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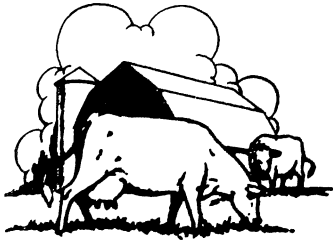
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MINNESOTA farm business NOTES



NO. 366

ST. PAUL CAMPUS, UNIVERSITY OF MINNESOTA

DECEMBER 30, 1955

20 Years Bring Changes in Creamery Industry

E. Fred Koller and Arvid C. Knudtson

Important changes have occurred in the Minnesota creamery industry in the last 20 years. These changes have affected nearly every phase of the organization and operation of the industry. These range from changes in the assembly of milk and cream and changes in product processing, to changes in methods of marketing the finished products.

One of the most significant changes has been the large decrease in the number of plants which manufacture butter. In the period 1935-55 the number of plants making butter in the state declined from 870 to 575. This is a reduction of 295 plants, or about one-third.

Most of these plants closed their doors. However, some of the decrease is due to some plants shifting from manufacturing butter to receiving milk and cream for larger plants. A few shifted to the processing of other dairy products.

The decline in plant numbers has affected nearly all areas of the state, since 79 out of 85 counties have fewer butter plants than they had in 1935. Counties with the largest decline in plants include Hennepin with a reduction of 17,¹ Wright 14, Carver 11, Pine 11, Freeborn 10, Goodhue 9, Rice 9, and Steele 9. Plant losses have been heaviest in more recent years with decreases of 27 in 1952, 29 in 1953, and 26 in 1954.

Various factors account for these changes in plant numbers. In some areas farmers shifted from dairying to cash crops and other livestock during the war and early postwar periods. With decreased receipts of cream successful operation of many plants was no longer practicable.

With rising equipment and construction costs many plants could not af-

ford to modernize and meet increased sanitary requirements. Rapidly rising costs of labor, fuel, and other items made it impossible for some small plants to continue profitable operations. Many plants lost out as more and more farmers shifted from the sale of cream to the sale of milk. Some plants felt that they could not afford the additional investments this involved.

As patrons shifted to plants receiving milk, many creameries had too little butterfat left to justify continued operation. Improved roads and the wider use of trucks brought increased competition for milk and cream from larger and more efficient plants. This left many plants with an inadequate volume of business. In a few places plants have been consolidated.

As the number of creameries in the state declined, the average volume of business of those which remained increased. In 1935, the annual butterfat

receipts of all creameries in the state averaged 319,800 pounds. By 1954, average receipts had risen to 475,400 pounds or an increase of 50 per cent. This increase in volume has enabled many plants to improve the efficiency of their operations and to pay relatively larger returns to their patrons.

The annual dollar volume of sales of creameries in the state, including dairy product sales as well as sideline sales, increased from an average of \$105,000 in 1934 to \$511,000 in 1954. This increase reflects not only an increase in the physical units sold but also an increase in the unit prices of dairy products and sideline items.

Some of the changes in the creamery industry may be illustrated by an analysis of a representative sample of 175 creameries which the Department of Agricultural Economics studied in 1935. Financial reports and other in-

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Table 1. Average Annual Sales of 141 Minnesota Creameries, 1934 and 1954

Sales items	1934 Sales		1954 Sales		Creameries handling items in 1954	
	Average 141 plants	Per cent	Average 141 plants	Per cent	Number	Average sales
Dairy products						
Butter	\$ 94,862	90.4	\$271,346	53.1	141	\$271,346
Bulk cream and milk	1,819	1.7	76,780	15.0	99	109,354
Skim and buttermilk	298	.3	35,026	6.9	139	35,530
Dry milk	510	.5	24,860	4.9	12	292,103
Bottled milk	356	.3	16,171	3.2	40	57,003
Cheese manufactured			9,471	1.8	3	445,124
Total dairy sales	\$ 97,845	93.2	\$433,654	84.9	141	
Sidelines						
Feeds, fertilizers, etc.	†		\$ 35,664	7.0	87	57,801
Produce (poultry, etc.)	†		27,877	5.5	32	122,832
Cheese and ice cream*	†		5,537	1.1	128	6,100
Lockers and service	†		3,758	.7	32	16,558
Jobbed bottle milk	†		2,019	.4	24	11,863
Miscellaneous	†		2,456	.4	32	20,024
Total sideline sales	\$ 7,068	6.8	\$ 77,311	15.1	137	
Total sales	\$104,913	100.0	\$510,965	100.0		

* Purchased for sale to patrons and others.

† Detailed data not available in 1934.

¹ In Hennepin county a number of fluid milk plants manufactured some surplus milk into butter before World War II and were listed as butter plants. Since then the number of fluid milk plants has declined and only one reports butter production.

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formation have been obtained from this sample in the 20 intervening years. Of these 175 plants, 141 were still manufacturing butter in 1955, 27 had closed their doors, three had shifted to the manufacture of cheese, three were milk receiving stations with no processing, and one had leased its facilities to another dairy company.

The nature of the operations, or the combinations of products processed and sideline items handled by these plants, has changed materially. There has been a tendency toward more diversified operations in many of these plants. In 1934, the dairy product sales of these plants were 93 per cent of all sales, but by 1954 had declined to about 35 per cent. (See table 1.) Sideline sales such as feed, fertilizer, produce, frozen food locker services, and many others, had increased from 6.8 per cent of all sales to 15 per cent.

Among the sideline items handled by these creameries, feeds and fertilizers ranked first in importance in 1954. In 87 plants annual sales on these items averaged \$57,801 (table 1). Thirty-two plants had produce departments (poultry, eggs, etc.) with average sales of \$122,832.

Creameries in the western counties of the state have entered sideline operations on a larger scale and in a more diversified way than creameries in the eastern and southeastern dairy areas. Many plants have entered sideline operations in order to offset losses in the volume of business in their butter departments and thus enable them to make better use of their facilities and labor.

Comparison of the component dairy product sales of the 141 sample plants in 1934 and 1954 shows another important aspect of the diversification trend. Twenty years ago these plants were rather specialized butter plants with about 90 per cent of all sales in the

form of butter. In 1954, only 53 per cent of their sales were in this form. (See table 1.)

Sales of whole milk and cream in bulk form were less than 2 per cent of sales in 1934 but had increased to 15 per cent in 1954. Ninety-nine out of the 141 plants sold an average of \$109,000 of milk or cream in bulk form. In 20 of the 99 plants bulk sales constituted over 50 per cent of all sales. Creameries are selling more milk and cream in bulk because the net returns which may be derived from this source are usually larger than from the processing of butter.

Most of these bulk sales were to large dairy plants which processed the milk or cream into cheese, dry milk, butter, and other products. As a result of this development, many creameries are serving increasingly as receiving stations for larger dairy plants, and their butter operations are dwindling to small proportions.

Receiving Stations Will Be By-Passed

In time, it may be expected that many of these "receiving stations" will be by-passed as milk is delivered directly to the larger plants. The wider use of bulk milk tanks on farms may result in the closing of many creamery receiving stations.

Skim milk and buttermilk sales from these plants have increased from a fraction of a per cent in 1934 to nearly 7 per cent in 1954. Most of this increase is represented by skim milk sales to central drying plants from 63 out of the 141 plants. In 1934, none of these plants were selling fluid skim milk to drying plants.

A further indication of increased diversification in these plants is that 20 years ago none of the plants dried skim milk, but in 1954 six engaged in this activity. Six additional plants dried buttermilk. In 1954, forty of the plants

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Prepared by the Department of Agricultural Economics and Agricultural Extension Service.

Published by the University of Minnesota Agricultural Extension Service, Institute of Agriculture, St. Paul 1, Minnesota.

bottled milk and cream as compared with six in 1934.

The diversification in dairy operations described above was made possible as large numbers of creameries shifted from the cream basis to the whole milk basis of operations in the war and post-war years. By 1954, 116 of the 141 plants received at least some of their butterfat in whole milk form as compared with eight plants in 1934. Butterfat received in milk averaged 65 per cent of total butterfat receipts in all 141 plants in 1954 compared with 2.3 per cent 20 years earlier. In 88 of the 116 plants which received milk, over 50 per cent of the butterfat receipts were in this form. The shift to the whole milk basis has involved many changes in the assembly of raw materials, large additional investment in plant facilities, and significant changes in plant operations.

There have been important changes in the cost of operation of these creameries. Comparison of the costs of these plants with earlier periods was difficult because of the widely varied nature of present operations. However, in one group of 18 plants nearly all of the butterfat was processed into butter and other activities such as sidelines handled were negligible in each of the three years compared.

Operating Costs Have Doubled

Total operating costs of these 18 plants more than doubled from an average of 2.51 cents a pound of butter in 1934 to 5.64 cents in 1954. (See table 2.) Nearly all of this increase was due to an increase in wartime and postwar prices of everything needed in the operation of these plants. Plant labor, which is one of the largest component expense items, increased from 0.8 cent a pound to 2 cents or 152.5 per cent. General and administrative expenses tripled, largely because most plants added an office worker to their staff during the 20 year period.

Plant costs showed a close relationship to volume. In the six smallest

Table 2. Average Operating Costs of 18 Minnesota Creameries 1934, 1947, and 1954

Expense items	Operating costs			Increase
	1934	1947	1954	1934-54
		cents per pound		per cent
Plant labor .....	.80	1.72	2.02	152.5
Manufacturing and packaging supplies ..	.67	.....	.93	38.8
Fuel and power .....	.31	.....	.70	125.8
Depreciation—building and equipment ...	.22	2.17*	.59	168.2
Other plant expenses .....	.23	.....	.55	139.1
General and administrative expenses .....	.28	.58	.85	203.6
Total cost	2.51	4.47	5.64	124.7
Average volume (thousand pounds)	344.7	326.5	379.9	.....

* Detailed data for these four items not available in 1947.

Costs of Drying Milk in Specialized Plants

Linley E. Juers and E. Fred Koller

The manufacturing costs of a representative group of 18 large specialized milk-drying plants in Minnesota have declined since 1947, according to a study by the Department of Agricultural Economics. The average cost of manufacturing dry milk was 3.23 cents a pound in 1953 as compared with 3.55 cents in 1947.

Those costs do not include the costs of milk procurement, containers, and selling costs. This reduction in costs is particularly significant since it was achieved in a period in which wages and the prices of most supplies and services were rising.

Operating Efficiency Improved

Improved efficiency in the operation of these plants resulted primarily from increased volume of production, better management practices, and some improvements in equipment. The average annual dry milk output of these plants increased from 5 million pounds in 1947 to 7.3 million pounds in 1953. Of the 18 plants studied, 16 showed an increase

plants, where the average annual volume was 165,000 pounds each, costs averaged 7.33 cents a pound. For six middle-size plants, where the average volume was 386,000 pounds of butter, costs averaged 5.97 cents. For the six largest plants, where the average volume was 588,000 pounds, costs were 4.95 cents.

In general, creameries have made many adjustments to changes in technical methods, sanitary requirements, transportation, labor, and other conditions. However, many further adjustments are needed to improve the efficiency of individual plants and the industry as a whole.

In view of rising costs of labor, particular attention needs to be given to increasing output per hour of labor. There are many ways in which this may be done: by giving more training and guidance to employees, by using worker incentives, by improving plant layout, by using labor-saving equipment, by more automation of operations, and others. Further increases in the volume of business of most plants is needed if more effective use is to be made of labor and capital. Continued improvements in management are also essential.

in volume which was accompanied by a reduction in per unit costs. A larger volume of production enables a plant to make more intensive use of its fixed cost factors such as building and equipment. This results in lower costs per pound.

Of the 3.23 cents in powder manufacturing costs in 1953, 2.85 cents consisted of plant expense items such as labor, fuel, and depreciation, while .38 cent was for general and administrative expenses (see table). Plant labor and fuel were the largest cost items and made up 62 per cent of the total cost.

The volume of output of the plants included in the study ranged from 2.3 to 14.5 million pounds of dry milk annually. In general, the larger plants had lower costs than the smaller plants but with some variations between plants of approximately the same volume. Much of this variation can be attributed to differences in management. Other factors which cause variations in manufacturing costs between different plants include type and price of fuel and local wage rates. In order to remove variations due to wage and fuel price differences, comparisons were made on the basis of hours of labor and physical units of fuel used.

Analysis of the labor efficiency in 12 of the drying plants showed a definite relation between volume and output of dry milk per hour of labor. The output of dry milk per hour of labor

ranged from 62.7 pounds for a plant with a volume of 2.3 million pounds per year up to 142.7 pounds for a plant with a volume of 7.5 million pounds per year.

Large differences in the efficiency in using labor were observed as production varied from month to month with seasonal changes in milk production. Variations in dry milk output per hour of labor arise from spreading the fixed portion of labor over the total production. At any level of production, a certain amount of labor is required to operate a plant. Within certain limits, production can be increased without increasing the amount of labor and with a resulting higher output per hour of labor. Labor employed in daily plant cleaning is also more or less a fixed cost of operation. A certain amount of clean-up time is required regardless of the amount of milk processed.

Fuel Efficiency Analyzed

Physical input-output ratios were also used to analyze fuel efficiency in 10 of the 18 plants. Of these 10 plants, 5 used coal and 5 used fuel oil. The data indicated that an average of 1.77 pounds of coal was used for each pound of dry milk produced in those plants using coal and .15 gallons of oil per pound of dry milk in the plants using oil. In the case of both coal and oil, these figures indicate a near 20 per cent increase in fuel efficiency in 1953 as compared with 1947.

Again larger volume seems to explain the increased efficiency in fuel utilization. As in the case of labor, there is a fixed fuel requirement in getting up steam in a boiler. And, as production is increased, this fixed cost is spread over more units of production resulting in a lower unit cost.

In general, further improvement in management seems to be the key to continued cost reduction. The variations between plants in efficiency of labor and fuel utilization indicate that greater economies can be achieved in many of the plants through improved management.

Improved technology can also offer cost reduction by saving labor or increasing capacity. Managers should be quick to appraise such advances. Reduced seasonality would contribute greatly toward lower costs. Reduction in seasonal variations will be attained only as farmer patrons even out their production throughout the year.

Manufacturing Costs per Pound of Dry Milk Produced in 18 Minnesota Spray Drying Plants, 1947 and 1953

Cost item	Cost per pound	
	1947	1953
	cents	
Labor	1.16	1.10
Payroll tax .....	.03	.02
Fuel	1.05	.91
Light and water .....	.06	.05
Plant maintenance .....	.19	.24
Depreciation and rent .....	.55	.31
Other .....	.23	.22
Total	3.27	2.85
Administrative and general expense		
Office supplies and expense ...	.11	.10
Taxes .....	.06	.08
Insurance .....	.04	.03
Other .....	.07	.17
Total .....	.28	.38
Total manufacturing cost*	3.55	3.23
Average annual production (million pounds)	5.0	7.3

* The cost of milk assembly and packing supplies has been excluded from this total.

Minnesota Farm Prices, *The Outlook Corner* — Dairying Oct. and Nov. 1955

Prepared by Harlan C. Lampe

Average Farm Prices for Minnesota, October 1955, November 1953, 1954, 1955*

	Oct. 1955	Nov. 1955	Nov. 1954	Nov. 1953
Wheat	\$ 2.15	\$ 2.14	\$ 2.30	\$ 2.11
Corn	1.03	1.07	1.23	1.21
Oats .....	.54	.54	.69	.65
Barley .....	.89	.92	1.10	1.07
Rye .....	.84	.78	1.07	.97
Flax	2.81	2.86	3.07	3.56
Potatoes .....	.80	.85	.80	.75
Hay	14.50	14.10	16.00	14.20
Soybeans†	1.99	2.05	2.46	2.51
Hogs	14.20	11.60	18.00	20.70
Cattle	14.60	12.80	13.90	15.00
Calves	16.30	14.30	14.00	16.00
Sheep-lambs	16.37	15.88	16.77	16.17
Chickens .....	.163	.150	.112	.163
Eggs .....	.37	.360	.25	.495
Butterfat .....	.62	.62	.64	.72
Milk	3.30	3.25	3.30	3.70
Wool† .....	.36	.36	.48	.48

* Average prices as reported by the USDA.

† Not included in Minnesota farm price indexes.

Minnesota farm prices fell to the lowest November level since 1945. Hog prices fell the most but other livestock prices also fell. The average price of all livestock was at the lowest November level since 1941.

Comparison of October and November Prices

Commodity class	Average November prices as a percentage of average October prices
Crops	102
Livestock	86
Livestock products	98
All commodities	93

Indexes for Minnesota Agriculture*

	Average Novem- ber 1935-39	Novem- ber 1955	Novem- ber 1954	Novem- ber 1953
U. S. farm price index	100	211.5	229.3	234.0
Minnesota farm price index	100	175.6	205.1	220.6
Minnesota crop price index	100	207.3	236.1	231.4
Minnesota livestock price index	100	170.6	228.6	236.0
Minnesota livestock products price index	100	166.0	153.3	191.7
Purchasing power of farm products				
United States	100	94.5	102.4	105.3
Minnesota	100	78.4	91.6	99.3
U. S. hog-corn ratio	14.4	11.2	13.6	15.0
Minnesota hog-corn ratio	17.3	10.8	14.7	16.1
Minnesota beef-corn ratio	15.1	12.0	12.0	11.5
Minnesota egg-grain ratio	24.6	14.2	8.8	15.9
Minnesota butterfat-farm-grain ratio	39.7	34.4	28.2	33.9

* Minnesota index weights are the average of sales of the five corresponding months of 1935-39. U. S. index weights are the average sales for 60 months of 1935-39.

U. S. milk production in 1955 was about 124.5 million pounds. The increase of 1 billion over 1954 was the smallest increase in three years. The leveling out of production was helpful in reducing the pressure of the surplus. The large 1955 production was achieved with 1½ per cent less cows. The average production per cow has increased about 25 per cent in 10 years.

Milk production definitely increased this past fall and promises to reach a new high in 1956. Feed supplies are large and the milk-feed ratio is higher and more favorable than other ratios—such as the hog-corn ratio. Cows probably will be fed better and production of milk per cow is likely to be up. It is also likely that the number of cows will increase in a year or two.

In 1955, the per capita consumption of milk and its products was above that of the previous year. Total nonfarm consumption of fluid milk and cream increased 4.2 per cent compared with a 10 year average annual gain of 2.2 per cent. This is significant since bottled milk is a higher valued outlet for farmers.

Increased consumption of fluid milk is in part due to higher consumer incomes, promotional campaigns, and population increase. The annual increase in population can take care of a two billion increase in production.

Not much change is expected in the overall consumption of dairy products per person in 1956. There may be some increase in fluid milk and cream consumption but any increase in manufactured products is unlikely.

The combination of a smaller increase in milk production and increased con-

sumption has resulted in smaller surpluses and reduced purchases under the price support program. The situation in 1956 will differ but slightly from that in 1955. More intensive effort will be put into promotional campaigns and other disposal programs. However, the surplus problem will continue in 1956.

Prices to farmers for milk and butterfat have been stable in the past year in contrast with substantial reductions in prices of feed and some alternative products, especially hogs. Prices to farmers in 1956 again will be influenced by the level of price supports yet to be announced for the marketing year, starting April 1.

Cash receipts from dairy products may increase moderately. And, with lower feed costs, net returns from dairying may be a little larger than in any of the last three years.

Farmers sold around 109 billion pounds of milk equivalent in 1955 and total cash receipts were approximately 4.2 billion dollars. An increase in milk output to 126 billion pounds in 1956 would result in total cash receipts from the sale of dairy products of at least 4.3 billion dollars. In 1954, farmers received 4.1 billion dollars from the sale of dairy products compared with 4.4 billion in 1953 and a record of 4.6 billion in 1952.

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Cooperative Extension Work in Agriculture and Home Economics, University of Minnesota, Agricultural Extension Service and United States Department of Agriculture Co-operating, Skuli Rutford, Director. Published in furtherance of Agricultural Extension Acts of May 8 and June 30, 1914.

UNIVERSITY OF MINNESOTA
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Agricultural Extension
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