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ST. LAWRENCE COUNTY
COST OF MILK PRODUCTION
SURVEY

1939-40

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St. Lawrence County
 Cost of Milk Production Survey
 1939-40

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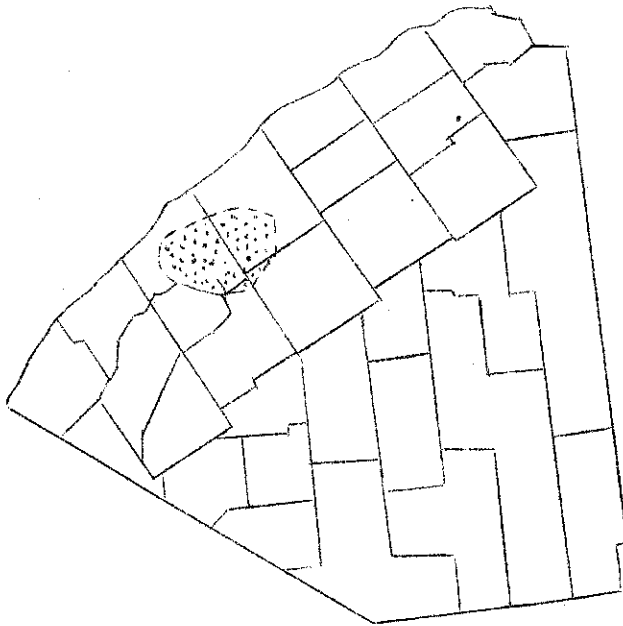
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Mr. R. M. Cary, County Agricultural Agent, helped to plan the survey. C. G. Borglum, E. A. Eklund, Richard Hildreth, R. G. Latimer, R. J. Peacock, R. H. Anderson, and Max Myers of the Department of Agricultural Economics assisted in taking the records.


PRELIMINARY REPORT
ST. LAWRENCE COUNTY
COST OF MILK PRODUCTION SURVEY
1939-40

A farm management survey of 117 farms was made in the area around Heuvelton in St. Lawrence County for the year ended April 30, 1940. Information was obtained concerning the whole farm business and detailed cost data were obtained on the dairy enterprise. The survey was made by the

New York State College of Agriculture in cooperation with the St. Lawrence County Farm Bureau, and the information was obtained by personal visits to the farms.



St. Lawrence County

 Area surveyed

The area included in these surveys is part of the extensive summer-dairy section of northern New York. Of the 117 farms in the survey, 97 were delivering milk to grade B plants and 20 to cheese factories.

Pastures in northern New York were about normal during the early part

of the summer, but were relatively poor during the latter part of the season due to the severe drought. For the state, pasture conditions in 1939 were 13 per cent below the average of the preceding 10 years, and were the lowest during the decade except for 1934.

One purpose of this study was to describe the relative importance of the various costs in producing milk in the summer-dairy region of northern New York. Another objective was to help farmers study the application in their community of some of the factors that have consistently been found

over a period of years to be related to the cost of producing milk, and hence to farm incomes.

THE ECONOMIC SITUATION, 1939-40

Following the reinstatement of the federal-state marketing order in the New York milk market in June 1939, the price of milk rose from the low level reached while the order was suspended to a point well above other prices (figure 1). Although the price of milk declined from this point during the rest of the year covered by the survey, it was still above other prices at the end of the year. The peak in the price of milk in November 1939 was higher than at any time since 1931. The net pool price of 3.7 per cent grade B milk at the 201-210 mile zone averaged \$1.91 for the year, or 19 per cent above the base period in 1910-14. In this study the average price

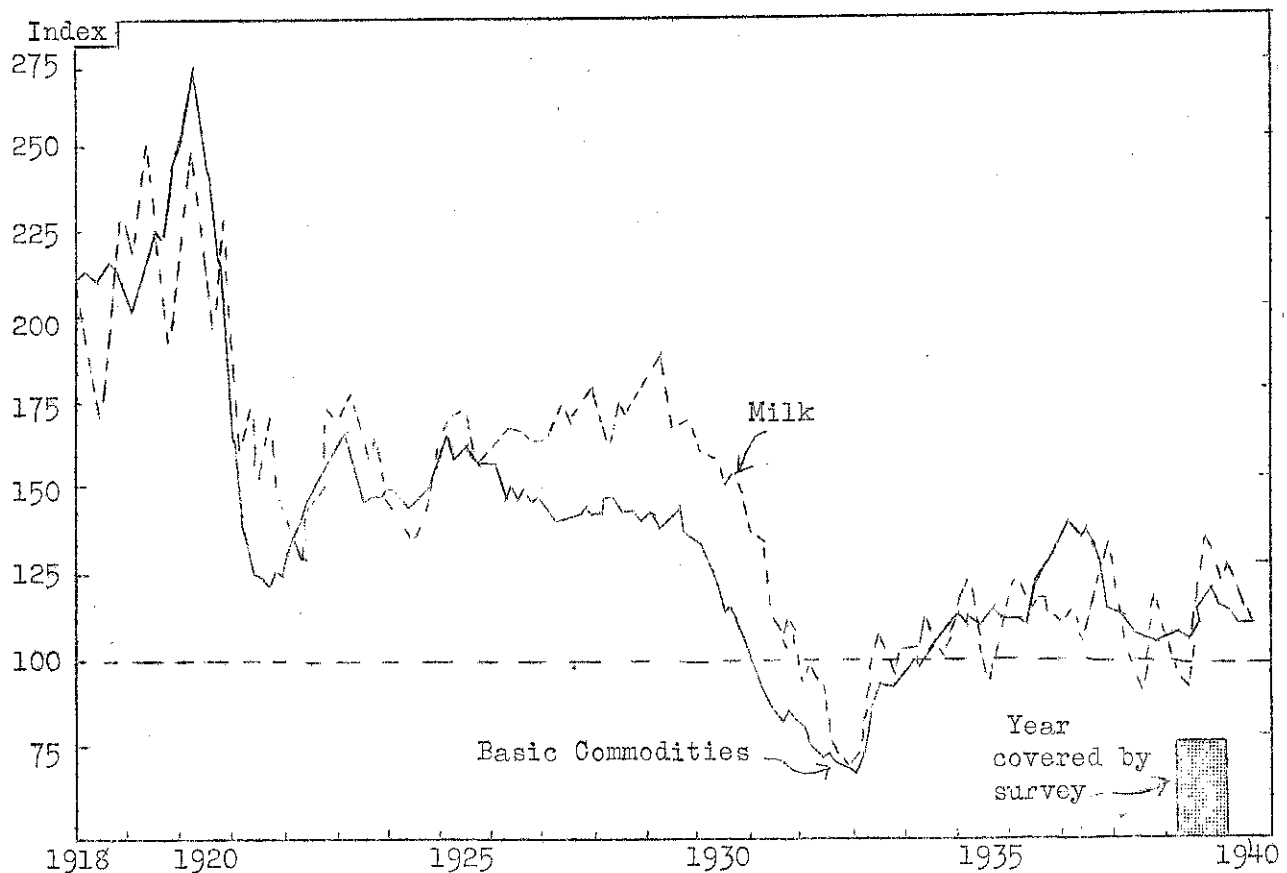


FIGURE 1. FARM PRICE OF MILK IN NEW YORK AND WHOLESALE PRICES OF BASIC COMMODITIES IN THE UNITED STATES (1910-14 = 100).

received for 3.7 per cent milk sold was \$1.72. Average prices paid to New York farmers for all farm products were only six per cent above 1910-14.

During the summer months the price of a dairy ration in New York was about 10 per cent below its 1910-14 level, but following the declaration of war in September 1939, grain prices rose rapidly and stayed about 5 per cent above the 1910-14 level for the rest of the year. On an average, dairy feed prices were 2 per cent above the 1910-14 average for the period covered by the survey. The average price per ton for dairy feeds purchased by farmers in this study was \$33. Hay prices averaged \$10 a ton and silage \$4.32 a ton.

Wages paid by New York farmers were about 26 per cent above their average in the base period, and averaged \$42 a month for farmers in the survey.

YEARLY COSTS AND RETURNS

Costs and Returns per Cow

During the year covered by this study, it cost \$140 to keep a dairy cow. Besides the milk produced, each cow on the average produced a calf valued at \$5, and seven tons of manure worth \$7. Other returns, such as fair premiums, amounted to \$1 a cow. When the value of these other returns was deducted from the cost of keeping a cow, the net cost of producing milk was \$127 a cow.

Total cost of feed per cow was \$72. On the average, each cow required almost 1,700 pounds of concentrates, which, including home grown grains, were valued at \$27 (table 1). Home grown grains made up one-fourth of the concentrates, and were valued at the farm price. The 2.7 tons of dry forage cost \$26, and the 3.2 tons of succulents were valued at \$14. Dry forage

included, besides hay, small amounts of corn fodder and straw. Corn silage made up most of the succulent feeds.

TABLE 1. AVERAGE AMOUNTS AND COST OF FEEDS AND LABOR PER COW
117 Farms, St. Lawrence County, 1939-40

Feed	Average amount per cow	Average price	Cost per cow
Concentrates	1,693 pounds	\$32.07 a ton	\$27
Dry forage	2.7 tons	9.63 a ton	26
Succulents	3.2 tons	4.32 a ton	14
Man labor	186 hours*	0.22 an hour	42

*Does not include man labor hauling milk.

The 186 hours of direct man labor used per cow, exclusive of time spent hauling milk, at 22 cents an hour cost \$42 a cow. Besides direct labor on cows, 9 hours of man labor worth \$2 were used hauling milk. Other costs, including bedding, milk hauling, use of buildings and equipment, bull service and other items amounted to \$25 a cow.

On an average, the value of milk produced per cow was \$109, including \$102 for milk sold and \$7 for milk used at home. The net cost of milk produced was \$127 a cow, or \$18 more than the value of the milk.

Since the charge for labor, including time spent hauling milk, was \$44 a cow, and the loss on milk produced was \$18 a cow, the return for labor was only \$26 a cow, or 13 cents an hour.

Costs and Returns per 100 Pounds of Milk Produced

The average net cost of producing 100 pounds of milk for the year was \$2.01, after credits of 20 cents, mostly for calves and manure, had been deducted (table 2). All milk was standardized to a 3.7 per cent butterfat basis to facilitate comparisons of costs between farms and seasons of the year.

TABLE 2. YEARLY COSTS AND RETURNS IN PRODUCING 100 POUNDS OF MILK*
 117 Farms, St. Lawrence County, 1939-40

Items	Amount	Cost of 100 pounds of milk produced	Per cent of net cost
COSTS			
Feed			
Concentrates	27 pounds	\$.42	21
Dry forage	85 pounds	.41	20
Succulents	101 pounds	.22	11
Pasture	2.5 days	.08	4
Total feed		<u>\$1.13</u>	<u>56</u>
Labor on cows	2.9 hours	.66	33
Depreciation on cows		.03	1
Interest on cows		.08	4
Milk hauling**		.11	3
Use of buildings		.06	3
Use of equipment		.02	1
Bull service		.03	2
Bedding		.03	2
Miscellaneous		.06	3
Total costs		<u>\$2.21</u>	<u>110</u>
CREDITS			
Manure		.11	5
Calves		.08	4
Miscellaneous		.01	1
Total credits		<u>\$.20</u>	<u>10</u>
NET COST PER 100 POUNDS OF MILK PRODUCED		\$2.01	100
VALUE PER 100 POUNDS OF MILK PRODUCED		\$1.71	--

*All milk was standardized to 3.7 per cent butterfat, and the value is for milk of the same test.

**Includes 0.2 hour of man labor hauling milk.

Feed costs amounted to \$1.13 and made up more than one-half of the net cost of producing milk. The 27 pounds of concentrates and the 85 pounds of dry forage fed per hundredweight of milk produced, each made up more than one-third of the feed cost. The 101 pounds of succulents were valued at 22 cents

and the 2.5 days of pasture accounted for 8 cents per 100 pounds of milk.

The 2.9 hours of direct labor on cows cost 66 cents, or one-third of the net cost. Feed and labor together accounted for almost 90 per cent of the net cost of producing milk.

Although an average loss of \$19 was taken per head for cows replaced, the cost of depreciation was only 3 cents per 100 pounds of milk, or less than 2 per cent of the net cost. Interest at 6 per cent on the value of the cows accounted for another 8 cents. Other costs, including milk hauling, use of buildings and equipment, bull service and other items amounted to 27 cents.

Of the total credits of 20 cents, manure accounted for 11 cents and calves for 8 cents.

SEASONAL COSTS AND RETURNS

During the summer while the cows were obtaining most of their feed from pasture, the net cost per 100 pounds of milk produced was \$1.16, as compared to \$2.84 for the winter season, and \$2.01 for the year (table 3).

Feed costs during the summer amounted to only 41 cents per 100 pounds of milk or about one-third of the net cost. During the winter, feed costs amounted to \$1.84, or two-thirds of the net cost. In the pasture season, only 13 pounds of grain were fed per 100 pounds of milk, as compared to 41 pounds in the barn-feeding season. The amounts of dry forage and succulents varied even more widely between the seasons. Only 3 pounds of dry forage and 20 pounds of succulents were fed per hundredweight of milk in the summer as compared to 166 pounds of dry forage and 181 pounds of succulents in the winter. Costs for these items of feed varied between seasons by about the same amount as the quantities fed. The five days of pasture required to produce 100 pounds of milk in the summer cost only 16 cents.

TABLE 3. SEASONAL COSTS AND RETURNS IN PRODUCING MILK*
117 Farms, St. Lawrence County, 1939-40

Items	Cost per 100 pounds of milk produced			
	Summer		Winter	
	Amount	Cost	Amount	Cost
COSTS				
Feed				
Concentrates	13 pounds	\$.20	41 pounds	\$.65
Dry forage	3 pounds	.01	166 pounds	.80
Succulents	20 pounds	.04	181 pounds	.39
Pasture	5 days	.16	---	---
Total feed		\$.41		\$1.84
Labor on cows	2.2 hours	.48	3.7 hours	.83
Other costs		.35		.49
Total costs		\$1.24		\$3.16
CREDITS		.08		.32
NET COST PER 100 POUNDS OF MILK PRODUCED		\$1.16		\$2.84
VALUE PER 100 POUNDS OF MILK PRODUCED		\$1.53		\$1.75

*All milk was standardized to 3.7 per cent butterfat basis.

Only 2.2 hours of man labor were used to produce 100 pounds of milk in the summer as compared to 3.7 hours for the winter season. The charge for labor of 48 cents per hundredweight in the summer was more than the cost of feed and accounted for more than two-fifths of the net cost in this season. During the winter, the cost of labor was 83 cents a hundred pounds of milk or less than one-third of the net cost.

Other costs were 35 cents during the summer and 49 cents per 100 pounds of milk produced during the winter. Credits during the summer were 8 cents. The 32 cents of credits for the winter season included 22 cents for manure produced.

Variation in the Cost of Producing Milk

The average net cost was \$2.01 a hundredweight, but there was a wide variation in costs on individual farms as shown in figure 2. Each vertical line in the graph represents one of the 117 farms, and the length of the line indicates the cost of producing 100 pounds of milk on that farm for the year 1939-40.

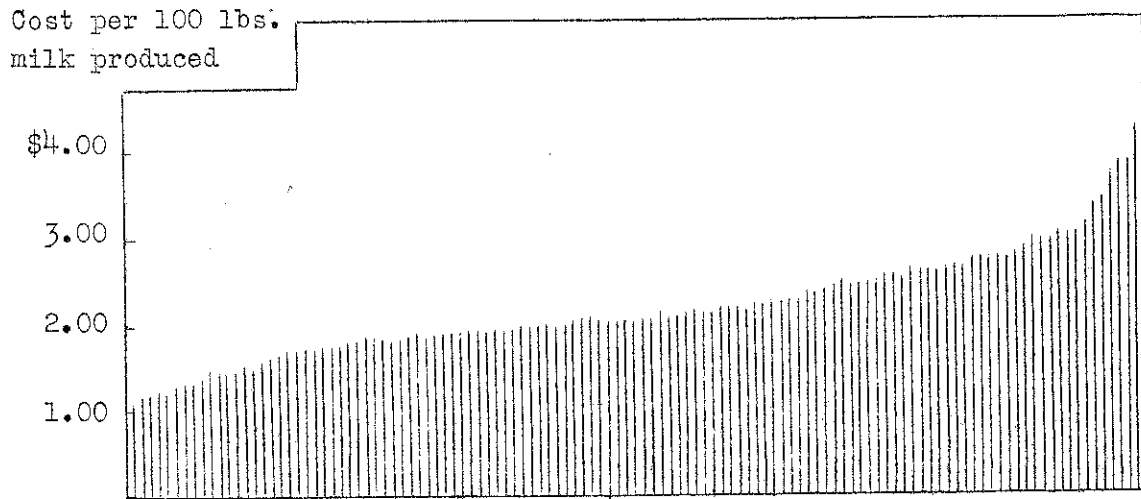


FIGURE 2. VARIATION IN THE YEARLY COST OF PRODUCING MILK
117 Farms, St. Lawrence County, 1939-40

On one-tenth of the farms, milk was produced at an average cost for the year of less than \$1.50 a hundredweight, as compared to more than \$3.00 on another one-tenth of the farms.

So far, this report has presented a cross-section picture of costs and returns in producing milk in this area in 1939-40. The rest of this report will attempt to show the main reasons why some farms produced milk at lower cost, and why some farms had higher incomes than others.

In the discussion that follows, labor income was used as the measure of returns on the individual farms. Labor income is the return that the farmer gets for his year's work, after paying all farm expenses and allowing 5 per cent interest on the money invested. During 1939-40, the average labor income of the 117 farms in this study was \$379.

There was a wide variation in labor income between farms. Sixteen farms had labor incomes of \$1,000 or more. At the same time, almost one-third of the farms lost money, in the sense that their incomes were not large enough to cover the charge of 5 per cent for the money invested and at the same time pay all farm expenses. None of these farms made any return to the operator for his year's work, after paying the farm expenses.

FACTORS AFFECTING COSTS AND RETURNS IN PRODUCING MILK

Relation of cost per 100 Pounds of Milk to Returns

Since most of the income on these farms was from the dairy enterprise, there was a close relationship between the cost of producing milk and returns. For the 25 farms with costs below \$1.80 a hundredweight, labor incomes averaged \$1,053, or about \$1,200 more than on the farms with costs of \$2.40 or more a hundredweight (table 4).

TABLE 4. RELATION OF COST OF PRODUCING 100 POUNDS OF MILK TO RETURNS
117 Farms, St. Lawrence County, 1939-40

Cost per 100 pounds milk produced	Number of farms	Average cost per 100 pounds milk produced	Labor income
Less than \$1.80	25	\$1.50	\$1,053
\$1.80 to \$2.10	36	1.94	492
\$2.10 to \$2.40	20	2.20	326
\$2.40 or more	36	2.90	- 171

Milk Produced per Cow

Relation of production per cow to various factors

The herds with the highest rates of production averaged the same size as the herds with smaller amounts of milk produced per cow (table 5). Apparently only a few hours more labor was required to care for high-producing cows than for low-producing cows. In this section of the report, man hours per cow includes time spent hauling milk.

TABLE 5. RELATION OF MILK PRODUCTION PER COW TO VARIOUS FACTORS
117 Farms, St. Lawrence County, 1939-40

Pounds of milk produced per cow	Number of farms	Pounds milk produced per cow	Per cent of milk sold October to March	Number of cows per farm	Man hours per cow*	Pounds grain fed per cow
Less than 5,000	26	4,068	34	19	207	1,077
5,000 to 6,250	34	5,554	35	19	193	1,541
6,250 to 7,500	29	6,742	36	18	214	1,859
7,500 or more	28	8,919	41	19	216	2,261

*In this and succeeding tables in this report, man hours per cow includes time spent hauling milk.

For the highest producing herds, more of the milk was produced during the winter season than for the other herds. The quantity of grain fed per cow increased regularly with the production of milk and in about the same proportion, as the quantity of grain fed per 100 pounds of milk was approximately the same for all groups.

Relation of production per cow to costs and returns

The amount of milk produced per cow was the most important of all factors affecting costs and returns. The average cost per hundredweight was \$2.74 in the group of herds with the lowest production, as compared with \$1.72 for the farms with the highest producing herds (table 6). In

other words, it cost farmers with an average production of less than 5,000 pounds per cow about \$1 more to produce 100 pounds of milk than farmers with cows producing 7,500 or more pounds of milk.

TABLE 6. RELATION OF PRODUCTION PER COW TO COSTS AND RETURNS
117 Farms, St. Lawrence County, 1939-40

Pounds of milk produced per cow	Number of farms	Cost per hundredweight of milk	Labor income
Less than 5,000	26	\$2.74	\$ -133
5,000 to 6,250	34	2.27	176
6,250 to 7,500	29	2.04	379
7,500 or more	28	1.72	1,104

On farms with less than 5,000 pounds of milk produced per cow, there was no return to the operator for his year's work. The labor income averaged \$1,104 for the group of farms with the highest producing herds.

Relation of size of cow to production per cow and other factors

The size of cows was studied in relation to the amount of milk produced per cow. Weights of all cows in the barns at milking time were estimated by use of a tape measure that had on it the cow weight scale developed for this purpose by the United States Department of Agriculture.

There was a striking relationship between the size of cow and production per cow. As the size increased, production increased proportionately more (table 7). For herds with cows averaging less than 850 pounds, only 4,832 pounds of milk were produced per cow, as contrasted to 8,741 pounds per cow for herds with cows averaging 1,050 pounds or more. The average size of all cows measured was 947 pounds, with a production of 6,324 pounds of milk per cow.

TABLE 7. RELATION OF SIZE OF COW TO PRODUCTION PER COW AND OTHER FACTORS*
117 Farms, St. Lawrence County, 1939-40

Size of cow (pounds)	Number of farms	Average size of cow (pounds)	Pounds milk produced per cow	Average age of cows	Cost per hundred- weight milk produced	Labor income
Less than 850	18	816	4,832	5.7	\$2.52	\$ 42
850 to 950	39	899	5,708	5.5	2.29	88
950 to 1,050	43	987	6,717	5.6	2.05	521
1,050 or more	15	1,115	8,741	5.3	1.83	1,184

*All milk was standardized to 3.7 per cent butterfat.

The large cows were slightly younger, on the average, than the smaller cows. This may be accounted for by the fact that other areas of the state obtain some of their replacements from this region, and may tend to select the larger and better-producing cows, which usually, due to the relationship of age and size, would be the older, mature cows.

Not only was more milk produced by large-sized cows, but it was produced more efficiently than by smaller cows. This was indicated by the cost of producing milk. On farms with the smallest cows, the cost of producing 100 pounds of milk averaged \$2.52 as compared to \$1.83 per hundred-weight on farms with the largest cows. Labor incomes increased rapidly as size and production per cow increased.

Relation of seasonal milk production to various factors.

The season of milk production also had a marked relationship to the amount of milk produced per cow. As the proportion of the milk sold during the six winter months from October to March increased from less than one-third of total milk sales to 40 per cent or more, milk production per cow increased from 5,340 pounds to almost 7,600 pounds (table 8).

TABLE 8. RELATION OF SEASON OF MILK PRODUCTION TO VARIOUS FACTORS*
117 Farms, St. Lawrence County, 1939-40

Per cent milk sold October to March	Number of farms	Per cent milk sold October to March	Pounds milk produced per cow	Number of cows	Man hours per cow	Pounds of grain per cow
Less than 33	35	29	5,340	17	215	1,386
33 to 40	51	36	6,230	21	191	1,645
40 or more	31	45	7,588	18	223	2,103

*All milk was standardized to 3.7 per cent butterfat.

More of the cows in the group that produced the most winter milk freshened in the fall. Turning these fall-freshening herds on pasture in the spring causes a second flush in their milk flow. Furthermore, the fall-freshening herds were fed more than a ton of grain per cow, while the cows in herds producing the least winter milk were fed only 1,386 pounds of concentrates. However, even though more grain was fed per cow in the fall-freshening herds, the production per cow was enough higher in this group so that about the same quantity of grain was fed per 100 pounds of milk produced than for the farms selling a smaller proportion of winter milk. Although slightly more labor was used per cow on the winter-producing herds as on the summer-producing herds, the increase in labor was much less than proportional to the increased production of milk per cow.

Relation of season of milk production to costs and returns

Due to the relationship of the season of milk production to the amount of milk produced per cow, costs on farms with a high proportion of winter milk averaged only \$2.00 a hundredweight, while costs on farms that sold less than one-third of their milk during this period averaged \$2.39 (table 9). Labor incomes increased as the proportion of winter milk increased and costs per hundredweight decreased.

TABLE 9. RELATION OF SEASON OF MILK PRODUCTION TO COSTS AND RETURNS*
117 Farms, St. Lawrence County, 1939-40

Per cent milk sold October to March	Number of farms	Cost per hundredweight of milk produced	Labor income
Less than 33	35	\$2.39	\$146
33 to 40	51	2.15	307
40 or more	31	2.00	763

*All milk was standardized to 3.7 per cent butterfat.

Crop Yields

Relation of yield of hay to various factors

Since farmers in this area usually produce all of the hay fed on their farms, the yield and quality of hay produced are of considerable importance. The number of cows per farm was the same for the groups with different hay yields (table 10). However, cows on farms with high hay yields were fed more grain and produced more milk than cows on farms with low hay yields.

TABLE 10. RELATION OF YIELD OF HAY TO VARIOUS FACTORS
117 Farms, St. Lawrence County, 1939-40

Yield of hay per acre	Number of farms	Number of cows	Pounds of milk per cow	Pounds of grain per cow	Size of cows (pounds)
Less than 1.2	34	19	5,206	1,438	839
1.2 to 1.8	48	19	6,398	1,760	951
1.8 or more	35	19	7,307	1,834	992

Size of cow also tended to increase as hay yields increased, and probably partly explains why the rate of milk production was higher on farms with high hay yields.

Relation of yield of hay to costs and returns

As hay yields increased from an average of 1 ton per acre to 2 tons per acre, the cost of producing milk declined from \$2.56 to \$1.94 a hundredweight. Labor incomes increased from \$-44 to \$876 as the yield of hay was doubled (table 11).

TABLE 11. RELATION OF YIELD OF HAY TO COSTS AND RETURNS
117 Farms, St. Lawrence County, 1939-40

Yield of hay per acre	Number of farms	Average tons hay per acre	Cost per hundredweight milk produced	Labor income
Less than 1.2	34	1.0	\$2.56	\$-44
1.2 to 1.8	48	1.4	2.09	427
1.8 or more	35	2.0	1.94	876

Part of the increased efficiency in milk production that appeared as hay yields increased was due to higher rates of production per cow. It seems evident, however, that good hay yields contributed to a larger farm income.

Relation of yield of silage to various factors

Herds on farms that produced corn for silage had higher rates of milk production, on the average, than on farms without silage (table 12). More of the milk was produced during the winter season on farms with silage than for the other group of farms.

The cows on farms without silage were smaller than the cows on farms producing silage. Almost 50 per cent more grain was fed per cow on farms with high silage yields than on farms with no silage. There was, however, less difference in production per cow between the farms without silage and those with high yields of silage than between farms with low and high yields of hay.

TABLE 12. RELATION OF YIELD OF SILAGE TO VARIOUS FACTORS
117 Farms, St. Lawrence County, 1939-40

Yield of silage per acre	Number of farms	Number of cows	Pounds of milk per cow	Per cent milk sold Oct.-Mar.	Pounds of grain per cow	Size of cows (pounds)
No silage grown	40	15	5,723	33	1,412	863
Less than 11 tons	48	21	6,459	37	1,719	963
11 tons or more	29	20	6,929	32	2,021	970

Relation of yield of silage to costs and returns

Silage yields did not appear to be as closely related to milk production costs as were hay yields (table 13). On farms without silage, costs averaged \$2.31 as compared to \$2.10 on farms with high yields of silage. Labor incomes on farms growing silage averaged about \$500, while on the 40 farms without silage, the average was \$168.

TABLE 13. RELATION OF YIELD OF SILAGE TO COSTS AND RETURNS
117 Farms, St. Lawrence County, 1939-40

Yield of silage per acre	Number of farms	Average tons silage per acre	Cost per cwt. milk produced	Labor income
No silage grown	40	...	\$2.31	\$168
Less than 11 tons	48	8	2.14	466
11 tons or more	29	13	2.10	538

Although the production of corn silage appeared to be relatively less important than some other factors in efficiency in milk production in this area in 1939-40, silage production was probably more important in certain other dairy regions of the state that were more severely affected by the drought of 1939. In general, silage yields were much less affected by drought conditions than were hay yields. As a result silage production was good insurance for a supply of home-grown roughage feeds.

Number of Cows per Farm

Relation of number of cows per farm to labor efficiency and costs and returns

In a dairy region, the number of cows per farm is a useful measure of size of business. The most favorable returns are obtained on a large as compared to a small dairy farm when the price of milk is high, relative to costs, because then even a small profit per cow or per 100 pounds of milk is multiplied many more times than for a small farm. As previously noted, the year covered by the survey was moderately favorable insofar as the relationship of costs and milk prices was concerned. As a result, incomes on farms with large herds were considerably higher than incomes on farms with small herds (table 14).

TABLE 14. RELATION OF NUMBER OF COWS PER FARM TO LABOR EFFICIENCY AND COSTS AND RETURNS
117 Farms, St. Lawrence County, 1939-40

Number of cows per farm	Number of farms	Number of cows	Man hours per cow	Pounds milk produced per cow	Cost per hundredweight of milk	Labor income
Fewer than 12	25	9	249	6,048	\$2.48	\$118
12 to 17	27	14	220	6,591	2.22	337
17 to 21	32	19	208	6,311	2.12	335
21 or more	33	29	163	6,325	2.00	656

In this area, large herds made possible much more efficient use of labor than small herds. On the average, only 163 hours were used per cow in herds of 21 or more cows, as compared to 249 hours per cow in herds of fewer than 12 cows. Almost twice as many cows were cared for per man on the farms with large herds than on farms with small herds. Production per cow was lowest in the small herds and about the same for the other groups.

Costs per 100 pounds of milk produced averaged \$2.48 for the smallest herds, and declined regularly as size of herd increased to \$2.00 per hundred-weight for the largest herds. This decline in cost as size of herd increased was the result largely of the saving in labor.

Relation of number of cows per farm to capital efficiency

Another advantage of large herds is the result of more efficient use of the money invested. More than \$600 was invested per cow on the farms with small herds (table 16). This was \$120 more than the investment per cow on the farms with large herds. Since the cow enterprise furnished most of the income on these farms, the proportion of the total farm capital invested in this major income-producing enterprise was a useful measure of capital efficiency. For the herds with fewer than 12 cows, only 13 per cent of the money was invested in cows, as compared to 18 per cent for the large herds.

TABLE 16. RELATION OF NUMBER OF COWS PER FARM TO CAPITAL EFFICIENCY
117 Farms, St. Lawrence County, 1939-40

Number of cows per farm	Number of farms	Number of cows	Value per cow	Total capital per cow	Per cent of total farm capital invested in cows
Fewer than 12	25	9	\$79	\$601	13
12 to 17	27	14	94	550	17
17 to 21	32	19	77	454	17
21 or more	33	29	86	481	18

The smaller investment per income-producing unit on the large farms results in more dollars of income for each dollar invested in the farm business.

Other advantages of a large-sized dairy farm business include:

1. A lower cost per hundredweight for hauling larger loads of milk.
2. Some saving in cost of building use per cow since the cost of a barn per cow tends to decrease as the number of cows increases.
3. Lower cost of bull service per cow, because it costs as much to feed and house a bull for a small herd as for a large herd.
4. The possibility of taking advantage of quantity discounts on purchases of feeds may be greater for owners of large herds than for owners of small herds.

Although the advantage of large herds may be small in some of these items, in some cases the aggregate effect may be a real economy to the farm business.

Use of Labor

Relation of man hours per cow to various factors

Efficient use of labor is one of the most important problems in farm organization. The number of hours required to care for a cow a year is one measure of labor efficiency.

There was a striking inverse relationship between the number of man hours per cow and the number of cows per farm (table 17). The group of farms most efficient in use of labor had herds that averaged almost twice as large as the least efficient group. Season of milk production was about the same for the different groups, and so did not seem to explain why more labor was spent per cow on some farms than on others. Milk production per cow was highest for the group of farms with the most labor per cow.

TABLE 17. RELATION OF MAN HOURS PER COW TO COSTS AND RETURNS
117 Farms, St. Lawrence County, 1939-40

Man hours per cow	Number of farms	Number of cows	Pounds milk produced per cow	Per cent milk sold Oct.-Mar.	Cost per hundred- weight milk	Labor income
Less than 160	28	24	6,104	35	\$1.94	\$624
160 to 200	28	21	6,226	38	2.02	606
200 to 240	30	18	6,152	35	2.35	129
240 or more	31	14	6,776	37	2.39	197

With less than 160 man hours per cow, the average cost was \$1.94 a hundredweight of milk, as compared to \$2.39 for the farms with 240 or more hours per cow. The labor incomes for the most efficient farms averaged more than \$400 higher than for the least efficient group of farms.

Relation of cows per man to various factors

Labor efficiency, as measured by cows per man, varied widely between individual farms. On the 21 farms with fewer than 8 cows kept per man, the average size of herd was 11 cows (table 18). For the 20 farms with 14 or more cows per man, the size of herd averaged 26 cows. Production per cow was lowest for the group with 14 or more cows per man, though there appeared to be no consistent relationship between labor efficiency and the amount of milk produced per cow. About the same proportion of the milk was sold in the winter season in all groups. Man hours per cow decreased rapidly as the number of cows kept per man increased.

TABLE 18. RELATION OF NUMBER OF COWS PER MAN TO VARIOUS FACTORS
117 Farms, St. Lawrence County, 1939-40

Number of cows per man	Number of farms	Average cows per man	Number of cows per farm	Pounds of milk produced per cow	Per cent milk sold Oct.-Mar.	Man hours per cow
Fewer than 8	21	6	11	6,360	35	251
8 to 11	47	9	16	6,313	37	231
11 to 13	29	12	24	6,523	36	183
14 or more	20	16	26	6,022	36	138

Relation of cows per man to costs and returns

The average cost of producing 100 pounds of milk on farms with fewer than 8 cows per man was \$2.40 (table 19). The cost per hundredweight decreased as labor efficiency increased, and the average cost for the group with 14 or more cows per man was \$1.92. Labor income for the most efficient group averaged \$779, as compared to \$224 for the group with fewer than 8 cows per man.

TABLE 19. RELATION OF NUMBER OF COWS PER MAN TO COSTS AND RETURNS
117 Farms, St. Lawrence County, 1939-40

Number of cows per man	Number of farms	Cost per hundredweight of milk	Per cent of work units on cows	Labor income
Fewer than 8	21	\$2.40	59	\$224
8 to 11	47	2.30	64	209
11 to 13	29	2.03	65	592
14 or more	20	1.92	70	779

The average labor income of \$224 for the group with fewer than 8 cows was higher than for the group with 8 to 11 cows per man. This may be accounted for by the fact that only 59 per cent of the work units in the lowest group were on cows, as compared to about two-thirds in the second group. This probably indicates that more work was done off the farm, and that the other work paid a higher return for labor than time spent on the cows.

Combined Effect of Important Factors

The four most important factors that were found to be related to costs and returns in producing milk in this area were production per cow, crop yields, size of business, and use of labor. It has been shown that it paid to be above average in each of these factors. It paid even better to be above average in more than one factor.

For the 19 farms that were below average in all four factors, the cost of producing 100 pounds of milk averaged \$2.81 and the average labor income was \$-220 (table 20). Costs on the 30 farms that were average or above in one factor were \$2.20 and labor incomes for this group averaged only \$124. The average cost of production for the 12 farms above average in all four factors was \$1.61, and the labor income was \$1,567.

TABLE 20.

COMBINED EFFECT OF IMPORTANT FACTORS*
117 Farms, St. Lawrence County, 1939-40

Number of factors	Number of farms	Cost per hundred* weight milk produced	Average labor income
Below average in all 4 factors	19	\$2.81	\$-220
Average or above in 1 factor	30	2.20	124*
Average or above in 2 factors	35	2.11	425
Average or above in 3 factors	21	2.04	537
Average or above in all 4 factors	12	1.61	1,567

*The four factors are: Size of business, use of labor, rate of milk production, and crop yields.

Twelve farms, or about one-tenth of those in the survey, were average or better in all four factors. The averages for these farms were not spectacular, but were well above the averages for all farms (table 21). The size of business of the 12 farms, as measured by number of cows per farm, was about 50 per cent above average. The amount of work accomplished per man,

measured by cows per man, was about one-third greater than the average for all farms. The amount of milk produced per cow averaged 8,258 pounds on the 12 farms, or about one-third higher than for the 117 farms.

TABLE 21. COMPARISON OF GOOD FARMS WITH THE AVERAGE
117 Farms, St. Lawrence County, 1939-40

Factor	Average	
	12 farms arranged as above in 4 factors	117 farms
<u>Size of Business</u>		
Number of cows per farm	28	19
<u>Use of Labor</u>		
Number of cows per man	13	10
Man hours per cow	158*	207*
<u>Rates of Production</u>		
Pounds milk produced per cow	8,258	6,324
Crop yields in per cent of average	116	100
<u>Other Factors</u>		
Per cent milk sold Oct.-Mar.	40	36
Pounds grain fed per cow	2,300	1,693
Size of cow (pounds)	1,031	947
<u>Costs and Returns</u>		
Cost per cwt. of milk produced	\$1.61	\$2.01
Labor income	\$1,567	\$379

*Includes man labor hauling milk. Calculated by averaging man hours per cow on the different farms.

Crop yields on the above-average farms were one-sixth higher than on all farms. About 500 pounds, or 30 per cent more grain was fed per cow, and the cows averaged about 80 pounds larger than for all farms.

The cost of producing 100 pounds of milk was \$1.61, or 20 per cent below the all-farm average. Labor incomes for the 12 farms average or better in all four factors averaged \$1,567, as compared to \$379 for the 117 farms.

AVERAGES OF IMPORTANT FACTORS
117 Farms, St. Lawrence County, 1939-40

Items	Your farm	Average all farms
<u>Size of Business</u>		
Cows per farm	_____	19
<u>Use of Labor</u>		
Cows per man	_____	10
Man hours per cow	_____	207
<u>Rates of Production</u>		
Pounds milk produced per cow*	_____	6,324
Crop yields in per cent of average	_____	100
<u>Other Factors</u>		
Per cent milk sold October to March	_____	36
Pounds of grain fed per cow	_____	1,693
Size of cow (pounds)	_____	947
<u>Costs and Returns</u>		
Cost per cwt. milk produced*	_____	\$2.01
Labor income	_____	\$379

*All milk standardized to 3.7 per cent butterfat basis.

VARIATION IN IMPORTANT FACTORS
 117 Farms, St. Lawrence County, 1939-40

SIZE OF BUSINESS		USE OF LABOR		RATES OF PRODUCTION		OTHER FACTORS			COSTS AND RETURNS	
Number of cows	Cows per man	Man hours per cow	Pounds milk per cow	Crop yields in % of average	% Milk sold Oct.-March	Pounds grain fed per cow	Size of cows (lbs.)	Cost per cwt. milk produced	Labor income	
36	18	112	10,102	150	50	3,300	1,136	\$1.31	\$1,949	
27	14	141	8,358	127	44	2,200	1,041	1.63	968	
22	12	163	7,412	119	40	2,100	1,002	1.83	671	
20	11	182	6,738	110	38	1,936	973	1.91	566	
19	10	196	6,388	103	36	1,825	956	2.02	420	
17	10	212	5,907	96	35	1,600	938	2.13	220	
15	9	227	5,472	88	33	1,375	906	2.30	76	
12	8	242	5,071	80	32	1,109	873	2.55	- 92	
10	7	275	4,476	73	29	925	846	2.81	- 211	
8	6	326	3,389	58	26	527	801	3.45	- 754	

There are ten numbers in each column. The number at the top is the average of the highest one-tenth of the farms for that factor. The columns are independent of each other. The line across the middle separates the upper one-half from the lower one-half of the farms for each factor. The red lines show how your farm compares with the others.