

Milk industry could go the way of the tomato industry... Here's how:

The evolution of the milk industry has some striking resemblances to the developments in the tomato industry. In essence, the tomato industry has developed into two separate sectors--fresh market and processing sectors --each with specific varieties of tomatoes and distinctive characteristics.

Tomatoes for the fresh market are produced in every state, while production of tomatoes for processing is highly concentrated, with 95% grown in California.

In the 1950s, 33 states grew processing tomatoes and California's share was only 55 percent of the market. Development of mechanical harvesting equipment and tomato varieties able to withstand mechanical harvesting led to concentration of the industry in California. The long growing season, advanced irrigation systems and dry harvesting weather combined with other natural advantages to help the Golden State come to dominate the U.S. market.

Development of bulk storage technology and transportation allowed processed tomato products to be manufactured year round and processors in the Midwest and East serve as final fabricators of processing tomatoes grown and partially processed in California.

While the milk industry is unlikely to be differentiated to such extremes, the evolution of the tomato industry provides food for thought as milk producers ponder the future.

--Charles Ling, USDA Rural Development Economist

New technology: opportunity & challenge: technology changes could turn milk plants into 'dairy refineries'

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www.rurdev.usda.gov/rbs/pub/newpub.htm

Recent technology developments and evolving technology now on the horizon will create new uses for milk, and new dairy ingredients and products. New manufacturing processes will create opportunities for further growth of the dairy industry. But along with these new opportunities come challenges.

In a future that is driven by technology, dairy cooperatives will face challenges in four primary areas: (1) research and development; (2) product development and marketing; (3) acquiring manufacturing and processing technology; and (4) equity financing.

Technology could create "milk refineries"

Two aspects of modern technology are becoming vitally important for the future of the dairy industry: (a) filtration technology for fractionizing milk components, and (b) processing technology for making dairy products using dairy-based ingredients with only limited amounts of fresh milk. Wider adoption of these technologies will likely cause further restructuring of the milk industry, presenting dairy cooperatives with many challenges and potentially rewarding opportunities.

Filtration is the use of semi-permeable membranes to separate and "harvest" milk components for uses as ingredients in various foods, beverages and nutritional or pharmaceutical products. Milk protein concentrate (MPC) is one such ingredient.

Technological advances in the future may transform milk plants into milk "refineries" that can fractionate milk components into all kinds of desired dairy ingredients.

In addition, advances in processing technology may allow the use of dairy ingredients combined with only a small amount of fresh milk to manufacture dairy products. An example of this is a patented "wheyless process" for production of mozzarella cheese. This process allows cheese to be manufactured from non-perishable or dried, shelf-stable dairy ingredients.

Developments in filtration and processing technology combine to allow greater flexibility, in the location of cheese manufacturing facilities because handling and/or transporting large quantities of fresh milk is not required. Also, the need for refrigerated storage of fresh milk is minimal. Several other wheyless-process patents also have been recently granted for making various other dairy products from dry ingredients.

The proliferation of this type of manufacturing process technology using dry ingredients is going to alter the dairy landscape in a profound way. A plant making cheese (or other dairy products) from mostly dry ingredients can then be located almost anywhere, with no need to be close to dairy farms. The plant would no longer need to deal with producer payrolls, milk hauling, weather-induced intake variability, seasonality of milk production and composition, seasonal inventories of cheese, etc. This development will have great implications for milk producers and their cooperatives, especially in regard to cooperatives' roles in the supply chain.

Domestic MPC has non-price advantages

Among dairy ingredients that are currently of particular interest to dairy producers are MPC, MPC/casein, casein and caseinates. These are used in the manufacture of cheese products, nutritional supplements and other dairy and nondairy foods.

Until recently; there was no domestic production of MPC, casein or caseinates in the United States. Milk prices in the United States are high enough that domestic production of these products cannot compete with imports based on price. Other protein products,

however, such as whey protein concentrate (WPC) and other whey products, can compete very well with foreign production because whey price is not regulated.

However, domestic milk-protein production may have some advantages over imports, despite its higher price. These advantages include fresher protein products at a lower transportation cost to customers, better customer services due to proximity to end-users, and the ability to supply protein products in wet form or caseinates made from fresh milk.

Based on the profitability, of milk production, the western United States is the region that is most certain to see continued growth in milk production and could support new plant capacity. This is the region where new milk-protein plants will likely be located. Indeed, the first plants in the United States for MPC production are located in Tempe, Ariz., and Portales, N.M.

One of the important functions of dairy cooperatives is supply-balancing and last-resort processing of surplus milk. Making milk protein ingredients would be an alternative outlet for such milk. Dairy cooperatives are certainly going to play a prominent role in a milk-protein ingredient sector if it becomes economically feasible to produce such products domestically.

Cooperatives also are end-users of dairy ingredients. Some have been making non-traditional dairy or related products either to satisfy consumers' shifting demand or to offer a complete line of products to customers. In most cases, the non-traditional products are dairy-based, and dairy ingredients constitute the major share of the manufacturing inputs.

R&D key to market niches

Research and development is the foundation of manufacturing and processing technology, product development and marketing. Through their dairy check-off dollars (an assessment on milk production that funds dairy research and promotion), dairy farmers have supported many research projects that advance processing technology and product development. However, only through a cooperative's own proprietary research and development efforts can it identify and fully grasp market niches and bring new products to the market.

New products may be developed by modifying the flavors, taste, colors, forms, packaging or shelf-life of existing products, or by fortifying them for desired functionality. Product development also refers to using dairy ingredients (or dairy products as ingredients) to develop or improve existing foods and beverages.

Marketing new consumer products requires market research, test marketing, advertising and promotion, consumer education, shelf-space acquisition, merchandising and servicing the products. Substantial costs are associated with each of these activities. In marketing new dairy ingredients, the challenge is to provide end-users (processors) with information on the attributes, the functionality and the application of the ingredients.

To differentiate value-added products and gain competitive advantages, cooperatives also must devote adequate resources to develop or acquire processing technology, and adopt new ways to manufacture or package products, or to enhance the particular attributes of their products. The other aspect of processing technology development is finding new ways to make existing products, such as the wheyless process for making mozzarella cheese.

Editor's note: This article is based on Dairy Co-op Growth Challenges, Research Report 206. The complete report is also available on the Internet at: [The evolution of the milk industry has some striking resemblances to the developments in the tomato industry](#). In essence, the tomato industry has developed into two separate sectors--fresh market and processing sectors --each with specific varieties of tomatoes and distinctive characteristics.

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RELATED ARTICLE: The ultimate R&D challenge: financing new technology.

Machinery and equipment are the embodiment of new manufacturing technology. Cooperatives usually acquire new manufacturing technology by purchasing equipment. There are considerable economies of scale associated with the new equipment technology. However, as the scale of dairy plants grows larger, the cost of building a new plant with new machinery becomes more substantial. The plant also requires a large milk volume to sustain the operations.

Financing is the ultimate challenge that will enable producers and their co-ops to meet these challenges.

A dairy cooperative's debt financing may work much the same as for any business. Its equity financing, however, is unique and may have one or more of these features:

- * common stock held by cooperative members (usually of nominal value);
- * retained patronage as net savings allocated to members based on patronage but retained for operations;
- * capital retains that are milk payments but are withheld at a certain rate per hundredweight of milk;
- * retained earnings that are earned on non-member business. Members must treat retained patronage and capital retains as income for tax purposes. These retains are revolved back to members after a certain period of time.
- * In lieu of retained patronage and capital retains, a cooperative may have a base capital plan. Under the plan, a target base capital level is established at a rate per hundredweight of milk marketed during a representative period.

Managing a cooperative's equity financing is a unique business challenge because of three often-competing forces:

1. Members want minimal retains held back from their patronage checks and as short a revolving period as possible;
2. The cooperative needs an adequate amount of capital for operations;
3. Lending institutions require the cooperative to maintain a certain level of equity.

The base capital plan may be viewed as a compromise among the three conflicting interests. Under the plan, once the prescribed base capital level is attained, a member can expect to receive all allocated patronage earnings in cash. The cooperative would have an adequate level of capital to operate with, and the base capital would have a certain degree of permanency that helps relieve lending institutions' concern about risk.

Debt financing increases

From 1997 to 2002, average cooperative equity increased by 3 cents per hundredweight, while assets increased by 97 cents and liabilities increased by 95 cents per hundredweight. Contributions by cooperative member-producers to the increased capital needs were minimal, so cooperative growth was mostly financed by debts.

Various alternative equity financing methods have been used to reduce cooperative members' fiscal burden and investment risks, including: public stock corporations, limited liability companies (LLC), joint ventures and new-generation cooperatives.

It is difficult to operate a public stock corporation or LLC on a cooperative basis because of one or more of the following:

- * Investor interests may conflict with the one-person, one-vote democratic control of cooperatives;
- * Producers support the cooperative's business by patronizing it, investors do not;
- * With investor capital, the cooperative is likely to lose Capper-Volstead status;
- * In a dairy cooperative, the distinction between milk pay prices and premiums vs. profits is not clear-cut, and conflicts between producers and investors may be very difficult to reconcile;
- * Investors' focus on returns on investment may create fundamental conflicts with a co-op's mission to provide benefits for member-producers.

The new-generation cooperative model has strengths, including a strong market orientation, and the ability to raise investment capital from members for specific projects and to provide members with greater flexibility in marketing their equity if they leave the co-op. But these co-ops have also had their share of problems (see pages 15-19 in the Jan-Feb. 2001 issue of Rural Cooperatives, archived at: www.rurdev.usda.gov/rbs/pub/openmag.htm).

The joint-venture model has worked well for many co-ops, some of which are organized as LLCs.

On the marketing side, a joint-venture LLC may be used by a cooperative and its partner to develop and market certain dairy products. The cooperative supplies milk to the LLC while the partner supplies technical and marketing know-how. The joint-venture partners share the financing and the risk of the business activities of the LLC. This organizational model reduces the financing burden and risk exposure of cooperative members, while a market outlet for milk is secured.

The promising rewards of adapting to new technology can be exciting, but the necessary industry adjustment can be challenging for dairy farmers and their cooperatives. Success will depend on adequate member equity capital, well thought-out strategic plans and research and development.