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farm business NOTES

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Production Changes On Minnesota Dairy Farms

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Changes are occurring rapidly on farms in Minnesota's major dairy area. One striking change is the rapid decrease in the number of small dairy herds. Several factors are primarily responsible for this decline:

1. The small dairy enterprise has become increasingly less profitable due to increasing production costs and relatively stable milk prices.
2. Some older farmers have either retired or shifted to less labor intensive farm enterprises.

The soil bank program and farmers' eligibility for Social Security have provided the retirement basis for a number of small dairymen. This situation is particularly common in some less productive soil areas north and west of the Twin Cities.

Other farmers have obtained off-farm employment and curtailed their farm enterprises, particularly dairy. Others have expanded and specialized their dairy enterprises.

Purpose of Study

Several questions arise concerning the continuing changes on farms in this dairy area. What factors cause these changes and are the changes desirable? What are the characteristics of farmers remaining in dairying and what are their future prospects?

Are farmers who are not dairymen interested in starting a dairy business? How will having a smaller number of dairy producers, who are larger and more specialized, affect the supply of fluid milk and other dairy products?

Answers to these and related questions should help dairy producers evaluate if they should curtail or eliminate their dairy enterprise or specialize and expand it. Such an evaluation should include assessment of the future supply of dairy products and the resulting implications concerning surplus dairy stocks and milk prices.

Study Procedure

In 1959, about 330 Minnesota farmers were selected at random from the study area (see figure). Contacts were made with these farmers again in 1961, 1962, and 1963. During these interviews each farmer was asked about himself, his farm business, and his future price and production expectations.

The information collected was then used as a basis for predicting changes in production that these same farmers would actually make between 1958 and 1963. By using such a forecasting procedure to determine changes over a sample time period, the accuracy of this forecast could be checked against actual production changes.

If accurate, this forecasting procedure could be used to estimate future actions of farmers. Moreover, the method gives insight into what factors are most important to farmers when deciding to make changes.

In making these predictions, several alternative methods were tried. In some cases, prediction formulations included only information obtained in 1959; in other cases they included information obtained throughout the study period. Furthermore, in some instances an attempt was made to forecast changes in dairy cow numbers only; in other cases an attempt was made to forecast changes in the total number of farmwork units (both crop and livestock).

Results

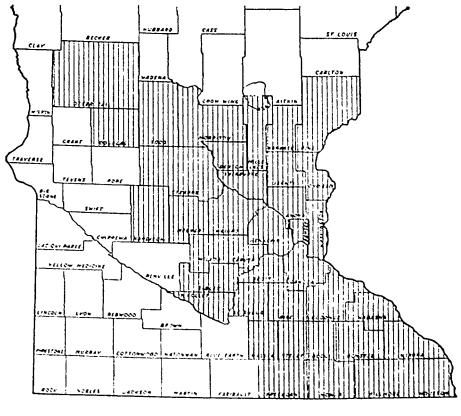
Study results varied, depending on which prediction formulation discussed above was used. By using a formulation with a large number of items (42) obtained throughout the study period, it was possible to forecast a large portion (96 percent) of the changes in farmwork units. Smaller percentages of change could be predicted when forecasting the change in dairy cow numbers only or when using only information available from the initial (1959) survey.

Several factors were consistently related to increases or decreases in production in all formulations:

- **Dairy herd size in 1958.** The larger the initial herd size in 1958, the larger the increase in production by 1963. In other words, larger producers got even larger during the period studied. A larger cropland acreage usually accompanied increases in dairy herd size.

- **The operator's willingness to borrow money when increased production required it.** The more money he was willing to borrow, the larger were his expected and realized increases in production between 1958 and 1963.

- **The ratio of total assets to total liabilities.** As the ratio of total assets to total liabilities increased, farmers were apparently willing and able to increase production.



Shaded counties composed study area

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● **Longrun price expectations for dairy products.** If farmers expected the price of milk to be at least as favorable (compared to beef and hog prices) in 5 years as it was in 1959, they generally responded by increasing milk production. However, shortrun (year-to-year) price expectations did not significantly affect changes in dairy cow numbers.

● **Age of operator.** As a farmer's age increased, rate of expansion decreased. This negative relationship was true over the entire age range of farmers studied. Few farmers past age 50 or 55 planned or actually made any expansion in dairy cow numbers from 1958 to 1963. Rather, they generally planned to curtail cow numbers in order to ease their work load.

● **Off-farm employment.** Many farmers engaged in or planning off-farm employment had already reduced or planned to reduce livestock enterprises, particularly dairy.

● **Absence of a dairy enterprise.** Virtually no farmers who did not have a dairy enterprise in 1958 were planning to or actually did add one by 1963. So milk production in 1963 was almost entirely from farmers who were in the dairy business in 1958.

● **Excess dairy building capacity.** Unused dairy capacity in 1958 was negatively related to changes in dairy cow numbers between 1958 and 1963. Farmers with unused capacity apparently had already decided to curtail or eliminate the dairy enterprise and were willing to let facilities stand idle.

While many sample farmers idled additional dairy capacity between 1958 and 1963, few made major improvements in dairy production technology. Additions of specialized housing and milking facilities that resulted in substantial reductions in per cow labor requirements and permitted substantial increases in herd size were few in number.[1]

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A COMPARISON OF CROP AND LIVESTOCK RETURNS

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How much does livestock add to a farmer's earnings? Sometimes, less than we expect. That conclusion is drawn from farm records kept by members of the Southeastern and Southwestern Minnesota Farm Management Services.

These farmers operated larger farms than were typical for their areas in terms of acres, number of workers, animal units of livestock, and capital (see table 1). However, type of farming was typical of the area.

The value of livestock and livestock products produced on these farms is shown in table 2. This includes sales, value used in the home, and changes in inventories. Purchases of livestock were subtracted, so the figures represent the value added on the farms.

Sources of Income

Beef cattle were the biggest single source of income on farms in Southwestern Minnesota; dairy was the biggest source in Southeastern Minnesota. Hogs were important in both areas, contributing about one-third of the total value from livestock.

The value of feed needed for livestock was about three-fourths of the value of livestock in Southwestern Minnesota. In other words, the livestock in the area converted feed worth $15,047 into livestock and livestock products worth $19,937. The livestock increased the value of the feed by only $4,890.

Livestock on Southeastern Minnesota farms consumed feed worth $10,732 and produced a total value of $17,730—an increase of $6,998 over the feed value.

Two reasons existed for the larger return over feed cost in Southeastern Minnesota. First, as an average, dairy cattle gave a return of $200 for each $100 feed fed, compared with $150 or less for $100 feed for beef cattle. Since labor, building, and equipment costs were less for beef cattle than for dairy, a much lower return was needed.

Second, returns from cattle feeding were low during this 5-year period. If beef returns had been as high as during the previous 15-year period, total livestock returns, with the same quantity of feed, would have been increased by about $1,600. This would have given a return over feed cost of about $6,400 for Southwestern Minnesota—about the same as on Southeastern farms.

In both areas the value of feed fed was greater than the value of crops produced. Although most of these farmers sold some crops, the value of feed purchases exceeded crop sales. By usual standards, these were livestock farms.

To summarize, in Southwestern Minnesota, almost three-fourths of the total

Conclusions

The producers included in the study fell largely into four categories. There were those who: (1) curtailed expansion plans due to their age; (2) reduced livestock enterprises, particularly dairy, because of off-farm employment; (3) had no dairy enterprise at the beginning of the study (almost all anticipated none in the future); and (4) were younger, not hampered by short labor supply, and planned to increase the size of their farm business.

Among the latter group, largest increases in dairying were planned and realized by producers who were already the largest dairy producers in 1958.

Because production expansion requires large amounts of capital, expansion was greater for operators having favorable asset to debt balances and who were willing to use credit to expand their farm business.

This latter group of dairy producers appears large enough to provide adequate milk supplies for at least the next several years, probably until 1970. Beyond that time, milk production is hazardous to project. The answer depends largely on the demand for dairy products and the rate of adoption of new production technology by dairy farmers. In turn, this adoption rate will probably be closely tied to milk prices.

Indications among the farmers studied were that current milk prices did not provide incentives for rapid adoption of new dairy technology. Instead, a substantially higher proportion of these farmers found off-farm employment a preferable alternative.

[1] For a discussion of the costs and profitability of such specialized dairy facilities, see "Economies of Size in Dairy Farming," *Minnesota Farm Business Notes*, November 1964.

Table 1. Average size of business, Southwestern and Southeastern Minnesota Farm Management Services, 1959-63

Item	Southwestern Minnesota	Southeastern Minnesota
Farms per year	133	161
Acres per farm	325	253
Total capital	$94,975	$58,412
Number of workers	1.7	1.7
Animal units	122	76

value produced on the farm ($18,981) was produced when the crops were raised; livestock added only one-fourth of the income. If beef cattle returns had been as high as during the previous 15 years, total returns would have been about $20,600; returns over feed cost would have been about $6,500. Even then, crops would have produced about two-thirds of the total value created on the farm and livestock would have produced about one-third.

In Southeastern Minnesota, crops produced almost 60 percent of the total value and livestock about 40 percent.

Contribution to Net Income

Another comparison is the contribution of crops and livestock to net income. To get an estimate of this, each operating cost on these farms was divided in proportion to the extent it was used for crops or livestock.

For example, the cost of a tractor was divided between crops and livestock in proportion to hours of use on each. However, no records were available as to the distribution of use of most items. Therefore, estimates were obtained from the Farm Management Services' fieldmen and from research workers and others who worked closely with these farmers.

Divisions of these expenses are shown in table 3. Feed purchases do not appear as an expense item; they have been subtracted from the livestock income in the process of calculating "return over feed from livestock." Similarly, the cost of seeds, fertiiizer, and other crop expenses was subtracted from the value of crops to obtain "returns from crops."

Among farmers in Southwestern Minnesota, expenses charged to livestock were larger than the value contributed by livestock. If the previous adjustment for beef cattle returns is made again, the return to labor from livestock would have been about $800—a small return for about 3,380 hours of labor. Crops, on the other hand, gave a return of $5,575 for about 1,650 hours of labor.

Returns from livestock were a little more favorable as compared with crops in the Southeastern area. Nevertheless, the return per hour was only about 50 cents from livestock compared with almost $3 from crops.

Factors to Consider

Before concluding that crops are more profitable than livestock, other factors must be considered. First, the value of crops produced was based on market prices for the crops which normally could be sold. Nonmarketable crops were valued at a level equivalent to market prices. However, these prices are brought up to this level only by the demand from livestock producers.

If a large number of farmers shift to cash crop farming, the value of crops and the cost of feed would fall sharply. The profitability of cash crop farming would then fall; that of livestock production would rise.

Second, if livestock were eliminated from some farms, costs would not be reduced by the full amount of the cost of livestock production as shown in table 3. For example, some costs of buildings would continue, even though they were not used by livestock.

Third, on farms with surplus labor, livestock increase volume and give some returns—even if small—to labor.

Fourth, livestock help to provide a market for pasture and hay that otherwise might not bring any income. This pasture and hay, and the manure from the livestock, may also help to maintain a good level of crop yields.

These data indicate that many farmers must closely examine their farm organization to see if they have the most favorable combination of crops and livestock. Some farmers may find a shift to cash crop farming profitable.

Table 2. Value added by livestock and crops, Southwestern and Southeastern Minnesota Farm Management Services, 1959-63

Item	Southwestern Minnesota	Southeastern Minnesota
Value added by livestock:		
Dairy cattle	$ 2,427	$ 9,829
Beef cattle	8,432	1,405
Hogs	7,518	5,450
Other livestock	1,560	1,046
Total	$19,937	$17,730
Less value of feed consumed	15,047	10,732
Return over feed cost	4,890	6,998
Value of crops produced	13,450	9,651
Other farm receipts	641	519
Total value produced	$18,981	$17,168

Table 3. Returns from and allocation of expenses to livestock and crops, Southwestern and Southeastern Minnesota Farm Management Services, 1959-63

Item	Southwestern Minnesota			Southeastern Minnesota		
	Total	Crops	Livestock	Total	Crops	Livestock
Returns:						
Return over feed from livestock	$ 4,890	.....	$4,890	$6,998	.....	$6,998
Crops	13,450	$13,450	.....	9,651	$9,651	.....
Other	641	.....	.....	519	.....	.....
Total	$18,981	$13,450	$4,890	$17,168	$9,651	$6,998
Expenses:						
Power	$ 3,053	$ 1,831	$1,222	$2,803	$1,491	$1,312
Crop machinery	1,623	1,623	.....	1,387	1,387	.....
Livestock equipment	521	.....	521	460	.....	460
Buildings	1,302	391	911	1,286	351	935
Miscellaneous livestock expenses	590	.....	590	701	.....	701
Property taxes	1,336	744	592	1,219	735	484
Interest on capital managed	4,775	3,104	1,671	2,940	1,970	970
General expense	418	182	236	388	163	225
Total expenses	$13,618	$7,875	$5,743	$11,184	$6,097	$5,087
Return to all labor	$ 5,363	$5,575	$—853	$ 5,984	$3,554	$1,911
Estimated hours of labor	.....	1,650	3,380	.....	1,120	3,960

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Beef Cows in Minnesota

A. R. Wells and S. A. Engene

What changes have occurred in beef cow numbers in Minnesota over the past 15 years? What will happen in the future? This article provides some facts to help answer these questions.

In 1948 there were 1,713,000 cows on Minnesota farms (see table). Nine percent of these—less than 1 cow in every 10—were beef cows.

By 1963, total cow numbers were up slightly to 1,838,000. But dairy cows on farms dropped by 141,000, or about 10 percent. Beef cow numbers increased from 151,000 to 417,000, or nearly threefold. With these changes, one cow in four (23 percent) was a beef cow.

Most beef cows on Minnesota farms are in the western and southern areas. The total number in the northeastern third of the state is relatively small.

The concentration of beef cows in 1963 was surprisingly uniform over the state, except in the southeast (see figure). This area, which has much rough land, had 25 cows per 1,000 acres of farmland. The concentration in the rest of Minnesota varied from a low of 10 cows per 1,000 acres in the northwest and central districts to a high of 17 in the southwest district.

The largest increase in concentration of beef cows came on farms in the north-central and northeast districts. Here, concentration increased from 5 cows per 1,000 acres in 1956 to 16 per 1,000 acres in 1963.

Concentration also doubled or more than doubled in the northwest and east-central districts. The southwest and south-central districts showed the lowest increases with a change of one cow per 1,000 acres.

Three main reasons probably accounted for the rapid increase in beef cow numbers:

1. Cattle prices rose more rapidly than did milk prices, making beef cows a more favorable enterprise than dairy on many Minnesota farms. In the 1920's, less than 300 pounds of milk were needed to bring the same income as 100 pounds of cattle. By the late 1950's and early 1960's, about 600 pounds of milk were needed.

2. Greater demand for feeder cattle made it more difficult to purchase feeders at reasonable prices in Minnesota. To solve this problem, farmers established their own beef cow herds.

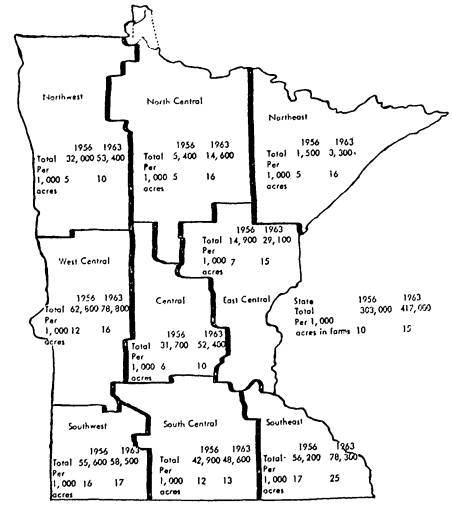
3. Higher off-farm wages caused farmers to take jobs. Many of these farmers continued to operate their farms on a part-time basis. With fewer hours of labor available for farmwork, they shifted to livestock enterprises requiring relatively little labor per dollar of income. Beef cows fitted this situation.

Will beef cow numbers in Minnesota continue to increase?

With higher incomes, per capita demand for beef can be expected to remain the same or increase slightly during the next decade. This fact, together with a 1.5- to 1.8-percent annual increase in population, creates a rather favorable outlook for beef cow herds in Minnesota. Demand for dairy products continues steady or downward; dairy prices will continue to rise more slowly than beef prices.

The northern Minnesota counties will continue to be grass and forage producing areas. Relatively cheap land and sufficient moisture make this a good area for beef.

Continued high wages for off-farm labor may add to the present number of part-time farmers in Minnesota. If this happens, beef cow herds probably will receive added attention as a part-time farming enterprise.



Beef cows and heifers, 2 years old and over

Cows and heifers 2-years-old and over, Minnesota, 1948-63

Year	Beef	Dairy	Percent beef
	number in thousands		
1948	151	1,562	9
1949	160	1,515	10
1950	175	1,470	11
1951	185	1,441	11
1952	229	1,412	14
1953	262	1,483	15
1954	278	1,542	15
1955	303	1,527	17
1956	303	1,542	17
1957	305	1,542	17
1958	285	1,496	16
1959	319	1,421	18
1960	335	1,407	19
1961	356	1,421	21
1962	383	1,435	21
1963	417	1,421	23

Source: Minnesota Agricultural Statistics.

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