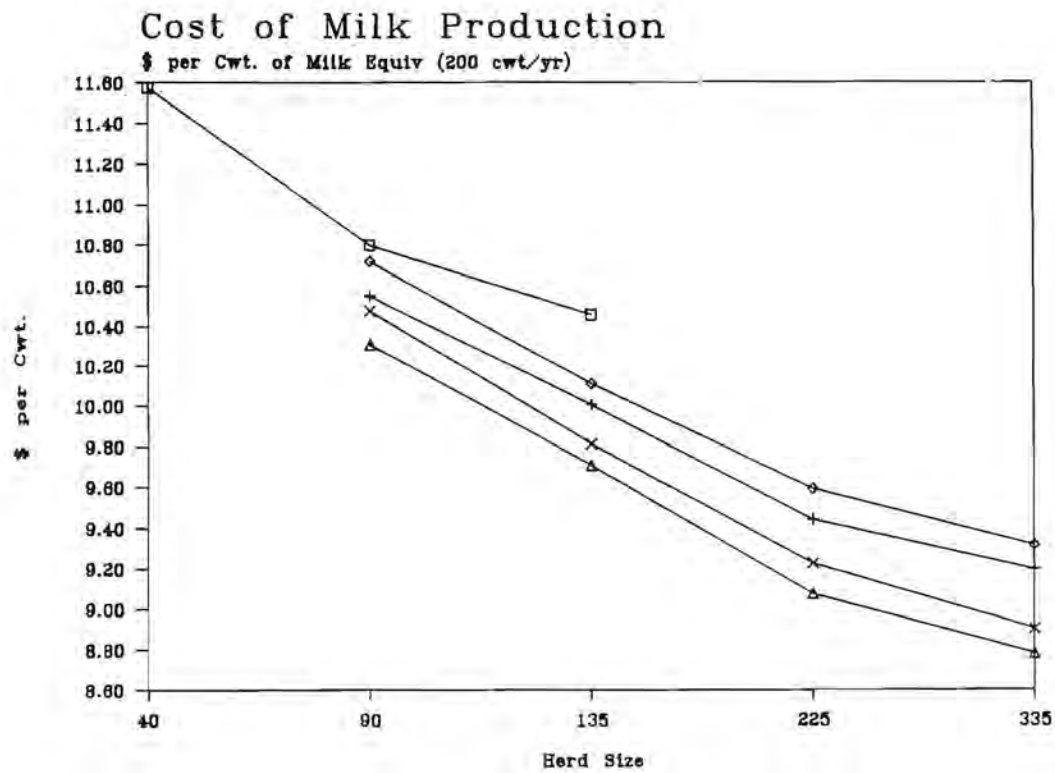
Area	
1	Ashland, Bayfield, Burnett, Barron*, Douglas, Iron, Polk, Rusk, Sawyer, St. Croix, Washburn
2	Buffalo, Chippewa, Clar, Dunn, Eau Claire*, Pepin, Pierce
3	Langlade, Lincoln, Marathon*, Menominee, Price, Taylor
4	Forest, Oneida*, Vilas
5	Brown*, Door, Florence, Kewaunee, Marinette, Oconto, Shawano
6	Calumet, Outagamie*, Waushara, Waupaca, Winnebago
7	Manitowoc*, Sheboygan
8	Dodge, Fond du Lac*, Green Lake, Washington
9	Milwaukee*, Ozaukee, Waukesha
10	Kenosha*, Racine, Walworth
11	Green, Rock*
12	Columbia, Dane*, Jefferson, Marquette, Sauk
13	Crawford, Grant*, Iowa, Lafayette, Richland
14	Jackson, Juneau, La Crosse*, Monroe, Trempealeau, Vernon
15	Adams, Portage, Wood*

*VTAE District Headquarters

APPENDIX E

COST OF MILK PRODUCTION AT 160 CWT. AND 200 CWT. PER COW PER YEAR

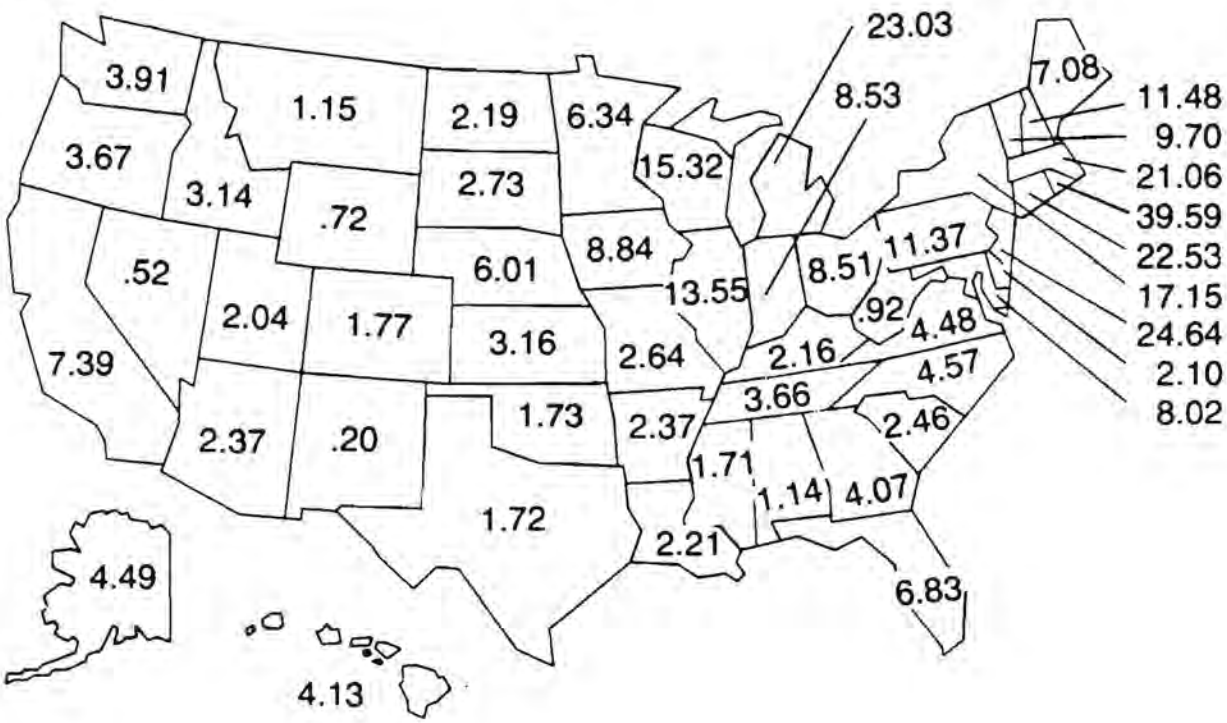




APPENDIX F

FARM REAL ESTATE TAXES PER ACRE

Dollars



Average, 50 States: $4.32

1983 revised.