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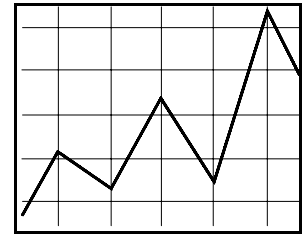
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MARKETING AND POLICY BRIEFING PAPER



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RETHINKING DAIRYLAND: BACKGROUND FOR DECISIONS ABOUT WISCONSIN'S DAIRY INDUSTRY

College of Agricultural and Life Sciences
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Preface

This is the first in a series of brief reports that document the current state of the Wisconsin dairy industry and evaluate factors that will influence its evolution. The series is intended to address a growing concern among Wisconsin dairy industry leaders about the viability of Wisconsin dairying. The concern can be summarized as follows: Wisconsin milk cow numbers have fallen sharply over the last 15 years and, despite increasing milk production per cow, total state milk production has been flat to decreasing since 1988. While Wisconsin milk production has languished, U.S. milk utilization, especially cheese consumption, have shown very strong growth. Despite paying higher prices for cheese milk than plants in the West, where milk production is escalating, Wisconsin cheese makers are finding it increasingly difficult to fill their vats. Some cheese manufacturers have relocated or expanded their operations to regions with an expanding and less expensive milk supply and others have threatened to do so. A significant loss of processing capacity could threaten the entire dairy infrastructure.

Enhancing the viability of Wisconsin dairying requires an aggressive collaborative effort among and between industry participants and state government. The university's role in this process – and the purpose of this series – is to promote a clear and common understanding of the challenges and opportunities involved.

The first report in the series outlines the general scope of the Wisconsin dairy industry and documents its contributions to the overall state economy. Subsequent reports to be issued over the next several months will focus on more specific issues related to competitiveness.

Wisconsin's Dairy Industry Today¹

Historical Overview²

In the 50 years between 1875 and 1925, a number of events led to the emergence of Wisconsin as the unchallenged dairy state. Early in this period, the cinch bug, the opening of land in the west, and the vision of an aggressive and articulate small town newspaper editor were key elements in the emergence of Wisconsin dairying.

Before 1875, agriculture in Wisconsin was small in scope and subsistence in nature. The exception was commercial wheat production, which totaled 25-30 million bushels between 1856 and 1872, placing Wisconsin among the top wheat states in the union.³ But growing wheat without fertilizer quickly depleted soils. So farmers moved further and further north to find virgin ground to cultivate. As they did, they incurred shorter growing seasons, increasing cinch bug infestations, and sharply lower yields. It became more profitable to grow wheat in Minnesota and the Dakotas, leaving abandoned, worn out farms in Wisconsin.

The newspaper editor was W.D. Hoard, who began preaching the gospel of dairying as the salvation of agriculture in Wisconsin from the pulpit of his *Jefferson County Union* and later his nationally distributed *Hoard's Dairyman*. Hoard traveled extensively throughout the state, promoting modern feeding and breeding methods and supporting collective marketing efforts of dairy farmers.

Hoard's ideas caught on, but nascent dairy farmers were faced with numerous production and marketing constraints. Chief among these were milk quality and herd health. These problems were effectively addressed by pioneer University of Wisconsin College of Agriculture faculty. Stephen Babcock's butterfat test (1890) allowed cheese and butter plants to price milk in reference to its value in products, and encouraged farmers to adopt better feeding and breeding practices. H.L. Henry brought sound science to the eventually successful battle against bovine tuberculosis. W.A. Henry conducted research that demonstrated the profitability of balanced dairy rations. F.H. King was instrumental in promoting the use of silos for winter feed storage. Benjamin Hibbard assisted in the creation of scores of dairy cooperatives to efficiently process and market milk.

In the early 1900's the University, especially its Agricultural Extension Service, took on the challenge of expanding dairying to the despoiled, cut-over lands of northern Wisconsin. University specialists developed and demonstrated effective land-clearing

¹ Authored by Ed Jesse, Professor and Extension Marketing Specialist, Department of Agricultural and Applied Economics, University of Wisconsin-Madison/Extension

² This section draws heavily from *Wisconsin: A Guide to the Badger State*, New York: Duell, Sloan and Pearce, 1941, and Osman, Loren H., *W.D. Hoard: A Man for the Time*, Fort Atkinson: W.D. Hoard and Sons Company, 1985.

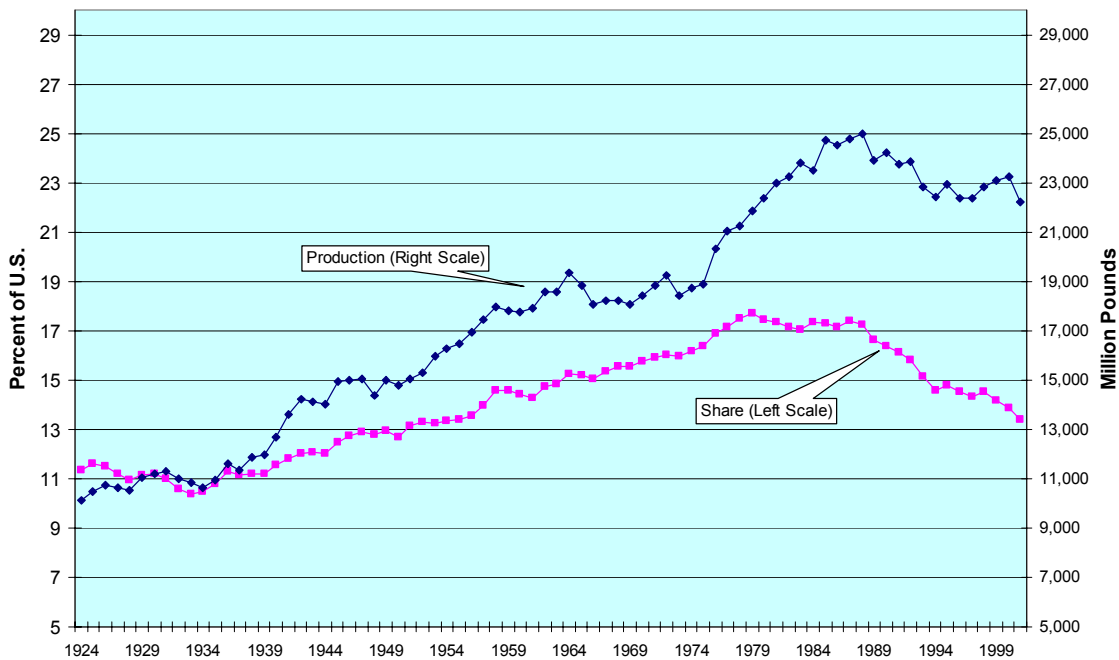
³ By comparison, Wisconsin produced 8.7 million bushels of wheat in 2000.

techniques, cropping systems, and feeding and management practices tailored to conditions in the north.

By 1925, dairy had reached the number 1 rank among commodity values in the state. Nearly 2 million Wisconsin dairy cows produced 10.6 billion pounds of milk that year. Wisconsin had long surpassed New York as the leading dairy, and accounted for 11.6 percent of U.S. milk production.

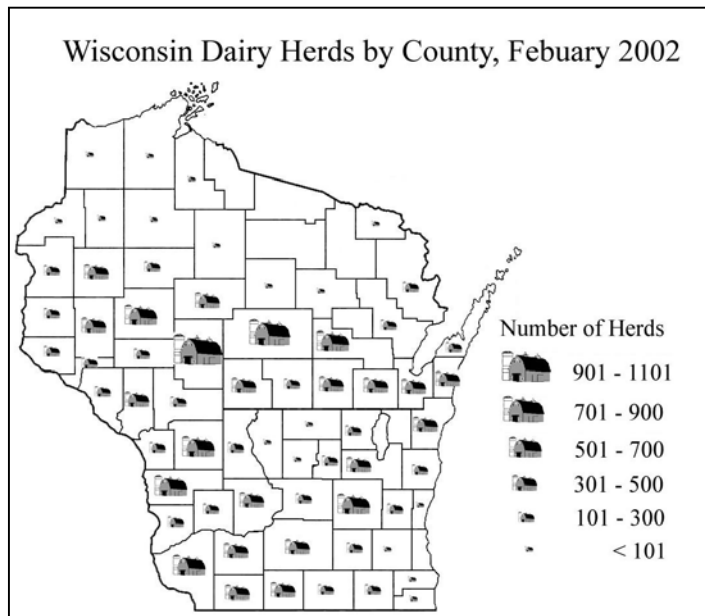
Both milk production and market share grew steadily for the next fifty years. In 1979, Wisconsin's share of U.S. milk production peaked at 17.7 percent, and then declined as milk production in the west mushroomed. Despite the fall-off in market share, milk production in Wisconsin continued to grow rapidly after 1979, peaking at 25 billion pounds in 1988. Since then, production has ranged between 22 and 24 billion pounds.

**Wisconsin Milk Production:
Total and Share of U.S.**



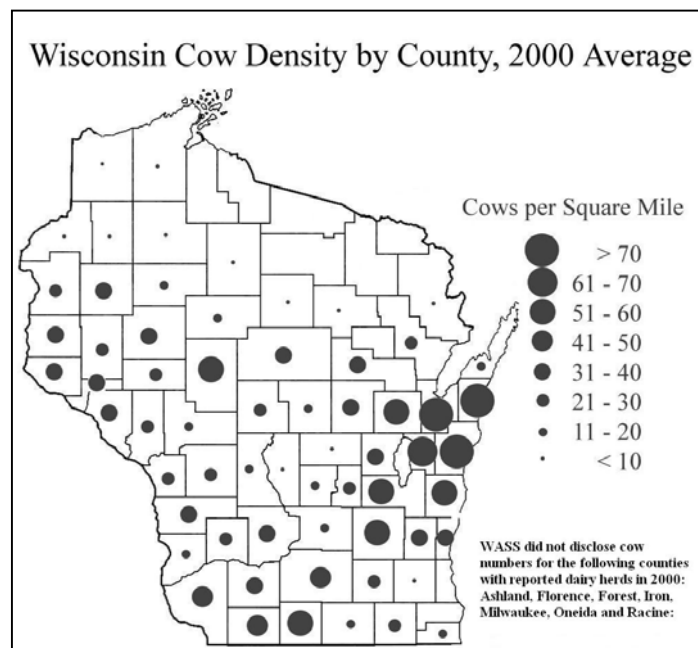
Wisconsin Dairy Farming in 2002

As of February 2002, there were 17,711 dairy farms in Wisconsin milking about 1.3 million cows. Dairying is widespread within the state – all but two counties (Vilas and Menominee) reported dairy farms in 2002. The top five dairy counties as measured by number of dairy herds were Clark, Marathon, Grant, Vernon and Chippewa, accounting for just over one-fifth of the state’s herds (Appendix Table 1).

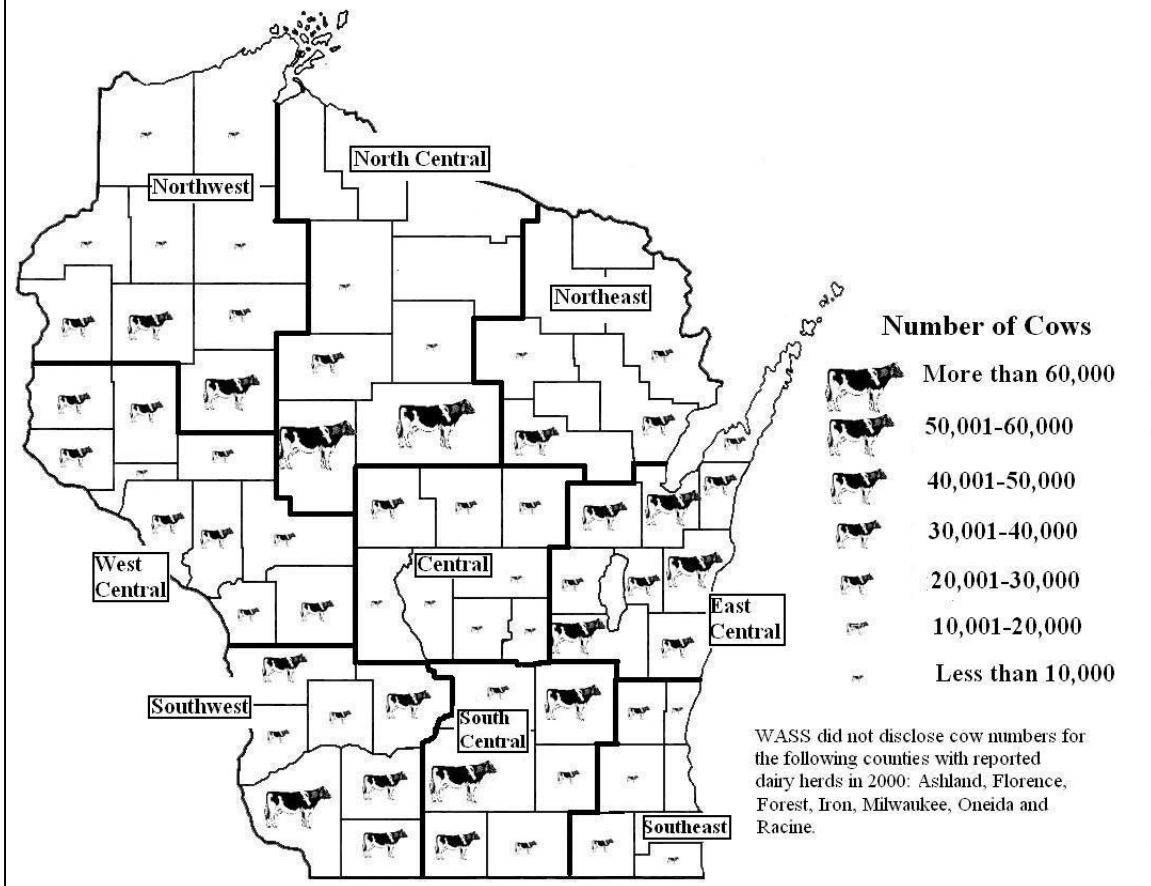


Eighty-five percent of Wisconsin dairy herds shipped Grade A milk in February 2002. There are nearly 3,000 Grade B herds, a number that has remained fairly constant in recent years. Grade B herds are concentrated in Western and North Central Wisconsin and in Green County. About 20 percent of Grade B producers cool and deliver milk in cans. This segment of the industry consists largely of Amish farmers whose religious beliefs forbid the use of electric-powered bulk cooling tanks.

Milk cow and milk production data by county are only available through 2000 (Appendix Tables 2 and 3). The latest dairy cow count shows a geographical pattern very similar to the 2002 herd data. However, the *density* of dairy farms or dairy cows (measured as the number of farms or cows per square mile) shows a somewhat different picture. The highest concentration of cows is in the East Central part of the state near Lake Winnebago and, to a lesser



Wisconsin Cow Numbers by County, 2000 Average

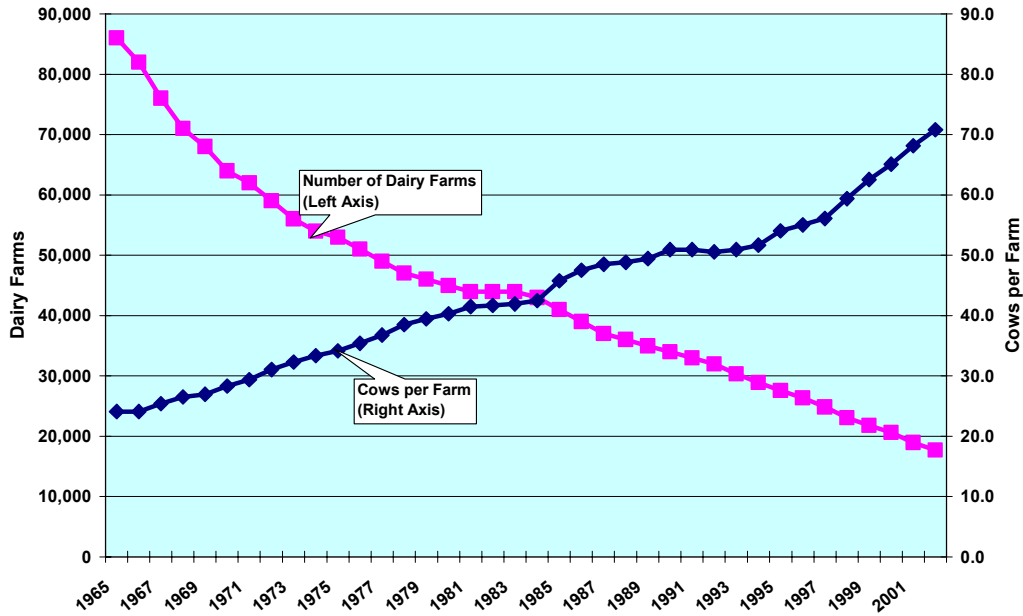


extent, in southwestern Wisconsin. Cow density in the East Central region, along with larger herd sizes in that region, suggest that growth in East Central Wisconsin may be more restricted than in some other parts of the state.

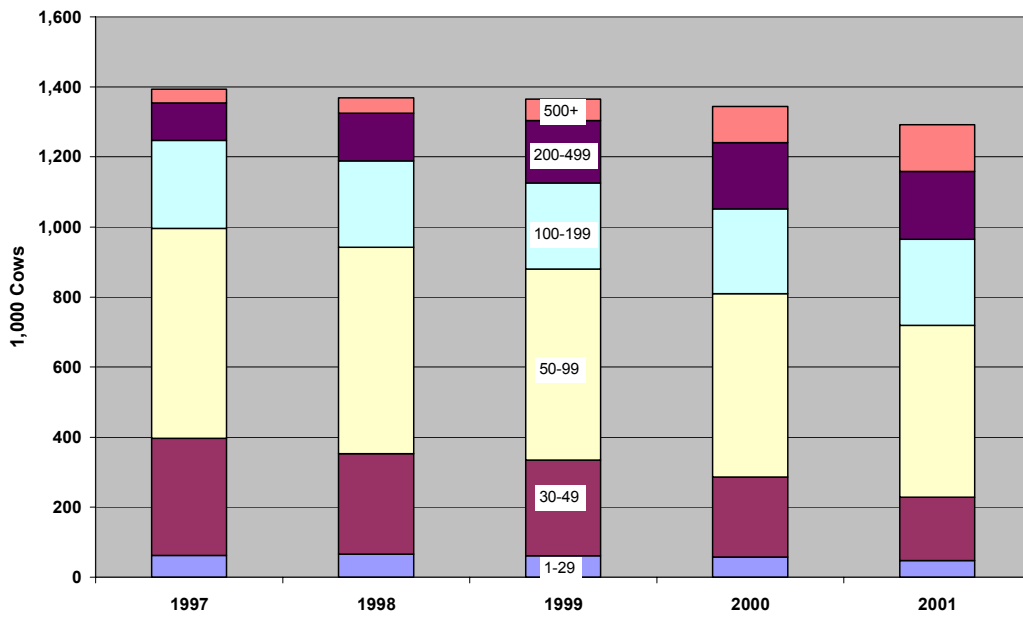
Over time, the number of dairy farms in Wisconsin has fallen steadily and the number of cows per farm has steadily increased as technological changes allowed family-sized farming units to handle more cows. Average herd size increased by less than one cow per year between 1965 and 1994, from 24.1 to 51.7. The average annual rate of change in herd size has accelerated to 2.4 cows per year since 1985. This reflects a rapidly-increasing proportion of the state's dairy cows in herds larger than 200 cows.

Changes in the dairy industry have not been uniform across the state. Total cow numbers fell by about one-half million or 26 percent between 1980 and 2000. The largest percentage losses were in the Northwest, Southeast, and Southwest regions, where cow numbers were down about a third. The East Central region was down only 16 percent.

Wisconsin Dairy Farms and Average Herd Size



Wisconsin Milk Cows by Herd Size



State milk production showed a four percent gain between 1980 and 2000. The Northwest and Southeast regions were down 7.4 and 6.1 percent, respectively, while the East Central region showed an increase of 19 percent. Changes in other regions were within 5 percentage points of the state average percentage change in milk production

Milk production per cow in Wisconsin increased 5,000 pounds, or 40 percent between 1980 and 2000 (Appendix Table 4). This represents an average annual gain of 250 pounds per year. Among Wisconsin counties, the percent change in milk yield between 1980 and 2000 ranged from 24 percent (Green County) to 53 percent (Marinette and Marquette). In 2000, Wisconsin milk cows produced an average 17,306 pounds. Yields were highest in the East Central region and lowest in the Northwest. Among counties, 2000 milk per cow ranged from 14,500 pounds to 18,700 pounds.

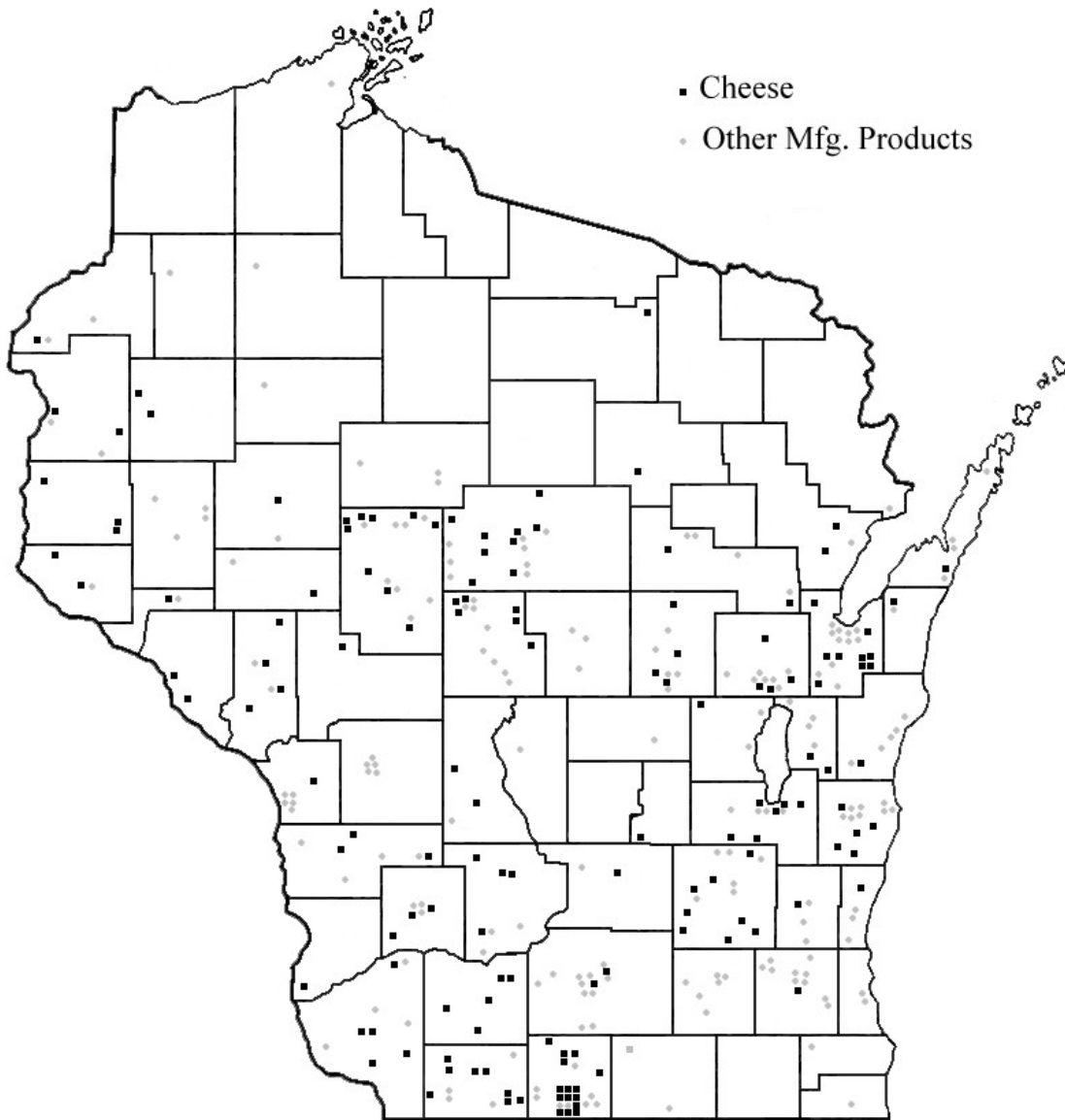
Other regional differences are in herd size and milk production per farm (Appendix Table 5). In 2000, dairy farms ranged in size from 41.5 cows in Crawford County to 109.2 cows in Brown County. The relative range in milk produced per farm was even greater, from 640,000 pounds in Crawford County to 2 million pounds in Brown County. Larger herds are concentrated in the East Central region. Of the 10 counties with the largest average herd size in 2000, five were in that region. The smallest herds were in the northern parts of the state.

Wisconsin Dairy Manufacturing in 2002

<i>Wisconsin Dairy Plants, 2001</i>	
<i>Type of Plant</i>	<i>No. of Plants</i>
Butter Factory	13
Cheese Factory	139
Cheese Cut, Wrap, Shred	119
Custard Mix	1
Cold Pack	23
Cream	2
Dairy Flavors	9
Cottage Cheese	4
Flavoring Cream	13
Cheese	
Powdering Operation	34
Processed Cheese	34
Ice Cream	27
Condensary	32
Powder	32
Mixing/Blending	
Retail Milk	11
Smoked Cheese	8
Sour Cream	5
Snack Dips	11
Soft Serve Yogurt	3
Whey Processing	42
Yogurt	3

While the dairy farming sector is the most visible element of the Wisconsin dairy industry, the dairy manufacturing sector is the element responsible for the largest value added. The Wisconsin Department of Agriculture, Trade and Consumer Protection dairy plant list for 2001 counted 364 dairy plants in the state making a wide variety of products. Dairy plants are widely-scattered throughout Wisconsin.

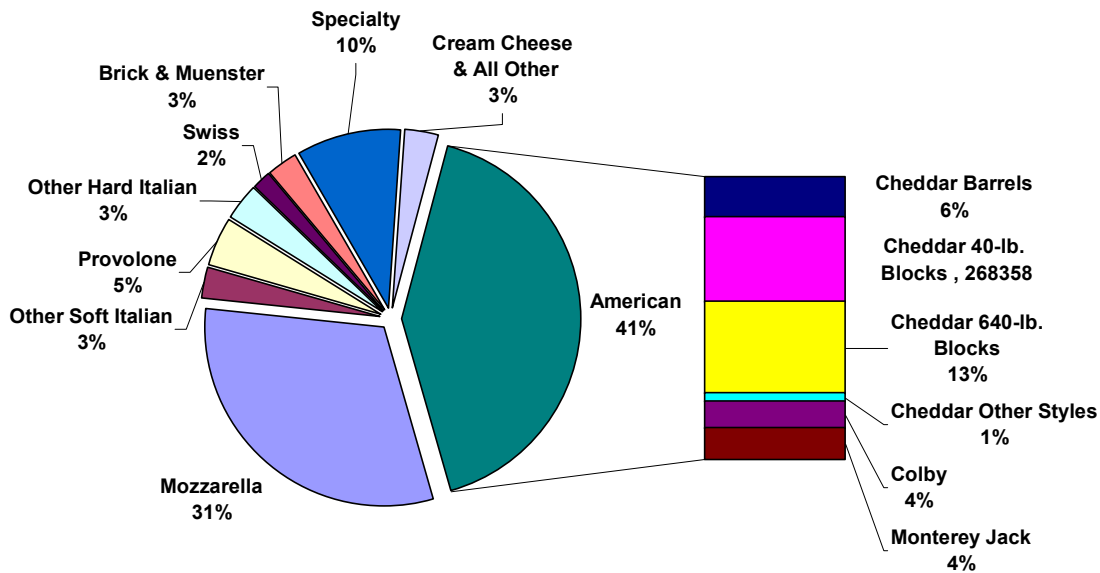
Wisconsin Dairy Plants, 2001



The principal use of Wisconsin milk is for cheese-making. It is impossible to derive a precise estimate of the fraction of the total state's milk supply going to cheese, but the percentage can be reasonably bracketed at 80-90 percent.⁴ Other major manufactured dairy products include butter⁵, cottage cheese, and whey products. Only about 6-8 percent of Wisconsin milk is used for fluid milk products.

In 2000, Wisconsin produced 2.2 billion pounds of natural cheese, about 27 percent of total U.S. cheese production. Cheddar and Mozzarella accounted for about 2/3 of production. But at least 50 identifiable cheese varieties are produced commercially in the state. Specialty cheese production (defined generally as "value-added" varieties with annual production less than 40 million pounds) is growing rapidly. In 2000, more than 220 million pounds of specialty cheese varieties were manufactured in the state, 10 percent of total cheese production. This is up from 4 percent in 1993. Half of Wisconsin's cheese factories produce one or more specialty varieties. Wisconsin also produced just over 1 billion pounds of processed cheese products in 2000, about half of U.S. production.⁶

Wisconsin Cheese Production by Variety, 2000



⁴ Converting cheese production to milk equivalent is not straightforward because significant volumes of milk and milk products (e.g., nonfat dry milk) produced outside the state are used to make Wisconsin cheese.

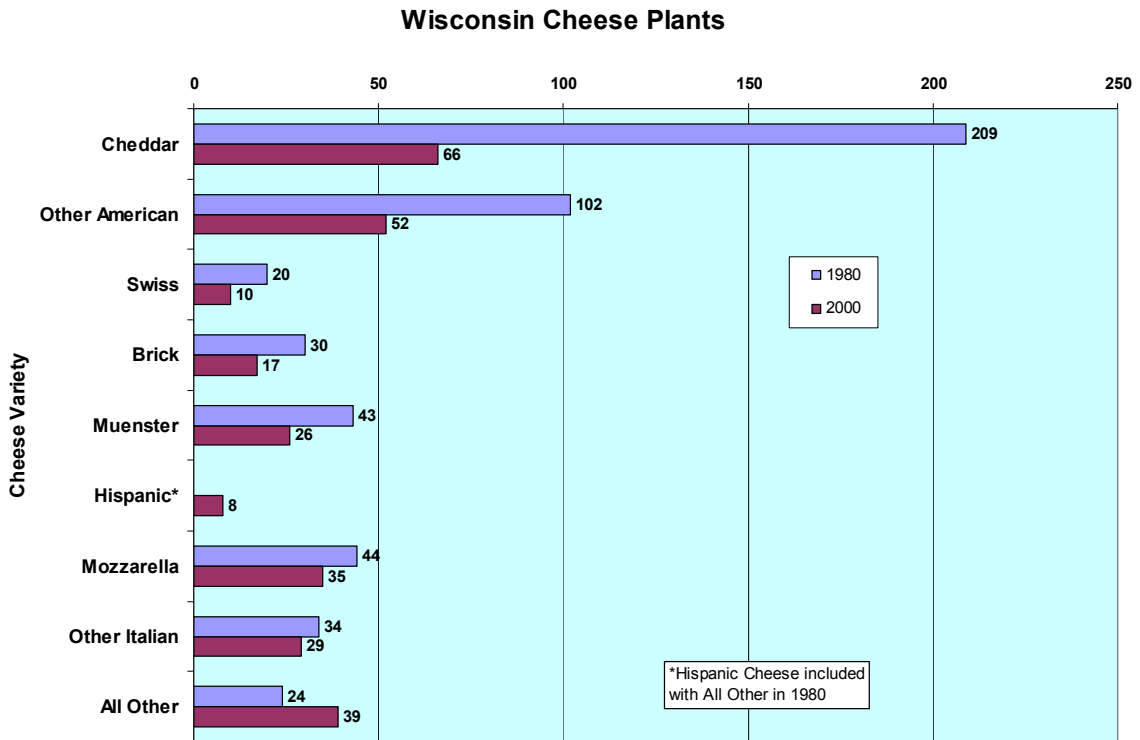
⁵ Wisconsin is second to California in butter production, but little milk is used directly in butter-making. Most of the butter in the state is manufactured from cream obtained from standardizing milk for cheese-making or imported from other states.

⁶ Processed cheeses and cheese foods use natural cheeses as their exclusive or primary ingredient.

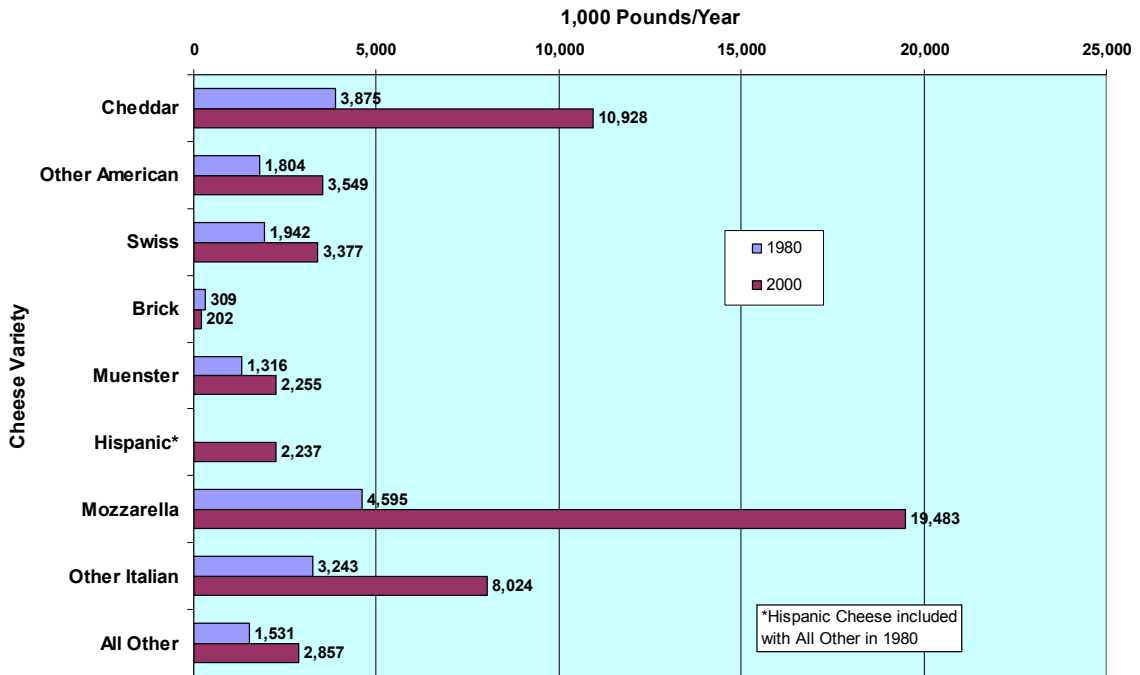
The number of cheese plants in Wisconsin fell by more than 60 percent between 1980 and 2000. By variety, the largest decline was in cheddar cheese plants. The number of plants making Mozzarella and other Italian cheese varieties remained relatively constant and plants making “other” varieties (mainly specialty cheeses) increased in number.

The consolidation in cheese making was accompanied by a substantial increase in average plant scale. Average volume per plant nearly tripled in cheddar factories and grew by more than 4 times in Mozzarella factories.

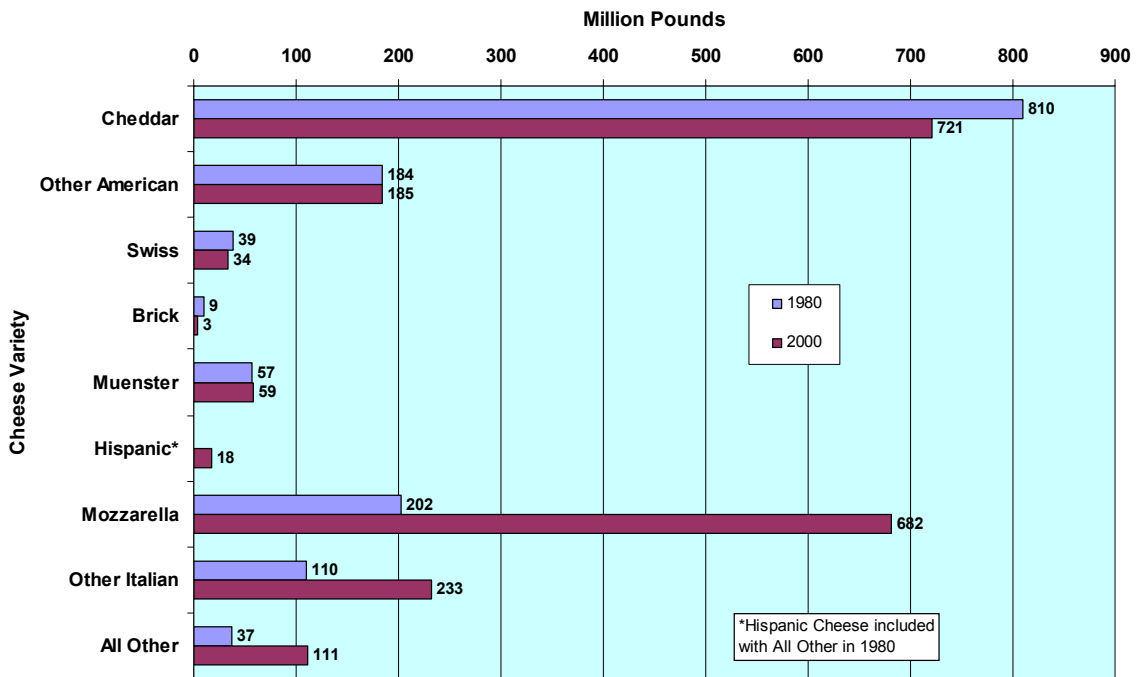
Wisconsin Mozzarella production in 2000 was 682 million pounds, second to Cheddar production of 721 million pounds. Cheddar production was down 11 percent from 1980, while Mozzarella was up 240 percent. Italian varieties as a group exceeded American cheese varieties in 2000. Demand for Mozzarella and other Italian cheeses has outpaced demand for cheddar cheese. Wisconsin cheese plants have altered production in response to these market signals.



Wisconsin Cheese Volume per Plant



Wisconsin Cheese Production



Contribution of Dairy to the Wisconsin Economy⁷

Measuring Economic Impact

Dairy's contribution to the Wisconsin economy takes many forms. Most obvious is the *direct* or *initial* contribution through on-farm and processing employment and income generation. For 1999, the most current year for which complete income and employment data are available, dairy production, both on-farm and dairy processing, accounted for 80,500 jobs or about 2.6 percent of all employment in Wisconsin and \$1.9 billion worth of income. Total industrial sales from dairy farms and dairy processors combined amounted to \$11.7 billion, accounting for 1.3 percent of Wisconsin's total industrial sales.

But the direct contribution of dairy farming and processing to the Wisconsin economy is only part of the picture. Other industries are linked, through *indirect* and *induced* effects, to the dairy industry. These industries represent additional sources of economic activity, in essence multiplying the effects of the direct activity of dairy production and processing. The dairy industry impacts many parts of the larger Wisconsin economy through this *multiplier effect*.

The dairy industry uses machinery, trucks, fuel, financial and other businesses services and a range of inputs from other industries. These linkages, or *indirect* effects, create a network of interdependent industries, which in turn generate additional jobs and income in non-dairy industries. The income generated directly by dairy farms and processors also adds to this interdependency; on-farm and dairy processing employees spend their wages and salaries on groceries, housing, entertainment, and a range of other consumer goods and services. In turn employees in these industries spend their income on consumer goods and services. These additional linkages, beyond dairy and indirectly related sectors of the economy, create *induced* effects, which help to form a complex intertwining of industries within Wisconsin. So the relevant question to ask is not what dairy adds to the Wisconsin economy directly through income and employment generation, but rather how much does agriculture contribute to the Wisconsin economy through this complex networking of industries.

To answer this question it is necessary to use an empirical representation of the Wisconsin economy. While there are numerous methods of regional analysis that can capture linkages, the method adopted for the analysis reported here is centered around a social accounting matrix (SAM). A social accounting matrix representation of a regional economy (in this case, the state of Wisconsin) can be described as a "snapshot" of the

⁷ Authored by Steven Deller, Professor and Extension Community Development Specialist, Department of Agricultural and Applied Economics, University of Wisconsin-Madison/Extension.

economy detailing the sales and purchases of goods and services between all sectors of the economy for a given period of time.

Industry output (sales) can be purchased by other industries as inputs, households for final consumption, or exported out of the state. Industry inputs (purchases) are obtained from other industries in the state, imported from outside the state, or purchased from households in the form of labor. The social accounting matrix approach to regional modeling allows these linkages to be described empirically. By examining expenditures by and sales from dairy firms, an assessment of the contribution of the dairy industry to Wisconsin's economy can be gained. In essence, by tracing the flow of dairy related dollars throughout the economy we can capture and measure the "multiplier effect."

A software package, IMPLAN (Impact PLANning),⁸ was used to create the social accounting matrix for Wisconsin. All analyses reported here are for calendar year 1999, the most recent year for which the data are available. The model has detail for 486 business sectors and 17 institutional sectors (i.e., household groups, governments, etc.).

Empirical Results

Three levels of economic activity are examined: on-farm dairy production; off-farm dairy processing; and on- and off-farm dairy operations combined. The results of these analyses are presented in Tables 1-3.

After accounting for the multiplier affect, the Wisconsin dairy industry accounted for about 174,000 jobs, about 5.1 percent of all employment in Wisconsin; \$5.7 billion income going to households, or about 3.6 percent of Wisconsin's gross state product; and \$18.5 billion in industrial sales, or about 5.9 percent of total Wisconsin industrial sales. Separately, on-farm dairy production accounted for 90,700 jobs, \$1.5 billion in household income and \$4.9 billion in industrial sales. The Wisconsin dairy processing sector accounted for 99,700 jobs, \$4.8 billion in household income (gross state product) and about \$17 billion in industrial sales.

It is important to note that the sum of the two individual components of the combined dairy sector, on-farm production and off-farm processing, do not add to the combined effects. In other words, directly adding the summaries of Tables 1 and 2 will not result in Table 3. The whole is not equal to the sum of the parts because of "spillover" effects between the two components. Clearly on-farm production influences off-farm processing and the demand for raw milk by processors influences on-farm production. In that sense, on-farm production and off-farm processing are mutually interdependent. The analysis summarized in Table 1 captures the dependency going in one direction while the analysis in Table 2 captures the dependency going in the other direction. Adding Table 1 to Table 2 would double count those co-dependencies and thereby result in a double counting error.

⁸ Minnesota IMPLAN Group, Inc., Stillwater, MN.

It is also important to that we *cannot* make the claim that if dairying were to cease to exist that total employment in Wisconsin would decline by 5.1 percent or gross state product (household income) would decline by \$5.7 billion. Such an interpretation would require that all employees affected would pack up their families and belongings and move from Wisconsin. We would also need to assume that all other inputs used directly, such as land, and indirectly through the multiplier effect, would not be used for any other productive activity. Such an interpretation is clearly unrealistic. Rather, a more reasonable interpretation is that the dairy industry is “connected” to these dollars and jobs either directly or through the multiplier effect.

Looking at the contribution of the dairy industry to Wisconsin across different sectors of the economy shows that the Wisconsin economy is extremely intertwined and interdependent; nearly every sector in Wisconsin is linked to dairy. For example, the dairy industry affects the construction industry to the tune of almost 3,600 jobs annually. Retail and wholesale trade enjoys nearly \$1.2 billion in household income from dairy. In terms of industrial sales, 36.5 percent of the total impact of dairy comes from sectors other than dairying itself. In terms of income, 66.8 percent of the total \$5.7 billion impact comes from non-dairy sectors. The “rippling,” or multiplier effect that dairying has on Wisconsin’s economy is significant with the bulk of that impact coming from dairy processing.

The economic activity generated by dairy adds significantly to tax revenues at both the federal and state and local levels (Table 4). On-farm dairying creates almost \$241 million in federal tax revenues while all of dairying generates in excess of \$1 billion in federal taxes. On-farm dairy operations generate about \$158 million in state and local taxes (not including support for K-12 public education) while all of dairying generates \$688 million in state and local tax revenues. These tax revenue figures include taxes paid directly by dairy operators and employees and taxes from all the economic activity generated by the dairy industry.

Table 1: Economic Impact, On Farm Dairy, 1999 Wisconsin

<i>Sector</i>	<i>Jobs</i>	<i>Total Income \$1,000</i>	<i>Industrial Output (Sales - \$1,000)</i>
Dairy Farm Products	63,742	542,322	3,146,199
Agriculture	11,721	119,926	383,807
Mining	4	503	752
Construction	1,136	50,064	87,557
Manufacturing	665	44,946	143,880
TCPU*	1,864	149,792	273,886
Trade	5,170	256,209	357,539
FIRE**	1,919	185,603	267,539
Services	4,331	142,517	230,702
Government	197	12,154	28,670
Total	90,748	1,504,037	4,920,532
<i>Implicit Multiplier</i>	<i>1.424</i>	<i>2.773</i>	<i>1.564</i>
Wisconsin State Total	3,393,514	161,484,190	311,245,490
Percent of State Total	2.7%	0.9%	1.6%
Initial	63,742	542,322	3,146,199
Indirect	19,795	645,892	1,264,629
Induced	7,211	315,823	509,703
Total	90,748	1,504,037	4,920,531

* TCPU: Transportation, Communications, and Public Utilities

**FIRE: Finance, Insurance, and Real Estate

Table 2: Economic Impact, Off Farm Dairy Processing, 1999 Wisconsin

<i>Sector</i>	<i>Jobs</i>	<i>Total Income (\$1,000)</i>	<i>Industrial Output (Sales-\$1,000)</i>
Agriculture	29,610	677,352	3,843,834
Mining	11	1,683	2,507
Construction	2,486	109,314	193,401
Manufacturing	3,481	210,597	631,294
Dairy Processing	16,762	1,366,408	8,571,647
TCPU*	4,321	344,252	637,563
Trade	18,863	931,785	1,305,853
FIRE**	5,123	509,343	742,858
Services	18,397	592,585	948,925
Government	630	36,736	85,101
Total	99,685	4,780,056	16,962,985
<i>Implicit Multiplier</i>	<i>5.947</i>	<i>3.498</i>	<i>1.979</i>
Wisconsin State Total	3,393,514	161,484,190	311,245,490
Percent of State Total	2.9%	3.0%	5.5%
Initial	16,762	1,366,408	8,571,647
Indirect	60,456	2,431,086	6,811,614
Induced	22,467	982,562	1,579,724
Total	99,685	4,780,056	16,962,985

* TCPU: Transportation, Communications, and Public Utilities

**FIRE: Finance, Insurance, and Real Estate

Table 3: Economic Impact, Dairy Combined, 1999 Wisconsin

<i>Sector</i>	<i>Jobs</i>	<i>Total Income (\$1,000)</i>	<i>Industrial Output (Sales-\$1,000)</i>
Agriculture	88,422	797,278	3,959,781
Mining	15	2,186	3,260
Construction	3,622	159,378	280,958
Manufacturing	20,895	1,620,909	9,340,973
TCPU*	6,186	494,045	911,450
Trade	24,033	1,187,993	1,663,392
FIRE**	7,042	694,947	1,010,397
Services	22,728	735,102	1,179,628
Government	828	48,890	113,771
Total	173,770	5,740,729	18,463,609
<i>Implicit Multiplier</i>	<i>2.159</i>	<i>3.008</i>	<i>1.576</i>
Wisconsin State Total	3,393,514	161,484,190	311,245,490
Percent of State Total	5.1%	3.6%	5.9%
Initial	80,504	1,908,730	11,717,847
Indirect	63,599	2,534,594	4,668,158
Induced	29,666	1,297,405	2,077,604
Total	173,770	5,740,729	18,463,609

* TCPU: Transportation, Communications, and Public Utilities

**FIRE: Finance, Insurance, and Real Estate

Table 4: Federal, State and Local Tax Contribution of Wisconsin Dairying, 1999

<i>Type of Tax</i>	<i>On-Farm</i>	<i>Processing</i>	<i>Total</i>
		\$	
<i>Federal Taxes:</i>			
Business Income Taxes	28,480,574	121,914,651	150,395,225
Indirect Business Taxes	13,446,168	45,676,151	59,122,319
Payroll Taxes- Employee Contribution	54,996,037	174,329,838	229,325,875
Payroll Taxes - Employer Contribution	45,178,406	161,705,032	206,883,438
Personal Tax: Income Tax	98,122,526	301,942,421	400,064,947
Other Personal Taxes and Fees	1,143,088	3,517,508	4,660,596
Total Federal	241,366,798	809,085,602	1,050,452,400
<i>State/Local Taxes:</i>			
Business Income Taxes	5,694,808	24,377,335	30,072,142
Indirect Business Taxes	106,991,186	363,537,117	470,528,303
Payroll Taxes- Employee Contribution	250,560	896,817	1,147,377
Payroll Taxes - Employer Contribution	1,015,427	3,634,471	4,649,898
Motor Vehicle License Fees	1,226,473	3,787,951	5,014,424
Personal Property Taxes	714,511	2,229,264	2,943,774
Personal Income Taxes	33,815,383	104,438,485	138,253,868
Other Personal Taxes	8,600,599	26,804,536	35,405,134
Total State and Local	158,308,946	529,705,974	688,014,920
Grand Total	399,675,744	1,338,791,576	1,738,467,320

Appendix: Reference Tables

Table 1: Wisconsin Dairy Herds by Grade of Milk, February 2002

<i>County</i>	<i>Grade A</i>		<i>Grade B</i>				<i>Total Herds</i>
	<i>Herds</i>	<i>Percent of Total</i>	<i>Herds</i>			<i>Percent of Total</i>	
			<i>Bulk</i>	<i>Can</i>	<i>Total</i>		
Adams	23	79%	6	0	6	21%	29
Ashland	18	82%	4	0	4	18%	22
Barron	423	88%	60	0	60	12%	483
Bayfield	36	72%	14	0	14	28%	50
Brown	269	86%	45	0	45	14%	314
Buffalo	235	85%	33	10	43	15%	278
Burnette	53	79%	14	0	14	21%	67
Calumet	232	94%	15	0	15	6%	247
Chippewa	538	91%	51	0	51	9%	589
Clark	820	74%	150	131	281	26%	1,101
Columbia	180	85%	17	15	32	15%	212
Crawford	179	76%	54	4	58	24%	237
Dane	433	95%	23	0	23	5%	456
Dodge	517	96%	22	0	22	4%	539
Door	114	79%	31	0	31	21%	145
Douglas	12	86%	2	0	2	14%	14
Dunn	320	92%	29	0	29	8%	349
Eau Claire	173	66%	27	63	90	34%	263
Florence	12	100%	0	0	0	0%	12
Fond du Lac	462	96%	21	0	21	4%	483
Forest	6	86%	1	0	1	14%	7
Grant	635	91%	63	0	63	9%	698
Green	307	67%	154	0	154	33%	461
Green Lake	94	73%	11	23	34	27%	128
Iowa	313	84%	58	0	58	16%	371
Iron	5	100%	0	0	0	0%	5
Jackson	180	80%	32	12	44	20%	224
Jefferson	191	95%	11	0	11	5%	202
Juneau	115	82%	25	1	26	18%	141
Kenosha	43	100%	0	0	0	0%	43
Kewaunee	255	80%	63	0	63	20%	318
La Crosse	150	96%	6	0	6	4%	156
Lafayette	309	79%	83	0	83	21%	392
Langlade	77	91%	8	0	8	9%	85
Lincoln	80	81%	19	0	19	19%	99

<i>County</i>	<i>Grade A</i>		<i>Grade B</i>				<i>Total Herds</i>
	<i>Herds</i>	<i>Percent of Total</i>	<i>Herds</i>			<i>Percent of Total</i>	
			<i>Bulk</i>	<i>Can</i>	<i>Total</i>		
Manitowoc	349	87%	52	0	52	13%	401
Marathon	734	76%	230	0	230	24%	964
Marinette	120	92%	10	0	10	8%	130
Marquette	53	77%	11	5	16	23%	69
Milwaukee	3	100%	0	0	0	0%	3
Monroe	334	64%	44	140	184	36%	518
Oconto	228	87%	32	1	33	13%	261
Oneida	0	0%	1	0	1	100%	1
Outagamie	318	91%	33	0	33	9%	351
Ozaukee	86	92%	7	0	7	8%	93
Pepin	107	90%	11	1	12	10%	119
Pierce	246	93%	19	0	19	7%	265
Polk	231	93%	16	2	18	7%	249
Portage	178	82%	38	0	38	18%	216
Price	60	67%	29	0	29	33%	89
Racine	51	100%	0	0	0	0%	51
Richland	206	76%	61	3	64	24%	270
Rock	156	93%	12	0	12	7%	168
Rusk	186	84%	36	0	36	16%	222
St. Croix	234	92%	19	0	19	8%	253
Sauk	306	85%	54	0	54	15%	360
Sawyer	31	89%	4	0	4	11%	35
Shawano	472	87%	71	0	71	13%	543
Sheboygan	226	90%	25	0	25	10%	251
Taylor	300	82%	60	4	64	18%	364
Trempealeau	267	87%	41	0	41	13%	308
Vernon	343	56%	99	167	266	44%	609
Walworth	135	100%	0	0	0	0%	135
Washburn	38	90%	4	0	4	10%	42
Washington	169	93%	12	0	12	7%	181
Waukesha	49	100%	0	0	0	0%	49
Waupaca	278	84%	51	0	51	16%	329
Waushara	79	86%	13	0	13	14%	92
Winnebago	146	85%	26	0	26	15%	172
Wood	271	83%	57	0	57	17%	328
<i>State Total</i>	<i>14,799</i>	<i>84%</i>	<i>2,330</i>	<i>582</i>	<i>2,912</i>	<i>16%</i>	<i>17,711</i>

Based on data from the Dairy Producer License list as of February 1, 2002, Division of Food Safety, Wisconsin Department of Agriculture, Trade and Consumer Protection.

Table 2: Wisconsin Milk Cows, 1980 and 2000

<i>County</i>	<i>No. of Milk Cows</i>		<i>Change in Cows</i>	
	<i>1980</i>	<i>2000</i>	<i>No.</i>	<i>%</i>
Adams	3,700	1,700	-2,000	-54.1
Ashland	3,600	ND*		
Barron	47,800	32,500	-15,300	-32.0
Bayfield	5,600	3,000	-2,600	-46.4
Brown	39,000	39,000	0	0.0
Buffalo	29,200	23,000	-6,200	-21.2
Burnett	7,100	3,800	-3,300	-46.5
Calumet	30,700	22,500	-8,200	-26.7
Chippewa	50,800	39,500	-11,300	-22.2
Clark	67,900	63,500	-4,400	-6.5
Columbia	23,400	16,000	-7,400	-31.6
Crawford	19,100	11,700	-7,400	-38.7
Dane	65,000	50,500	-14,500	-22.3
Dodge	63,100	45,000	-18,100	-28.7
Door	15,500	10,300	-5,200	-33.5
Douglas	2,400	900	-1,500	-62.5
Dunn	41,000	25,000	-16,000	-39.0
Eau Claire	22,100	13,100	-9,000	-40.7
Florence	1,200	ND		
Fond Du Lac	50,500	42,500	-8,000	-15.8
Forest	1,600	ND		
Grant	56,800	52,000	-4,800	-8.5
Green	50,200	36,000	-14,200	-28.3
Green Lake	14,600	9,100	-5,500	-37.7
Iowa	37,900	28,000	-9,900	-26.1
Iron	600	ND		
Jackson	19,000	15,000	-4,000	-21.1
Jefferson	28,800	17,000	-11,800	-41.0
Juneau	14,500	9,800	-4,700	-32.4
Kenosha	6,900	3,600	-3,300	-47.8
Kewaunee	30,400	27,500	-2,900	-9.5
La Crosse	20,100	12,700	-7,400	-36.8
Lafayette	42,100	33,000	-9,100	-21.6
Langlade	13,300	7,700	-5,600	-42.1
Lincoln	11,500	6,100	-5,400	-47.0
Manitowoc	44,900	44,000	-900	-2.0
Marathon	85,900	64,000	-21,900	-25.5
Marinette	14,200	11,500	-2,700	-19.0
Marquette	7,300	5,700	-1,600	-21.9
Milwaukee	100	ND		
Monroe	37,700	27,900	-9,800	-26.0
Oconto	30,400	21,500	-8,900	-29.3

<i>County</i>	<i>No. of Milk Cows</i>		<i>Change in Cows</i>	
	<i>1980</i>	<i>2000</i>	<i>No.</i>	<i>%</i>
Oneida	300	ND		
Outagamie	46,200	36,000	-10,200	-22.1
Ozaukee	10,300	9,100	-1,200	-11.7
Pepin	10,100	8,500	-1,600	-15.8
Pierce	25,900	19,200	-6,700	-25.9
Polk	34,000	19,300	-14,700	-43.2
Portage	17,200	14,400	-2,800	-16.3
Price	9,300	4,400	-4,900	-52.7
Racine	7,000	ND		
Richland	27,700	17,300	-10,400	-37.5
Rock	27,500	14,500	-13,000	-47.3
Rusk	18,600	13,400	-5,200	-28.0
St. Croix	35,600	25,100	-10,500	-29.5
Sauk	38,400	29,000	-9,400	-24.5
Sawyer	3,200	3,100	-100	-3.1
Shawano	47,700	36,400	-11,300	-23.7
Sheboygan	32,400	26,300	-6,100	-18.8
Taylor	30,100	19,600	-10,500	-34.9
Trempealeau	35,600	25,500	-10,100	-28.4
Vernon	44,800	30,000	-14,800	-33.0
Vilas	100	ND		
Walworth	21,000	13,800	-7,200	-34.3
Washburn	5,900	3,500	-2,400	-40.7
Washington	22,500	16,000	-6,500	-28.9
Waukesha	10,200	4,700	-5,500	-53.9
Waupaca	33,800	25,400	-8,400	-24.9
Waushara	12,200	6,400	-5,800	-47.5
Winnebago	24,000	15,900	-8,100	-33.8
Wood	25,900	23,500	-2,400	-9.3
<i>Regional Summary</i>				
Northwest	175,400	119,000	-56,400	-32.2
North Central	209,300	160,000	-49,300	-23.6
Northeast	108,400	78,000	-30,400	-28.0
West Central	276,300	195,000	-81,300	-29.4
Central	129,200	96,000	-33,200	-25.7
East Central	313,600	264,000	-49,600	-15.8
Southwest	266,800	179,000	-87,800	-32.9
South Central	258,000	201,000	-57,000	-22.1
Southeast	78,000	52,000	-26,000	-33.3
<i>State Total</i>	1,815,000	1,344,000	-471,000	-26.0

*ND = Not Disclosed. Included in regional summary and state totals.

Source: Wisconsin Agricultural Statistics Service

Table 3: Wisconsin Annual Milk Production, 1980 and 2000

<i>County</i>	<i>Total Milk, 1,000 Pounds</i>		<i>Change in Milk</i>	
	<i>1980</i>	<i>2000</i>	<i>1,000 Lbs</i>	<i>%</i>
Adams	44,030	26,860	-17,170	-39.0
Ashland	41,040	ND*		
Barron	587,940	559,000	-28,940	-4.9
Bayfield	65,520	48,000	-17,520	-26.7
Brown	503,100	721,500	218,400	43.4
Buffalo	350,400	391,000	40,600	11.6
Burnett	80,940	60,420	-20,520	-25.4
Calumet	396,030	411,750	15,720	4.0
Chippewa	619,760	632,000	12,240	2.0
Clark	841,960	1,098,550	256,590	30.5
Columbia	301,860	280,000	-21,860	-7.2
Crawford	217,740	180,180	-37,560	-17.2
Dane	845,000	954,450	109,450	13.0
Dodge	820,300	769,500	-50,800	-6.2
Door	193,750	172,010	-21,740	-11.2
Douglas	27,120	13,050	-14,070	-51.9
Dunn	496,100	425,000	-71,100	-14.3
Eau Claire	262,990	220,080	-42,910	-16.3
Florence	14,640	ND		
Fond Du Lac	651,450	782,000	130,550	20.0
Forest	17,600	ND		
Grant	670,240	894,400	224,160	33.4
Green	647,580	576,000	-71,580	-11.1
Green Lake	179,580	151,970	-27,610	-15.4
Iowa	451,010	478,800	27,790	6.2
Iron	6,720	ND		
Jackson	226,100	247,500	21,400	9.5
Jefferson	374,400	287,300	-87,100	-23.3
Juneau	174,000	164,640	-9,360	-5.4
Kenosha	88,320	62,280	-26,040	-29.5
Kewaunee	383,040	497,750	114,710	29.9
La Crosse	245,220	214,630	-30,590	-12.5
Lafayette	496,780	508,200	11,420	2.3
Langlade	155,610	129,360	-26,250	-16.9
Lincoln	134,550	99,430	-35,120	-26.1
Manitowoc	574,720	814,000	239,280	41.6
Marathon	1,073,750	1,081,600	7,850	0.7
Marinette	166,140	205,850	39,710	23.9
Marquette	85,410	102,030	16,620	19.5
Milwaukee	1,220	ND		
Monroe	448,630	463,140	14,510	3.2
Oconto	355,680	380,550	24,870	7.0
Oneida	3,210	ND		
Outagamie	595,980	644,400	48,420	8.1

<i>County</i>	<i>Total Milk, 1,000 Pounds</i>		<i>Change in Milk</i>	
	<i>1980</i>	<i>2000</i>	<i>1,000 Lbs</i>	<i>%</i>
Ozaukee	129,780	164,710	34,930	26.9
Pepin	120,190	149,600	29,410	24.5
Pierce	318,570	341,760	23,190	7.3
Polk	418,200	322,310	-95,890	-22.9
Portage	208,120	237,600	29,480	14.2
Price	101,370	70,400	-30,970	-30.6
Racine	90,300	ND		
Richland	324,090	290,640	-33,450	-10.3
Rock	354,750	256,650	-98,100	-27.7
Rusk	204,600	211,720	7,120	3.5
St. Croix	441,440	469,370	27,930	6.3
Sauk	460,800	504,600	43,800	9.5
Sawyer	36,160	50,530	14,370	39.7
Shawano	591,480	644,280	52,800	8.9
Sheboygan	421,200	489,180	67,980	16.1
Taylor	361,200	323,400	-37,800	-10.5
Trempealeau	430,760	441,150	10,390	2.4
Vernon	506,240	465,000	-41,240	-8.1
Vilas	1,060	ND		
Walworth	268,800	247,020	-21,780	-8.1
Washburn	69,620	57,050	-12,570	-18.1
Washington	290,250	288,000	-2,250	-0.8
Waukesha	126,480	86,010	-40,470	-32.0
Waupaca	415,740	452,120	36,380	8.8
Waushara	148,840	113,280	-35,560	-23.9
Winnebago	312,000	271,890	-40,110	-12.9
Wood	310,800	418,300	107,500	34.6
<i>Regional Summary</i>				
Northwest	2,109,860	1,954,080	-155,780	-7.4
North Central	2,564,860	2,714,900	150,040	5.8
Northeast	1,301,150	1,374,890	73,740	5.7
West Central	3,340,400	3,363,230	22,830	0.7
Central	1,566,520	1,666,800	100,280	6.4
East Central	4,031,270	4,804,480	773,210	19.2
Southwest	3,126,900	3,123,900	-3,000	-0.1
South Central	3,343,890	3,321,820	-22,070	-0.7
Southeast	995,150	934,900	-60,250	-6.1
<i>State Totals</i>	22,380,000	23,259,000	879,000	3.9

*ND = Not disclosed. Included in regional summary and state totals.

Source: Wisconsin Agricultural Statistics Service

Table 4: Wisconsin Annual Milk Production per Cow, 1980 and 2000

<i>County</i>	<i>Annual Milk per Cow</i>		<i>Change</i>		<i>2000 Dev. From State Avg., Pounds</i>
	<i>1980</i>	<i>2000</i>	<i>Pounds</i>	<i>%</i>	
Adams	11,900	15,800	3,900	32.8	-1,506
Ashland	11,400	ND*			
Barron	12,300	17,200	4,900	39.8	-106
Bayfield	11,700	16,000	4,300	36.8	-1,306
Brown	12,900	18,500	5,600	43.4	1,194
Buffalo	12,000	17,000	5,000	41.7	-306
Burnett	11,400	15,900	4,500	39.5	-1,406
Calumet	12,900	18,300	5,400	41.9	994
Chippewa	12,200	16,000	3,800	31.1	-1,306
Clark	12,400	17,300	4,900	39.5	-6
Columbia	12,900	17,500	4,600	35.7	194
Crawford	11,400	15,400	4,000	35.1	-1,906
Dane	13,000	18,900	5,900	45.4	1,594
Dodge	13,000	17,100	4,100	31.5	-206
Door	12,500	16,700	4,200	33.6	-606
Douglas	11,300	14,500	3,200	28.3	-2,806
Dunn	12,100	17,000	4,900	40.5	-306
Eau Claire	11,900	16,800	4,900	41.2	-506
Florence	12,200	ND			
Fond Du Lac	12,900	18,400	5,500	42.6	1,094
Forest	11,000	ND			
Grant	11,800	17,200	5,400	45.8	-106
Green	12,900	16,000	3,100	24.0	-1,306
Green Lake	12,300	16,700	4,400	35.8	-606
Iowa	11,900	17,100	5,200	43.7	-206
Iron	11,200	ND			
Jackson	11,900	16,500	4,600	38.7	-806
Jefferson	13,000	16,900	3,900	30.0	-406
Juneau	12,000	16,800	4,800	40.0	-506
Kenosha	12,800	17,300	4,500	35.2	-6
Kewaunee	12,600	18,100	5,500	43.7	794
La Crosse	12,200	16,900	4,700	38.5	-406
Lafayette	11,800	15,400	3,600	30.5	-1,906
Langlade	11,700	16,800	5,100	43.6	-506
Lincoln	11,700	16,300	4,600	39.3	-1,006
Manitowoc	12,800	18,500	5,700	44.5	1,194
Marathon	12,500	16,900	4,400	35.2	-406
Marinette	11,700	17,900	6,200	53.0	594
Marquette	11,700	17,900	6,200	53.0	594
Milwaukee	12,200	ND			
Monroe	11,900	16,600	4,700	39.5	-706
Oconto	11,700	17,700	6,000	51.3	394
Oneida	10,700	ND			
Outagamie	12,900	17,900	5,000	38.8	594

<i>County</i>	<i>Annual Milk per Cow</i>		<i>Change</i>		<i>2000 Dev. From State Avg., Pounds</i>
	<i>1980</i>	<i>2000</i>	<i>Pounds</i>	<i>%</i>	
Ozaukee	12,600	18,100	5,500	43.7	794
Pepin	11,900	17,600	5,700	47.9	294
Pierce	12,300	17,800	5,500	44.7	494
Polk	12,300	16,700	4,400	35.8	-606
Portage	12,100	16,500	4,400	36.4	-806
Price	10,900	16,000	5,100	46.8	-1,306
Racine	12,900	ND			
Richland	11,700	16,800	5,100	43.6	-506
Rock	12,900	17,700	4,800	37.2	394
Rusk	11,000	15,800	4,800	43.6	-1,506
St. Croix	12,400	18,700	6,300	50.8	1,394
Sauk	12,000	17,400	5,400	45.0	94
Sawyer	11,300	16,300	5,000	44.2	-1,006
Shawano	12,400	17,700	5,300	42.7	394
Sheboygan	13,000	18,600	5,600	43.1	1,294
Taylor	12,000	16,500	4,500	37.5	-806
Trempealeau	12,100	17,300	5,200	43.0	-6
Vernon	11,300	15,500	4,200	37.2	-1,806
Vilas	10,600	ND			
Walworth	12,800	17,900	5,100	39.8	594
Washburn	11,800	16,300	4,500	38.1	-1,006
Washington	12,900	18,000	5,100	39.5	694
Waukesha	12,400	18,300	5,900	47.6	994
Waupaca	12,300	17,800	5,500	44.7	494
Waushara	12,200	17,700	5,500	45.1	394
Winnebago	13,000	17,100	4,100	31.5	-206
Wood	12,000	17,800	5,800	48.3	494
<i>Regional Summary</i>					
Northwest	12,029	16,421	4,392	36.5	-885
North Central	12,254	16,968	4,714	38.5	-338
Northeast	12,003	17,627	5,624	46.9	321
West Central	12,090	17,247	5,157	42.7	-59
Central	12,125	17,363	5,238	43.2	57
East Central	12,855	18,199	5,344	41.6	893
Southwest	11,720	17,452	5,732	48.9	146
South Central	12,961	16,526	3,565	27.5	-780
Southeast	12,758	17,979	5,221	40.9	673
<i>State Averages</i>	12,331	17,306	4,975	40.3	0

*ND = Not disclosed. Included in regional summary and state averages.

Source: Wisconsin Agricultural Statistics Service

Table 5: Estimated Wisconsin Dairy Herd Size and Milk per Farm, 2000

<i>County</i>	<i>July 2000 Herds</i>	<i>Annual Avg. 2000 Cows</i>	<i>Cows per Herd</i>	<i>Annual 2000 Milk, 1,000 Lbs.</i>	<i>Milk per Herd, Pounds</i>
Adams	36	1,700	47.2	26,860	746,111
Ashland	28	ND*			
Barron	552	32,500	58.9	559,000	1,012,681
Bayfield	60	3,000	50.0	48,000	800,000
Brown	357	39,000	109.2	721,500	2,021,008
Buffalo	316	23,000	72.8	391,000	1,237,342
Burnett	74	3,800	51.4	60,420	816,486
Calumet	283	22,500	79.5	411,750	1,454,947
Chippewa	677	39,500	58.3	632,000	933,530
Clark	1,162	63,500	54.6	1,098,550	945,396
Columbia	249	16,000	64.3	280,000	1,124,498
Crawford	282	11,700	41.5	180,180	638,936
Dane	515	50,500	98.1	954,450	1,853,301
Dodge	608	45,000	74.0	769,500	1,265,625
Door	167	10,300	61.7	172,010	1,030,000
Douglas	20	900	45.0	13,050	652,500
Dunn	409	25,000	61.1	425,000	1,039,120
Eau Claire	295	13,100	44.4	220,080	746,034
Florence	11	ND			
Fond Du Lac	546	42,500	77.8	782,000	1,432,234
Forest	7	ND			
Grant	783	52,000	66.4	894,400	1,142,273
Green	527	36,000	68.3	576,000	1,092,979
Green Lake	142	9,100	64.1	151,970	1,070,211
Iowa	418	28,000	67.0	478,800	1,145,455
Iron	5	ND			
Jackson	258	15,000	58.1	247,500	959,302
Jefferson	228	17,000	74.6	287,300	1,260,088
Juneau	165	9,800	59.4	164,640	997,818
Kenosha	48	3,600	75.0	62,280	1,297,500
Kewaunee	358	27,500	76.8	497,750	1,390,363
La Crosse	175	12,700	72.6	214,630	1,226,457
Lafayette	428	33,000	77.1	508,200	1,187,383
Langlade	94	7,700	81.9	129,360	1,376,170
Lincoln	105	6,100	58.1	99,430	946,952
Manitowoc	453	44,000	97.1	814,000	1,796,909
Marathon	1,030	64,000	62.1	1,081,600	1,050,097
Marinette	148	11,500	77.7	205,850	1,390,878
Marquette	76	5,700	75.0	102,030	1,342,500
Milwaukee	2	ND			
Monroe	561	27,900	49.7	463,140	825,561
Oconto	291	21,500	73.9	380,550	1,307,732
Oneida	1	ND			
Outagamie	394	36,000	91.4	644,400	1,635,533
Ozaukee	94	9,100	96.8	164,710	1,752,234
Pepin	135	8,500	63.0	149,600	1,108,148
Pierce	299	19,200	64.2	341,760	1,143,010
Polk	291	19,300	66.3	322,310	1,107,595
Portage	238	14,400	60.5	237,600	998,319

<i>County</i>	<i>July 2000 Herds</i>	<i>Annual Avg. 2000 Cows</i>	<i>Cows per Herd</i>	<i>Annual 2000 Milk, 1,000 Lbs.</i>	<i>Milk per Herd, Pounds</i>
Price	103	4,400	42.7	70,400	683,495
Racine	55	ND			
Richland	307	17,300	56.4	290,640	946,710
Rock	194	14,500	74.7	256,650	1,322,938
Rusk	254	13,400	52.8	211,720	833,543
St. Croix	303	25,100	82.8	469,370	1,549,076
Sauk	405	29,000	71.6	504,600	1,245,926
Sawyer	42	3,100	73.8	50,530	1,203,095
Shawano	591	36,400	61.6	644,280	1,090,152
Sheboygan	285	26,300	92.3	489,180	1,716,421
Taylor	401	19,600	48.9	323,400	806,484
Trempealeau	357	25,500	71.4	441,150	1,235,714
Vernon	689	30,000	43.5	465,000	674,891
Walworth	153	13,800	90.2	247,020	1,614,510
Washburn	48	3,500	72.9	57,050	1,188,542
Washington	205	16,000	78.0	288,000	1,404,878
Waukesha	62	4,700	75.8	86,010	1,387,258
Waupaca	367	25,400	69.2	452,120	1,231,935
Waushara	105	6,400	61.0	113,280	1,078,857
Winnebago	209	15,900	76.1	271,890	1,300,909
Wood	358	23,500	65.6	418,300	1,168,436
<i>State Totals/Averages</i>	19,897	1,344,000	67.5	23,259,000	1,168,970

*ND = Not disclosed.

Source: Wisconsin Agricultural Statistics Service (cows and milk) and Dairy Producer License list as of July 1, 2000, Division of Food Safety, Wisconsin Department of Agriculture, Trade and Consumer Protection (herds).