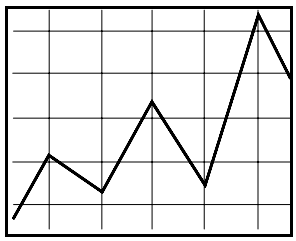
MARKETING AND POLICY BRIEFING PAPER



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RETHINKING DAIRYLAND

Chapter 2

Wisconsin and U.S. Dairy Industry Trends[1]

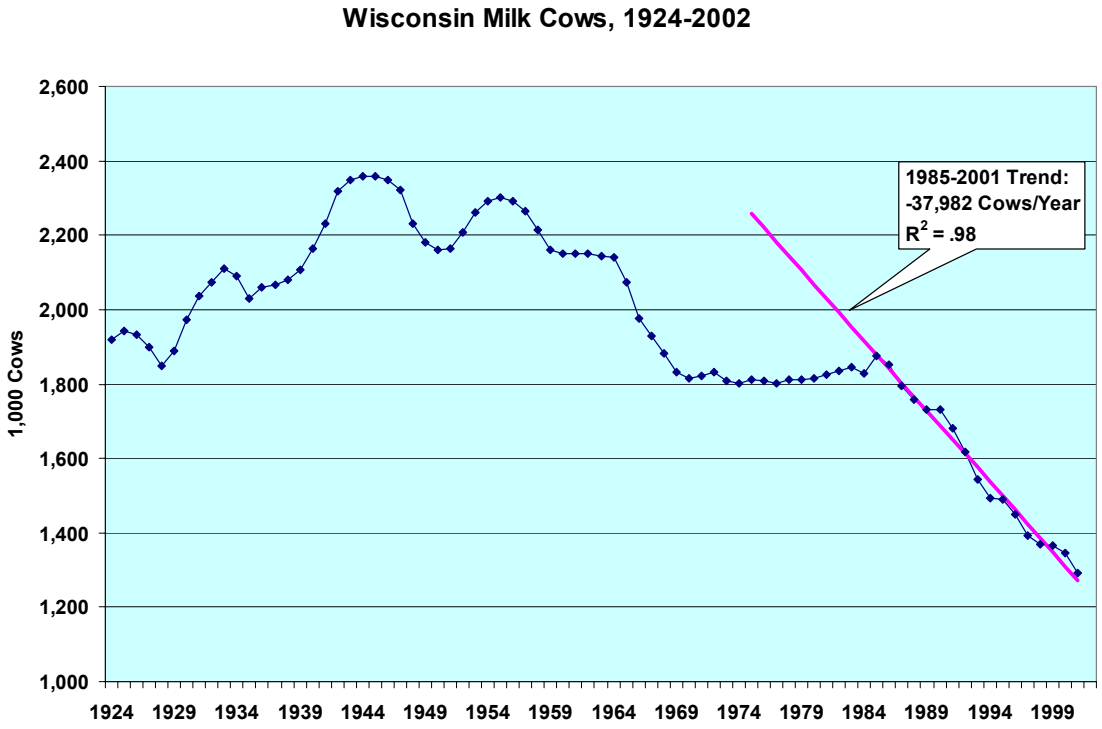
This is the second in a series of brief reports that document the current state of the Wisconsin dairy industry and evaluate factors that will influence its evolution. In this installment, we discuss changes in cow numbers and milk production per cow in Wisconsin and compare these changes with what has occurred in other regions. We review what happened to alter relative regional growth rates and speculate on whether these conditions will continue. We then examine trends within the state with respect to the structure of the production sector and the emergence of new production systems.

Regional Milk Production Trends

Wisconsin milk production peaked in 1988 at 25 billion pounds after increasing more or less steadily at an average rate of 232 million pounds per year for the previous 65 years. Since 1988, annual milk production has varied within a narrow range of 22 to 24 billion pounds.

The recent stagnation in milk production is due entirely to a reduction in cow numbers that has sharply exceeded historical rates. Between 1985 and 2001, Wisconsin milk cow numbers fell from 1.876 million to 1.292 million, a loss of 31 percent. Fitting a linear trend over this period shows a rate of loss of 38,000 cows per year.

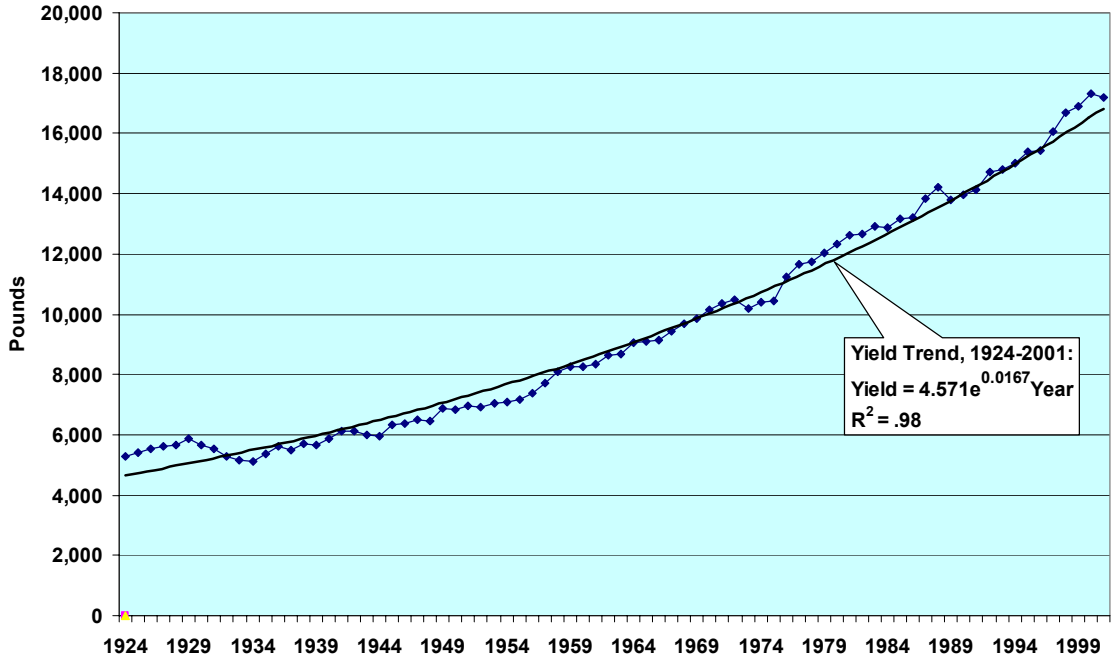
[1] Contributors to this Chapter are Ed Jesse, Brad Barham, and Bruce Jones, Department of Agricultural and Applied Economics, University of Wisconsin-Madison



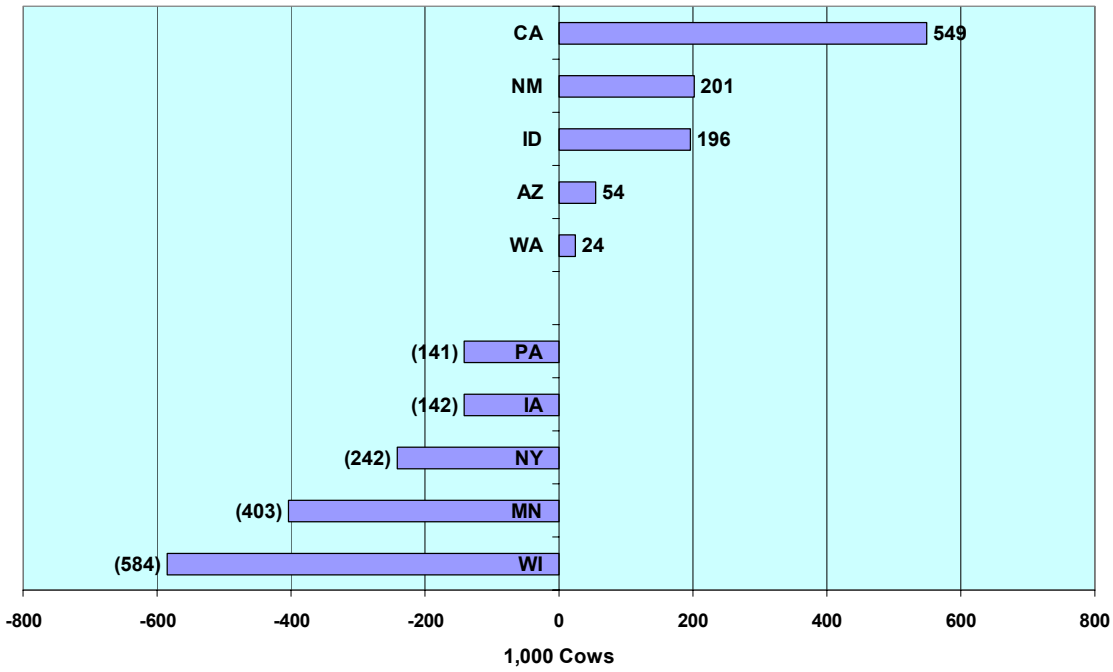
Wisconsin milk production per cow increased over the 1985-2001 period at a rate that was somewhat higher than average annual gains in earlier years. This yield gain offset part of the cow loss, keeping total milk production relatively constant. The long-term trend in milk per cow can best be depicted as an exponential growth rate – milk per cow is increasing at an increasing rate. This is encouraging, but at the same time, Wisconsin milk per cow continues to lag behind the U.S. average. For 2001, Wisconsin's per cow yield was 17,182 pounds. This ranks 25th among states, nearly 1,000 pounds below the U.S. weighted average annual yield, more than 5,000 pounds less than Washington, the leading state in milk per cow, and 3,700 pounds less than California, the leading dairy state.

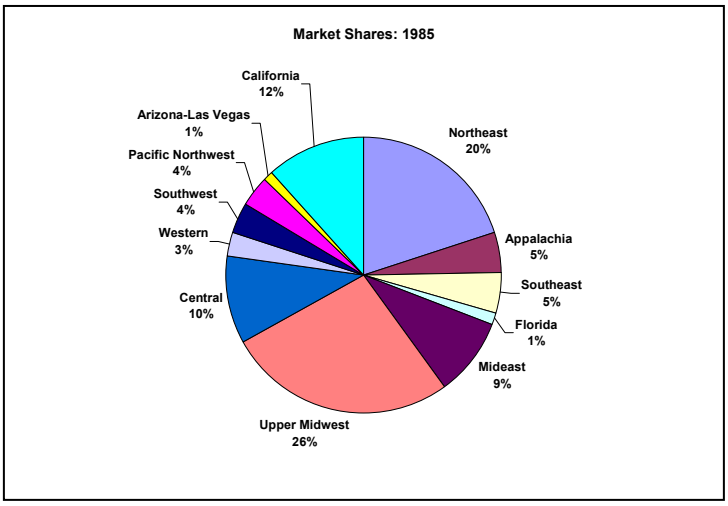
The sharp reduction in Wisconsin cow numbers since the mid-1980's is consistent with other Eastern and Midwestern states, but contrasts with generally positive rates of growth in the west. The five states showing the largest decreases in cow numbers between 1985 and 2001 were in the "traditional" lake states dairy region. The nine states showing an increase in cow numbers were all in the west. California gained almost as many cows as Wisconsin lost.

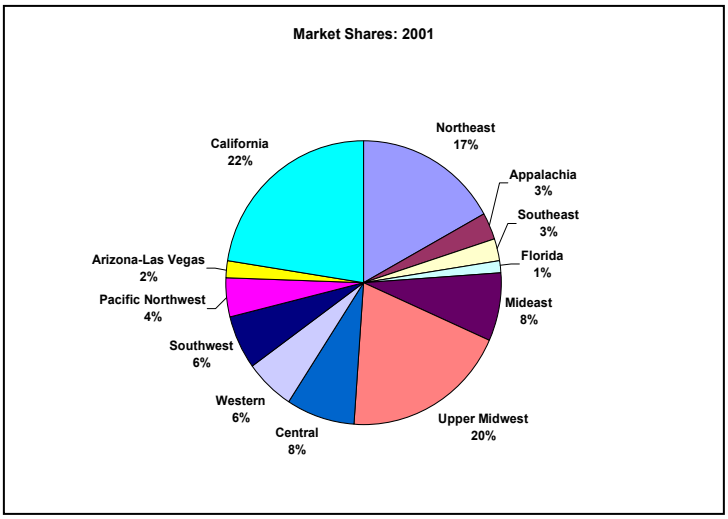
Wisconsin Milk per Cow

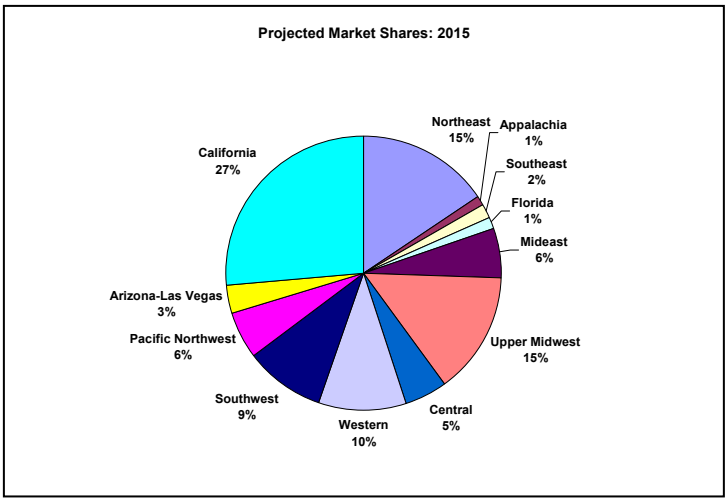


Change in Milk Cows, 1985-2001









Divergent regional rates of growth in milk production have substantially altered regional shares of total U.S. milk. In 1985, states in regions west of the Rocky Mountains accounted for 24 percent of the U.S. milk supply.[2] States within the Northeast, Upper Midwest, and Central regions – the traditional U.S. milkshed – accounted for 56 percent.

By 2001, the western regions had increased market share to 40 percent, while the traditional regions had declined to 45 percent. Projecting these recent trends in regional cow numbers and milk per cow suggests that the west could be producing 55 percent of U.S. milk in 2015, with the Northeast, Upper Midwest, and Central regions at 35 percent.[3]

Projecting Wisconsin cow number and yield per cow trends to 2015 shows state milk production at about 16 billion pounds, about 8 billion pounds less than 2001. Cutting the annual cow loss in half, to 19,000 cows per year, would still result in 2015 milk production about 1 billion pounds less than 2001. If cow numbers held steady at the 2001 level, milk production in 2015 would be about 5 billion

[2] Regions shown in the charts correspond approximately to current federal milk marketing order areas.
[3] Projections based on Jesse, E.V. and Jacob Schuelke, *Regional Trends in U.S. Milk Production: Analysis and Projections,* Marketing and Policy Briefing Paper #74, Dept. of Ag. And Applied Economics, University of Wisconsin-Madison, December 2001.

pounds higher than 2001. Yield increases above trend would not materially alter these projections – reducing the decline in cow numbers is much more important than increasing yield as a means of growing Wisconsin milk production. Stated differently, a continuation of the annual loss in dairy cows that has been experienced since 1985 cannot be offset by even very optimistic gains in milk per cow.

Projected 2015 Wisconsin Milk Production (Million Pounds) Under Varying Milk per Cow and Cow Number Assumptions

Yield increase Above Trend	*Annual Change in Cow Numbers*		
	*Trend (-38,000) (742,000 Cows)**	*½ Trend (-19,000) (1,006,000 Cows)*	*Constant @ 2001 (1,292,000 Cows)*
0% (21,264 Pounds)*	15,772	21,396	27,473
5% (22,327 Pounds)	16,561	22,466	28,847
10% (23,391 Pounds)	17,349	23,536	30,221

*Numbers in parentheses are projected 2015 values for milk cows and milk per cow under the indicated assumptions.

These are sobering projections. However, they are presented only to suggest what *could* happen; not necessarily what *will* happen. The rates of growth in cow numbers and milk yield per cow observed in the western U.S. over the last 15 years do not appear to be sustainable. And projected erosion of market share for Wisconsin is inconsistent with other evidence that indicates a possible rebound.

Will the West Continue to Grow?

The expansion of dairying in the West is the result of several factors. The western expansion began in California, where strong population growth created robust demand for fluid milk and, later, manufactured dairy products. A favorable climate encouraged large-scale drylot dairying with related economies to scale. Dairy plant investment was encouraged by California's milk pricing regulations, which granted manufacturing allowances that guaranteed cheese and butter-nonfat dry milk plants a dependable and profitable return on investment. County governments offered special incentives for farms and plants to invest.

Tax laws related to capital gains also spurred dairy expansion in California. Urban encroachment in southern California allowed dairies there to sell their land to real estate

developers at very high prices and reinvest in higher-valued like property – larger dairies – in the Central Valley of California and in other western states.

From the mid-1970's to the mid-1980's, the dairy price support program was altered to mandate semi-annual changes in the support price to maintain the support level at 80 percent of parity. This change occurred during an inflationary period, and the resulting elevation in milk prices combined with reduced risk prompted accelerated new investment in California dairying. Between 1965 and 1975, the California dairy herd grew by only 17,000 cows. During the next 10 years, 200,000 cows were added.

Dairy growth in Idaho and New Mexico started later than in California, but for some of the same reasons. In particular, these states were capable of supporting large-scale drylot dairy systems that had proven to be profitable in California. Indeed, some of the dairy investors in Idaho and New Mexico migrated from California dairies. Land was inexpensive and capable of growing high quality forages. Concentrates were readily available and made inexpensive by federal feed grain programs that increasingly relied on direct payments rather than acreage restrictions to maintain grower returns. The use of direct payments decoupled planting decisions from market prices, frequently causing market prices for corn and soybeans to fall below costs of production.

The West will continue to show gains in milk production. The growth factors noted above are not expected to change very much in the years ahead. And state and local governments in western states have been very supportive of their dairy industries. But continued dairy growth in the West at the rate demonstrated in recent years seems unlikely for several reasons:

- Relative milk prices are falling, especially in Idaho and New Mexico, as the utilization of the milk supply in higher-valued use classes declines. The California state milk pricing program has cushioned the effect of declining utilization by raising Class I differentials, but adjustments are limited by the need to align Class I prices with adjacent regulated areas.[4] And California continues to maintain low manufacturing class prices as a means of encouraging plant investment.

- Competition for land is intensifying with the increasing demand for forage to feed the expanding western dairy herd. The extent to which this represents a constraint on dairy growth is hard to judge. The land base is fixed, and adding acres of alfalfa comes at the cost of taking land out of other crops or growing alfalfa on less-productive ground. In either case, alfalfa prices increase. But greater substitution of corn silage for hay could reduce the amount of land required for forage production. And a reduction in direct federal payments to corn and soybean producers could reduce land values and make alfalfa production more competitive with these crops.

[4] However, California has been able so far to prevent fluid milk imports that do not meet the state's higher minimum standards for nonfat solids. This raises the cost to out-of-state processors marketing milk in California.

- Urban encroachment is an issue in California and, to a lesser extent, Idaho. But dairies can usually still be isolated from people in all regions. Encroachment does not seem to pose an especially serious threat to dairy expansion, at least directly. However, more people means more demand for water. This will intensify competition between municipalities and agricultural irrigation water districts. As population grows, the availability of irrigation water will decrease and its cost will increase.

- Environmental restraints on dairying are becoming more common. State and local environmental agency permitting is a fact of life in nearly every dairy state. Environmental restrictions are likely to be fairly uniform across regions. Larger dairies (CAFOs) are more visible and more heavily targeted. Thus, they may be more likely to be constrained by current and expected non-point pollution, air quality, and other environmental standards. Indeed, both California and Idaho have moratoriums on new dairies in some counties based on environmental considerations. On the other hand, there are economies to scale in meeting some environmental standards, and they may be easier to meet in dry, warm weather areas. Thus, the regional effect is hard to predict.

- There are biological constraints to increased milk production per cow. Put simply, it is harder to increase milk yield from 25,000 pounds per cow than from 18,000 pounds. Major technological breakthroughs like rBST are not foreseen. The same dairy genetics are available in every region. Thus, it is likely that Wisconsin will close the gap with western states in milk per cow.

Will Wisconsin continue to shrink?

Some of the factors that could limit dairy growth in the West might favor growth in Wisconsin.

- Utilization of Wisconsin milk for higher-valued fluid purposes has increased recently, at least on paper. More liberal pooling provisions under federal milk orders have allowed plants to associate Wisconsin milk with distant markets that have relatively high Class I utilization. This means more Wisconsin milk receives the benefit of higher Class I prices.[5]

- Wisconsin is capable of producing high-quality forages without irrigation. With fewer dairy cows and slower population growth, the state is not facing the same competition for land that is being experienced in the west. While urban encroachment is an issue in a few parts of the state, there is plenty of room for growth in predominantly rural areas.

[5] Liberalized pooling has become a contentious issue, eliciting strong objections from regions where outside milk has reduced Class I utilization and prices. The decisions from recent federal milk marketing order hearings will likely restrict the ability of Wisconsin plants to pool milk on distant markets.

- The same dairy genetics are available in Wisconsin as elsewhere. Wisconsin's milk per cow ranks 25th among states. Adoption of superior genetics along with improved herd feeding and management practices can substantially improve milk yields in the state. Looking at Dairy Herd Improvement Association records shows that improvement is clearly happening. The 30 percent of Wisconsin dairy cows on official test averaged 20,000 pounds of milk in 2001, 860 pounds more than the average for all U.S. cows on official test. This demonstrates the ability of Wisconsin's better herds to match or exceed milk yields experienced in the West.

- Winter conditions preclude full adoption of western-style drylot dairy systems in Wisconsin. But many cost-saving elements of drylot dairy systems can be adopted in Wisconsin. And many western dairies are moving away from drylot systems toward free stall housing that is already used extensively in Wisconsin. The state's moderate climate is generally favorable to dairying. In particular, Wisconsin does not experience California's yield-reducing high temperatures or periodic heavy rains.

- More generally, there are no obvious impediments to Wisconsin dairy farmers achieving costs of production comparable to or lower than those experienced in the west. Published cost of production estimates do not permit a comparison between operations of similar size and management. California Department of Food and Agriculture dairy producer cost surveys for 2001 show statewide average costs ranging from $12.40 to $13.25 per hundredweight for the year.[6] This is an easily achievable cost of production goal for Wisconsin dairy farmers.

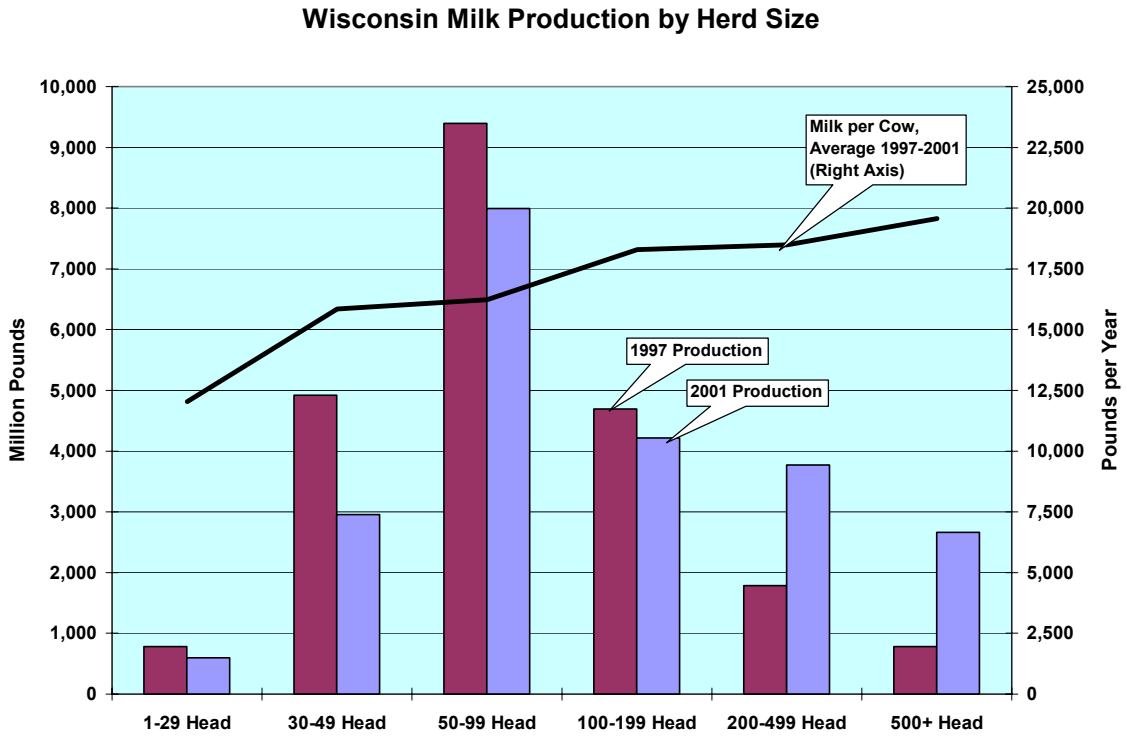
Despite the alarming reduction in Wisconsin dairy cows since the mid-1980s, there are signs of a turnaround in the production sector. Dairy farmers who are willing to make changes are adopting new production strategies to increase their competitiveness.

One of these strategies is larger-scale milking parlor/free stall housing systems. These operations typically involve 200 cows or more. Herd size distribution data (available only since 1993) suggest fairly rapid adoption of this model in Wisconsin. In 1993, 300 Wisconsin herds exceeded 200 cows. In 2001, there were 850, including 170 with more than 500 cows. The 200+ herd size accounted for 5.7 percent of total Wisconsin milk production in 1993 and 29 percent in 2001.

The growth in larger-scale dairy farms is significant because these farms achieve higher milk yields per cow than smaller farms. Average 1997-2001 milk per cow for the 1-29 cow category was 12,000 pounds versus 19,600 pounds for 500+ herds. Stated differently, one cow added to the 500+ herd size class offsets a loss of 1.6 cows from herds in the smallest size class.

[6] California Department of Food and Agriculture, *California Dairy Statistics and Trends, 2001*, Division of Marketing Services, Dairy Marketing Branch, Sacramento: March 2002.

It is also noteworthy that the total number of Wisconsin dairy farms in the 100-199 herd category has held steady over the past five years at nearly 2,000. These farms were responsible for 19% of total production in 2001. Thus, while farm numbers and cow numbers have declined substantially in Wisconsin with the exit of farms, this is not the case for herds with over 100 cows.



Using recent growth rates segregated by herd size to project future milk production gives a much more optimistic outlook than using overall trends in cow numbers and milk per cow:

Wisconsin Milk Production Forecasts by Herd Size Class

Size Class	*Cow Numbers*	*Milk per Cow*	*Total Milk*
2001 Actual Values	*Number*	*Pounds*	*Bil. Lbs.*
Less than 50 Cows	229,000	15,532	3.55
50-99 Cows	491,000	16,278	7.99
100 or More Cows	572,000	18,617	10.66
State Totals	1,292,000	--	22.20
Annual Percent Change, 1993-2001:	*%*	*%*	*%*
Less than 50 Cows	–9.58	2.15	–7.64
50-99 Cows	-3.85	1.33	-2.57
100 or More Cows	7.34	1.54	8.99
2010 Forecasts:	*Number*	*Pounds*	*Bil. Lbs.*
Less than 50 Cows	92,388 (74,440-144,807)*	18,809 (17,179-21,025)	1.74 (1.28-3.04)
50-99 Cows	344,818 (323,219-390,185)	18,333 (17,305-20,308)	6.32 (5.59-7.92)
100 or More Cows	1,082,731 (830,144-1,316,293)	21,368 (19,963-24,231)	23.14 (16.57-31.90)
State Totals	1,519,937 (1,227,803-1,851,285)	--	31.20 (23.44-42.86)

*Numbers in parentheses are the low and high values of the 95 percent confidence range of the forecasts

These forecasts indicate nearly a doubling of the number of Wisconsin cows in herds of more than 100 cows by 2010. However, sustaining growth in the larger herd size classes at rates experienced since the mid-1990s is questionable for several reasons. Most important, the increased number of larger herd sizes has come largely from growth in smaller and medium-sized farms. The size of that base has declined substantially in recent years. Thus, maintaining recent rates of growth in the number of larger herds would require a higher proportion of those remaining herds under 100 cows to expand their operations.

The larger-scale model is not the only blueprint for growth and viability in Wisconsin dairying. Indeed, during the 1990s, a significant proportion of Wisconsin dairy farms, especially in the Western and North Central regions of the state, have successfully pursued "low-input" strategies that reduce both labor and capital use in an effort to produce milk at lower cost. One example of this approach is management-intensive rotational grazing, wherein farmers seek to produce high quality forage through improvement and careful use of pastures. Having cows harvest their own food reduces labor and machinery costs. Another low-input strategy that recent entrants have pursued is to rent a barn, buy feed and forage, and concentrate their labor and financial resources on milking cows rather than buying or working land.

Both of these approaches can be combined with a household income strategy that mixes dairy farming with other enterprise or off-farm labor activities. They can also be combined with a low-cost parlor in order to pursue more efficiency in milking and growth in herd size. In fact, it is important to point out that these "low-input" approaches are not mutually exclusive with the larger-scale model mentioned above, as some farmers pursuing a "low-input" strategy may do so in order to grow their herd more quickly than they might otherwise be able to do so because of financial or labor constraints.

The viability of dairy farms pursuing low-input strategies is quite strong. Recent research by the Program on Agricultural Technology Studies shows that these sorts of operations were just as likely to survive as the larger-scale model mentioned above, and more likely to survive than the traditional semi-confinement operation. At the same time, it is important to note that, *on average*, farms pursuing low-input strategies grow their herds at a much less dynamic rate than farmers pursuing a large-scale model. They also tend to have somewhat lower herd production averages, especially if they are using management rotational grazing as a major component of their production strategy. Thus, in terms of their contribution to the overall vitality of the Wisconsin dairy industry (adding cows and milk), they are not as "dynamic" as the large-scale model. Nonetheless, to the extent that low-input strategies may be more accessible alternatives to a significant proportion of moderate-sized operations, they could play a vital role in stemming the loss of dairy farms in Wisconsin.

Reversing the Trend

If the Wisconsin dairy industry is to thrive, then the sharp annual reduction in dairy cows seen since the mid-1980s must be substantially reduced. Milk volume is essential to maintaining the strength of the state's processing sector. We expect large gains in milk production per cow over the next few years. But even if gains in milk per cow are well above trend, that will not prevent further losses in milk production if cow numbers continue to drop at their current clip.

While the key to maintaining vitality in Wisconsin dairying is stopping the freefall in cow numbers, there is no single avenue to achieving that goal. Producers have demonstrated that several dairy system options can increase profitability and encourage growth: Management intensive rotational grazing, incremental modernization/expansion, and large-scale intensive management are all viable options. What is NOT an option is resisting change. Wisconsin dairy farmers must be willing to embrace changes in their operations that allow them to be competitive with dairy farmers in other regions.