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No. 678 Fall 1994

First Looks at the New Agricultural Census for Minnesota

Fewer Farms, Similar Structure

Dale C. Dahl

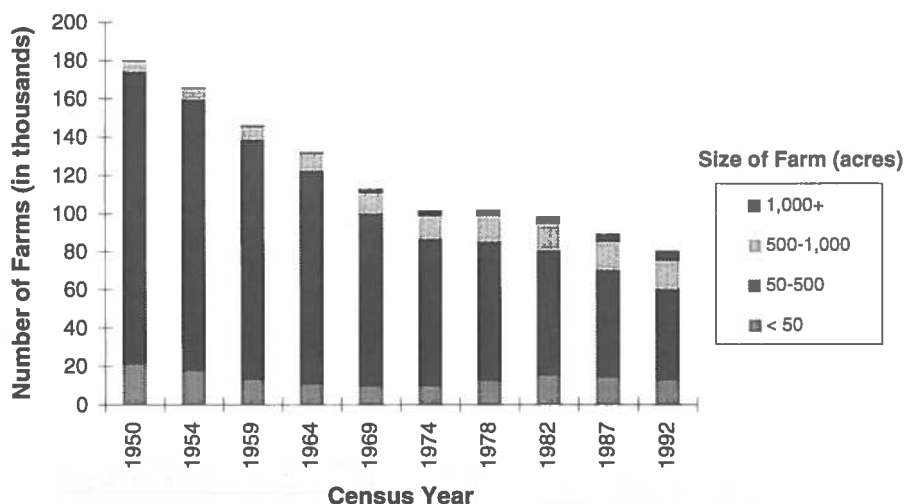
According to the new census, Minnesota lost 10,000 farms between 1987 and 1992. This represents a 12 percent decline, and continues the downward trend in farm numbers experienced in recent decades. Since 1950, more than 100,000 of the state's farms have disappeared.

The drop in farm numbers has occurred partly in the smallest size class (0-50 acres), but predominately in the 50-500 acre category (figure 1).

Most of the "lost" farms were purchased by other farmers, causing average farm sizes to increase. The

average Minnesota farm was 184 acres in 1950. By 1992 the average had grown to 342 acres. In spite of this, land used

Figure 1. The Drop in the Numbers Is Due to the "Diminishing Middle" Size Class in Minnesota



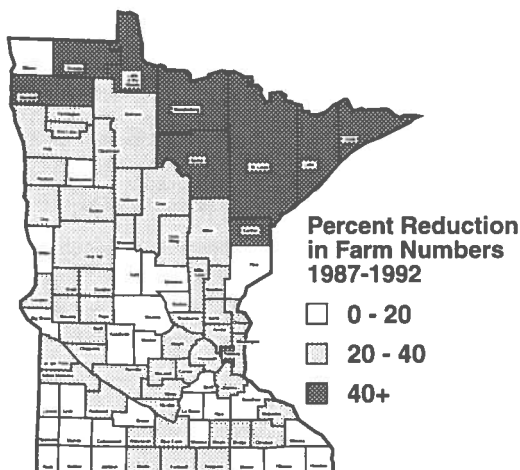
From the Editor

The 1992 Census of Agriculture is not yet available in printed form, but the Commerce Department (which conducts the census) sent us some of the early findings. We asked five faculty members to give us their first impressions.

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Figure 2. Farm Numbers Drop Throughout State



for farming in Minnesota has declined by 22 percent since 1950, mostly due to drops in woodlands and pastures (figure 3).

Approximately one-sixth of the farms in Minnesota are "small"—less than 50 acres in size. More than half are located near major population centers (figure 4) and most are probably run by part-time operators (see accompanying article, Part-Time Farmers Down in Numbers, But Up in Proportion). Although many people might not regard these small operations as "real farms," the census still considers them so.

In contrast, the largest acreage category (1,000 acres or more) recorded a 12 percent increase over 1987. These large acreage farms are primarily located in the western and northwestern crop areas of the state (figure 5).

The 1992 census confirms a long-term trend; Minnesota agriculture continues to change from a large number of small, family farms to a mixture of part-time farms and large agricultural units.

Dale C. Dahl is a professor in the Department of Agricultural and Applied Economics.

What Is a Farm?

The census definition of a "farm" has changed nine times since 1950. From 1950 to 1954, farms were businesses engaged in growing livestock or crops that had a minimum of three acres or a minimum value of \$150. For the census years 1959, 1964, and 1969, a "farm" needed an acreage of at least 10 acres and at least \$50 in sales. (An enterprise could still be considered a farm if it had fewer than 10 acres, but only if the value of agricultural products sold was higher than \$250.) Since 1974, the definition has been the same; sales of at least \$1,000, or the potential of selling products of this value under normal conditions.

Figure 3. The Drop in Minnesota "Farmland" Is Mostly Due to Less Woodland and Pasture

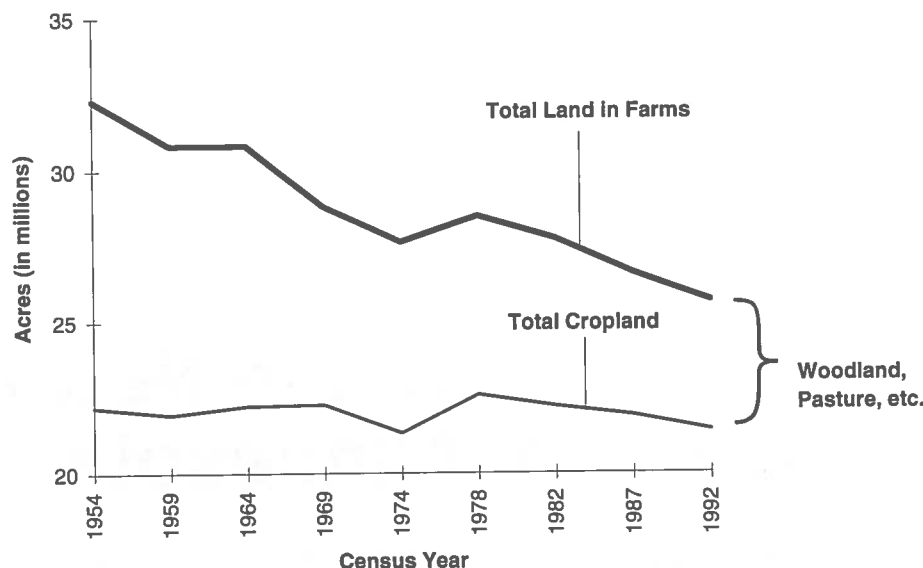


Figure 4. Counties With More Than 200 "Small" Farms (<50 Acres), 1992

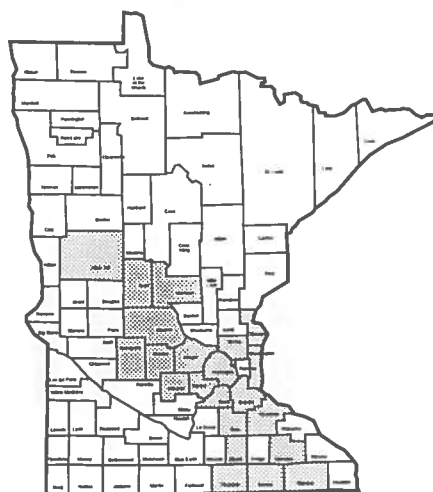


Figure 5. Counties With More Than 75 "Large" Farms (>1,000 acres), 1992

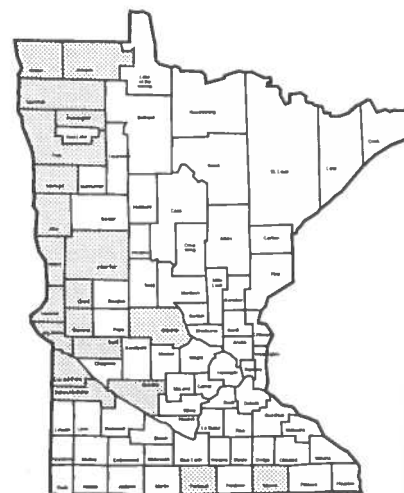


Table 1. The Minnesota Agricultural Census at a Glance

	1987	1992	Percent Change
Number of farms	85,079	75,079	-12
Land per farm (acres)	312	342	+10
Market value of agricultural products sold (\$1,000)	5,676,376	6,477,004	+14
Crop sales (\$1,000)	2,500,827	3,054,747	+22
Livestock & poultry sales and their products (\$1,000)	3,175,549	3,422,257	+8
Net cash returns (\$1,000)	1,233,896	1,216,890	-1

Financial Performance Fairly Stable Across Farm Sizes

Kent Olson

Minnesota farms are in essentially the same financial condition in 1992 as in 1987. Net cash returns are down only 1 percent (table 2). In this article, we will examine farm condition and performance. First we will look at some total figures. Then we will look at the different farm size categories, by number of acres and by sales per farm.

Because the census does not collect all the needed information, we cannot correctly calculate some of the traditional measures of performance, such as the rates of return on equity or on total assets. However, we can use the census data to approximate two measures that can serve as indicators of performance and efficiency: the operating profit margin and the asset turnover rate.

The operating profit margin is approximated as the average net cash returns per farm plus the average interest expense, all divided by the average sales per farm. The asset turnover rate is approximated as the average sales per farm divided by the average value of land, buildings, machinery, and equipment. These are not the exact measures we would use if we had complete information, but they are consistent, given the census data. They permit us to examine differences in profitability and efficiency, respectively.

Performance by Averages

By both measures, average performance in 1992 was lower than in 1987. In 1987, the approximate operating profit margin for all farms was 22 percent; in 1992, 19 percent. In 1987, the approximate asset turnover rate was 24 percent for all farms; in 1992, 23 percent.

It could be argued that since the value of land, buildings, machinery, and equipment has increased 39 percent between 1987 and 1992, the net cash return would have to increase by more than 39 percent to increase the turnover rate. Asset values were indeed lower in 1987, since they had not recovered from the low points of the mid-1980s. So the 1987 values could be viewed as abnormally low, thus making this efficiency measure look better in 1987 than it should be normally and, thus, the

argument continues, the 1992 value looks relatively worse than it should.

That argument, however, does not explain why the approximate operating profit margin also decreased from 1987 to 1992. Thus, both measures point toward lower efficiency in 1992.

Performance by Size Class

When 1992 performance alone is viewed by size class, rather than by a simple average, a different picture of farm performance emerges.

Measured by either acreage or sales, larger farms have larger expenses and net cash returns than the smaller farms. (Except for one class: those farms with

fewer than 10 acres had larger average returns than the next several size classes.)

Viewing farms by size class reveals some interesting differences in the two approximate measures of efficiency and profitability. The approximate asset turnover rate varies little between acreage classes, especially for farms with more than 200 or so acres (figure 6). The smallest farms (less than 10 acres) also compete well by this measure. When the farms are split by sales, larger farms have higher turnover rates than do the smaller sizes (figure 7). This is especially the case for the largest sales category.

Figure 6. Financial Performance by Farm Acreage, 1992

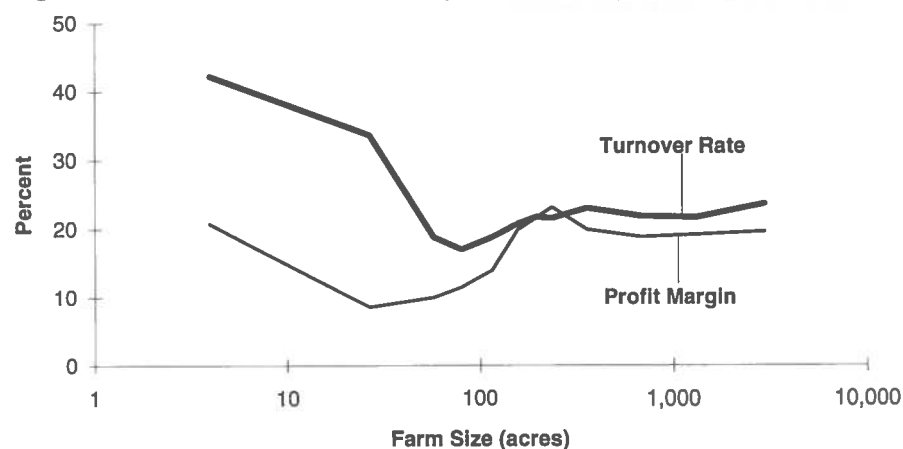


Figure 7. Financial Performance by Farm Sales, 1992

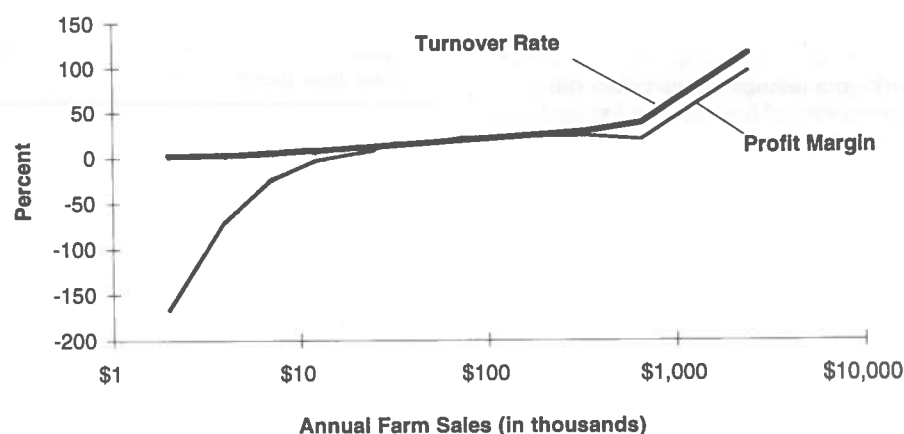


Table 2 shows the percentage of farms in each sales class that had a positive net cash return. With few exceptions, this percentage increases from the smallest size to the largest size whether the farms are classified by acreage or by sales. So even though profit margins and turnover rates are similar among the larger classes, we can say as a rule of thumb: the bigger the farm, the better its chances of having a positive return.

Kent Olson is an associate professor and extension economist in the Department of Agricultural and Applied Economics.

Livestock Industries More Concentrated

Bill Lazarus

Livestock production is an important part of Minnesota's agriculture. In 1992, sales of livestock, poultry, and their products amounted to \$3.4 million.

Livestock operations are becoming fewer and larger. Between 1987 and 1992, all types of livestock operations disappeared at a faster rate than did crop operations, except for beef cow-calf operations, which stayed fairly constant in number. The largest declines were in farms selling hens and pullets and those selling broilers.

Overall broiler sales volume increased despite the decline in the number of farms selling them. Sales of turkeys and hogs increased, as did inventories of hens and pullets and beef cows. The only inventory declines were for milk cows and sheep. It is interesting that sales of hens and pullets dropped while their inventories rose in 1992. Perhaps changes in flock culling dates or other practices may have caused year-end inventory fluctuations that show up in the figures.

Most dairy, beef, sheep, and hog farms remain relatively small: the average dairy farm had 45 cows; the average for beef farms was 25; sheep and lamb farms averaged 64 head; and hog farms averaged 662 head sold.

These averages may hide more than they show. We can learn more looking at various size categories,

Table 2. The More Farms Sell, the More They Prosper

Annual Sales (\$1,000)	Number of Farms	Percent of All Farms	Percent of Farmland	Percent of Farms with Positive Net Cash Return
1-10	22,140	29.5	9.6	27.2
10-20	8,212	10.9	5.4	54.2
20-25	2,975	4.0	2.4	66.6
25-40	6,710	8.9	6.2	71.7
40-50	3,458	4.6	3.8	76.4
50-100	12,482	16.6	17.9	77.3
100-250	13,958	18.6	31.6	83.4
250-500	3,816	5.1	15.2	88.5
500-1,000	974	1.3	5.4	90.0
1,000 or more	354	0.5	2.5	89.3

Table 3. Livestock Industries Summary

	1987	1992	Percent Change 1987-92
Beef cows			
farms	15,528	15,101	-3
inventory (head)	360,153	381,869	+6
Milk cows			
farms	17,454	13,380	-23
inventory (head)	709,832	609,034	-14
Sheep and lambs			
farms	4,250	3,451	-19
inventory (head)	241,603	221,777	-8
Hens and pullets			
farms	2,310	4,003	+42
inventory (mill. birds)	10.2	12.6	+23
Hogs			
farms	16,652	13,749	-17
sales (000 head)	8,073	9,142	+13
Turkeys			
farms	450	390	-13
sales (mill. birds)	37.1	44.2	+19
Broilers			
farms	1,000	679	-32
sales (mill. birds)	27.3	36.8	+35

such as those shown for farms selling hogs and pigs (figure 8). Even in 1992, most hogs were still raised on fairly small farms. The share of hogs produced on farms in the under 1,000 head category has declined from 45 percent to 34 percent since 1987. There have been increases in each size category over 2,000 head, while the 1,000-2,000 head group has been stable.

Farms selling between 2,000 and 5,000 head are generally considered commercial-size family farm hog operations. Their share is still growing, although at a slower rate than the share of farms selling over 5,000 head. Only 1.3

percent of all hog farms sold more than 5,000 head in 1992, but that is double the percentage of five years earlier.

Farm size distributions vary according to species. For example, the distribution of dairy farm size is less skewed than that of hogs, while the distribution of turkey farm size is more skewed (figure 9). When ranked by production levels, the smallest two-thirds of the dairy farms produces half of all milk, while the same proportion of hog farms produces only a third of the pigs. For turkey farms, the smallest two-thirds produces less than one-fifth of the birds.

Figure 8. Proportion of Hog Marketings by Size of Farm

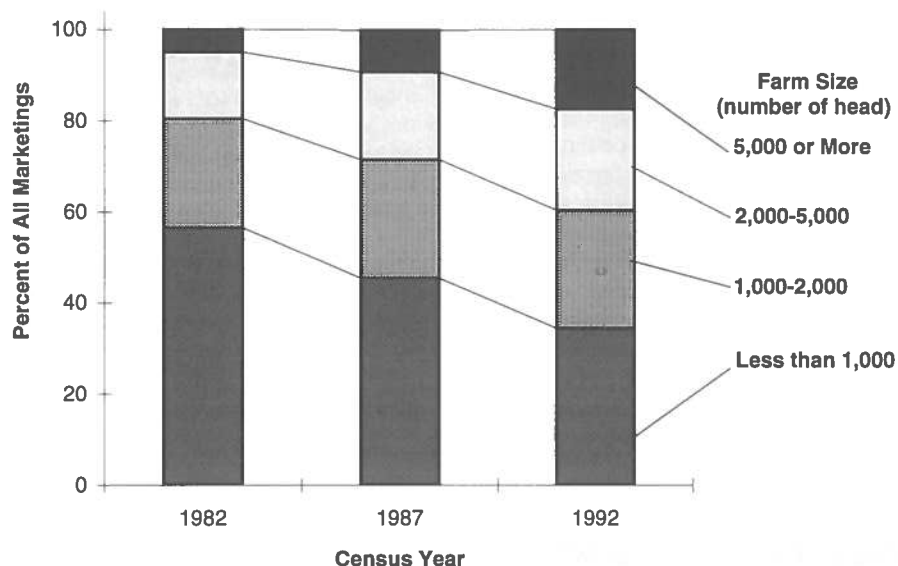
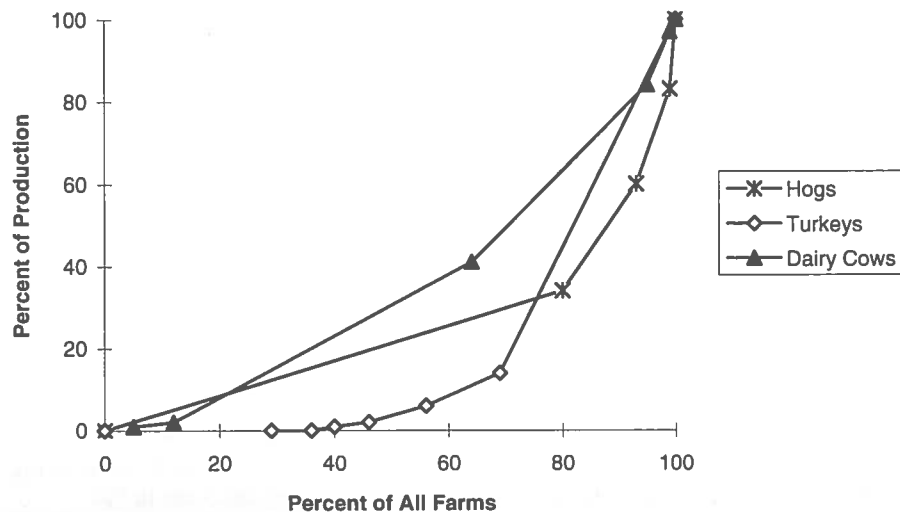


Figure 9. Farm Size Distribution by Industry, 1992



Changing Definitions

The increasing use of production contracts, vertical integration, multiple ownership arrangements, leasing, and consultants in agriculture makes it harder to define exactly what we mean by "farms" and "farmers."

Is the contractor who owns hogs but no facilities a "farmer"? Is the contractee-producer who owns a hog finishing building but not the hogs a "farmer"? Both of them, or neither? The census definition would appear to focus on the contractee-producer rather than the contractor. Thus, a hog operation with many contractee-

producers will appear in the census as many "farms."

The popular notion of a "farm" generally refers to a single location (the farmstead and fields), but such a picture is somewhat out-of-date. Many modern livestock operations have facilities located at more than one location for reasons of health maintenance, manure disposal, or merely to utilize existing buildings.

Bill Lazarus is an associate professor and extension economist in the Department of Agricultural and Applied Economics.

Part-Time Farmers Down in Numbers, But Up in Proportion

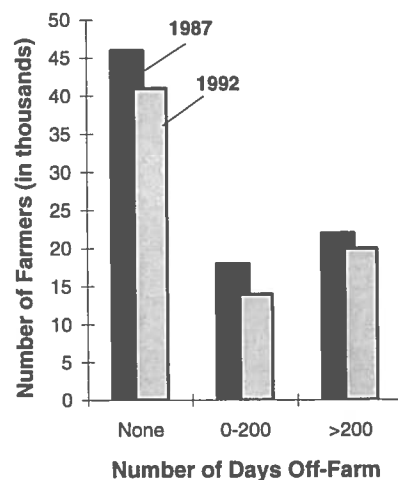
Randy Cantrell

The census reflects continuing changes in the structure of Minnesota's agriculture. Proportionally, farm losses were highest in northern Minnesota, exceeding 12 percent in every county north of Brainerd with the exception of Kittson and Mahanomen (figure 10). While proportional farm losses were typically smaller in the southern part of the state, more than 15 percent of the farms disappeared in some very agricultural counties, including Traverse, Chippewa, and Sibley. Farm losses were also high in the northern metropolitan area, where reduced farm numbers can probably be attributed to the continuing conversion of agricultural land to urban uses.

Both full- and part-time farmers dropped out of agriculture since the last census. Between 1987 and 1992, the number of farmers reporting that farming was their "principal" occupation declined from 58,519 to 51,021, while farmers reporting some other primary occupation declined from 26,560 to 24,058. The net result of these changes was that farming as a secondary occupation characterized 32 percent of all farm operators in 1992, a 1 percent increase since 1987.

The pattern of full- and part-time farming followed relatively predictable regional lines, with farming as a principal occupation characterizing counties in the southwest and west, and farming as a secondary occupation characterizing northeastern and east

Figure 10. Off-Farm Employment, 1992



central counties. For example, more than 85 percent of farm operators in Wilkin and Murray Counties indicated that their principal occupation was farming; 63 percent of St. Louis County operators claimed some other principal occupation.

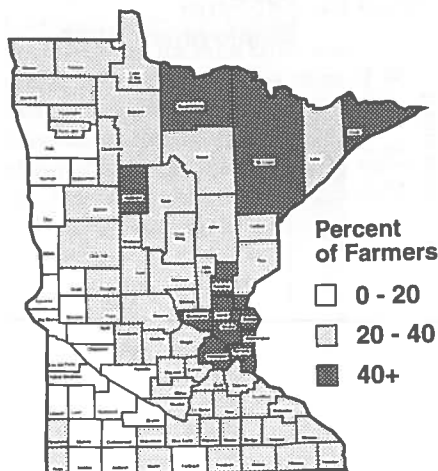
The 1992 census demonstrated no clear pattern of change in the primary occupation of farm operators that would lead one to speculate on whether farmers were moving between full- and part-time participation in farming. However, variations in the rate at which farmers reported off-farm employment may provide some insight into this question.

Off-Farm Employment

The census allows us to sort farm operators with off-farm employment into two categories: those who worked off the farm for 200 or more days in the previous year, and those who worked off the farm fewer than 200 days. The proportion of farmers in all categories of off-farm employment declined slightly between census years, from 47 percent in 1987 to 45 percent in 1992 (figure 11).

Overall, the number of farmers working off-farm for 200 days or more declined from 22,006 in 1987 to 19,826 in 1992. The rate of decrease among such farmers was just under 10 percent, and less than the overall rate of farm loss. At the same time, farmers reporting more than zero but fewer than 200 off-farm work days declined about 19 percent, from 17,561 to 14,106, a rate

Figure 11. Farmers With 200 or More Days of Off-Farm Employment, 1992



of loss considerably greater than that of farmers overall.

Regionally, significant off-farm employment (more than 200 days) was most common among operators in counties of northeastern and east central Minnesota. This regional pattern basically matches that for farming as a secondary occupation. Significant off-farm work was reported by more than half of farm operators in suburban counties like Anoka, Chisago, and Sherburne, but by less than 15 percent of operators in western counties such as Wilkin, Traverse, and Big Stone.

The number of counties with farm operators working 200 or more days off the farm increased between 1987 and 1992. Twenty counties reported increases, some as high as 21 percent. Fifteen of these counties are in the very agricultural, southwestern part of the state. Increases in the number of farm operators who work fewer than 200 days off the farm were reported in only two counties.

Drawing Conclusions from Census Data

Because census data are reported in aggregate, we cannot match the 1987 and 1992 reports of individual farmers. For this reason, our ability to draw conclusions regarding the precise nature of the changes documented in the 1992 census is limited. For instance, we cannot determine if the increase in significant off-farm employment in southwestern Minnesota reflects full-time farmers becoming part-time farmers or part-time farmers becoming, in effect, even more part-time. Equally troublesome is our inability to know precisely what meaning farmers ascribe to questions concerning their occupation and off-farm work. The census does not probe the occupational question in great detail, and some farm operators may claim farming as the principal occupation, even if they make more money and work more days at some other endeavor. Others may not claim a non-agricultural enterprise operated on the farm as off-farm employment.

Despite these shortcomings, the census gives us enough information to know that off-farm employment is gaining importance in Minnesota, even in our dominant agricultural regions.

Randy Cantrell is an extension educator and professor in the Hubert H. Humphrey Institute of Public Affairs.

Does Minnesota Have an Aging Farm Population?

We often hear that Minnesota's farmers are getting older. The census provides only modest support for this contention—at least if one uses average age as the indicator. A more detailed analysis might show that the distribution of farmers' ages is shifting upward in some manner, but fluctuations in the average have ranged only between 47 and 50 since 1954.

Census Year	Average Age of Operator
1954	47.8
1959	48.1
1964	48.9
1969	49.2
1974	49.8
1978	47.7
1982	47.2
1987	48.5
1992	49.6

Bigger Herd Size Suggests Reversal in Milk Decline

Jerome W. Hammond

For more than a decade, Minnesota's share of total U.S. milk production has declined. This declining share has raised concerns in the industry regarding Minnesota's competitiveness and has resulted in vigorous competition for milk supplies among milk buyers as they attempt to maintain plant volumes. Community leaders are concerned about the general economic impacts of a declining dairy industry on local business and the total economic activity within the state.

However, more detailed analysis of the changes in the dairy industry's structure indicates that the industry's future is not as gloomy as recent milk production and farm numbers suggest. In fact, the opposite may be true; it appears that the industry is on the verge of reversing the long-term trend in Minnesota milk production.

Expansion in U.S. milk production has occurred largely where large herds predominate and where productivity per

milk cow is high. Five western and southwestern states (California, Idaho, New Mexico, Texas, and Washington), whose share of U.S. milk production has dramatically increased, had 80 percent or more of their herds with 100 or more cows in 1992. Minnesota, on the other hand, had only 17 percent of its herds with more than 100 cows (figure 12). Annual production per cow in those states substantially exceeded that of Minnesota; three of these states exceeded Minnesota's per cow production by about 4,500 pounds. The trend is clear: states that have major growth in dairying are those that have large herd size and high productivity per cow.

A long-term trend toward larger herd sizes in Minnesota is cause for optimism. Since 1969, herds with fewer

than 30 cows declined at an average annual rate of 8.8 percent. On the other hand, the number of herds of 100 or more cows increased substantially. It is reasonable to believe that these larger herds will continue to increase in total numbers.

Continuation of recent trends implies a turnaround in Minnesota milk production in the very near future. Total cows in the three herd sizes larger than 50 expanded throughout the period 1969-92. Cows in herds of 50 and smaller declined. Of total cows, most are now in herds larger than 50 (figure 12).

Projections Through 2001

Using a statistical projection technique — the Markov Chain process, which estimates different growth rates for

the various farm sizes — I have projected Minnesota dairy farm and milk cow numbers through the year 2001. For this analysis, the factors that have affected the state's milk production — milk prices, government programs, adoption of improved production and management techniques, and credit for expansion and improvements — were assumed to remain essentially the same over the rest of the decade. The average annual rate of decline in total dairy herds will fall from 4.4 percent for the preceding years to 3.5 percent for 1994-2001 — a slowing, but not a reversal.

It is my projection of total dairy cows by herd size that signals an important change in the state's dairy sector. Almost 65 percent of the state's dairy cows will be in herds of 50 cows or greater by the year 2000. The average herd size will be 56 cows. Large percentage declines will continue for the small herds, but they will be increasingly less important in determining total state milk production.

What do the projected changes in the farm and cow number changes imply for total milk production? Per cow milk production can be expected to increase at least as rapidly as it has throughout 1980s and 1990s. The adoption of rBST (recombinant bovine somatotropin) should accelerate the increase. While total 1994 Minnesota milk production per cow still will be below 1993, and while declines will continue for a few more years, total production will increase beginning in late 1997. It will continue to expand throughout the remainder of the decade (figure 13).

The projected increases are less than 1 percent annually, but they spell good news for milk processors and others concerned about Minnesota's declining dairy sector. As we observe from data for states with expanding milk production, dairy farms with increased production will maintain Minnesota's competitiveness in the national dairy industry.

Jerome W. Hammond is a professor in the Department of Agricultural and Applied Economics.

Figure 12. Number of Milk Cows by Herd Size, 1969-1992

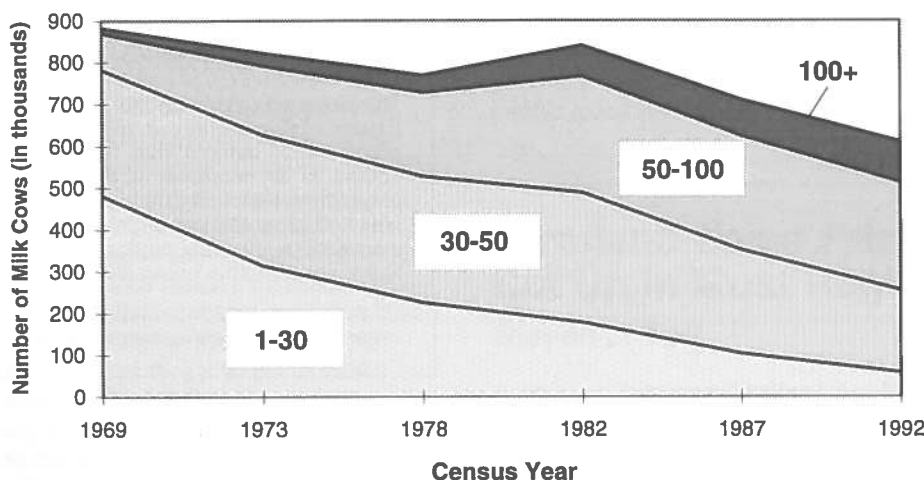
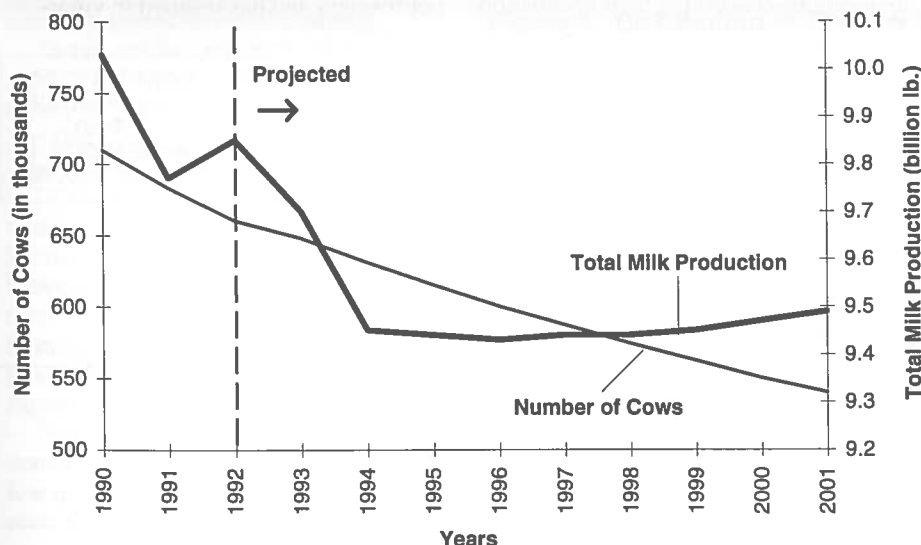


Figure 13. Minnesota Milk Production Expected to Turn in the Mid-1990s



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Minnesota Agricultural Economist

No. 678 Fall 1994

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Prepared by the Minnesota Extension Service and the Department of Agricultural and Applied Economics. Views expressed are those of the authors, not necessarily those of the sponsoring institutions. Address comments or suggestions to Steven J. Taff, Department of Agricultural and Applied Economics, University of Minnesota, 1994 Buford Avenue, St. Paul, MN 55108-6040.

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