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Factors that Drive Dairy Expansion

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This fact sheet is one in a series intended to answer — with science-based land-grant university research — questions frequently asked by the public about issues and needs affecting agricultural growth, urban expansion, and rural community development in South Dakota.

Consolidation of dairy farms into larger operations continues in the U.S. South Dakota is a part of this expansion; the state has seen a dramatic decline in the number of dairies that milk fewer than 100 cows and an increase in the number that milk more than 100 cows. One reason for this trend is “economy of scale.” Typically—but not always—more cows provide a better return on investment in land and facilities. In South Dakota, another prime reason is the close-by availability of affordable feedstuffs. Another reason for expansion, as valid as the desire to financially succeed, is the desire of producers to improve the quality of life for their families.

Consolidation to fewer but larger dairies has been constant in the U.S. during the last few decades:

- The average U.S. dairy herd size was approximately 15 cows in 1965 and 70 in 2000.
- In 1998, 46.5% of the dairy cows in South Dakota were in operations of 100 cows or more. In 2003, 63% of the cows were housed in this size of operation.
- South Dakota large dairy operations (defined as 500 cows or more) accounted for 26.5% of total milk cows during 2003 compared to 11.5% in 1999 (5).
- Since 1999, 40% of South Dakota farmers with less than 99 cows have quit dairying, while 88% of those with 100 to 499 cows still remain in business.
- The number of herds with 500 cows or more has doubled between 1999 and 2003. Not all South Dakota dairies with more than 500 cows are the result of expansion from smaller to larger operations; some are start-ups.
- New dairies that relocated to the state between 1999 and 2003 represented 13% of the total number of South Dakota dairies with more than 100 cows in 2003.



What drives producers to expand or relocate?

Since 1965, dairy farm numbers across the country have fallen by nearly 90%, from almost 1.2 million to 120,000. South Dakota is among several states in which efforts are being made to attract and energize dairy operations.

A new cheese factory and expanded existing facilities have attracted producers from other states to South Dakota. Close to 65,000 additional cows are needed to supply milk for these manufacturing plants to work to capacity.

A market for the milk produced on the farm is the prime factor in a decision to relocate or expand. Other factors include proximity to population centers; the availability of feed, labor, services, and other inputs; weather within the comfort zone of the cow; the regulatory environment; and the state's tax structure.

Also important relocation factors for new dairies are the availability and the quality of a fresh water supply, availability of land for waste management, and the average price of milk (8).

Owners of 405 dairies from South Dakota, Iowa, Illinois, Idaho, New Mexico, Ohio, and Wisconsin recently completed a Southern Illinois University-Carbondale (SIUC) 2-year project evaluating the factors that drive dairy expansions or start-ups (2). Of the 405 participants, 11% were from South Dakota.

A market for milk and its co-products was ranked most important of the 42 items rated by all dairies in all states surveyed. The Extension Service received the tenth highest rating (of 42 ranked items) of importance. Assistance in obtaining licenses and permits and guaranteed loans were positive but to a lesser extent than Extension and university research. "Very positive" for South Dakota respondents to this survey were ease of compliance with health regulations, land availability, and land prices.

Just over half (51%) of dairies participating in the survey had herds of 100 cows or less; 34% had between 100 and 1,000 cows, and 15% had more than 1,000 cows. One revealing aspect of this project was the average age of the operators—46 years with 25% older than 54. If we consider that nearly half of dairies owned by older producers milked 100 cows or less, the main constraint to sustainability becomes the transfer of the dairy to the next generation. Small dairy farms are very often a husband-wife operation that can rarely sustain two households. In another survey, Michigan State University scientists found that almost all small dairies, whose operators averaged 49 years old, faced farm transfer concerns. Large-scale dairies, on the other hand, usually involved partnerships of family members or other individuals.

What difference does size of dairy make?

Responses to the SIUC survey were grouped into three size categories: less than 100 cows, 101 to 1,000 cows, and more than 1,000 cows. Small and large dairies rated recruiting activities and guaranteed loans more positive than did medium dairies. Small dairies rated tax breaks higher in importance for expansion than did the other two groups. Large dairies rated labor training higher than the other two groups.

All participating South Dakota dairies rated land prices, property taxes, and other fees as positive elements in expansion. Over-all, results from all seven states suggested that economic and social factors were important drivers in expanding or locating a dairy.

What part does cost of milk production play?

Any enterprise has to return profits to stay in business, and dairy farms are no exception. But it isn't only greater returns on investment that drive producers to expand. Wisconsin dairy producers who modernized their operations had positive feelings about their expansion experiences, increased production and improved profitability, and quality of life (1).

In 2003, the Wisconsin Center for Dairy Profitability conducted a survey of 652 dairy farms (7). Average herd size was 123 cows, similar to the South Dakota average. Wisconsin herds were producing 21,346 lb per cow and per lactation, a figure that exceeds by almost 5,000 lb that produced in South Dakota.

The average total cost of milk production for the Wisconsin herds was \$12.77, while the average U.S. milk price was \$12.50. The four largest cost categories were 1) purchased feed (22%), 2) hired and family labor wages and benefits (11%), 3) building, machinery, and equipment depreciation (9%), and 4) farm interest payments (6%). According to the survey, production costs exceeding milk prices have occurred in 8 out of the last 10 years.

One of the biggest problems dairy farmers face today is extreme volatility in milk prices. Prices paid between 1999 and 2003 for South Dakota milk (which receives premiums for volume and quality) are shown in Figure 1. The dotted line represents the cost of production reported by the University of Wisconsin Center for Dairy Profitability.

It is apparent that every other year, dairies made some money (best year being 2001: $15.61 - 12.77 = \$ 2.84$ per each hundred lb of milk), whereas they lost money every following year. A 120-cow dairy producing 16,500 lb/cow (305-day lactation) and thus

Table 1. Production parameters for 644 Wisconsin dairy herds (2003).

Range in herd size	50 cows	51-75	76-100	101-150	151-250	250 cows
Avg cows/farm	42	63	87	123	192	482
Milk sold/cow	18,103	19,881	20,154	21,033	20,532	23,268
Crop acres/cow	5.1	5	5.1	4.3	3.1	2.2
Crop acres farmed	214	315	444	529	595	1,060

Source: J. Vanderlin, 2004.

shipping 1,980,000 lb yearly would have net returns of \$56,232 during the best year, 2001. For the 5-year period of 1999 to 2003, this dairy would have netted an average of \$22,255 per year from milk sales.

Researchers at Michigan State University say that "bigger farms are apparently more profitable," and "farm milk price must be \$12.50 or more if farms with fewer than 100 cows are to replace their deteriorating capital and make a slight profit" (3). The only possible option to dilute fixed costs is to ship more milk off the farm. This could be done by increasing cow productivity in the same facility or by milking more cows through expansion.

However, most of those farms in the survey had been in the family for decades. Barns and milking facilities needed improvement, which implies capital investment that might further deteriorate their equity.

Do larger dairies produce more milk?

In the SIUC survey, dairies that expanded their operations to an average of 513 cows went from 18,024 lb milk per cow in 1997 to 20,095 lb during 2003. Michigan has also seen a persistent increase in the scale of surviving dairies, paralleled with a steady increase in per-cow productivity, from about 12,000 lb in 1979 to over 19,883 in 2002. In just one decade, cow productivity increased in South Dakota from 12,257 in 1990 to 16,020 lb in 2000.

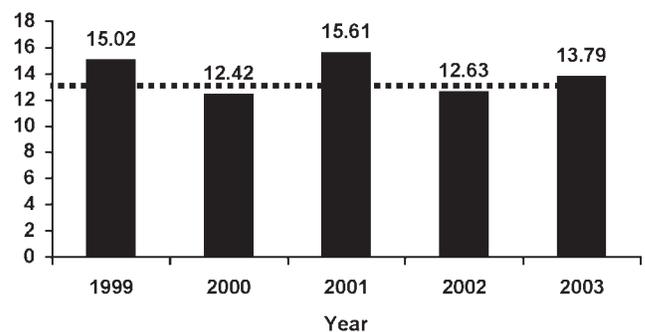
There is a positive correlation between good management and higher milk production per cow, whether the dairy operation is large or small. There is also a positive relationship between the number of cows milked and production per cow; larger dairies usually make more intensive use of facilities and labor and have better access to the capital to buy new, more efficient technology.

Efficiency of land utilization

It is generally agreed that 2 to 3 acres of cropland are needed to raise the feed—grain, silage, and alfalfa—for one dairy cow. Table 1 shows the land utilization efficiency for operations of various sizes. Dairies with 42 cows and 482 cows produced 3,550 and 10,576 lb per acre, respectively. The owners of the smaller dairies may be using the additional land for crops that will not be used in dairy production. However, from a strictly milk production perspective, to produce the higher amount of milk the 42-cow dairy would need to support two additional cows on every 5.1 acres to match the output of the larger dairy. This would have an impact on the nutrient load in the environment, as more manure would have to be spread in 1.7 acres instead of 2.2 acres as in the larger dairy.

A study of New York dairy farms showed similar results. Large dairies (582 cows) produced 11,750 lb of milk per acre compared to 4,870 lb for smaller dairies (47 cows). The study concluded that land was used 251% more efficiently by large dairies.

Figure 1. Five-year annual average milk price, South Dakota.



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