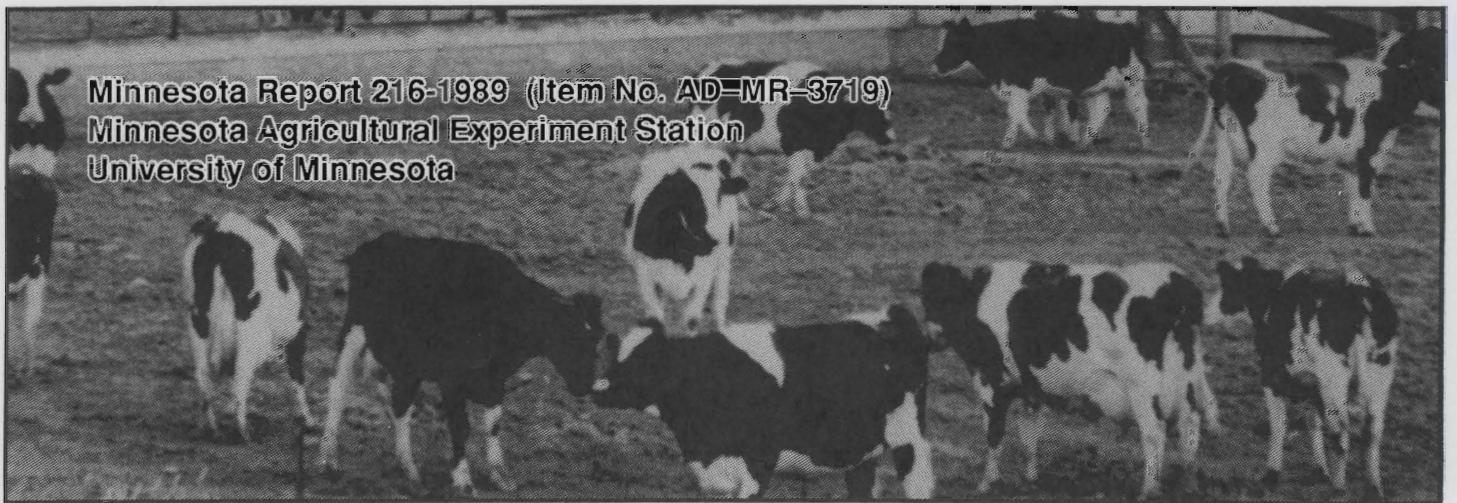
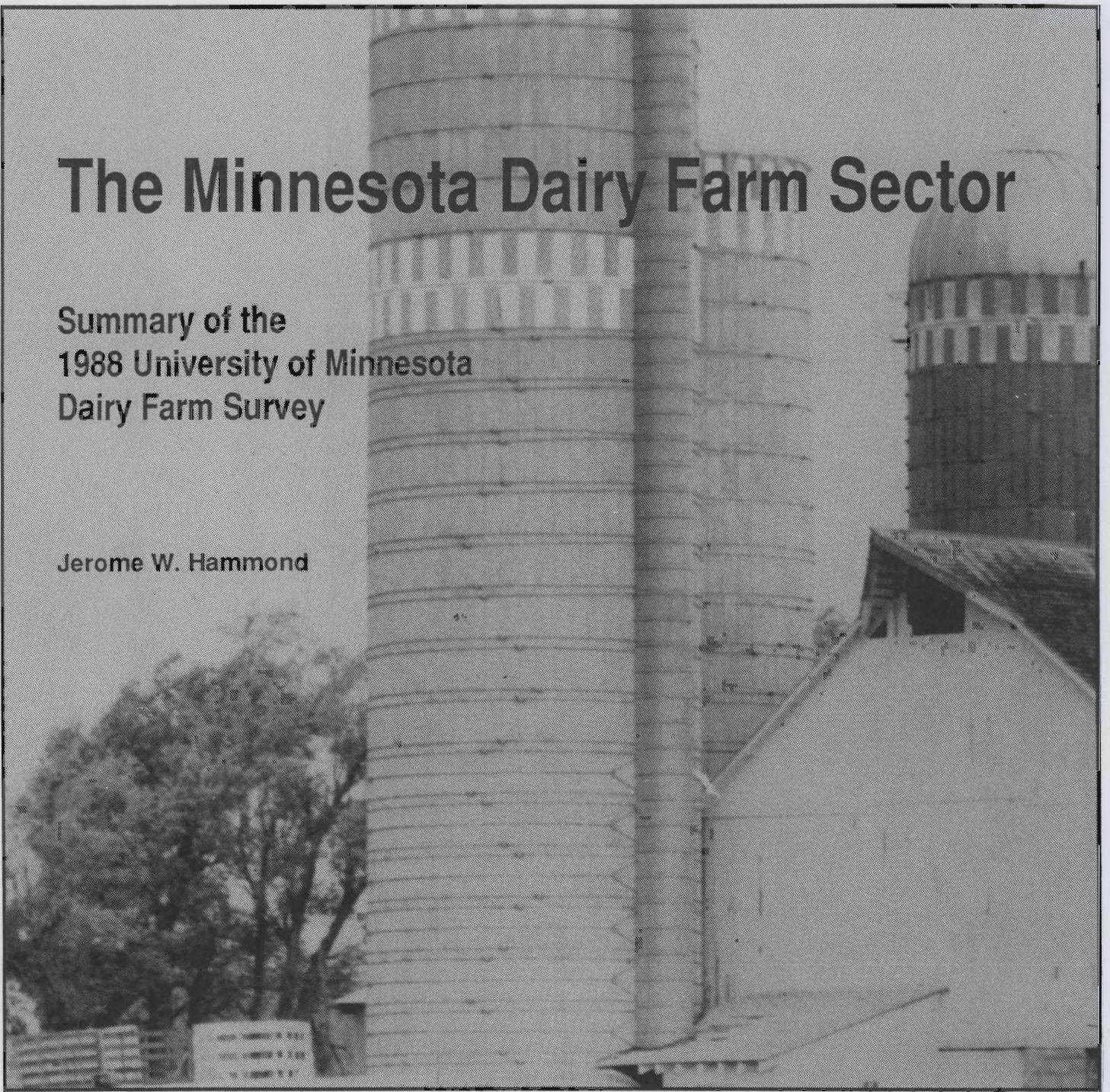


# The Minnesota Dairy Farm Sector

Summary of the  
1988 University of Minnesota  
Dairy Farm Survey

Jerome W. Hammond



Minnesota Report 216-1989 (Item No. AD-MR-3719)  
Minnesota Agricultural Experiment Station  
University of Minnesota

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**St. Paul, Minnesota**

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The author thanks the staff of the Minnesota Agricultural Statistics Service, particularly Carroll Rock, George Howse, and Roger Binning. They directed and administered selecting the sample of dairy farms, mailing questionnaires and telephoning for follow-up with non-respondents. They also assisted in other aspects of survey design and data collection.

The survey would not have been possible without the widespread participation of the many Minnesota dairy producers who took the time to complete and return it to us. This extensive survey did require considerable time and effort by respondents. The leadership of the Minnesota dairy industry greatly helped by informing producers of the importance of this survey, and by encouraging them to respond.

Thanks also to Sue Pohlod and Linda Littrell of the Department of Agricultural and Applied Economics of the University of Minnesota for typing and preparing the final report.

### **DISCLAIMER**

No statistical analysis was undertaken for this report. Consequently, the patterns and relationships that are noted from the summaries and cross-tabulations of data imply no level of statistically based significance.

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# THE MINNESOTA DAIRY FARM SECTOR

## SUMMARY OF THE 1988 UNIVERSITY OF MINNESOTA DAIRY FARM SURVEY

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### SUMMARY

This report summarizes data obtained from a survey of Minnesota milk producers during February and March 1988. It provides a profile of the Minnesota dairy industry at the producer level that is not readily available in standard statistical reports.

Completed questionnaires were obtained from 868 milk producers. Information was obtained on ownership, farm size, labor sources, management practices, income and financial status, and attitudes and future plans of producers. Some of the important highlights of this survey's results were:

- 1) The individual family operation predominates as the form of dairy enterprise (78.7 percent of all dairy farms). Multiple family operations account for the remainder. The average age of the principal (or oldest) operator was 50 years.
- 2) About half of all producers have a high school diploma as their highest earned degree. The data indicates that milk production per cow (a measure of productivity) generally increases with level of education.
- 3) Land ownership is high among dairy farmers, with 92.9 percent owning some or all of the land in their farms.
- 4) Average herd size for respondents was 50.6 cows, somewhat higher than the 1988 state average of 44. Only 5.4 percent of the herds had 100 or more cows.
- 5) Average production per cow per year for the respondents was 14,027 pounds for 1987. This compared to 12,680 pounds for all herds, as reported by the Minnesota Statistical Service. Of the herds in the survey, 28 percent produced in excess 16,000 pounds per year per cow, but 11 percent still produced less than 10,000 pounds of milk per cow.
- 6) Stanchion housing systems are used on almost 80 percent of the dairies. Pipeline milking facilities account for 70.5 percent of all milking systems. Milking parlors are on only 11.9 percent of Minnesota dairy farms.
- 7) Age of housing facilities averaged more than 30 years. However, 39.6 percent of the housing systems and 40.5 percent of the milking facilities had been remodeled or updated in the last ten years.
- 8) Labor is provided primarily by the operator, operator spouse and children. Only 17.6 percent use full-time hired labor and only 2.2 percent of the farms have a full-time hired manager.
- 9) Artificial insemination is used on 80 percent of all farms.

- 10) Herd performance testing is widely used. Services of the Dairy Herd Improvement Association are used by 54.7 percent of the farms. Another 10.6 percent use some other performance testing method.
- 11) Milking three times per day is infrequent (done by only .7 percent of the farms in the sample).
- 12) More than half the farms generated annual net farm incomes of less than \$20,000. Only 16 percent of farms generated more than \$40,000 per year net farm income. Off-farm employment of operators or spouses generated an additional \$5,000 to \$10,000 per year for about half of the farms.
- 13) More than 70 percent of the dairy farms reported their debts to be less than 70 percent of assets. The rest were financially stressed or insolvent (assuming that 70 percent or greater debt was indicative of problems).
- 14) Almost half of the respondents, 46.3 percent, said they will not use Bovine Somatotropin (BST) even if the hormone is approved by the Federal government for commercial use. Intention to adopt decreased with age of the operator. Financially stressed farmers were more likely to adopt the technique than financially sound operations.
- 15) One-fifth of the farms report an intention to terminate dairy operations within the next five years. This is consistent with past trends in dairy farm numbers in Minnesota.

## INTRODUCTION

U.S. milk production increased from 124.2 billion pounds in 1965 to 142.5 billion in 1987, a 14.7 percent increase. However, Minnesota's share of U.S. milk production declined from its peak of 8.6 percent in 1965 to 7.3 percent in 1987 (Table 1). Most of the decline occurred by 1970 and the share has since been relatively constant. Continued declines in share have characterized the Corn Belt and Northern Plains Regions.

The total Lake State Region, in which Minnesota is located, has shown little change in percentage terms since 1965, but this is largely because Wisconsin has increased its share of U.S. milk production.

Some of the South Central States and the Pacific Coast States saw their share of U.S. milk production grow. The Pacific Region's share increased from 9.2 percent to 16.4 percent between 1965 and 1987.

The major growth in U.S. milk production since the 1960s has also been accomplished with fewer cows (Table 2). The total dairy herd declined from 13.5 million to 10.3 million animals. That represents declines of 18.7 percent from 1967 to 1977, and 5.8 percent from 1977 to 1987.

And, while Minnesota's change has essentially paralleled the national picture, regional changes have been quite different. In the Pacific Region, for example, cow numbers rose during both periods, by a slight .2 percent from 1967 to 1977, but a substantial 18.1 percent from 1977 to 1987. Cow numbers also declined by greater percentages in both periods in Minnesota than it did in the other states in the Lake States region.

Increased total milk production resulted from significant increases in productivity per cow. The ten-year increase from 1967 to 1977 for the U.S. was 27.1 percent. It went up another 23.3 percent for the period 1977 to 1987, reaching a national 1987 milk production average of 13,786 pounds per year (Table 3). As for Minnesota, while its per cow production was above the

national average in 1967, it is now below the national average.

Gains in milk production in Minnesota for the two 10-year periods are less than for any of the major milk producing regions in the U.S., and well below the average increase for the Lake States. Greatest productivity gains occurred in the Pacific Region, by 33 percent from 1967 to 1977, and by 26 percent for the 1977 to 1987 period. Minnesota's rank in average per cow milk production, a major indicator of productivity on dairy farms, continues to fall (Table 4). Ranked 29th in production per cow in 1978, Minnesota dropped to 33rd in 1987, and 38th in 1986.

State and national trends in milk production and productivity concern many leaders in Minnesota's dairy industry. Dairy leaders in the other Northern and Northeastern states of the major milk producing regions are also concerned about these changes in their industry. Some ask whether these regions are losing their comparative advantage in milk production. Others question the role of Federal price supports and Federal order programs in stimulating or accelerating these trends. Population shifts, and therefore demand for dairy products by regions, have also been changing.

This study was undertaken against this background of concerns and the likelihood of continuing shifts in the geographic location of U.S. milk production.

Agricultural economists interested in the dairy industry, and representing the Northeastern and North Central states, met at the Annual Meetings of the American Agricultural Economics Association in 1987 to discuss this situation. They concluded that a more complete understanding of the regional shifts in milk production required information not currently available from standard statistical sources on the structure and organization of the industry in each of the states. They decided to gather that data with dairy farm surveys in each state in the northern dairy region.



This publication reports the results of Minnesota's survey. A regional publication describing the characteristics of all of the states that participated in the northern dairy survey is forthcoming.

A standard questionnaire was used for obtaining the information for all of the states. It included eight categories of questions, covering:

- 1) ownership characteristics
- 2) farm size characteristics
- 3) milk production and specialization characteristics
- 4) equipment and facilities
- 5) labor use
- 6) management practices
- 7) income and financial characteristics of the farms, and
- 8) miscellaneous questions, including attitudes on dairy policy options and on the use and adoption of BST (bovine somatotropin).

The Minnesota Agricultural Statistics Service played a major role in sampling and surveying Minnesota dairy farms. From its 1987 list of approximately 19,000 dairy farms, it selected a representative random sample of 4,000.

Questionnaires were mailed to each selected dairy farm in late February and early March of 1988. Telephone follow-ups were used with non-respondents to increase the number of responses. Of 4,000 questionnaires mailed, 1,184 completed responses were obtained. Of the returns, 868 were still actively engaged in dairy farming (Table 5). Those no longer in dairying encompassed a number of situations (Table 6). In some cases the dairy herd had been sold; in others both the farm and herd. Consequently, some of the herds of the 316 reporting that they were no longer in dairying are still in production.

Respondents to the survey represented 4.6 percent of the dairy farms in Minnesota, and 5.3 percent of both the milk produced in Minnesota, and the total cow inventory (Table 5). The average respondents had somewhat larger herds and higher production per cow than statewide averages. Thus, cow inventory and milk production are somewhat larger percentages of the state total than the number of

farm respondents is of the total number of dairy farms.

Summaries of the survey results and various cross-tabulations of these results are presented and discussed in the following sections. Some of the important characteristics of the summaries or the cross-tabulations are noted. No statistical analysis was undertaken for this report. Consequently, the patterns and relationships that are noted from the summaries and cross-tabulations of the data imply no level of statistically based significance.

**Table 1: Regional Shares of U.S. Milk Production for Regions of the U.S. and for Minnesota — Selected Years, 1965-87**

Region	1965	1970	1975	1980	1985	1987
	Percentage					
Northeast	20.7	20.7	20.4	20.4	20.0	19.8
Lake States	28.3	27.9	28.0	28.7	28.7	28.4
Minnesota	8.6	8.2	7.8	7.4	7.8	7.3
Corn Belt	17.1	14.8	13.6	12.4	11.8	11.5
Northern Plains	5.3	5.1	4.6	4.1	3.9	3.8
Appalachian	6.9	7.0	6.9	6.6	6.1	5.9
Southeast	3.0	3.5	3.8	3.5	3.1	3.1
Delta	2.3	2.4	2.3	2.0	1.8	1.7
Southern Plains	3.5	3.7	3.7	3.7	3.6	3.8
Mountain	3.7	4.0	4.4	4.8	5.5	5.5
Pacific	9.2	10.8	12.3	13.8	15.5	16.4

Source: "Dairy Situation and Outlook" August 1988, DS416, ERS, USDA, Washington, D.C., and "Wisconsin Dairy Facts, 1979," 210-1-79, Wisconsin Agricultural Reporting Service, Madison, WI.

**Table 2: Number of Milk Cows by State and Region for 1967, 1977 and 1987**

State/Region	1967	1977	1987	1967-77	1977-87
	Number			Percent Change	
Northeast	2,562	2,202	2,059	-14.0	-6.5
Lake States	3,523	3,071	2,979	-12.8	-3.0
Minnesota	1,084	866	823	-20.1	-5.0
Corn Belt	2,124	1,526	1,299	-28.2	-14.9
Northern Plains	827	582	448	-29.6	-23.0
Appalachian	1,242	842	708	-32.2	-15.9
Southeast	551	467	360	-15.2	-22.9
Delta	518	333	224	-35.7	-32.7
Southern Plains	543	431	438	-20.6	+1.6
Mountain	504	443	510	-12.1	+15.1
Pacific	1,107	1,111	1,312	+0.2	+18.1
Total U.S.	13,501	10,977	10,337	-18.7	-5.8

Source: "Dairy Situation and Outlook," selected issues, 1985-88, ERS, USDA, Washington, D.C.

**Table 3: Output Per Cow for 1967, 1977 and 1987 for Minnesota and Selected Regions**

State/Region	1967	1977	1987	1967-77	1977-87
	lbs./cow/year			Percent Change	
Northeast	9,533	11,187	13,645	+17.4	+22.0
Lake States	9,414	11,490	13,595	+22.0	+18.3
Minnesota	9,430	10,950	12,680	+16.1	+15.8
Corn Belt	8,972	10,608	12,702	+18.2	+19.7
Northern Plains	7,579	9,328	12,150	+23.1	+30.0
Appalachian	6,767	10,020	11,956	+48.1	+19.3
Southeast	7,149	9,610	12,258	+34.4	+27.6
Delta	5,481	8,024	10,763	+46.4	+34.1
Southern Plains	8,002	10,422	12,557	+30.2	+20.5
Mountain	9,015	12,061	15,349	+33.8	+27.3
Pacific	10,649	14,160	17,835	+33.0	+26.0
Total U.S.	8,797	11,181	13,786	+27.1	+23.3

Source: "Dairy Situation and Outlook," selected issues, 1985-88, ERS, USDA, Washington, D.C.

**Table 4: Milk Production and Per Cow Productivity in Minnesota, 1978-87**

Year	Production (millions of lbs.)	Production per cow (lbs.)	State's National
			Rank in Productivity
1978	9,089	10,859	29
1979	9,145	10,848	29
1980	9,535	11,061	30
1981	10,061	11,356	32
1982	10,341	11,452	33
1983	10,913	12,139	26
1984	10,331	11,647	30
1985	10,840	11,847	35
1986	10,614	11,912	38
1987	10,436	12,680	33

Source: "Dairy Situation and Outlook," selected issues, 1985-88, ERS, USDA, Washington, D.C.

**Table 5: Comparison of 1988 Dairy Farm Survey Respondents to Total Minnesota Dairy Industry**

	Minnesota Total 1987	U of M Survey	U of M Survey as Percent of State
Number of Dairy Farms	19,000	868	4.60
Total Pounds of Milk Produced (1987)	10,436,000,000	550,097,789	5.27
Total Cow Inventory January 1, 1988	823,000	43,705	5.31
Average Production Per Cow	12,680	14,027	110.60

**Table 6: Current Status of Dairy Farm Respondents — 1988 University of Minnesota Dairy Farm Survey**

Current Dairy Farming Status	Number of Farms Reporting	Percent of Total Farms Reporting
<i>Active dairy farmers</i>	868	73.3
<i>No longer in dairying</i>	316	26.7
Still farming, sold only dairy herd	196	16.6
Still farming, sold both dairy farm and herd	6	.5
Retired from farming, sold only the dairy herd	39	3.3
Retired from farming, sold both the dairy farm and herd	29	2.4
Other	41	3.5
<b>Total</b>	<b>1,184</b>	<b>100.0</b>

## OWNER-OPERATOR CHARACTERISTICS

The most predominant form of Minnesota dairy farm ownership is individual ownership by a single family. This is the form of ownership for 80.2 percent of all the farms in the sample (Table 7). Partnerships owned 10.3 percent of the farms, but accounted for 14.1 percent of total milk volume. Incorporated family farms were only 4.3 percent of the sample. No dairy farm in the sample reported control by an outside corporation.

At 78.7 percent, the pattern of dairy farm operation is similarly dominated by single families (Table 8). Two-family operations accounted for 16.1 percent of the dairies, and operations run by three or more families characterized 5.2 percent of the farms. Multi-family operations combined represent slightly more than one-fifth of our dairy farms.

The average age of the principle farmers responding to the survey was 50 years. Highest concentrations of dairy farmers are between ages 30 to 59 (Table 9). Though there are relatively similar numbers in each of those three largest ten year age groups, the age group 40-49 is smallest of those groupings. This may reflect the economic situation in dairying during the time when these individuals made the decision to enter dairying. The middle 1960s were considered to be depressed years for the dairy sector, with poor prospects for income generation.

The age group 60 and above accounts for 12 percent of all dairy farms, still a relatively large number of farmers. However, that they produce a smaller proportion of total milk, only 9 percent, indicates that the size of their herds are, on average, considerably smaller than the average dairy herd in the state.

The highest education level of the principle operator of a Minnesota dairy farm is most commonly a high school degree. But, 80 percent of all dairy farm operators had achieved at least that degree (Table 10). A relatively large share of the dairy farmers, 20 percent, had less than a

high school education. Nine percent of respondents had some college. Only 5.8 percent were college graduates.

The data indicates that average size of a dairy farmer's operation increases with the level of education. For example, college graduates account for only 5.8 percent of the dairy farms, but produce 8.7 percent of the milk. On the other hand, the 20.2 percent with less than a high school degree produce only 15.7 percent of total milk volume.

Also interesting is the relationship of education to the average milk production per cow, indicated in the last column of Table 10. Average production for all respondents is 14,027 pounds per year. The lowest production per cow is for producers with less than 12 years of education; only 13,153 pounds per year.

The level of production per cow increases almost consistently with the level of education. Those with a college degree average 15,637 pounds production per cow per year, and those with post-graduate work are producing at 17,829 pounds per year. At least in this dimension, there appear to be fairly high returns to education with respect to milk production.

Land ownership is very high for dairy farmers. Almost 93 percent of the respondents owned some or all of their land, with the average number of owned acres being 276.9 (Table 11). However, more than half of the farmers in the sample, 62.8 percent, rent some land. The average rented acreage for farms reporting rented land was 177.9 acres. A few of the farms, 1.7 percent, reported renting or leasing land to others.

**Table 7: Distribution of Minnesota Dairy Farms by Farm Ownership Type and Milk Volume**  
— 1988 University of Minnesota Dairy Farm Survey

Type of Ownership	Number of Farms Reporting	Percent of Total Farms Reporting	Percent of Milk Volume <sup>1</sup>
Individual owner	694	80.2	73.6
Partnership (formal)	89	10.3	14.1
Limited partnership	45	5.2	6.4
Corporation - family	37	4.3	5.9
<b>Total</b>	<b>865</b>	<b>100.0</b>	<b>100.0</b>

<sup>1</sup> Calculated for respondents reporting both ownership type and milk volume.

**Table 8: Distribution of Minnesota Dairy Farms by Number of Families Operating the Dairy Unit**  
— 1988 University of Minnesota Dairy Farm Survey

Number of Families Operating Dairy Unit	Percent of Farms Reporting	Total Farms Reporting
One	680	78.7
Two	139	16.1
Three or more	45	5.2
<b>Total</b>	<b>864</b>	<b>100.0</b>

**Table 9: Distribution of Minnesota Dairy Farms by Age of Principal Operator and Milk Volume**  
— 1988 University of Minnesota Dairy Farm Survey

Age of the Farm's Principal Operator	Number of Farms Reporting	Percent of Total Farms Reporting	Percent of Milk Volume <sup>1</sup>
Less than 30	66	8.0	7.1
30 - 39	231	28.0	29.1
40 - 49	189	22.9	24.5
50 - 59	239	29.0	30.3
60 and up	100	12.0	9.0
<b>Total<sup>2</sup></b>	<b>825</b>	<b>100.0</b>	<b>100.0</b>

<sup>1</sup> Calculated for respondents reporting both age of operator and milk volume.  
<sup>2</sup> Average age for all farmers was 50.

**Table 10: Distribution of Minnesota Dairy Farms by Principal Operator's Education Level**  
 — 1988 University of Minnesota Dairy Farm Survey

Principal Operator's Education Level	Number of Farms Reporting	Percent of Total Farms Reporting	Percent of Milk Volume <sup>1</sup>	Average Annual Production/Cow (lbs.)
Less than 12 years	175	20.2	15.7	13,153
High school graduate	424	49.0	48.8	13,986
Technical training	130	15.0	14.4	13,982
Some college	78	9.0	10.3	14,464
College graduate	50	5.8	8.7	15,637
Post graduate work	9	1.0	2.0	17,829
Combination of above	0	0	0	—
Total	866	100.0	100.0	14,027

<sup>1</sup> Calculated for respondents reporting both level of education and milk volume.

**Table 11: Distribution of Minnesota Dairy Farms by Land Ownership and Renting or Leasing Arrangement**  
 — 1988 University of Minnesota Dairy Farm Survey

Ownership and Renting or Leasing Arrangement	Number of Farms Reporting	Percent of Total Farms Reporting	Average Acreage for Farms Reporting
Owned Acres	806	92.9	276.9
Rented or leased from others	515	62.8	177.9
Rented or leased to others	15	1.7	102.7

## FARM SIZE CHARACTERISTICS

Both herd size and land area were examined as factors of farm size.

### Herd Sizes

The average herd size for producers responding was 50.6 milk cows (Table 12). This included both cows that were milking and dry cows. Heifer calves or replacement heifers averaged 41.6 animals per farm.

It was somewhat surprising that the average number of bulls was 2.3 per herd because a large percentage of dairy farms reported using artificial insemination for animal breeding. Feeding of bull calves or dairy steers seems to be a rather common practice on dairy farms as the number of these animals averaged more than 30 per dairy farm (Table 12).

Distribution of dairy farms by herd size categories indicates that few Minnesota farms have very large numbers of milking cows. Table 13 shows that only 5.4 percent have more than 100 milking cows. Forty percent of the farms are in the 30-49 cows per herd range and 30.2 percent are in the range of 50-74 cows per herd.

Herds of less than 30 cows account for almost 17 percent of total dairy farms (Table 13). These herds, however, account for only 5.5 percent of total milk volume. Though these figures show rather large numbers of small farms, there have been significant changes in the distribution since 1980. Then, almost 50 percent of Minnesota dairy farms reported less than 30 cows per herd and only 15 percent of herds were in the size range 50-99 cows.<sup>1</sup>

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<sup>1</sup>Harry Kaiser and Jerome Hammond, *Changing Structure of the Minnesota Dairy Industry*, Economic Report ER83-8, Department of Agricultural and Applied Economics, University of Minnesota, St. Paul, June 1983.

The distribution of herd sizes does not show large differences in size according to age of the operator (Table 14). Producers who are 60 years or older report an average herd size of 45.1 cows. The largest average herd size, 53.3 cows, existed for those 50-59 years of age. The 60 and older age group exhibited the largest percentage of small herds, with 33.7 percent having fewer than 30 cows. In general, one can conclude from this data that average herd size increases moderately with age until operators reach age 60 and then herd size begins to decline.

### Dairy Farm Land Base

Because most Minnesota dairy farmers produce their own feed for dairy animals, a substantial land base for dairy farms could be expected. This is verified (Table 15). The average size of dairy farms in terms of all land operated is 369.2 acres in 1987. Tillable crop land averages 252 acres per farm. For farms reporting land in government set-aside programs or the conservation reserve program, an average of more than 100 acres per farm is reported, with an average 45.8 acres for annual set-aside programs and 67.1 acres for longer term conservation reserve (CRP). Permanent pasture land averages 55.8 acres per farm.

Though information on use of crop land was requested, respondents appeared to be uncertain how to report acreage for a crop when it was included for two different uses, such as corn for grain and corn for silage. Though conclusions drawn from this data are tenuous, the results nevertheless provide some insights into cropland use.

Corn and soybeans are the most important uses of crop land for the surveyed dairy farmers. For those reporting corn or soybean production, their averages are 85.7 and 86.4 acres respectively (Table 16). Of the remaining cropland, legumes account for the largest land use, for production of either haylage or hay. For

haylage production, 58.2 percent of the farms report producing legumes, with an average of 69.6 acres per farm. For hay production, 77.9 percent of farms report using legumes, with an average of 62.4 acres per farm (Table 16).

A large number of the farms, 79.5 percent, report producing corn for silage, with an average of 30.9 acres per farm. Small grains are produced on a large number of the farms, 76.6 percent, with an average of 66.7 acres per farm for those reporting. This primarily includes wheat, oats and barley.

A majority of Minnesota's dairy farms specialize in that product. This determination of specialization is based on a threshold calculation requiring that at least 75 percent of a dairy farm's total gross farm sales be from milk and dairy animals (Table 17). On this basis, 60.1 percent of the farms are specialized. Nearly 40 percent of the farms receive less than 75 percent of their cash receipts from milk or dairy animals sales and are therefore considered to be diversified farms. Cattle feeding and cash crop activities characterize many of this latter group.

**Table 12 : Distribution of Minnesota Dairy Farms by Dairy Stock on Hand (January 1, 1988)**  
— 1988 University of Minnesota Dairy Farm Survey

Type of Dairy Stock	Average Number of Animals per Farm Reporting	Number of Farms Reporting	Percent of Dairy Farms
Total milk cows on hand (including dry cows)	50.6	864	100.0
Dairy heifer calves & replacement heifers	41.6	843	98.0
Bulls on hand	2.3	339	39.5
Bull calves on hand	11.5	419	49.0
Dairy steers on hand	18.6	441	51.5

**Table 13: Distribution of Minnesota Dairy Farms by Herd Size and Milk Volume**  
— 1988 University of Minnesota Dairy Farm Survey

Herd Size	Number of Farms Reporting	Percent of Total Farms Reporting	Percent of Milk Volume <sup>1</sup>
Less than 30	145	16.8	5.5
30 - 49	346	40.0	29.5
50 - 74	261	30.2	35.9
75 - 99	66	7.6	14.0
100 - 124	28	3.2	7.8
125 - 149	6	.7	1.4
150 - 199	6	.7	2.1
200 - 299	6	.7	3.0
300 and up	1	.1	.9
Total	865	100.0	100.0

<sup>1</sup> Calculated for respondents reporting both herd size and milk volume.



**Table 14: Distribution of Minnesota Dairy Farms by Age of Principal Operator and Herd Size**  
 — 1988 University of Minnesota Dairy Farm Survey

(Herd Size (Number of Cows))	Percent of Farms by Age of Principle Operator (years) <sup>1</sup>				
	Under 30	30-39	40-49	50-59	60 or older
Less than 30	10.6	12.2	12.7	18.1	33.7
30 - 49	51.5	44.8	38.6	35.7	32.7
50 - 74	28.8	34.4	34.4	29.0	22.4
75 - 99	6.1	4.4	9.0	10.0	6.1
100 - 124	3.0	3.0	3.7	3.8	1.0
125 - 149	0	.9	.5	.8	1.0
150 - 199	0	0	0	1.7	1.0
200 - 299	0	.4	.5	.8	2.0
300 and up	0	0	.5	0	0
Total percent	100.0	100.0	100.0	100.0	100.0
Total number	66	230	189	238	98
Average herd size	47.5	49.3	52.7	53.3	45.1

<sup>1</sup> Calculated for respondents reporting both operator age and milk volume.

**Table 15: Distribution of Minnesota Dairy Farms by Total Land Operated in 1987**  
 — 1988 University of Minnesota Dairy Farm Survey

Land Category	Number of Farms Reporting	Percent of Total Farms Reporting	Average Acreage for Farms Reporting
Tillable cropland	857	98.7	252.0
Government set aside programs	546	62.9	45.8
Conservation reserve	53	6.1	67.1
Permanent pasture land	705	81.2	55.8
All other land	751	86.5	47.7
All land operated	853	98.2	369.2

**Table 16: Distribution of Minnesota Dairy Farms by Acreage of Crops Grown**  
— 1988 University of Minnesota Dairy Farm Survey

Crop	Number of Farms Reporting	Percent of Total Farms Reporting	Average Acreage for Farms Reporting
<i>Harvested for Grain</i>			
Corn	733	84.4	85.7
Soybeans	260	30.0	86.4
Small grains (wheat, oats, barley)	665	76.6	51.5
Other	107	12.3	66.7
<i>Silage, Haylage, or Greenchop</i>			
Corn silage	690	79.5	30.9
Legumes (alfalfa, clover, etc.)	505	58.2	69.6
Small grains (oatlage, barlage, etc.)	153	22.3	27.2
Other	49	5.6	21.3
<i>Hay</i>			
Grasses (bluegrass, brome, etc.)	198	22.8	35.5
Legumes (alfalfa, clover, etc.)	676	77.9	62.4
Other	53	6.1	35.8
<i>Pasture</i>			
Temporary pastures	131	15.1	24.5
Other	23	2.6	46.2

**Table 17: Specialization of Minnesota Dairy Farms**  
— 1988 University of Minnesota Dairy Farm Survey

	Number of Farms Reporting	Percent of Total Farms Reporting	Percent of Milk Volume <sup>1</sup>
Specialized dairy farms (75% or more of total farm sales from milk and dairy animals)	497	60.1	59.1
Diversified farms (less than 75% of total farm sales from milk and dairy animals)	330	39.9	40.9
<b>Total</b>	<b>827</b>	<b>100.0</b>	<b>100.0</b>

<sup>1</sup> Calculated for respondents answering both questions, milk volume and level of specialization.

## MILK PRODUCTION AND PRODUCTIVITY

The average production per cow for the surveyed dairy farms was 14,027 pounds per year for 1987. This was somewhat higher than production for all herds in the state, which according to the agricultural statistical service, was 12,680 pounds per year.

The distribution of farms by level of milk production per cow is presented in Table 18. This table shows that 36 percent of all herds produce from 13,000 to 16,000 pounds of milk per cow per year. Another 26 percent of our herds produce only 10,000 to 13,000 pounds per year, and 11 percent produce less than 10,000 pounds per year. Only 28 percent of our herds produce in excess of 16,000 pounds per year. This group also produces more than 38 percent of the total milk volume.

The sample of farms reflects the grade A/grade B quality differences in the herds. For the sample, 73.7 percent of the herds were producing grade A quality milk, that is, milk eligible for fluid markets. Only 26.3 percent of the farms produced grade B milk (Table 19). These percentages are consistent with the statewide 71 percent Grade A share reported by the USDA.

The data also indicates that total milk production by grade A farmers tends to be considerably larger than grade B farmers. The 73.7 percent of the farms producing grade A milk actually produced 84.5 percent of milk volume, while the 26.3 percent of farms which were of grade B quality produced only 15.5 percent of total milk volume.

**Table 18: Distribution of Minnesota Dairy Farms by Average Production per Cow and Milk Volume**  
— 1988 University of Minnesota Dairy Farm Survey

Average Production Per Cow per Year (lbs.)	Number of Farms Reporting	Percent of Total Farms Reporting	Percent of Milk Volume <sup>1</sup>
Less than 10,000	81	11.0	4.8
10,000 - 12,999	192	26.0	19.2
13,000 - 15,999	265	36.0	37.5
16,000 - 18,999	162	22.0	29.6
19,000 - 21,999	40	5.0	8.1
22,000 - 24,999	4	1.0	.7
Total	744	100.0	100.0

Average Production per Cow: 14,027 lbs.

<sup>1</sup> Calculated for respondents reporting both production per cow and total production.

**Table 19: Distribution of Minnesota Dairy Farms by Grade A and Grade B Milk and Milk Volume**  
— 1988 University of Minnesota Dairy Farm Survey

Milk Quality	Number of Farms Reporting	Percent of Total Farms Reporting	Percent of Milk Volume <sup>1</sup>
Grade A	638	73.7	84.5
Grade B	228	26.3	15.5
Total	866	100.0	100.0

<sup>1</sup> Calculated for respondents reporting both grade of milk and milk volume.

## EQUIPMENT AND FACILITIES

The several types of dairy farm equipment and housing systems reported by the dairy farm operators indicate that a wide variety of dairy technologies are in use. Four types of milking systems and nine types of housing systems were reported.

### Milking Systems

The milking systems were classified into four types: bucket systems, pipeline systems, herringbone parlors, or other types of parlors (Tables 20 and 21). Most commonly used was the pipeline milker, accounting for 70.5 percent of all systems used on the farms (Table 20). Next in importance was the bucket system, in 17.6 percent of the milking systems. Parlors accounted for only 11.9 percent of the dairy operations.

Table 20 indicates that the milking parlor is the most common form of milking system for herds in excess of 150 cows. Pipeline systems predominate for herds in the 30-149 cow category, and the bucket system with a dump station is most widely used for herds of less than 30 cows.

The type of milking system used appears to be largely unrelated to the level of per cow milk production. The exception to this is for the less than 10,000 pounds per year herds (Table 21). Beyond that level of production, distribution of systems seems relatively similar for all herd sizes. For herds above 10,000 pounds per year milk production, the pipeline system is the most popular.

### Housing Systems

Of the nine housing systems used by Minnesota dairy farmers, stanchion type housing continues to predominate, with 79.4 percent of the sample farms using it (Table 22). This reflects some decline from 1982 when 87.4 percent of the sample farms reported use of a stanchion type

of operation.<sup>1</sup>

None of the dairy farms with more than 150 cows used the stanchion type housing system. Either free stalls or some other type of loose housing system was used. But for herds of fewer than 125 cows, the stanchion type of housing system is the most dominant form of housing. Stanchion type systems are more labor intensive than other forms of housing, so it's not surprising that very large dairies use systems that reduce labor requirements.

Free stall or loose housing systems are gaining in popularity in Minnesota, but are still found on only a relatively small share of dairy farms. Free stall systems account for 11.5 percent of the dairy herds (Table 22).

There does not appear to be a strong relationship between housing type and productivity per milking animal. Table 23 shows that, for all levels of milk production, stanchion/tie type housing is the predominant type of system. That is, it is the predominant form for low producing as well as for high producing herds. It is noteworthy that the stanchion/tie or free stall housing type is the exclusive form of housing for the very high producing herds, herds in excess of 19,000 pounds of annual milk production per cow. This may indicate that stall type housing is necessary to best manage for very high milk production.

### Manure Handling

Two types of manure handling predominated for Minnesota sample dairy farms in 1988. Daily haul to the field was used by 54 percent. Another 24.9 percent used long-term storage for cow manure (Table 24). There is very little short-

<sup>1</sup> Kaiser and Hammond, op. cit. p.28.

term storage of manure, defined as for less than three months.

There appears to be a possible relationship between manure handling and size of dairy herd (Table 25). Daily haul was used by 77.8 percent of herds with fewer than 30 cows, and 60.2 percent of the 30 to 49 cow herds. Only 20.6 percent of this combined fewer-than-50 group used long-term storage for cow manure. By contrast, for herds with more than 50 cows, use of daily hauls to the field ranged from a low 10.7 percent for herds of 100-124 cows, up to only 41.9 percent for herds of 75-99 cows.

Long-term storage for manure is the most common technique used by operators with the larger herds. Obviously, as the herd size increases, manure handling becomes a much more difficult problem and some kind of storage program is needed to manage this function efficiently.

Several types of manure storage systems are used by dairy farmers. Lagoons were used by 31.4 percent of the 529 sample dairy farms that responded to the question on type of storage facility (Table 26). Next were simply storing in a pile (20 percent), and storage tanks (12.4 percent). Some tanks were above ground, some were below (Table 26).

Although more than 50 percent of the dairy farms used daily haul as the *principal* method of manure handling, quite a large number also used some kind of storage of manure. This is reflected in the 23.8 percent that *only* used daily haul.

## Feed Handling

Minnesota dairy farms use mechanical equipment extensively for feed handling and feeding of animals. As would be expected, a very large percentage use upright silos, and a large proportion of those have mechanical loaders. The sample dairy farm data shows that 82 percent of Minnesota dairy farms use silo unloaders for upright silos (Table 27). For horizontal bunker silos, 17.6 percent were handling silage with front-end loaders.

Almost half of the dairy farms, 49 percent, used a feed-mix mill. Mechanical bunk feeders were also widely used, on 33.6 percent of the dairy farms. Computer controlled feeding was infrequently used. Only 2 percent of sampled Minnesota dairy farms reported this technology in 1988.

The hay making system used for dairy herds is primarily the small bale system. Almost 70 percent of sampled dairy farms report this (Table 28). This is to be expected because it frequently is the most compatible hay making system for use with the stanchion/tie and stall type housing systems that predominate on Minnesota dairy farms. The large bale system is used on 7.6 percent of the dairy farms. Field stacking is used for only about 1 percent of the dairy herds.

## Housing Age

Housing facilities on Minnesota dairy farms average more than 30 years old. The average construction year for housing systems is 1951 (Table 29). Almost 62 percent of all dairy barns are more than 20 years old. Only about 18 percent of the dairy farms have a housing facility built within the past 10 years.

For the dairy farms reporting milking facilities, the average year built was 1960 (Table 29). But, more than a quarter of them were constructed within the past 10 years.

Mechanical feed handling and waste disposal systems have been relatively recent additions to the dairy industry. Consequently, the average date of construction for these was much later than for other dairy facilities and equipment. Nearly half (48.0 percent) of all feed handling systems, and 60.9 percent of the waste disposal systems, were built within the last 10 years (Table 29). The average year of construction for feed handling systems was 1973. For waste disposal systems, the average construction year was 1974.

Although Minnesota's dairy housing and milking facilities appear to be quite old, there has been considerable remodeling and updating of facilities. This is reflected in Table 30. Forty percent of the housing facilities and 40.5 percent of the milking facilities have been remodeled since 1977. And, even though the feed storage and handling systems and waste disposal systems have a much later construction date, they have seen extensive remodeling.

Minnesota dairy farmers also reported additional plans for remodeling or constructing new facilities. Remodeling of housing facilities was the most common response, by 17.4 percent of the dairy farm respondents (Table 31). Next most common were plans to remodel milking facilities, planned to be done within the next five years by 11.4 percent of the dairy farms

operators. Remodeling of feed storage facilities was the third most frequent intention of respondents.

Only a relatively small percentage are planning to build entirely new systems. Waste disposal systems are the most important category of planned construction for the sampled dairy farms, with 6.5 percent indicating their intention to build a new system within the next 5 years. Only 2.8 percent intend to build new housing systems and only 3.1 percent to build new milking facilities.

**Table 20: Distribution of Minnesota Dairy Farms by Herd Size and Type of Milking Facility**  
— 1988 University of Minnesota Dairy Farm Survey

Type of Milking Facility	Percent of Farms by Herd Size (Number of Cows) <sup>1</sup>									Total Number	Percent
	fewer than 30	30 - 49	50 - 74	75 - 99	100 - 124	125 - 149	150 - 199	200 - 299	300 or more		
Bucket system	61.8	14.2	4.6	3.0	0	0	0	0	0	152	17.6
Pipeline system	36.8	83.2	78.5	62.1	60.7	66.7	0	16.7	0	609	70.5
Herringbone parlor	.7	1.2	9.6	30.3	32.1	33.3	100.0	50.0	100.0	71	8.2
Other parlor	.7	1.4	7.3	4.5	7.1	0	0	33.3	0	32	3.7
Total Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	—	—
Total Number	144	346	261	66	28	6	6	6	1	864	100.0

<sup>1</sup> Calculated for respondents reporting both type of milking system and number of milking cows.

**Table 21: Distribution of Minnesota Dairy Farms by Milking Facility and Average Production Per Cow  
— 1988 University of Minnesota Dairy Farm Survey**

Type of Milking Facility	Percent of Farms By Average Production Per Cow Per Year (lbs.) <sup>1</sup>					
	Less than 10,000	10,000 - 12,999	13,000 - 15,999	16,000 - 18,999	19,000 - 21,999	22,000 & above
Bucket system	46.9	26.0	10.6	3.1	5.0	0
Pipeline system	43.2	63.0	74.7	85.2	87.5	100.0
Herringbone parlor	1.2	6.8	12.1	8.6	7.5	0
Other parlor	8.6	4.2	2.6	3.1	0	0
Total Percent	100.0	100.0	100.0	100.0	100.0	100.0
Total Number	81	192	265	162	40	4

<sup>1</sup> Calculated for respondents reporting both type of milking system and production.

**Table 22: Distribution of Minnesota Dairy Respondents By Herd Size and Type of Housing  
— 1988 University of Minnesota Dairy Farm Survey**

Type of Milking Housing	Percent of Farms by Herd Size (Number of Cows) <sup>1</sup>									Percent of Herds	Total Number
	fewer than 30	30 - 49	50 - 74	75 - 99	100 - 124	125 - 149	150 - 199	200 - 299	300 or more		
Stanchion	87.4	72.9	62.4	37.9	35.7	0	0	0	0	66.6	568
Stanchion with outside feeding	7.7	12.7	17.4	9.1	10.7	16.7	0	0	0	12.8	109
Free stall	0	2.9	9.7	30.3	32.1	33.3	83.3	50.0	0	8.7	74
Free stall with outside feeding	1.4	.6	4.3	6.1	7.1	16.7	16.7	16.7	0	2.8	24
Bedded pack	0	.3	0	0	0	0	0	0	0	.1	1
Bedded pack with outside feeding	.7	3.5	0	1.5	0	0	0	0	0	1.6	14
Dry lot outside feeding	0	.3	.4	1.5	0	0	0	0	0	.4	3
Other	0	.6	1.2	0	0	0	0	0	0	.6	5
Combination of above	2.8	6.2	4.7	13.6	14.3	33.3	0	33.3	100.0	6.4	56
Total Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	—	—
Total Number	143	339	258	66	28	6	6	6	1	100.0	853

<sup>1</sup> Calculated for respondents reporting both herd size and housing system.

**Table 23: Distribution of Minnesota Dairy Farms By Housing Systems and Average Production Per Cow**  
— 1988 University of Minnesota Dairy Farm Survey

Type of Milking Facility	Percent of Farms by Average Production Per Cow Per Year (lbs.) <sup>1</sup>					
	Less than 10,000	10,000 - 12,999	13,000 - 15,999	16,000 - 18,999	19,000 - 21,999	22,000 & above
Stanchion	71.8	65.8	65.0	65.6	76.9	75.0
Stanchion with outside feeding	10.3	12.6	12.5	13.8	12.8	25.0
Free stall	2.6	10.5	9.9	10.6	5.1	0
Free stall with outside feeding	5.1	2.1	3.4	1.9	0	0
Bedded pack	0	.5	0	0	0	0
Bedded pack with outside feeding	2.6	1.1	1.5	1.9	0	0
Dry lot outside feeding	0	0	1.1	0	0	0
Other	1.3	1.1	0	0	0	0
Combination of above	6.4	6.3	6.5	6.3	5.1	0
Total Percent	100.0	100.0	100.0	100.0	100.0	100.0
Total Number	78	190	263	161	39	4

<sup>1</sup> Calculated for respondents reporting both production per cow and housing.

**Table 24: Distribution of Minnesota Dairy Farms By Manure Handling Practices and Milk Volume**  
— 1988 University of Minnesota Dairy Farm Survey

Principle Method Used to Handle Dairy Manure	Number of Farms Reporting	Percent of Total Farms Reporting	Percent of Milk Volume <sup>1</sup>
Daily haul to field	466	54.0	42.8
Short-term storage	42	4.9	5.9
Storage for 2-3 months	30	3.5	3.8
Long-term storage for cow manure	215	24.9	34.0
Long-term storage for all manure	81	9.4	10.5
Other	29	3.4	2.9
Total	863	100.0	100.0

<sup>1</sup> Calculated for respondents reporting both milk volume and manure hauling method.



**Table 25: Distribution of Minnesota Dairy Farms By Herd Size and Manure Handling System**  
 — 1988 University of Minnesota Dairy Farm Survey

Type of Milking Housing	Percent of Farms by Herd Size (Number of Cows) <sup>1</sup>								
	fewer than 30	30 -49	50 -74	75 - 99	100 -124	125 - 149	150 - 199	200 - 299	300 or more
Daily haul to field	77.8	60.2	41.9	44.6	10.7	33.3	16.7	33.3	0
Short-term storage	.7	5.5	3.8	10.8	7.1	16.7	16.7	16.7	0
Storage for 2-3 months	4.2	2.3	4.2	3.1	7.1	0	16.7	0	0
Long-term storage for cow manure	9.0	20.6	31.5	38.5	57.1	50.0	16.7	33.3	100.0
Long-term storage for all manure	5.6	8.1	13.5	3.1	17.9	0	33.3	16.7	0
Other	2.8	3.2	5.0	0	0	0	0	0	0
<b>Total Percent</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Total Number</b>	<b>144</b>	<b>344</b>	<b>260</b>	<b>65</b>	<b>28</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>1</b>

<sup>1</sup> Calculated for respondents reporting both herd size and manure hauling system.

**Table 26: Distribution of Minnesota Dairy Farms By Type of Manure Storage Facility**  
 — 1988 University of Minnesota Dairy Farm Survey

Type of Manure Storage Facility	Number of Farms Reporting	Percent of Total Farms Reporting
Above ground tank	24	4.5
Below ground tank	42	7.9
Lagoon	166	31.4
Pile	106	20.0
Bunker	20	3.8
Daily haul	126	23.8
Other	40	7.6
Combination of above	5	.9
<b>Total</b>	<b>529</b>	<b>100.0</b>

**Table 27: Distribution of Minnesota Dairy Farms By Feed Handling Equipment Used for Dairy Cows and Heifers**  
— 1988 University of Minnesota Dairy Farm Survey

Feed Handling Equipment	Number of Farms Reporting	Percent of Total Farms Reporting
Silo unloader (upright silo)	710	82.1
Front end loader for bunker horizontal silo	152	17.6
Bulk storage for purchased feeds	386	44.6
Feed mix mill	424	49.0
Mixer with scales stationary	32	3.7
Mixer with scales, wheel mounted	58	6.7
Feed wagon, no scales	84	9.7
Mechanical bunk feeder	291	33.6
Individual magnet feeder	14	1.6
Individual computer-controlled feeder	36	4.2
Parlor feeder	62	7.2
Other	129	14.9
<b>Total</b>	<b>865</b>	<b>—</b>

**Table 28: Distribution of Minnesota Dairy Farms By Type of Hay Making System**  
— 1988 University of Minnesota Dairy Farm Survey

Type of Hay Making System	Number of Farms Reporting	Percent of Total Farms Reporting
Small bales	599	69.8
Large bales	65	7.6
Field stacker	8	.9
None	6	.7
Other	66	7.7
Combination of above	114	13.3
<b>Total</b>	<b>858</b>	<b>100.0</b>

**Table 29: Distribution of Minnesota Dairy Farms By Year Facilities Were Built**  
— 1988 University of Minnesota Dairy Farm Survey

Facility	Number of Farms Reporting	Percent of Farms By Year Built					Total Percent	Average Year Built
		Before 1957	1957-1966	1967-1976	1977-1982	1983-1987		
Housing	639	49.1	12.7	20.3	14.3	3.4	100.00	1951
Milking	566	29.7	16.1	28.4	20.1	5.7	100.00	1960
Feed storage capacity	481	13.1	14.1	35.3	30.6	6.9	100.00	1969
Feed handling system	360	6.1	12.2	33.6	36.1	11.9	100.00	1973
Waste disposal system	335	6.0	10.4	22.7	44.2	16.7	100.00	1974

**Table 30: Distribution of Minnesota Dairy Farms By Year Facilities Were Last Remodeled**  
 — 1988 University of Minnesota Dairy Farm Survey

Facility	Number of Farms Reporting	Number Remodeled	Percent of Farms By Year Remodeled					Percent of All Farms	Average Year Remodeled
			Before 1957	1957-1966	1967-1976	1977-1982	1983-1987		
Housing	639	468	2.0	8.0	23.6	21.4	18.2	73.2	1976
Milking	566	344	.7	4.8	14.8	20.0	20.5	10.8	1978
Feed storage capacity	481	209	1.3	2.5	8.3	19.3	12.3	43.5	1978
Feed handling system	360	148	0	1.7	8.6	14.4	16.4	41.1	1979
Waste disposal system	335	118	.3	1.2	6.0	15.5	12.2	35.2	1979

**Table 31: Distribution of Minnesota Dairy Farms By Future Plans for Facility Changes**  
 — 1988 University of Minnesota Dairy Farm Survey

Facility	Modify or Enlarge Present System		Build New System	
	Number of Farms Reporting	Percent of Total Farms in Survey <sup>1</sup>	Number of Farms Reporting	Percent of Total Farms in Survey
Housing	151	17.4	24	2.8
Milking	99	11.4	26	3.1
Feed storage capacity	85	9.8	39	4.5
Feed handling system	66	7.6	40	4.7
Waste disposal system	36	4.1	56	6.5

<sup>1</sup> Total 868 dairy farms

## LABOR USE

Much of the labor on Minnesota dairy farms is provided by the operator and other family members. The spouse provides some labor for 65 percent of the dairy farms in this survey (Table 32). Children older than 12 provide labor on 35 percent of the dairy farms, with an average of 1.8 children for farms reporting this labor source. Other unpaid family labor is also important for a large number of the dairy farms.

Hired labor is used by many of the farmers, but only 17.6 percent reported full-time hired labor on their farm. And, only 2.2 percent of the dairy farms had a full-time hired manager (Table 32). Seasonal or part-time labor was also common, being used by about a quarter of the farms.

The source of labor on the dairy farm varies according to activity (Table 33). In all cases, the operator is a major source of labor in all dairy farm activities. The operator provides the labor for milking on 92 percent of the farms, for feeding on 88.2 percent of the farms, and for crop work on 94.1 percent of the farms.

Spouses also provide a wide variety of labor functions. They are engaged in milking on 34.7 percent of the farms. They do the feeding on 41.3 percent of the farms. And, 26.2 percent of the spouses are engaged in crop work.

As would be expected, the part-time seasonal labor is engaged most heavily in crop work, on 31.1 percent of the farms (Table 33). It appears that full-time hired labor are equally engaged in all labor activities on the dairy farm.

**Table 32 : Distribution of Minnesota Dairy Farms by Family Labor and Other Workers on the Farm — 1988 University of Minnesota Dairy Farm Survey**

Unpaid and Paid Labor	Number of Farms Reporting	Percent of Total Farms Reporting	Average Number of Persons for Farms Reporting Labor
<i>Unpaid Labor</i>			
Spouse	556	65.1	1.0
Children over 12	300	35.0	1.8
Other unpaid labor	130	15.2	1.4
<i>Paid Labor</i>			
Hired manager	19	2.2	1.0
Full-time labor	151	17.6	1.3
Part-time labor	231	26.8	1.6
Seasonal labor	207	23.9	1.9

**Table 33: Distribution of Minnesota Dairy Farms By Individuals Performing Specified Types of Work**  
 — 1988 University of Minnesota Dairy Survey

Type of Work and Individual Performing Work	Number of Farms Reporting	Percent of Total Farms Reporting <sup>1</sup>
<i>Milking</i>		
Operator	790	92.0
Spouse	298	34.7
Other family	281	32.7
Hired manager	26	3.0
Full-time labor	86	10.0
Part time/seasonal	99	11.5
<i>Feeding</i>		
Operator	763	88.2
Spouse	355	41.3
Other family	399	46.4
Hired manager	23	2.7
Full-time labor	96	11.2
Part time/seasonal	93	10.8
<i>Crop Work</i>		
Operator	808	94.1
Spouse	225	26.2
Other family	396	46.2
Hired manager	15	1.7
Full-time labor	92	10.7
Part time/seasonal	267	31.1

<sup>1</sup> Percentages for each activity total to more than 100 because more than one individual is frequently involved in each activity.

## MANAGEMENT PRACTICES

Several questions asked of the respondents concern management practices on the dairy farms. Responses to these questions are presented in Tables 34-40. Whether or not the farms use particular management practices are summarized in Tables 34 and 35.

### Herd Management and Testing

Artificial insemination is widely used on dairy farms. For cow matings, 80 percent of the dairy farms report using it. And, 59.6 percent say they use it for all heifer matings (Table 34).

The use of Dairy Herd Improvement Association services (DHIA) was reported by 54.7 percent of all dairy farms in the sample. This was considerably higher than the statewide average of 38 percent, reported by DHIA. And, another 10.6 percent of the dairy farms reported using performance testing other than DHIA. Thus, about 65 percent of the dairy farms were using performance testing for their dairy herds.

Less than 1 percent of the dairy farms in the sample are engaged in three-times-a-day milking. Use of microcomputers for farm records on the farm is reported by 6.7 percent of all farms.

Distribution of management practices by level of milk production per cow is reported in Table 35. Some significant patterns of management appear to be associated with this factor. The level of milk production generally increases with percent of herds using forage testing.

The use of DHIA testing is also associated with higher productivity levels. It is used by only 10.1 percent of herds at less than 10,000 pounds per cow per year, but by more than 75 percent of herds in excess of 16,000 pounds per year.

### Feeding and Feed Handling

Soil testing and feed testing are widely used (Table 34). Forage quality testing by cutting is

used by 52.8 percent of the dairy farms and soil testing for fertilizer application is used by 74 percent of the farms in the sample.

Other management practices for feed production and feed handling are reported in Tables 36-38. Most dairy farms produce all of their forage. However, a substantial portion of the sampled farms, 26.1 percent, reported purchasing some forage, with an average of 28 percent of all forage requirements being purchased for these dairy farms (Table 36).

As would be expected, grain purchases were more frequent than forage purchases on Minnesota dairy farms. Almost half, 46 percent of dairy farms reported purchasing of some grain. This accounted for 22 percent of all grain use on sample dairy farms.

There was a wide distribution in grain and forage purchases among these dairy farms. Table 37 shows that 4.4 percent of the farms purchased from 1 to 9 percent of their forage requirements, and 5.7 percent reported purchased 50 percent or more of their forage requirements. About 22 percent of the dairy farms purchased from 50 percent or more of their grain requirements, and 4.1 percent purchased from 1 to 9 percent of their requirements.

Efficiency of forage production is to some extent indicated by the number of cuttings of legumes per year. Most dairy farms are able to obtain more than one cutting per year (Table 38). Only 3.8 percent of the farms report only one cutting per year. More than half of the farms, 57.1 percent, report three cuttings per year on legumes, and 15.2 percent of the farms obtain four cuttings.

A variety of techniques are used for feeding of dairy rations. The most common method is the separate feeding of forage and concentrates, with neither being fed while milking. This technique is used with 33.3 percent of the herds (Table 39). The next most common method, used with 26.9 percent of the herds, is to feed

concentrates while milking. Only 13.1 percent of the dairy farms reported feeding a complete blended feed ration, which requires feeding at times other than during the milking operation.

### Who Makes the Decisions

Management decisions for dairy farms are provided by various individuals. The operator is most important for all activities (Table 40). Ration formulation is most often the responsibility of the operator, at 70 percent of the reporting farms. However, 34.3 percent of the dairy farms use an off-farm consultant for this function. The spouse is only infrequently the decision maker regarding ration formulation.

Artificial insemination decisions were made principally by the operator, on 48.4 percent of the farms (Table 40). An off-farm consultant was used by 28.8 percent of the farms.

Financial records were the responsibility, at least partially, of the farm operator for 63.1 percent of the farms. However, the spouse was very important for this activity, accounting for approximately one-half of all the farms in the sample. Off-farm specialists were used infrequently to keep financial records.

Herd records were also the primary responsibility of the operator. Almost 72 percent of the farms reporting this to be an activity of the farm operator. The spouse provided this service for about 25 percent of all dairy farms. Off-farm consultants or other persons were used relatively infrequently.

**Table 34: Management Practices Utilized on Minnesota Dairy Farms**  
— 1988 University of Minnesota Dairy Farm Survey

Management Practice Used	Number of Farms Reporting	Percent of Total Farm Reporting
Forage quality testing by cutting	456	52.8
Hire crop pest scouts	26	3.0
Soil testing for crops for fert. appl.	642	74.3
Microcomputer for farm records	58	6.7
Mail-in service for farm records	74	8.6
DHIA performance testing	473	54.7
Performance testing other than DHIA	92	10.6
Subscribe to DHIA somatic cell count	388	44.9
A.I. in majority of cow matings	691	80.0
A.I. in majority of heifer matings	515	59.6
Feed ration formulation—regular basis	524	60.6
Group cows by milk productivity and feed accordingly	274	31.7
Pregnancy check within 40 days	502	58.1
Systematic postpartum exams	331	38.4
Purchase majority of replacement cows	29	3.4
Heat synchronization check	86	10.0
Use regularly scheduled vet. services	426	49.6
Milk three times a day	6	.7
Predip all cows	136	15.8
Teat dip all cows after milking	583	67.9
Treat dry cows for mastitis prevention	654	76.1
First calf heifers age 24-25 months	618	71.9
Culling rate 15 percent or less	257	30.0
Culling rate 15-29 percent	419	48.8
Culling rate 30 percent or more	146	17.0
Registered cattle account for majority	100	11.6
Purchase 16% plus concentrate dairy ration	451	52.5
Purchase by-product feeds	143	16.6
Total reporting management practices	864	—

**Table 35: Distribution of Minnesota Dairy Farms By Average Production Per Cow and Management Practices  
— 1988 University of Minnesota Dairy Farm Survey**

Management Practice Used	Percent of Farms Using Practice by Average Production Per Cow Per Year (lbs.)					
	Less than 10,000	10,000- 12,999	13,000- 15,999	16,000- 18,999	19,000- 21,999	22,000- 24,999
Forage quality testing by cutting	29.6	41.6	61.4	71.4	65.0	75.0
Hire crop pest scouts	0	1.1	4.5	6.2	2.5	0
Soil testing for crops for fert. appl.	55.5	77.3	77.7	71.4	85.0	75.0
Microcomputer for farm records	7.4	3.7	7.2	10.5	12.5	0
Mail-in service for farm records	1.2	7.9	9.8	12.3	1.5	25.0
DHIA performance testing	24.7	39.5	62.5	79.6	82.5	75.0
Performance testing other than DHIA	7.4	12.6	12.1	8.0	10.0	0
Subscribe to DHIA somatic cell count	19.8	37.4	49.2	69.1	67.5	50.0
A.I. in majority of cow matings	60.5	71.1	91.2	91.4	95.0	100.0
A.I. in majority of heifer matings	38.3	54.2	63.3	76.5	77.5	100.0
Feed ration formulation—regular basis	37.0	53.2	67.0	77.2	72.5	75.0
Group cows by milk production and feed accordingly	32.1	62.6	28.4	35.8	45.0	50.0
Pregnancy check within 40 days	30.9	48.9	63.3	79.0	82.5	50.0
Systematic postpartum exams	11.1	29.1	43.2	62.3	70.0	50.0
Purchase majority of replacement cows	11.3	1.6	1.9	1.9	0	0
Heat synchronization check	10.0	8.5	12.4	18.1	10.0	25.0
Use regularly scheduled vet. services	25.0	42.3	52.9	70.0	72.5	25.0
Milk three times a day	0	.5	.8	.6	2.5	0
Predip all cows	13.8	11.1	17.1	18.3	10.0	50.0
Teat dip all cows after milking	57.5	62.4	72.2	75.0	92.5	75.0
Treat drip cows for mastitis prevention	65.0	74.6	77.9	86.3	92.5	100.0
First calf heifers age 24-25 months	70.0	75.1	70.0	70.6	77.5	100.0
Culling rate 15 percent or less	52.5	36.0	22.8	15.0	30.0	25.0
Culling rate 15-29 percent	18.8	50.3	58.2	50.0	35.0	50.0
Culling rate 30 percent or more	6.5	10.1	18.6	31.9	32.5	25.0
Registered cattle account for majority	10.0	11.1	7.6	20.6	25.0	0
Purchase 16 percent plus concentrate dairy ration	70.0	48.1	52.5	47.5	45.0	50.0
Purchase by-product feeds	12.5	13.2	16.0	24.4	32.5	25.0



**Table 36: Distribution of Minnesota Dairy Farms By Feed Normally Purchased**  
— 1988 University of Minnesota Dairy Farm Survey

Type of Feed Purchased	Number of Farms Purchasing Feed	Percent of All Farms	Purchases as Percent of Feed Use for All Farms	Purchases as Percent of Feed Use for Farms Reporting Feed Purchases
Forage	224	26.1	7.3	28.0
Grain	395	46.0	22.0	47.3

**Table 37: Distribution of Minnesota Dairy Farms By Feed Purchasing Patterns**  
— 1988 University of Minnesota Dairy Farm Survey

Purchased Feed as Percent of Farm's Feed Use	Number of Farms Reporting	Percent of Total Farms
<i>Forage</i>		
0	634	73.9
1 - 9	38	4.4
10 - 24	91	10.6
25 - 49	46	5.4
50 and over	49	5.7
Total	858	100.0
<i>Grain</i>		
0	456	54.9
1 - 9	34	4.1
10-24	108	12.6
25-49	65	7.6
50 and over	189	21.9
Total	852	100.0

**Table 38: Distribution of Minnesota Dairy Farms by Number of Cuttings on Established Legume Acreage**  
— 1988 University of Minnesota Dairy Farm Survey

Number of Cuttings on established legume acreage	Number of Farms Reporting	Percent of Total Farms Reporting
1	32	3.8
2	201	23.8
3	481	57.1
4	128	15.2
5 or more	1	.1
Total	843	100.0
Mean number of cuttings	2.8	—

**Table 39: Distribution of Minnesota Dairy Farms By How Concentrate Ration Is Fed to Milking Herd — 1988 University of Minnesota Dairy Farm Survey**

How Concentrate Ration is Fed to Milking Herd	Number of Farms Reporting	Percent of Total Farms Reporting
Only while milking	230	26.9
Part fed while milking— remainder mixed with other feeds	118	13.8
Part fed while milking— remainder not mixed with other feeds	59	6.9
None fed while milking— separate forage and concentrate feeding	284	33.3
None fed while milking— complete blended ration	112	13.1
Other	48	5.6
Combination of above	3	.4
<b>Total</b>	<b>854</b>	<b>100.0</b>

**Table 40: Distribution of Minnesota Dairy Farms By Individuals Responsible for Specified Management Functions — 1988 University of Minnesota Dairy Farm Survey**

Type of Management Function and Individual Responsible	Number of Farms Reporting	Percent of Total Farms Reporting <sup>1</sup>
<i>Ration Formulation</i>		
Operator	601	70.0
Spouse	38	4.4
Other family	63	7.3
Hired manager	20	2.3
Off-farm consultant	295	34.3
<i>Artificial Insemination</i>		
Operator	416	48.4
Spouse	27	3.1
Other family	73	8.5
Hired manager	34	4.0
Off-farm consultant	247	28.8
<i>Financial Records</i>		
Operator	542	63.1
Spouse	424	49.4
Other family	34	4.0
Hired manager	7	.8
Off-farm consultant	55	6.4
<i>Herd Records</i>		
Operator	619	72.1
Spouse	211	24.6
Other family	109	12.7
Hired manager	34	4.0
Off-farm consultant	75	8.7

<sup>1</sup> Percentages do not add to 100 for each category because many activities are shared.

## INCOME AND FINANCIAL CHARACTERISTICS

### Farm Income

Income and financial performance of Minnesota dairy farms varies across a wide range. Table 41 lists the total 1987 income distribution for the dairy farms in the sample.

Most of the farms reporting for this survey generated total income in the range of \$40,000 to \$175,000 annually. Only 3.7 percent generated less than \$20,000 in gross income, and 17.8 percent generated income in excess of \$175,000 annually. These gross figures represented all crop and animal sales, and government farm program payments, but did not include any non-farm income. The median gross receipts of all farms reporting for this survey was about \$100,000.

Milk sales account for the largest share of farm income for these farms, 72.1 percent (Table 42). However, dairy animal sales are also an important part of income for dairy farms.

For farms reporting crop sales, 17.5 percent of the farm income was generated by those sales, and by government payments associated with those crops. For farms reporting income from livestock other than dairy animals, 12.9 percent of their income was generated by those sales.

Net cash farm income<sup>1</sup> for Minnesota dairy farms shows a wide distribution (Table 43). More than half of the farms, 59.1 percent, generated less than \$20,000 income in 1987. About 25 percent had net cash farm income from \$20,000 to \$40,000. Only about 16 percent generated net income in excess of \$40,000 in that year.

Table 44 shows that net cash farm income is

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<sup>1</sup>Includes net farm income plus capital gains/losses and ordinary gains/losses as reported on IRS Schedule F.

related to the level of productivity per cow. Low net cash farm income is associated with low per cow productivity. Farms with less than \$20,000 in net cash farm income are overwhelmingly, 76.0 percent, averaging production of less than 10,000 pounds per cow per year. That percentage declines steadily with increasing productivity.

For net cash farm incomes in the range of \$20,000 to \$100,000 per year, only 17.4 percent of the farms have production less than 10,000 pounds per year. The percentage of farms in this income range increases with increasing productivity. For net incomes in excess of \$100,000 per year, only 6.7 percent of those farms have production less than 13,000 pounds per year.

Non-farm sources, primarily employment, accounted for some income on a majority of Minnesota dairy farms. Only 43.8 percent of the farms received no income from non-farm sources (Table 45). The most frequently reported non-farm income was in the range of \$5,000 to \$10,000 per year, accounting for 48.9 percent of all farms responding to this question. Only 6.4 percent of the farms reported that non-farm income exceeded \$20,000 in 1987.

Off-farm work provided various kinds of benefits to some farm families--medical and dental benefits, retirement benefits, and life insurance. Medical benefits were cited most frequently, by 15.4 percent of the dairy farms in the sample (Table 46). Retirement benefits were provided to about 8 percent of the respondents.

### Financial Stability and Solvency

The financial status of the dairy farms in the sample ranged from strong to insolvent. No long term debt was reported by 20 percent of the dairy farms (Table 47). If farms with debts to assets at less than 70 percent are considered to be liquid, then more than 70 percent of the farms in the sample were financially sound.

At the other extreme, 7.3 percent of the dairy farms had debts exceeding their assets and could be considered insolvent. Including that 7.3 percent, those possibly in financial distress, with over 70 percent debt to asset ratios, accounted for 21.5 percent of the farms.

Financial stability is somewhat related to age of operator (Table 48). For operators younger than 30, only 9.2 percent of the dairy farms had zero debt, whereas for operators age 60 and up, 41.5 percent had no debt.

Insolvency or financial instability, debt-asset ratios greater than 70 percent, characterized 33.9 percent of the younger than 30 operators, and 36.8 percent of operators from 30 to 40 years of age. On the other hand, insolvency or financial difficulty characterized only 18.1 percent of operators 60 years old or older.

Financial stability does not appear to vary significantly according to size of dairy herd. Small dairies, herds of less than 30 cows, depart somewhat from the pattern for other herd sizes (Table 49). Only 19.3 percent would be considered financially troubled or insolvent and 34.3 percent are debt free. On the other hand, herds above 30 cows, regardless of the size classification, appear to have about equal numbers of debt free, financially stable, or financially troubled or insolvent farms in each of the size categories listed.

The debt/asset ratio appears to be somewhat related to the level of production per dairy animal (Table 50). Financial solvency in the debt/asset range of 1-69 percent increases, and financial distress declines, as annual milk production per cow increases.

Financial status may also be somewhat related to the age of the housing facility, milking facility or manure handling system because large amounts of capital are normally needed for construction of these types of facilities. This is because borrowed capital will frequently be the source of these funds for such improvements.

Cross-tabulating debt/asset ratios with age of construction of mechanical systems or facilities shows an apparent relationship and influence. Debt-free status generally increases with age of the facility (Table 51).

Financial distress or insolvency is highest for most recently constructed facilities. It is notable that financial problems are not pronounced for the investments made in the 1978 to 1982 period. Decisions made during that period forced

many Minnesota crop farmers into subsequent insolvency.

Low incomes do not show a strong association with financial insolvency or distress. Almost half of the dairy farms, 45.8 percent, with 1987 income of less than \$10,000 were insolvent or financially distressed (Table 52). The percentage of farms that would be considered solvent, with less than the 70 percent debt/asset ratio, is quite variable from one net income group to another.

Twenty percent of the dairy farms with incomes in excess of \$100,000 were in financial difficulty in 1987. None of the farms with annual incomes in excess of \$100,000 were completely debt free. This should be expected because the high income farms are likely to be very capital intensive and operating without debt is a very difficult situation to attain.

**Table 41: Distribution of Minnesota Dairy Farms By Total Value of All Cash Receipts in 1987**  
— 1988 University of Minnesota Dairy Farm Survey

Value of All Cash Receipts in 1987 <sup>1</sup> (\$)	Number of Farms Reporting	Percent of Total Farms Reporting
Less than 10,000	8	1.0
10,000 - 19,999	23	2.7
20,000 - 39,999	55	6.5
40,000 - 99,999	317	37.7
100,000 - 174,999	289	34.4
175,000 - 249,999	89	10.6
250,000 - 499,999	52	6.2
500,000 and over	8	1.0
Total	841	100.0

<sup>1</sup> Includes crops, animals, and animal products sold, plus government payments.

**Table 42: Distribution of Minnesota Dairy Farms By Percent of Cash Receipts From Specified Source — 1988 University of Minnesota Dairy Farm Survey**

Source of 1987 Cash Receipts	Number of Farms Reporting	Average Percent for Farms Reporting
Milk sales	827	72.1
Percent from purebred dairy animal sales	61	10.1
Other dairy livestock sales	609	11.4
Crop sales and gov't program payments	530	17.5
Other livestock sales	364	12.9
Other income	128	12.2

**Table 43: 1987 Net Cash Farm Income for All Families in the Dairy Unit — 1988 University of Minnesota Dairy Farm Survey**

Net Cash Farm Income 1987 (\$)	Number of Farms Reporting	Percent of Total Farms Reporting
Less than 10,000	221	27.7
10,000 - 19,999	250	31.4
20,000 - 39,999	201	25.2
40,000 - 99,999	95	11.9
100,000 - 174,999	19	2.4
175,000 - 249,999	6	.8
250,000 and over	5	.6
Total	797	100.0

**Table 44: Distribution of Minnesota Dairy Farms by Net Cash Farm Income and Average Production per Cow — 1988 University of Minnesota Dairy Farm Survey**

Net Cash Farm Income per Farm (\$/year)	Percent of Farms by Average Production Per Cow Per Year (lbs.) <sup>1</sup>						All
	Less than 10,000	10,000-12,999	13,000-15,999	16,000-18,999	19,000-21,999	Greater than 21,999	
Less than \$20,000	76.0	67.9	55.8	45.1	42.1	0	57.6
\$20,000 to 39,999	10.7	17.8	27.9	37.3	28.9	100.0	26.0
\$40,000 to 99,999	6.7	10.6	13.6	12.4	23.7	0	12.3
\$100,000 and above	6.7	3.9	2.8	5.6	5.3	0	4.1
All	100.0	100.0	100.0	100.0	100.0	100.0	100.0

<sup>1</sup> Calculated for respondents reporting both income and milk production.

**Table 45: Distribution of Minnesota Dairy Farms By 1987 Household Income Obtained From Non-Farm Sources for All Families in Dairy Unit**  
— 1988 University of Minnesota Dairy Farm Survey

Non-Farm Income (\$)	Number of Farms Reporting	Percent of Total Farms Reporting
None	360	43.8
Under 5,000	211	25.7
5,000 - 9,999	108	13.2
10,000 - 14,999	56	6.8
15,000 - 19,999	34	4.1
20,000 - 39,999	39	4.8
40,000 and over	13	1.6
Total	821	100.0

**Table 46: Distribution of Minnesota Dairy Farms By Benefits Received By Family Members Working Off-Farm in 1987**  
— 1988 University of Minnesota Dairy Farm Survey

Type of Benefit	Number of Farms Reporting	Percent of Total Farms In Survey
Medical benefits	134	15.4
Retirement benefits	72	8.3
Life insurance benefits	56	6.5
Dental benefits	55	6.3

**Table 47: Distribution of Minnesota Dairy Farms By Debt/Asset Ratio and Milk Volume**  
— 1988 University of Minnesota Dairy Farm Survey

Debt/Asset Ratio (percent)	Number of Farms Reporting	Percent of Total Farms Reporting	Percent of Milk Volume <sup>1</sup>
0	168	20.1	12.5
1 - 19	111	13.3	12.3
20 - 39	128	15.3	17.2
40 - 69	187	22.4	24.2
70 - 100	179	21.5	22.3
Greater than 100	61	7.3	6.5
Total	834	100.0	100.0

**Table 48: Distribution of Minnesota Dairy Farms By Age of Principal Operator and Debt/Asset Ratio**  
— 1988 University of Minnesota Dairy Farm Survey

Debt/Asset Ratio (percent)	Percent of Farms by Age of Principal Operator (years) <sup>1</sup>				
	Under 30	30 - 39	40 - 49	50 - 59	60 and older
0	9.2	13.3	13.0	26.2	41.5
1 - 69	56.9	49.8	57.1	52.4	40.4
70 - 100	26.2	28.4	21.2	15.1	12.8
Greater than 100	7.7	8.4	8.7	6.2	5.3
Total	100.0	100.0	100.0	100.0	100.0

<sup>1</sup> Calculated for respondents reporting both debt/asset ratio and milk volume.

<sup>1</sup> Calculated for respondents reporting both debt/asset ratio and age of operator.

**Table 49: Distribution of Minnesota Dairy Farms By Herd Size and Debt/Asset Ratio**  
— 1988 University of Minnesota Dairy Farm Survey

Debt/Asset Ratio (percent)	Percent of Farms by Herd Size (Number of Cows) <sup>1</sup>				Percent
	Fewer than 30	30-74	75-149	150 and greater	
0	34.3	17.2	17.5	16.7	20.1
1 - 69	46.4	52.5	50.5	50.0	51.1
70 - 100	14.3	22.4	25.8	33.3	21.5
Greater than 100	5.0	7.9	6.2	0	8.3
Total	100.0	100.0	100.0	100.0	100.0

<sup>1</sup> Calculated for respondents reporting both debt/asset ratio and number of milk cows.

**Table 50: Distribution of Minnesota Dairy Farms by Debt/Asset Ratio and Average Production per Cow**  
— 1988 University of Minnesota Dairy Farm Survey<sup>1</sup>

Debt/Asset Ratio (percent)	Percent of Farms by Average Production per Cow per Year (lbs.) <sup>1</sup>		
	Less than 10,000	10,000 - 15,999	16,000 and above
0	28.2	20.3	17.1
1 - 69	39.7	52.3	57.3
70 - 100	23.1	20.1	20.1
Greater than 100	9.0	7.4	5.5
Total	100.0	100.0	100.0

<sup>1</sup> Calculated for respondents providing information on both financial status and production.

**Table 51: Distribution of Minnesota Dairy Farms by Debt/Asset Ratios and Construction Data for Housing**  
— 1988 University of Minnesota Dairy Farm Survey

Debt/Asset Ratio (percent)	Percent of Farms by Farms with housing constructed <sup>1</sup>			
	Before 1968	1968 - 77	1978 - 82	1983 - 87
0	21.5	18.9	15.4	5.0
1 - 69	51.7	49.6	48.7	50.0
70 - 100	17.7	26.0	24.4	35.0
Greater than 100	7.1	5.1	11.5	10.0
Total	100.0	100.0	100.0	100.0

<sup>1</sup> Calculated for respondents reporting both debt/asset ratio and data of construction of cattle housing facility.

**Table 52: Distribution of Minnesota Dairy Farms by Debt/Asset Ratios and Net Farm Income**  
— 1988 University of Minnesota Dairy Farm Survey

Debt/Asset Ratio (percent)	Percent of Farms by 1987 annual net farm income (\$) <sup>1</sup>				
	Less than 10,000	10,000- 19,999	20,000- 39,999	40,000- 99,999	More than 100,000
0	14.5	16.9	24.9	35.8	6.6
1 - 69	39.7	54.1	59.4	42.1	73.3
70 - 100	29.9	24.8	12.7	12.6	20.0
Greater than 100	15.9	4.1	3.0	9.5	0
Total	100.0	100.0	100.0	100.0	100.0

<sup>1</sup> Calculated for respondents providing data on both debt/asset ratio, and net farm income.

## OTHER DAIRY FARM CHARACTERISTICS

The dairy farms surveyed were also asked their opinions or plans with regard to herd size, use of bovine somatotropin (BST), and to federal dairy price policies. Tables 53 through 57 summarize their responses.

### Bovine Somatotropin Attitudes

Producers were asked if they would adopt BST, and if so, when they would adopt it. A large proportion, 46.3 percent of the farms in the survey stated that they would not adopt BST (Table 53). Only 9.1 said they would adopt the hormone when it first becomes available. The rest indicated they would begin using BST if they see it being successfully used by neighbors, or if recommended by the University or the industry.

There is a very apparent relationship between age of operator and attitude toward using BST. Producers below age 40 are much more likely than not to adopt BST. For both age groups below 40, more than 60 percent indicate adoption if it becomes available or after receiving information about its use (Table 54). The intention to not adopt this technology increases with age, reaching 64.2 percent of the respondents for the age group 60 and up.

All age categories appear to have about the same proportion of producers who would rely on University recommendations regarding use of BST, all in the 20-30 percent range. Except for the group age 60 and older, about 10 percent of the producers in each age group would adopt BST if they observed it to be successfully used by neighbors.

Financial stability of a dairy farm appears to be somewhat related to intentions to adopt or not adopt BST. Of the farmers with no debt, 57.7 percent indicate they will not adopt BST if it becomes available. Only 3.4 percent of these farmers indicate they will adopt it when it first became available (Table 55). A large percentage however, say they will adopt it if they see it being successfully used by neighbors, or if it's

recommended by the University or other industry representatives.

Farmers with financial difficulty, that is, debts of 70 percent or more of assets, reported a greater likelihood of adoption if it becomes available, 13.3 percent and 10.9 percent respectively for these two financially stressed groups. Less than half of the financially stressed groups indicated that they would not adopt BST if it became available.

These results imply that debt-free operators are risk averse. They are not likely to adopt new technology until they observe its consequences and are convinced of its benefits. Those who are financially insecure are more likely to take chances on a new technology that may enable them to resolve their financial problems.

### Dairy Price Supports

Attitudes to various specified dairy price support policy options were obtained by asking for agreement or disagreement on several alternatives. With respect to the dairy price support program, respondents were asked to agree or disagree with (1) continuing the current price support level, (2) reducing the price support level, (3) increasing the price support level, and (4) eliminating price support.

More than 45 percent of the respondents indicated that they feel the dairy price support program should not be continued at current levels. The current levels of support were viewed favorably by 33.3 percent. A relatively small number, only 6.5 percent of all the respondents, agreed that the dairy price support levels should be reduced, while 55.1 percent feel that price supports should be increased.

This latter response is consistent with responses to the next policy option, which was to eliminate the price support program. Elimination of price support would lead to a decline in producer prices. To this alternative, 23.4 percent of the



producers agree that the program should be eliminated.

The producers were also asked if they felt the whole herd buy-out program should be re-instituted if it is needed. There was substantial opposition to this kind of program, with 45.7 percent of the respondents opposed. A smaller 33.5 percent of producers were in agreement. Nevertheless, there seems to be rather strong support for some form of supply management.

The question asked on the questionnaire was rather open-ended, but 65.6 percent of all the respondents indicated that some form of supply management should be instituted. Only 16.5 percent were opposed.

### Planning for Future Growth

Plans for milking herd size adjustment for the next five years are consistent with trends in average herd size changes that have been present throughout the post World War II period. There is little doubt that average Minnesota herd size will continue to expand based on producer plans.

Nearly half of the producers, 44.8 percent, reported plans to expand herd size (Table 57). Twenty-five percent intend to hold to their current herd size and 11.0 percent plan herd reductions.

Consistent with the long term trend in herd numbers, 19.2 percent plan to terminate their dairy operations during the next five years.

**Table 53: Distribution of Minnesota Dairy Farms By Farm Plans for Adoption of Bovine Somatotropin and Milk Volume**  
— 1988 University of Minnesota Dairy Farm Survey

Farms Will Adopt BST When:	Number of Farms Reporting	Percent of Total Farms Reporting	Percent of Milk Volume <sup>1</sup>
First available	71	9.1	12.3
Successfully used by neighbors	79	10.1	10.1
Recommended by university	186	23.8	28.5
Recommended by industry	84	10.7	12.3
Will not adopt	362	46.3	36.8
<b>Total</b>	<b>782</b>	<b>100.0</b>	<b>100.0</b>

<sup>1</sup> Calculated for respondents answering both questions, adoption of BST and milk volume.

**Table 54: Distribution (percent) of Minnesota Dairy Farms By Age of Principal Operator and Farm Plans for Adoption of Bovine Somatotropin**

— 1988 University of Minnesota Dairy Farm Survey

Farm Plans For Adoption of Bovine Somatotropin	Percent of Farms by Age of Principal Operator (years) <sup>1</sup>				
	Under 30	30 - 39	40 - 49	50 - 59	60 and older
Adopt when available	13.8	11.1	10.4	7.3	2.5
Adopt if successfully used by neighbors	10.8	12.4	11.0	10.2	4.9
Adopt on basis of university recommendations	27.7	26.3	22.0	22.0	21.0
Adopt on basis of industry recommendations	12.3	12.4	8.7	9.3	7.4
Not adopt	35.4	37.8	48.0	51.2	64.2
Total	100.0	100.0	100.0	100.0	100.0

<sup>1</sup> Calculated for respondents answering both questions, adoption of BST and age of operator.

**Table 55: Distribution of Minnesota Dairy Farms By Debt/Asset Ratio and Farm Plans for Adoption of Bovine Somatotropin**

— 1988 University of Minnesota Dairy Farm Survey

Farm Plans for Adoption of Bovine Somatotropin	Percent of Farms by Debt/Asset Ratios <sup>1</sup>			
	0	1-69	70-100	Greater than 100
Adopt when available	3.4	9.4	13.3	10.9
Adopt if successfully used by neighbors	9.4	9.9	10.3	7.3
Adopt on basis of university recommendations	20.8	24.7	24.8	27.3
Adopt on basis of industry recommendations	8.7	12.3	10.3	9.1
Not adopt	57.7	43.6	41.2	45.5
Total	100.0	100.0	100.0	100.0

<sup>1</sup> Calculated for respondents reporting both debt/asset ratio and response to availability of BST.

**Table 56: Distribution of Minnesota Dairy Farms By Reactions to Dairy Policy Options**  
 — 1988 University of Minnesota Dairy Farm Survey

Dairy Policy Options		Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Number of Farms Responding
Continue DPSP <sup>1</sup> at 1988 price levels	#	74	185	160	197	162	778
	%	9.5	23.8	20.6	25.3	20.8	
Continue DPSP at reduced price levels	#	9	40	110	231	368	759
	%	1.2	5.3	14.5	30.4	48.6	
Continue DPSP at increased price levels	#	201	222	158	112	73	766
	%	26.2	28.9	20.6	14.6	9.5	
Eliminate DPSP	#	93	81	238	166	168	746
	%	12.5	10.9	31.9	22.3	22.5	
Reinstitute dairy whole herd buyout program if needed	#	116	145	163	154	203	781
	%	14.9	18.6	20.9	19.7	26.0	
Institute some form of supply management	#	250	266	141	66	64	787
	%	31.8	33.8	17.9	8.4	8.1	

<sup>1</sup> DPSP — Dairy Price Support Program

**Table 57: Distribution of Minnesota Dairy Farms by Plans for Herd Size Adjustment or Exit by 1993 (Total Milking and Dry Cows)**  
 — 1988 University of Minnesota Dairy Farm Survey

	Number of Herds	Percent of Herds
<i>Cease Dairying</i>	166	19.2
<i>Reduce Herd Size</i>	95	11.0
by 1 - 25 cows	84	9.7
by 26 - 50 cows	9	1.0
by 51 - 100 cows	1	.1
by more than 100 cows	1	.1
<i>No Change in Herd Size</i>	216	25.0
<i>Increase Herd Size</i>	387	44.8
by 1 - 25 cows	315	36.5
by 26 - 50 cows	50	5.8
by 51 - 100 cows	15	1.7
by more than 100 cows	7	.8
<i>Total Herds</i>	864	100.0