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CAYUGA COUNTY
COST OF MILK PRODUCTION
SURVEY

1939-40

Prepared by
Ivan R. Bierly

New York State College of Agriculture
Department of Agricultural Economics
and Farm Management, Cooperating with
the Cayuga County Farm Bureau

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Cayuga County
 Cost of Milk Production Survey
 1939-40

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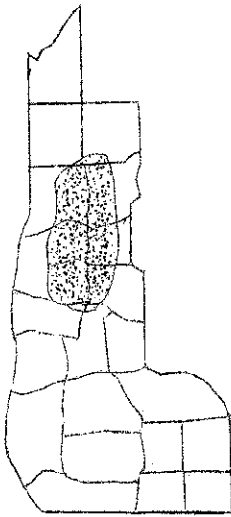
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Mr. C. L. Messer, County Agricultural Agent, helped to plan the survey. C. G. Borglum, E. A. Eklund, Richard Hildreth, R. G. Latimer, and R. J. Peacock of the Department of Agricultural Economics assisted in taking the records.

PRELIMINARY REPORT
CAYUGA COUNTY
COST OF MILK PRODUCTION SURVEY
1939-40

A farm management survey of 105 farms was made in the area between Auburn and Cato in Cayuga 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 Cayuga County Farm Bureau. The information was obtained by personal visits to the farms.

The area included in this survey is part of the general crop-farming section of west-central New York. Many of the farms in this area were formerly hay and grain farms that are gradually expanding the dairy enterprise. As a result, dairy herds in this area are on the average relatively small as compared to several other sections in the State. About three-fifths of the income on the farms in the survey was from the dairy enterprise, and one-fourth from crops, eggs and poultry. Thirteen of the farms in the survey had grade A milk markets, 21 shipped to plants in Syracuse, and the remainder had grade B markets.



 Area surveyed

CAYUGA COUNTY

The land in Cayuga County has been classified as to the intensity of use to which it is adapted. The soils, topography, elevation, crops grown, and size and condition of the farm buildings are important factors in this economic classification of the land. The areas of land classes I and II are, in general, better suited to forestry and recreational uses than to farming. The areas of land classes III, IV, and V probably will remain permanently in agriculture. The higher the number of the land class, the higher the proportion of good soils and the greater the intensity of land use. Of the 105 farms in the survey, none were located in land classes I or II, 63 were in land class III, and 42 were in land class IV.

Pastures in this area were substantially below normal during the early part of the summer, and due to the severe drought declined continually during the season, until the latter part of August when there was some improvement in conditions. For the state, pasture conditions in 1939 were 13 per cent below the average of the preceding 10 years, and were lower than for any other year 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 an area where cash crops and poultry were commonly combined with the dairy enterprise. 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.

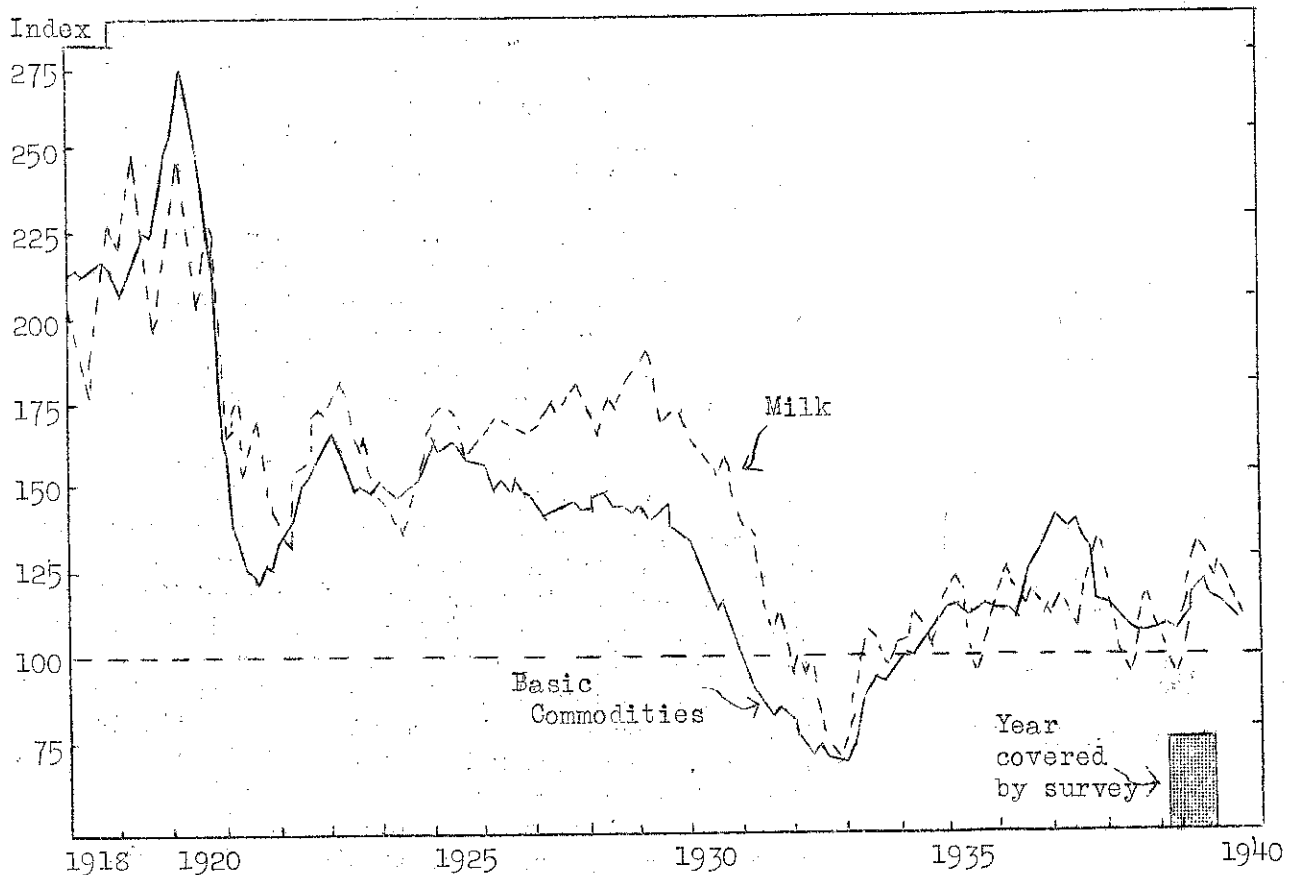


FIGURE 1. FARM PRICE OF MILK IN NEW YORK AND WHOLESALE PRICES OF BASIC COMMODITIES IN THE UNITED STATES (1910-14 = 100).

The net pool price of 3.7 per cent grade B milk for the New York City market 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 received for 3.7 milk sold, including grade A premiums, was \$1.98. Average prices paid to New York farmers for all farm products were only six per cent above the level in 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 \$11 a ton and succulents \$4 a ton.

Wages paid by New York farmers were about 26 per cent above their average in the base period, and averaged \$43 a month for the farmers in the survey.

YEARLY COSTS AND RETURNS

Costs and Returns per Cow

During the year covered by this study, it cost \$166 to keep a dairy cow. Besides the milk produced, each cow on the average produced a calf valued at \$6, and seven tons of manure worth \$11. When the value of these other items was deducted from the cost of keeping a cow, the net cost of producing milk was \$149 a cow.

Total cost of feed per cow was \$81. On the average, each cow required one ton of concentrates, which, including home-grown grains, were valued at \$28 (table 1). The value of the 2.1 tons of dry forage was \$23 and the 6.2 tons of succulents were valued at \$25. Dry forage included, besides hay, small amounts of corn fodder and other feeds. Corn silage made up most of the succulent feeds. The 158 days on pasture, between May 15 and October 20, cost 3 cents a day or \$5 a cow for the season.

TABLE 1. AVERAGE AMOUNTS AND COST OF FEEDS AND LABOR PER COW
105 Farms, Cayuga County, 1939-40

Feed	Average amount per cow	Average price	Cost per cow
Concentrates	2,001 pounds	\$28 a ton	\$28
Dry forage	2.1 tons	11 a ton	23
Succulents	6.2 tons	4 a ton	25
Pasture	158 days	.03 a day	5
Man labor	200 hours*	.23 an hour	46

*Does not include man labor hauling milk.

The 200 hours of direct man labor used per cow, exclusive of time spent hauling milk, at 23 cents an hour cost \$46 a cow. Besides direct labor on cows, 8 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 \$39 a cow.

On an average, the value of milk produced per cow was \$135, including \$124 for milk sold and \$11 for milk used at home. The net cost of milk produced was \$149 a cow, or \$14 more than the value of the milk.

Since the charge for labor, including time spent hauling milk, was \$48 a cow, and the loss on milk produced was \$14 a cow, the return for labor was only \$34 a cow, or 16 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 \$2.17, after credits of 24 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*
105 Farms, Cayuga County, 1939-40

Items	Amount	Cost and value of 100 pounds of milk produced	Per cent of total
COSTS			
Feed			
Concentrates	29 pounds	\$.40	17
Dry forage	61 pounds	.33	14
Succulents	181 pounds	.37	15
Pasture	2.3 days	.07	3
Total feed		\$1.17	49
Labor on cows	2.9 hours	.67	28
Depreciation on cows		.07	3
Interest on cows		.07	3
Milk hauling [†]		.14	6
Use of buildings		.07	3
Use of equipment		.04	2
Bull service		.04	1
Bedding		.04	1
Miscellaneous		.10	4
Total costs		\$2.41	100
CREDITS			
Manure		\$.15	63
Calves		.09	37
Miscellaneous		#	--
Total credits		\$.24	100
NET COST PER 100 POUNDS OF MILK PRODUCED		\$2.17	--
VALUE PER 100 POUNDS OF MILK PRODUCED		\$1.96	--

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

[†]Includes 0.1 hour of man labor hauling milk. # Less than \$.005.

Feed costs amounted to \$1.17 and made up almost one-half of the cost of producing milk. The 29 pounds of concentrates, 61 pounds of dry forage, and 181 pounds of succulents fed per hundredweight of milk produced, each made up about one-third of the feed cost. The 2.3 days of pasture cost 7 cents per 100 pounds of milk.

The 2.9 hours of direct labor on cows cost 67 cents, or more than one-fourth of the total cost. Feed and labor together accounted for almost four-fifths of the total cost of producing milk.

Although an average loss of \$20 was taken per head for cows replaced, the cost of depreciation was only 7 cents per 100 pounds of milk, or 3 per cent of the total cost. Interest at 6 per cent on the value of the cows accounted for another 7 cents. Other costs, including milk hauling, use of buildings and equipment, bull service and other items amounted to 43 cents.

Of the total credits of 24 cents, manure accounted for 15 cents and calves for 9 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 \$1.63, as compared to \$2.53 for the winter season, and \$2.17 for the year (table 3). Production per cow per day averaged 18 pounds for the pasture season, and 20 pounds for the barn-feeding season.

TABLE 3. SEASONAL COSTS AND RETURNS IN PRODUCING MILK*
105 Farms, Cayuga County, 1939-40

Items	Cost and value of 100 pounds of milk produced			
	Summer		Winter	
	Amount	Cost	Amount	Cost
COSTS				
Feed				
Concentrates	13 pounds	\$.18	40 pounds	\$.55
Dry forage	11 pounds	.06	94 pounds	.52
Succulents	81 pounds	.16	248 pounds	.50
Pasture	6 days	.18	—	—
Total feed		\$.58		\$1.57
Labor on cows/	2.4 hours	.55	3.2 hours	.74
Other costs		.59		.56
Total costs		\$1.72		\$2.87
CREDITS		.09		.34
NET COST PER 100 POUNDS OF MILK PRODUCED		\$1.63		\$2.53
VALUE PER 100 POUNDS OF MILK PRODUCED		\$1.73		\$2.11

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

/Does not include man labor hauling milk.

Feed, labor, and other costs each make up about one-third of the total cost during the summer. During the winter, feed costs alone amounted to \$1.57, or more than one-half of the total cost. In the pasture season only 13 pounds of grain were fed per 100 pounds of milk, as compared to 40 pounds in the barn-feeding season. The amounts of dry forage and succulents varied even more widely between the seasons. Only 11 pounds of dry forage and 81 pounds of succulents were fed per hundredweight of milk in the summer as compared to 94 pounds of dry forage and 248 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 six days of pasture required to produce 100 pounds of milk in the summer cost only 18 cents.

Only 2.4 hours of man labor were used to produce 100 pounds of milk in the summer as compared to 3.2 hours for the winter season. The charge for labor of 55 cents a hundredweight in the summer accounted for almost one-third of the total cost in this season. During the winter, the cost of labor was 74 cents a hundred pounds of milk, but only about one-fourth of the total cost.

Other costs were 59 cents during the summer and 56 cents per 100 pounds of milk produced during the winter. Credits during the summer, mostly for calves were 9 cents. The 34 cents of credits for the winter season included 25 cents for manure produced.

Variation in the Cost of Producing Milk

The average net cost was \$2.17 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 105 farms, and the length of the line indicates the cost of producing 100 pounds of milk on that farm for the year 1939-40.

On one-tenth of the farms, milk was produced at an average cost for the year of \$1.56 a hundredweight, as compared to \$3.48 on another one-tenth of the farms.

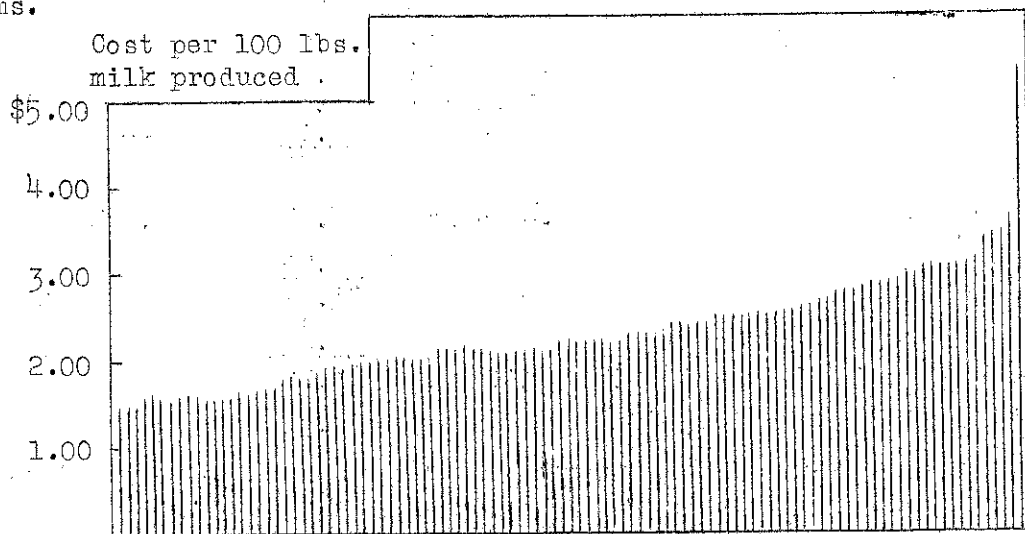


FIGURE 2. VARIATION IN THE YEARLY COST OF PRODUCING 100 POUNDS OF MILK
 Each line represents a farm, and the length of the line indicates the cost of producing milk on that farm in 1939-40.

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, two measures of returns were used. Returns per hour of labor on cows is a measure of what the cows paid for the time spent on them during the year. The average was 16 cents an hour. Labor income is a measure of the return that the whole farm made to the operator for his year's work, after paying all farm expenses and allowing 5 per cent interest on the money invested. The average labor income was \$468.

There was a wide variation in both measures of returns between farms. On one-fifth of the farms, the cows paid all other expenses and made a return of 30 cents an hour for time spent on them, while on another one-fifth of the farms no return was made to labor, and in some cases returns did not cover all other expenses. One-fourth of the farms had labor incomes of \$1,000 or more. At the same time, almost one-fourth 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.

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 \$1.90 a hundredweight, returns per hour of labor on cows averaged \$.37 and labor incomes \$1,019, as compared to a loss of 6 cents an hour or \$223 a farm for the group with highest costs per hundredweight (table 4). Because of this close relationship between the cost of producing milk and incomes, the factors that are related to and affect milk production costs are important to dairy farmers.

TABLE 4. RELATION OF COST OF PRODUCING 100 POUNDS OF MILK TO RETURNS
105 Farms, Cayuga County, 1939-40

Cost per 100 pounds milk produced	Number of farms	Average cost per 100 pounds of milk produced	Returns per hour of labor on cows	Labor income
Less than \$1.90	25	\$1.66	\$.37	\$1,019
\$1.90 to \$2.30	36	2.08	.19	662
\$2.30 to \$2.70	21	2.48	.09	233
\$2.70 or more	23	3.15	-.06	- 223

Pounds of Milk Produced per Cow

Relation of Production per Cow to Various Factors

There were more cows in the herds with the lowest rates of production than in the higher-producing herds (table 5). Apparently somewhat 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
105 Farms, Cayuga County, 1939-40

Founds of milk produced per cow	Number of farms	Pounds milk produced per cow	Number of cows per farm	Man hours per cow*	Per cent of milk sold October to March	Pounds grain fed per cow
Less than 6,000	28	5,066	16	184	45	1,514
6,000 to 7,000	29	6,481	13	242	47	1,900
7,000 to 8,000	21	7,318	15	219	53	2,067
8,000 or more	27	9,183	13	232	53	2,537

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

For the two highest producing groups of herds, more of the milk was produced during the winter season than for the other herds. As compared to the low-producing group, about 1,000 pounds more grain was fed per cow to the cows that produced the most milk, but about 4,000 pounds more milk was produced per cow.

The average amount of milk produced per cow on all farms was 6,966 pounds.

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 \$2.61 in the group of herds with the lowest production, as compared with \$1.94 for the farms with the highest producing herds (table 6). In other words, it cost farmers with an average production of less than 6,000 pounds per cow almost 70 cents more to produce 100 pounds of milk than farmers with cows producing 8,000 or more pounds of milk.

TABLE 6. RELATION OF PRODUCTION PER COW TO COSTS AND RETURNS
105 Farms, Cayuga County, 1939-40

Pounds of milk produced per cow	Number of farms	Cost per hundredweight of milk	Returns per hour of labor on cows	Labor income
Less than 6,000	28	\$2.61	\$.05	\$ 131
6,000 to 7,000	29	2.37	.13	188
7,000 to 8,000	21	2.24	.16	503
8,000 or more	27	1.94	.29	1,089

On farms with less than 6,000 pounds of milk produced per cow, only \$131 was returned to the operator for his year's work, and returns per hour of labor on cows averaged only 5 cents. Labor incomes averaged \$1,089 for the group of farms with the highest producing herds, and the herds in this group returned 29 cents an hour for time spent on them. In other words, the cows returned 24 cents more an hour for labor, and the farm operator received about \$960 more for his year's work on farms with herds producing 8,000 pounds or more of milk than on farms with herds producing less than 6,000 pounds per cow.

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 weighing on the average less than 850 pounds, only 5,766 pounds of milk were produced per cow, as contrasted to 8,070 pounds per cow for herds with an average weight of 1,050 pounds or more. Herds with the larger cows averaged the same age as those with the smaller cows. The average size of all cows measured was 965 pounds, with a production of 6,966 pounds of milk per cow.

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

Size of cow (pounds)	Number of farms	Average size of cow (pounds)	Pounds milk produced per cow	Per cent milk sold October to March	Cost per hundred-weight milk produced	Returns per hour of labor on cows
Less than 850	12	814	5,766	44	\$2.44	\$.11
850 to 950	35	897	6,353	48	2.44	.12
950 to 1,050	32	995	7,255	52	2.25	.16
1,050 or more	25	1,094	8,070	50	2.07	.23

*All milk was standardized to 3.7 per cent butterfat.

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 the two groups of farms with the smallest cows, the cost of producing 100 pounds of milk averaged \$2.44 as compared to \$2.07 per hundredweight on farms with the largest cows. Returns per hour of labor on cows increased as size and production per cow increased.

Relation of Season of Milk Production to Various Factors

The area included in this survey is located in west-central New York. For the 105 farms in the survey, 49 per cent of the milk was sold during the six winter months from October to March. The drought during the pasture season of 1939 may have reduced the milk flow enough during this season to have increased to some extent the proportion of winter milk on these farms for the year covered by the survey. A wide variation occurred, however, in the season of production on different farms.

The amount of milk produced per cow increased as the proportion of milk sold during the winter season increased (table 8). Herds that produced 55 per cent or more of their milk during the period from October to March had an average production of about 8,200 pounds per cow, while herds producing less than 45 per cent of their milk during these months averaged about 6,000 pounds per cow. The amount of grain fed per cow also increased as the proportion of winter milk increased.

TABLE 8. RELATION OF SEASON OF MILK PRODUCTION TO VARIOUS FACTORS*
105 Farms, Cayuga 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	Average size of cow (pounds)	Man hours per cow	Pounds of grain per cow
Less than 45	30	40	5,965	937	215	1,643
45 to 55	47	49	6,861	962	218	1,938
55 or more	28	59	8,214	999	227	2,464

*All milk was standardized to 3.7 per cent butterfat.

The cows tended to be somewhat heavier in the herds with the larger proportion of winter milk. The amount of time spent per cow tended to increase as more winter milk was produced.

Relation of Season of Milk Production
to Costs and Returns

Primarily as a result of the higher rates of milk production, the cost of producing milk decreased as more milk was produced during the six winter months (table 9). Returns per hour of labor and labor incomes both increased rapidly as the proportion of winter milk increased.

TABLE 9. RELATION OF SEASON OF MILK PRODUCTION TO COSTS AND RETURNS*
105 Farms, Cayuga County, 1939-40

Per cent milk sold October to March	Number of farms	Number of cows per farm	Cost per hundred- weight of milk produced	Returns per hour of labor on cows	Labor income
Less than 45	30	15	\$2.55	\$.06	\$ 28
45 to 55	47	14	2.24	.17	469
55 or more	28	14	2.12	.23	935

*All milk was standardized to 3.7 per cent butterfat.

Number of Cows per Farm

Relation of Number of Cows per Farm to Labor Efficiency
and Costs and Returns

In a region in which the cows are an important enterprise, 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, costs per hundredweight were lower and labor incomes higher on farms with large herds than on farms with small herds (table 10). Returns per hour of labor on cows also increased as the number of cows per farm increased. Somewhat more of the work on the farms with small dairies was on other enterprises than for the farms with large dairies.

TABLE 10. RELATION OF NUMBER OF COWS PER FARM TO LABOR EFFICIENCY
AND COSTS AND RETURNS
105 Farms, Cayuga 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 hundred-weight of milk	Returns per hour of labor on cows	Labor income
Fewer than 10	25	8	260	7,380	\$2.48	\$.10	\$ 415
10 to 18	52	12	216	6,811	2.29	.15	439
18 or more	28	23	188	6,885	2.15	.21	568

In this area, large herds made possible much more efficient use of labor than small herds. On the average, only 188 hours were used per cow in the herds of 18 or more cows, as compared to 260 hours per cow in herds of fewer than 10 cows. About 4 more cows were cared for per man on the farms with the largest herds than on the farms with the smallest herds. Production per cow was highest for the herds with the fewest cows.

Relation of Number of Cows per Farm to Capital Efficiency

Another advantage of large herds was the result of more efficient use of the money invested. On the average, on the farms with fewer than 10 cows, \$860 was invested per cow (table 11). This was \$160 more than the investment per cow on the farms with 18 or more cows. Since the cow enterprise furnished more than one-half 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 the fewest cows, only 10 per cent of the money was invested in cows, as compared to 13 per cent for the large herds.

TABLE 11. RELATION OF NUMBER OF COWS PER FARM TO CAPITAL EFFICIENCY
105 Farms, Cayuga 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 10	25	8	\$ 81	\$860	10
10 to 18	52	12	86	721	12
18 or more	28	23	89	700	13

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 housing cost 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.

Partly because herds were relatively small, and perhaps because some of the dairy barns were not very conveniently arranged since many of them had formerly been hay and grain barns, a relatively large amount of time was spent per cow on many of the farms. There was, however, a wide variation between farms.

In the group with the most hours of labor per cow, there were fewer cows per farm, but more milk was produced per cow than in the other groups (table 12). 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.

TABLE 12. RELATION OF MAN HOURS PER COW TO COSTS AND RETURNS
105 Farms, Cayuga County, 1939-40

Man hours per cow	Number of farms	Average number of man hours per cow	Number of cows per farm	Pounds of milk produced per cow	Cost per hundred-weight of milk	Returns per hour of labor on cows	Labor income
Less than 160	23	132	16	6,180	\$2.31	\$.15	\$ 441
160 to 260	57	212	15	7,090	2.19	.19	572
260 or more	25	315	11	7,408	2.53	.10	252

Because there were nearly as many cows in the herds and considerably more milk was produced per cow, the cost of producing milk was lower and returns per hour of labor on cows and labor incomes were higher in the middle group than in the group with the fewest hours per cow. Even though still more milk was produced per cow in the group with the most hours per cow, costs were considerably higher and returns much lower than in the groups that were more efficient in use of labor.

Relation of Cows per Man to Various Factors

Labor efficiency, as measured by the number of cows kept per man also varied widely between individual farms. As the number of cows cared for per man increased, the number of cows per farm increased, showing that on the large farms more work was accomplished per man than on the smaller farms (table 13). The amount of milk produced per cow was lowest for the group with the most cows kept per man.

TABLE 13. RELATION OF NUMBER OF COWS PER MAN TO VARIOUS FACTORS
105 Farms, Cayuga County, 1939-40

Number of cows per man	Number of farms	Average number cows per man	Number of cows per farm	Pounds milk produced per cow	Per cent work units on cows	Man hours per cow
Fewer than 6	25	4	9	7,545	39	280
6 to 10	63	8	14	6,942	51	214
10 or more	17	12	21	6,203	56	150

As indicated by the number of cows per farm and the per cent of work units on cows, more of the work on the farms with the most cows kept per man was on cows and relatively less on other enterprises than for the farms with fewer cows per man. Man hours per cow decreased rapidly as the number of cows kept per man increased.

Relation of Cows per Man to Costs and Returns

The average cost of producing 100 pounds of milk on farms with fewer than 6 cows per man was \$2.40 (table 14). The cost per hundredweight decreased as more cows were kept per man. Returns per hour of labor on cows increased as more cows were kept per man, and labor incomes averaged the highest for the group with the most cows per man.

TABLE 14. RELATION OF NUMBER OF COWS PER MAN TO COSTS AND RETURNS
105 Farms, Cayuga County, 1939-40

Number of cows per man	Number of farms	Cost per hundredweight of milk	Return per hour of labor on cows	Labor income
Fewer than 6	25	\$2.40	\$.13	\$449
6 to 10	63	2.29	.16	439
10 or more	17	2.17	.18	601

Crop Yields

Relation of Crop Yields to Various Factors

Efficiency in crop production was an important factor in relation to incomes on these farms because a considerable part of the income was from crop sales, and because all of the roughage crops and most of the concentrates were grown on the farms where they were fed.

As crop yields increased, milk production per cow tended to increase (table 15). The proportion of the milk sold during the winter months and the amount of grain fed per cow also increased as crop yields and milk production per cow increased.

TABLE 15. RELATION OF CROP YIELDS TO VARIOUS FACTORS
105 Farms, Cayuga County, 1939-40

Crop yields in per cent of average	Number of farms	Number of cows per farm	Pounds milk per cow	Per cent of milk sold Oct. - Mar.	Pounds grain fed per cow
Less than 80	26	14	6,167	46	1,646
80 to 90	32	15	6,750	48	6,750
90 to 100	17	13	7,304	47	7,304
100 or more	30	15	7,671	53	7,671

Relation of Crop Yields to Costs and Returns

Although the cost of producing milk was about the same on farms with different yields of crops, the farms with the highest crop yields made much greater returns to the farm operator for his year's work than farms with lower crop yields (table 16).

TABLE 16. RELATION OF CROP YIELDS TO COSTS AND RETURNS
105 Farms, Cayuga County, 1939-40

Crop yields in per cent of average	Number of farms	Yield of hay per acre	Yield of silage per acre	Cost per cwt. milk produced	Returns per hour of labor on cows	Labor income
Less than 80	26	1.4	7	\$2.30	\$.14	\$289
80 to 90	32	1.5	10	2.34	.15	254
90 to 100	17	1.7	12	2.22	.17	605
100 or more	30	1.9	13	2.30	.18	773

In this study, home grown feeds were charged to the cows at their market value, which varied somewhat but was approximately the same for different farms. On the farms with high yields of hay, silage, and grain per acre, these feeds were probably produced at lower cost per unit than on farms with low yields of these crops.

If these feeds could have been charged at their cost of production on each farm, the cost of producing milk would probably have decreased as crop yields increased. The fact that labor income increased with crop yields, while the cost of producing milk remained about the same for all groups would seem to confirm this explanation.

Combined Effect of Important Factors

The four most important factors that were found to be related to costs and returns in producing milk and to farm incomes in this area were the amount of milk produced per cow, number of cows in the herd, use of labor, and crop yields. 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 12 farms that were below average in all four factors, the cost of producing 100 pounds of milk averaged \$2.45 (table 17). On these farms only 9 cents an hour were returned to labor on the dairy enterprise, and the operator received only \$82 from the whole farm for his year's work. Costs on the 33 farms that were average or above in one factor were also \$2.45 but there was a return of 12 cents an hour for labor on cows, and labor income for this group averaged \$374. For the 10 farms that were average or better in all four factors, costs of production averaged \$2.02, returns per hour of labor on cows 26 cents, and labor incomes \$957.

TABLE 17. COMBINED EFFECT OF IMPORTANT FACTORS*
105 Farms, Cayuga County, 1939-40

Number of factors	Number of farms	Cost per hundred-weight milk produced	Returns per hour of labor on cows	Average labor income
Below average in all 4 factors	12	\$2.45	\$.09	\$ 82
Average or above in 1 factor	33	2.45	.12	374
Average or above in 2 factors	33	2.22	.16	325
Average or above in 3 factors	17	2.19	.20	909
Average or above in all 4 factors	10	2.02	.26	957

*The four factors are: Number of cows per farm, number of cows per man, rate of milk production, and use of labor.

Ten farms, or about one of each 10 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 18). The size of business of the 10 farms, as measured by number of cows per farm, was one-third greater than average. The amount of work accomplished per man, measured by cows per man, was also about one-third greater than the average for all farms. The amount of milk produced per cow averaged 8,242 pounds with about 2,700 pounds of grain per cow on the 10 farms as compared to 6,966 pounds with a ton of grain per cow for all farms.

TABLE 18. COMPARISON OF GOOD FARMS WITH THE AVERAGE
105 Farms, Cayuga County, 1939-40

Factor	Average	
	10 farms average or above in 4 factors	105 farms
<u>Size of Business</u>		
Number of cows per farm	19	14
<u>Use of Labor</u>		
Number of cows per man	9	7
Man hours per cow*	228	208
<u>Rates of Production</u>		
Pounds milk produced per cow	8,242	6,966
Crop yields in per cent of average	116	100
<u>Other Factors</u>		
Per cent milk sold Oct.-Mar.	52	49
Pounds grain fed per cow	2,720	2,001
Size of cow (pounds)	1,011	965
<u>Costs and Returns</u>		
Cost per cwt. of milk produced	\$2.02	\$2.17
Returns per hour of labor	\$.26	\$.16
Labor income	\$957	\$468

*Includes man labor hauling milk.

Crop yields on the above-average farms were considerably better than for all farms. The cows averaged about 45 pounds larger.

The cost of producing 100 pounds of milk was \$2.02 or well below the all-farm average. Returns per hour of labor on cows was much greater and labor incomes were twice as large as the average for the 105 farms.

AVERAGES OF IMPORTANT FACTORS
105 Farms, Cayuga County, 1939-40

Items	Your farm	Average all farms
<u>Size of Business</u>		
Cows per farm	_____	14
<u>Use of Labor</u>		
Cows per man	_____	7
Man hours per cow	_____	208
<u>Rates of Production</u>		
Pounds milk produced per cow*	_____	6,966
Tons of hay per acre	_____	1.6
Tons of silage per acre	_____	10
<u>Other Factors</u>		
Per cent milk sold October to March	_____	49
Pounds of grain fed per cow	_____	2,001
Size of cow (pounds)	_____	965
<u>Costs and Returns</u>		
Cost per cwt. milk produced*	_____	\$2.17
Returns per hour of labor on cows	_____	\$.16
Labor income	_____	\$468

*All milk standardized to 3.7 per cent butterfat basis.

VARIATION IN IMPORTANT FACTORS
105 Farms, Cayuga 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 ave.	% milk sold Oct.-March	Pounds grain fed per cow	Size of cows (lbs.)	Cost per cwt. milk produced	Returns per hour of labor on cows	Labor income	
30	12	114	10,094	123	62	3,590	1,145	\$1.56	\$0.49	\$2,145	
20	10	144	8,752	108	57	2,960	1,065	1.68	0.30	1,186	
18	9	165	7,955	101	55	2,518	1,041	1.90	0.25	855	
14	8	185	7,287	95	52	2,280	1,007	2.05	0.22	645	
13	8	207	7,017	89	50	1,964	980	2.11	0.18	465	
12	7	222	6,698	85	48	1,800	947	2.20	0.13	268	
10	6	245	6,223	81	46	1,655	920	2.42	0.09	138	
10	6	259	5,884	78	44	1,450	888	2.58	0.05	-32	
8	4	282	5,344	72	40	1,245	854	2.90	-0.01	-208	
7	4	363	4,226	64	36	870	809	3.48	-0.17	-762	

There are ten numbers in each column. The number at the top is the average of the highest or most efficient 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.