

COSTS OF PRODUCING MILK IN OHIO, 1945-1946



OHIO AGRICULTURAL EXPERIMENT STATION

Wooster, Ohio

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COSTS OF PRODUCING MILK IN OHIO, 1945-1946

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The dairy enterprise in Ohio usually brings in more gross income than any other farm enterprise. Ohio, with over one million dairy cows, now ranks seventh among the states in number of milk cows. Seventy-seven percent of Ohio's farms have dairy cows. Income from sale of dairy products, veal calves, and dairy cattle makes up more than one-fourth of the total agricultural cash income for the state.

OBJECTIVES

The purpose of this study was to obtain up-to-date information on elements entering into the cost of producing milk for fluid bottling purposes on Ohio dairy farms (1). All farms studied were shipping milk to fluid bottling plants in the larger Ohio cities.

The question often arises as to what it costs to produce milk. Not only do producers and consumers express an interest in this subject but also handlers of milk, administrators, and others concerned with price policies.

In order that the results can be useful over a longer period than just that of the study, the data pertaining to the elements of cost were collected in physical units wherever possible. Quantities and kinds of feed fed to the dairy herds, the hours of labor required, and the proportion that feed and labor are of net cost give a basis for computing, with reasonable accuracy, the cost of producing milk under varying price conditions.

The basic facts obtained in a cost of production study are of value to all dairy farmers by making it possible to compare the performance and relative profitableness of different farms and different combinations of management practices, and in turn to determine future choice of enterprises or management practices.

(1)—ACKNOWLEDGMENTS.—The authors wish to acknowledge the assistance given in this study by Raymond A. Bailey, John L. Smith, and J. H. Lintner, and also Mable Quehl, and Francis McCormick. We wish to acknowledge the cooperation of many dairy farmers who furnished the information for this study and to the various milk companies, producers' associations and market administrators' offices for the facts about milk sold.

To the public at large, the basic facts from cost of production studies provide the basis for intelligent judgment upon the probable effect of any legislation or administrative ruling upon the farmer as a producer and upon the general welfare of all citizens.

It is possible to secure facts for this type of study by any one (or combination) of three methods—questionnaires sent by mail, route cost accounting, or survey by trained investigators. The mailed questionnaire was not used because of the need for so many facts about each farm that the length of questionnaire would have been almost prohibitive.

The cost of accounting method makes it necessary that arrangements be made with farmers to keep detailed records of all operations and transactions in connection with the whole farm, or at least the dairy enterprise. This task then must be supervised by a route man who makes periodic visits to each farm.

Because of the extra time and effort required on the part of the farmer to keep detailed cost and operation records, the men who do cooperate in these projects are usually better than average producers. This tendency to select a sample from better than average dairymen and the fact that this method is quite costly per record secured were the principal reasons that the cost accounting method was not chosen for this study.

In the third or survey method, as used in this study, the necessary information to complete a standard schedule is obtained from farmers by trained interviewers. Some data are obtained from account books, barn records, receipt slips, milk handlers' offices; some from silo, bin, or mow capacities; and some is based upon estimates made by the farmer. It is believed that a better sample that properly represents all grades and sizes of dairy herds can be obtained by the survey method. It is recognized that any individual farmer may make errors in estimating quantities of feed fed or hours of labor required. If the investigator is experienced in the subject under study and applies cross checks (2) to answers received, the errors can be minimized. If the survey is carefully conducted these errors in over-estimation usually will be balanced by errors in under-estimation.

(2)—Feed consumption can be cross-checked by comparing the average batch of feed ground or mixed times the frequency of grinding or mixing at different seasons of the year with crop yields plus purchases less sales, corrected for inventory changes. Labor requirements can be cross-checked by testing whether the sum of the times required for each job (feeding, milking, cleaning barn, cleaning up equipment) is the same as the time elapse from beginning dairy chore to finish of same.

METHODS OF STUDY

The data were obtained by the survey method for the 12-month period ended July 31, 1946. All elements of cost entering into the dairy enterprise were considered. In addition to feed (including feed grinding, roughage, silage and pasture) and labor, the two principal items of cost in milk production, information pertaining to a great many other factors was obtained. Other costs that were considered in determining costs of milk production were breeding expenses, testing, veterinary fees, medicine, bedding, taxes, insurance, electricity, fly spray, disinfectant, washing powder, strainer pads, whitewash, lime; the dairy's share of telephone, auto, trailer, or truck; the interest on investments; and depreciation and repairs of dairy equipment and buildings. On some farms the facts were taken from fairly complete accounts, while others were obtained from barn records, feed bills, or check stubs. The farmers made estimates of items for which records were not available. Amounts and test of milk sold were secured from the milk plants if the farmers did not have them.

Sample areas in principal market milk sheds were selected in conferences with extension specialists, county agricultural extension agents and other informed persons. In each selected sample, area blocks of contiguous or neighboring dairy farms were used in order to insure that the sample represented dairy farms of different sizes and efficiency and to eliminate bias in sampling.

In some milk sheds where fairly similar characteristics are found one or two blocks of farms were chosen, while in the Cleveland milk shed, which has a greater variety of soils and weather conditions, several sample areas were used. There were 3,320 cows on the 227 farms studied.

Only herds averaging six or more cows for the year and selling milk to fluid bottling plants were included in the study. Where a large share of the return from a purebred herd was from the sale of breeding stock, the herd was not included in the study.

The data were collected on an entire herd basis. It is difficult to separate the amount of time, feed, pasture, or barn space chargeable to each part of the enterprise, such as the milking herd, bull, calves, and young stock; and hence all costs were collected for the dairy enterprise as a whole.

Net receipts from calf sales, net increase (3) in value of the

(3)—Net increase due to increase in numbers and not simply increase in value per head. Net increase considered purchases and sales and change in inventory. Animals of similar quality and age were valued the same at the beginning and end of survey year. If a net decrease occurred it was debited to gross cost.

herd, and credit for the manure produced were credited to gross cost to determine the net cost of milk produced.

COSTS OF PRODUCING MILK

The average cost of producing milk on the 227 farms selected to represent the principal Ohio fluid milk sheds for the 12-month period ending July 31, 1946 was found to be \$4.12 per 100 pounds of four percent butterfat milk at the farm. On two-thirds of the farms, the costs were found to have ranged between \$3.25 and \$5.50 per cwt.

TABLE 1.—VARIATION IN COST PER 100 POUNDS OF MILK PRODUCED

Cost per 100 pounds	Number of herds
range	
\$3.00 and under	23
3.01 to \$3.50	31
3.51 to 4.00	43
4.01 to 4.50	36
4.51 to 5.00	30
5.01 to 5.50	25
5.51 to 6.00	18
Over \$6.00	21

Feed, at prices prevailing during the period of the study, made up 55 percent of the total cost of milk production. Labor was next to the largest item of cost, making up 28 percent of the total. Grains and hay were calculated at average farm prices, and labor was figured at 60 cents an hour.

TABLE 2.—AVERAGE COST OF PRODUCING MILK IN OHIO, 1945-1946

Items	Per cow		Per 100 lbs. of 4% milk		Percentage of total cost
	Amount	Value	Amount	Value	
Ground feed	3496 lb.	\$ 82.14	53 lb.	\$1.24	30
Dry forage	2.2 T.	38.30	66 lb.	.58	14
Succulents	2.2 T.	14.40	66 lb.	.22	5
Pastures	198 days	16 16	3 days	.24	6
Total feed		\$151.00		\$2.28	55
Labor	128 hr.	76.88	1.93 hr.	1.16	28
Bedding		10.46		.16	4
Interest		9.28		.14	4
Use of buildings		8.04		.12	3
Use of equipment		3.53		.06	1
Grinding		2.77		.04	1
Miscellaneous		10.78		.16	4
Total Cost		\$272.74		\$4.12	100

The net annual cost per cow was \$272.74, of which \$151 was for feed.

Feed per 100 pounds of 4 percent milk was 53 pounds of ground feed, (of which 32 pounds was corn; 9 pounds oats; and 11 pounds of mill feed); 66 pounds of hay and an equal amount of silage; and 3 days of pasture. The total cost of all feed per 100 pounds of milk was \$2.28.

SIZE OF HERDS

The average size of the herds studied was between 14 and 15 cows. The smallest dairy studied had 6 cows and the largest had 40. Two-thirds of the farms had herds of 9 to 20 cows. In addition to the cows there were, on the average, one bull, 3 heifer calves, and 5 older heifers (4) being raised for replacement or sale.

Farms in the sample average 147 acres. Capital investment in dairy herd, dairy equipment, and buildings used for dairy purposes was \$4,480.

TABLE 3.—SIZE OF HERD AND VARIOUS FACTORS, OHIO, 1945-1946

Size of herd (cows)	Number of Farms	Number of cows	Pounds of 4% milk produced per cow	Average		Cost per 100 lb. of 4% milk
				Hours of labor per cow	per cwt.	
Fewer than 8	20	7.0	6,789	211	3.1	\$4.97
8 to 9.9	44	9.1	7,132	181	2.5	4.77
10 to 11.9	31	11.0	6,928	153	2.2	4.39
12 to 13.9	30	13.0	6,226	138	2.2	4.34
14 to 17.9	40	16.2	6,806	116	1.7	3.89
18 to 21.9	36	19.6	6,392	98	1.5	3.72
22 or more	26	26.8	6,399	106	1.7	3.91
Average	227	14.6	6,616	129	1.9	\$4.12

No consistent relationship existed between size of herd and rate of milk production. Some smaller herds had somewhat higher production per cow. The average cost of producing milk tended to decline as the size of herd increased. The labor spent per cow decreased as the size of herd increased. This is explained in part by the greater use of mechanical milking machines.

AVERAGE PRODUCTION

The average production of the 227 herds was 6,616 pounds of 4 percent milk per cow per year.

(4)—None of the feed, labor, or other items charged to the young stock are shown in the tables in this bulletin.

TABLE 4.—LEVEL OF PRODUCTION AND VARIOUS FACTORS, OHIO, 1945-1946

Level of production	Number of farms	Average number of cows	Average* production per cow	Average cost per cwt.	Hours of labor		Percent feed is of total cost	Pounds of feed per cwt. of 4% milk		
					per cwt.	per cow		Concentrates	Hay	Silage
9,000 and over	16	14.2	10,040	\$3.60	174	1.7	52	45	63	78 (11)†
8,000 - 8,999	29	13.6	8,372	3.38	124	1.5	57	46	52	79 (19)
7,000 - 7,999	47	13.8	7,426	3.95	129	1.7	57	54	63	89 (25)
6,000 - 6,999	60	14.0	6,479	4.25	130	2.0	56	57	68	97 (29)
5,000 - 5,999	52	16.1	5,449	4.62	125	2.3	56	54	73	137 (31)
Under 5,000	23	16.3	4,153	5.13	103	2.5	56	61	89	151 (10)
Average	227	14.6	6,616	4.12	128	1.9	55	53	66	104 (125)

*Four percent butterfat milk equivalent.

†In the last column the numbers in parenthesis indicate the number of farms in each group where silage was fed.

As was to be expected, the rate of milk production per cow was an important factor influencing cost of producing milk. In table 4 it is seen that with but one exception the average cost of production increased as milk yield decreased. Herds averaging 8,372 pounds of 4 percent milk annually had a cost of \$3.38 per cwt., while those whose production was only half that much had a cost of over \$5.00.

Little relationship existed between rate of milk production and size of the herd. The number of man hours per 100 pounds of milk produced tended to increase as milk production per cow decreased.

With few exceptions the quantities of feed consumed per 100 pounds of milk produced decreased as rate of production increased.

SEASON OF FRESHENING

A large proportion of the cows were bred to freshen in late winter and early spring. About twice as many calved during February, March, and April as during June, July, and August.

TABLE 5.—SEASONAL VARIATION IN FRESHENING OF COWS

1945		1946	
	Percent		Percent
August	4.2	January	8.8
September	7.2	February	10.3
October	9.6	March	11.1
November	9.5	April	10.7
December	8.7	May	8.0
		June	6.3
		July	5.6

TABLE 6.—SEASONAL VARIATION IN MILK SOLD PER COW

Month 1945	4% milk per cow lb.	Percent of monthly average Pct.
August	535	106
September	487	96
October	473	93
November	417	83
December	425	84
1946		
January	443	87
February	422	83
March	503	99
April	540	107
May	637	126
June	615	122
July	578	114
	<u>6075</u>	

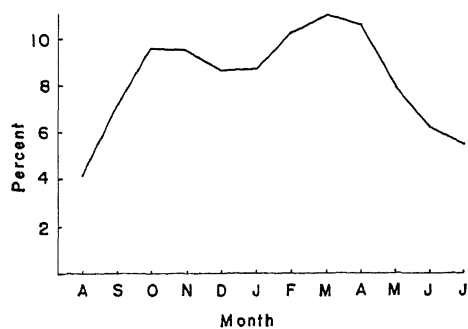


Fig. 1.—Seasonal distribution of freshenings

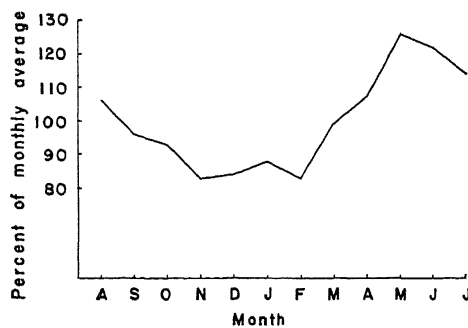


Fig. 2.—Relative seasonal deliveries of milk per cow

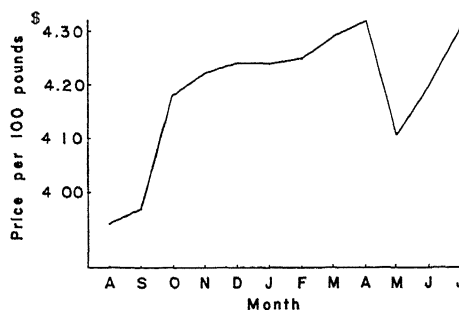


Fig 3.—Average monthly prices paid for 100 pounds of 4 percent butterfat milk in five Ohio markets, August 1945 - July 1946.

SEASONALITY OF MILK PRODUCTION

When figures for milk production per cow are examined for a calendar year they show a steady decline from May until November, a leveling-out through February, and a sharp rate of increase until May. In May the production was 26 percent above the monthly average for the year, while in November it was 17 percent below average.

TABLE 7.—AVERAGE MONTHLY PRICES PAID PER 100 POUNDS OF 4% MILK FOR FIVE OHIO MARKETS^a, F.O.B. DEALERS' PLAT-FORMS, AUGUST 1945 - JULY 1946

Month	Average price [†]
August 1945	\$3.94
September 1945	3.97
October 1945	4.18
November 1945	4.22
December 1945	4.24
January 1946	4.24
February 1946	4.25
March 1946	4.29
April 1946	4.32
May 1946	4.11
June 1946	4.20
July 1946	4.31
Average	\$4.19

^aCleveland, Toledo, Columbus, Cincinnati, and the other than Huntington portion of the Tri-state area.

[†]Including subsidy.

The November production per cow was 65 percent of the peak production in May. These peaks and valleys are the results of seasonal variations in freshenings, pasture, and weather. Some producers try to attain more nearly uniform production. A comparison of their production and cost is shown in table 10.

SEASONAL PRICES

During the 12 months which this study covered, prices paid Ohio farmers for milk did not follow the pattern of seasonal variation that usually is expected. In figure 3 it is shown that the highest price received for the 12-month period was in April 1946 when the average of the prices paid at the five Ohio markets for 4 percent milk was \$4.32 per 100 pounds, subsidy included. Prices paid for milk during the flush production period of May and June are usually lower than the period of short supply from November through February. Because of the general upward trend of prices during the year covered in this study the prices paid for milk in May and June were only 13 and 4 cents, respectively, lower than the average of the November through February prices for 100 pounds of 4 percent milk.

In the analysis of the relative return associated with certain production or management patterns, this lack of typical seasonal price fluctuation has made it impossible to make many significant comparisons as to relative profits.

MOST FARMS USE MILKING MACHINES

Three-fourths of the farms in the samples studied had mechanical milking machines. The herds where milkers were used had 6 cows more on the average and were larger by 34 acres per farm. There was only 120 pounds difference in average milk production per cow.

On the farms where milking machines were used, the average cost of producing 100 lbs. of milk was found to be \$3.95 as compared with \$4.93 on farms not using them. A large part of the increased cost was due to high labor requirements per cow. It required 114 hours per cow annually where milking machines were used as compared with 196 hours without mechanical milkers. The herds without milking machines averaged 10 cows, while those with milking machines averaged 16 cows. This smaller scale of operation probably would account for a part of this 82 hours difference.

TABLE 8.—STUDIES OF MILKING MACHINES

	With milking machines	Without milking machines
Number of farms	170	57
Size of farm	155 acres	121 acres
Size of herd	16.1 cows	10.2 cows
Average production per cow*..	6638 lbs.	6518 lbs.
Average cost per cwt. of 4% milk produced	\$3.95	\$4.93
Labor per cow	114 hr.	196 hr.
Present value of equipment per cow	\$32.30	\$16.02
Equipment, depreciation, and repairs per cow.....	\$3.85	\$2.01
Electricity cost per cow.....	\$2.68	\$1.64

*Four percent butterfat milk equivalent.

The investment in dairy equipment was twice as high on farms using mechanical milkers. Equipment repairs and depreciation were \$3.85 per cow on farms with milking machines, compared with \$2.01 on other farms. Electrical costs charged to the production of milk were 60 percent higher per cow on farms having mechanical milkers. Such investment, however, saved labor and reduced milk production costs.

SILAGE FEEDING

Slightly over one-half of the 227 farms studied fed silage to their dairy herds. Average cost of producing milk was almost identical for farms that fed silage and those that did not.

TABLE 9.—STUDIES OF FARMS FEEDING SILAGE

	Farms feeding silage	No silage fed
Number of farms	125	102
Size of farm	153 acres	139 acres
Average number of cows	16.2	12.75
Average production per cow	6720 lb.	6453 lb.
Cost of production per cwt. of 4% milk	\$4 13	\$4 12
Feed cost	\$2 40	\$2.24
Labor cost	\$1.12	\$1.23
Quantities of feed per cwt. of milk produced		
Silage	104 lb.	—
Hay	64 lb.	70 lb.
Corn	29	35
Oats	9	10
Other concentrates	13	12

Cows on 125 farms where silage was fed consumed an average of 104 pounds of silage per 100 pounds of milk. Cattle receiving silage ate on the average a little less hay and 6 pounds less of ground feed, per hundred-weight of milk, than cows not receiving silage.

Net income from a dairy enterprise is determined by the difference between costs and gross receipts. Although there was no

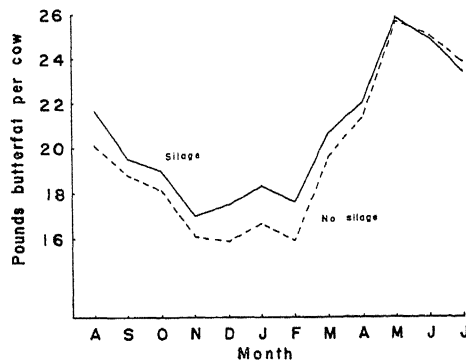


Fig. 4.—Average butterfat sold per cow by months on farms feeding silage as compared to those that did not, Ohio, 1945-1946.

significant difference between the costs on farms feeding silage as compared with those that did not, figure 4 shows a difference in seasonal production of milk that has an influence on gross receipts. The two groups of farms during the period of flush spring production sold practically the same amount of butterfat per cow but during the fall and winter months (October to March) the farms feeding silage sold 7½ percent more milk per cow than farms not feeding silage.

Heavier receipts during this fall and winter period when prices usually are higher, if accomplished without any higher cost, makes for a more profitable enterprise.

“FALL” HERDS VS. “SPRING” HERDS

Forty-four percent (or 99) of the farms sold almost as much milk in November and December as they did in May and June. The other herds only sold about half as much in the 2 fall months as they did in the spring. Herds with relatively heavy fall production produced about 350 pounds more milk annually per cow at an average cost of \$4.02 per hundredweight as compared with \$4.20 for the herds with heavy spring production. The labor spent per 100 pounds of milk produced in the fall herds was 10 percent less than with the spring herds.

TABLE 10.—FALL VS. SPRING MILK DELIVERIES

	No farms	Average No cows	Average production* per cow	Hours per Cow	per Cwt	Average cost* per cwt	Percent of Total Del in May & June	Percent of Total Del in Nov & Dec	Ratio of fall to spring deliveries
Heavy fall deliveries	99	14.2	6,815	125	1.8	\$4.02	17.9	16.4	92
Heavy spring deliveries	128	14.9	6,469	130	2.0	4.20	23.1	11.7	51

*Four percent butterfat milk.

Here again the difference in costs of these two groups of dairy farms does not tell the whole story about profitableness of the two patterns of seasonal production.

The seasonal variation in the price paid for milk did not follow the usual pattern but was within a few cents as high in the flush milk period of 1946 as it was during the scarce milk months of November and December of 1945. Thus any comparison of the average annual prices received by these two groups because of this

unusual price situation shows no significant difference in prices received. It should be self-evident that if a larger proportion of the year's production is sold during the fall months when milk usually is higher in price, the gross return will be greater than if the heaviest production occurs during the spring and early summer when prices are usually lowest.

Some of the management practices which make this heavier fall production possible are full season pasture programs, good feeding practices, and planned breeding program for heavy fall freshening. Figure 5 gives a comparative picture of the seasonal distribution of freshenings of the fall herds as compared to the spring herds; the fall herds had a more uniform pattern of freshening than the spring herds. The peak of freshenings came in October for the fall herds while the spring herds had most of their calves in the winter and early spring.

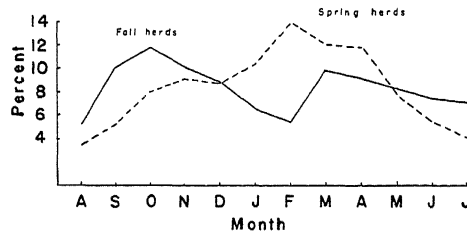


Fig. 5.—Comparison of seasonal distribution of freshening on farms with heavy fall deliveries of milk to those with heavy spring deliveries.

When the herds were sorted according to seasonality of freshening into fall, spring, and uniform freshening herds, it was found that an even greater difference in cost of production was shown.

TABLE 11.—COMPARISON OF HERDS WITH HEAVY FALL AND SPRING FRESHENINGS

	No. of herds	Ave. No. cows	Average production* per cow	Average cost per cwt.	Percent of total freshenings in	
					Fall†	Spring‡
Heavy fall freshening	57	13.7	6934	\$3.84	52.1	16.5
Uniform freshening	113	15.0	6485	4.15	23.4	27.4
Heavy spring freshening	57	14.8	6585	4.35	14.0	55.8

*Four percent butterfat milk.

†October, November, December. ‡February, March, April.

The fall freshening herds produced at a cost of \$3.84 per 100 pounds, which was 51 cents lower than the spring freshening herds and 31 cents lower than the uniform freshening herds.

Not much difference was found in the size of herd, but the rate of production of the fall freshening herds was 350 and 450 pounds greater, respectively, than the spring freshening and uniform freshening herds.

COMPARISON OF HIGH, MEDIUM, AND LOW-COST HERDS

When the farms visited in this study were divided into three equal groups on the basis of cost, a noticeable difference is noted in the average size of herd and level of production among the groups. Farms with the highest cost were smaller, averaging 12 cows per herd as compared with 15½ and 16½ for the medium- and low-cost groups. The average production in the high-cost herds was considerably lower than in the other two groups. The average for the high-cost group was 5,940 pounds, while the medium group was about 6,400 and the low-cost group was about 7,300 pounds of 4 percent milk per cow annually.

The average cost of production of the high-cost group was 36 percent above the average of all farms, or \$5.61 per 100 pounds of 4 percent milk. The low-cost group had an average cost of \$3.16 per hundredweight or 23 percent lower than average cost.

The high-cost group had lower production per cow, smaller herds, more hours spent per cow, and they were less efficient in conversion of feed to milk than were the other groups. The high-cost group fed nearly \$40 more feed per cow than did the low-cost group.

There is no significant difference in the relative proportions of the various classes of feeds consumed by the cows among the

TABLE 12.—COMPARISON OF HIGH, MEDIUM, AND LOW-COST HERDS AS TO SOURCE OF FEED

Total	No farms	Average No cows	Average production per cow*	Cost per cwt *	Ground feed	Percent of total feed cost		
						Hay	Pasture	Silage
High Cost	76	12.0	5940	\$5.61	55.0	24.4	9.4	9.5
Medium	75	15.4	6397	4.23	53.1	26.3	10.5	8.5
Low Cost	76	16.5	7308	3.16	52.0	24.7	11.9	9.8
Average	227	14.6	6616	4.12	53.3	25.2	10.7	9.2

*Four percent butterfat milk.

three groups. A little over one-half of the feed charges are for ground feed, one-fourth for hay, 10 percent for pasture, and 9 percent for silage.

METHODS USED IN COMPUTING COSTS

Man labor was charged at 60 cents an hour. Labor included milking, feeding, and general care of the herd, including cleaning stables but not hauling manure to the field. Due to the difficulty of accurately appraising the contribution of the operator's labor, the wage rates used were those prevailing for a good hired man. The contribution of the operator's family (wife or children) was converted to man hour equivalents. Hours spent by women, children, or aged persons were reduced to equivalent time it would have required a man to do the same jobs.

Feed quantities were determined by several approaches. The number of times feed was ground during the year times the weights of an average mixture was the usual basic approach. This was checked by total feed available, less allocations of other livestock enterprises. For hay consumption, the size of mows, acres and yield of hay (considering carryovers and sales), and use by other livestock enterprises were used to estimate quantities fed. Published tables were the basis for calculating the amount of silage fed. Pasture was charged to the dairy enterprise on a cow-month basis at rates that were found to prevail in the communities studied.

Home-grown feeds were charged at the local prices received by farmers. Some of the prices used averaged: corn \$1.25 per bushel; oats \$.79 per bushel; alfalfa hay \$19.71 per ton; mixed hay \$16.40 per ton; 32 percent mixed concentrate \$4.25 per 100 pounds; 18 percent mixed feed \$3.25 per 100 pounds; and wheat bran \$2.50 per 100 pounds. Corn silage was figured at one-third alfalfa hay prices.

Bedding was charged according to the amount of straw used. This was determined from the amount harvested as estimated by the farmer and its allocation to the various kinds of livestock bedded.

The annual charge for the use of buildings was figured at 10 percent of the long-time prewar replacement cost of the buildings. This charge is to cover taxes, insurance, interest, depreciation, and maintenance expenses. Only those portions of the barn that were used in housing the herd and caring for the milk were charged against the dairy enterprise. Hay or bedding storage area above the

stable was not charged against the dairy herd directly, because the hay was charged to the dairy enterprise at current monthly prices that include an element of storage in the monthly price. Where hay was stored above the stable, the dairy enterprise bears 60 percent of the total charge.

The charges for equipment used consisted of depreciation (based upon expected life and original cost), repairs (average annual), and interest (at 5 percent of present value).

Strainer pads, washing powders, fly sprays, lime, whitewash and testing were included in miscellaneous expenses at their actual cost. The dairy enterprise's share of the cost of such items as electricity, telephone, veterinarian, medicine, disinfectant, truck, insurance, and taxes were estimated as nearly as possible by the farmer.

Interest was charged at 5 percent of the inventory value of the dairy herd. The valuation used was a prewar long-time value. In most herds the cows were valued at from \$100 to \$150 each.

In order that all comparisons could be made on a similar basis, all milk produced was converted to 4 percent butterfat milk basis. The average test of all milk sold from the herds in this study was found to be 3.96 percent butterfat. Milk of various butterfat tests was converted to 4 percent milk, using butterfat content only.

CREDITS

Manure was credited to the herd at \$1 per ton at the barn. Veal calves were credited at actual receipts less delivery and sales expense.

Since all charges were collected on a herd basis it is necessary to credit any increase in inventory before cost of milk production is figured. Beginning inventories and purchases were subtracted from the sum of closing inventories and sales. Inventory values per head were the same in both beginning and closing inventories. This increase in the value of the herd amounted to \$20.84 per cow in the herd.

SUMMARY

In a study of Ohio dairy farms producing milk for fluid bottling purposes it was found that for the 12-month period from August 1945 through July 1946, the cost of producing 100 pounds of 4 percent milk at the farm was \$4.12.

Costs were found to vary greatly among farms. Some herds had costs of over \$6 per hundredweight while others were under \$3 per hundredweight. On two-thirds of the farms, the costs were found to range between \$3.25 and \$5.50 per hundred pounds of 4 percent milk.

The average size of herd studied was between 14 and 15 cows. The average production of the 227 herds was 6,616 pounds of 4 percent butterfat milk per cow annually.

Three-fourths of the farms used milking machines. The labor required per cow was 72 percent greater and the cost per 100 pounds of 4 percent milk averaged about \$1 higher for herds that were milked by hand than where milking machines were used; but this was in part due to fewer cows in the hand-milked herds. The herds milked by hand averaged 10 cows as compared with 16 in herds where mechanical milkers were used.

Feed, at the prices prevailing during the period of the study, comprised 55 percent of the total cost of milk production. The average feed consumed per 100 pounds of milk produced was 53 pounds of concentrates, 66 pounds of hay, 66 pounds of silage, and 3 days of pasture.

The labor used in producing the milk was 28 percent of the cost. The average time spent was 1.93 hours per 100 pounds of milk produced, or 128 hours annually per cow.

The costs of production as shown in this study are not necessarily the costs which must be returned to farmers in order to bring forth a supply of milk sufficient to meet the demands of the market. There are periods when alternative opportunities for the use of labor and capital in other farm enterprises may cause farmers to continue to produce milk for a price less than the cost of production as here computed. There are other periods when alternative opportunities will necessitate that prices higher than the cost of production (as determined by the accounting methods used in this study) be offered to bring forth production to meet market demands.

The basic facts set forth in this study can be of much value to producers, consumers, handlers, and administrators in arriving at intelligent decisions about future courses of action.