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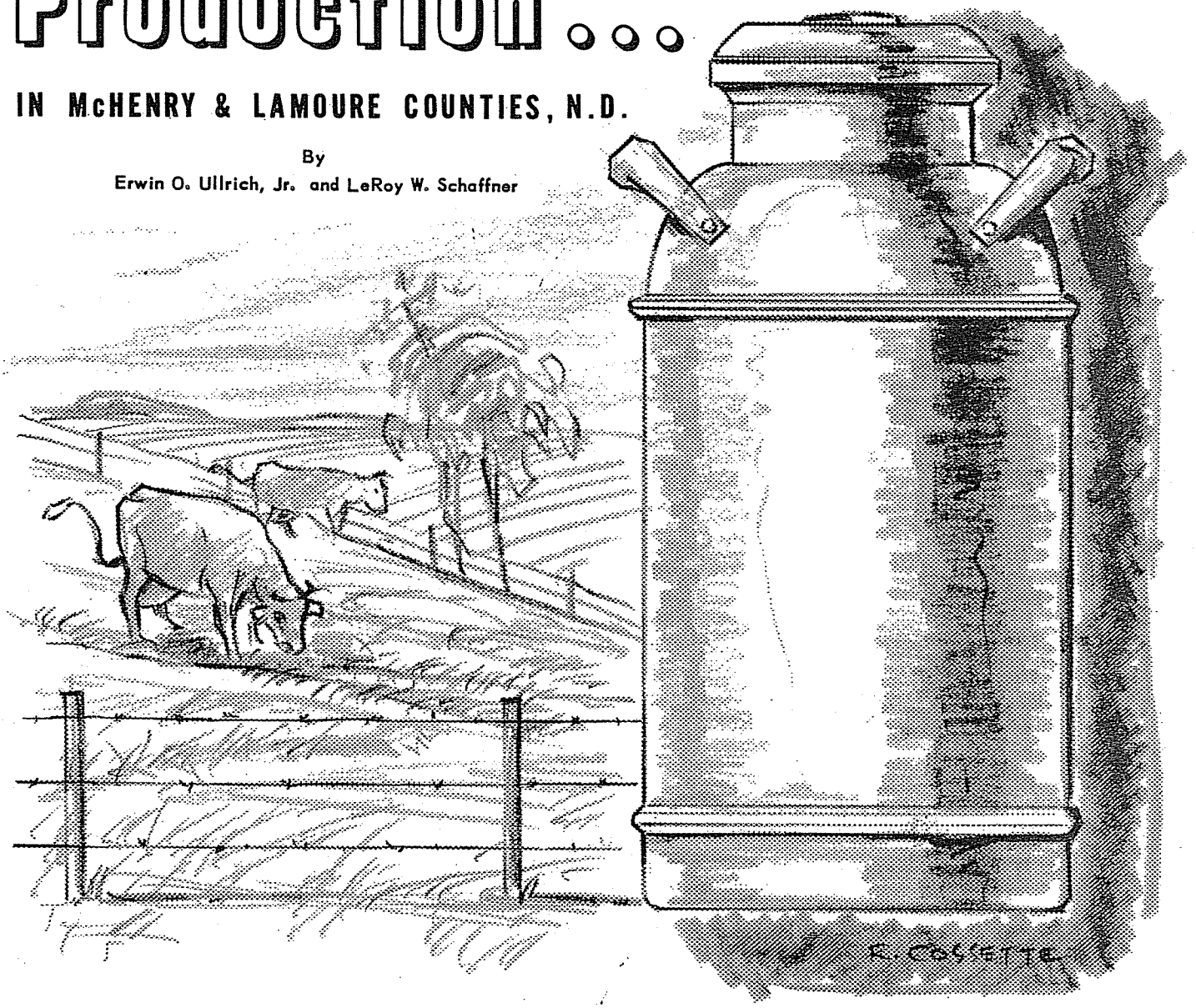
# Economics of Cream Production...

## IN McHENRY & LAMOURE COUNTIES, N.D.

By
Erwin O. Ullrich, Jr. and LeRoy W. Schaffner

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Agricultural Research Service
United States Department of Agriculture

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# ECONOMICS OF CREAM PRODUCTION IN McHENRY AND LAMOURE COUNTIES, NORTH DAKOTA

By Erwin O. Ullrich, Jr. and LeRoy W. Schaffner 1/

## SUMMARY AND CONCLUSIONS

The purpose of the study reported here was: (1) to assemble and analyze data on the resources and management practices used for the cream production enterprise on farms in the small-grain area of central North Dakota, and (2) to make an economic appraisal of the enterprise.

The trend in North Dakota dairying is a gradual change from the production of farm-separated cream to production of whole milk. Whole milk must be produced and marketed according to rigid specifications and sanitary regulations. It is difficult to forecast the extent of this change during the next 10 or 15 years. Dairying has been a relatively stable enterprise; changes in organization are not as frequent nor as easily made as in many other farm enterprises. As time goes on, more and more cream producers will be faced with the possibilities of changing over to whole milk production and the accompanying changes in marketing patterns. A change from cream production to whole milk production is revolutionary--additional capital outlays for buildings and equipment are required initially and operating costs are increased considerably.

The cream producing enterprise on the farms studied was one of relatively low inputs. The quality of the cattle was generally poor; less than half of the cows milked were of dairy breeds. The average production in 1957 was only 225 pounds of butterfat per cow. The enterprise utilized buildings that might otherwise have been vacant. Building facilities were usually poor and in many cases cream was produced under unsanitary surroundings. Feeding management generally was of poor quality, only 5 percent of the farmers interviewed reported feeding their cows according to butterfat production. The concentrate ration was usually deficient in protein. Often, the length of the lactation period was far below normal. One-third of the farmers milked their cows less than 9 months of the year; a few of these milked cows for only 6 months.

Income from the cream-production enterprise was generally low; hourly returns varied from less than 10 cents to about 90 cents. The return to labor would have been even lower if building repair and depreciation could have been added to the other costs.

Net income from the cream-production enterprises studied can be increased with very little additional expense or investment by adoption of

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better management practices including: (1) improved feeding practices that would provide a higher level of protein, (2) improved breeding and culling of the dairy herd, (3) lengthening the lactation period, and (4) by improving the sanitary conditions under which cream is produced. Better quality cattle also would increase farm income although this would require a higher capital investment in the herd.

Chosen for study were three size groups of herds: 5 to 9, 10 to 14, and 15 to 29 cows. Farm interviews were made in two counties, LaMoure County in the southern and McHenry County in the northern part of the State.

The farms studied varied in size from 320 acres to 1,680 acres each. A ranch of 16,000 acres was also included. The average size of all farms (excluding the ranch) was 866 acres. With few exceptions, the sample farms were cash-grain and livestock farms. Beef and hog enterprises were common.

## Factors Affecting Milk Production

Nearly half of the cows milked on the sample farms were a dairy breed and the others were either beef-type or crossbred cows. LaMoure County, in the southern part of the State, had the largest percentage of dairy-breed cows, mainly Holstein. Only 2 percent of the milk cows on the sample farms were registered in official breed associations. The chief factors that affect butterfat production are the type and quality of individual cattle, length of lactation, and the feeding-management practices. In 1957, the average production was approximately 225 pounds of butterfat per cow. Average production tended to increase with size of herd, possibly because the large herds contained a higher percentage of dairy-breed cows. Average butterfat production per cow was highest in LaMoure County. It was approximately 32 pounds higher per cow for dairy-breed cattle than for mixed dairy and beef-type cattle and approximately 63 pounds higher than for beef-type and crossbred cattle. Cows milked for less than 8 months produced an average of 177 pounds of butterfat compared with 232 pounds for those milked 9 months or longer. Butterfat production varied also with annual quantity of grain fed. Cows fed no grain in 1957 produced, on the average, 57 fewer pounds of butterfat than the average for all cows in the sample.

## Feeding

Almost 90 percent of the farmers interviewed fed some alfalfa or alfalfa hay mixture during 1957. Approximately 55 percent fed corn silage.

Fifty-five percent of the farmers fed a grain ration during the entire year, while an additional 39 percent fed grain during a part of the year. Six percent fed no grain or concentrate ration. Most of the grain used was homegrown. Most grain rations were simple; they consisted of varying ratios of ingredients, i. e. oats and barley, 3/4 to 1/4; oats and millet, 1/2 to 1/2; or oats and corn, 2/3 to 1/3. Only 1 in 5

farmers fed a ground mixture that contained three or more ingredients. Only four farmers indicated that they fed milk cows in accordance with production.

The usual ration for young calves was milk, grain, and roughage. Feeding practices were generally alike for replacement heifers, veal, and other market calves.

## Labor

Labor was not a limiting factor of production in the cream enterprise on the farms in the sample. Much of the labor needed comes at a time when labor is not otherwise needed for the other farm enterprises. Total man-hours used for a cow and a calf varied from approximately 90 to a little more than 200 hours per year.

Approximately 50 percent of the annual labor requirements involved with dairy were associated directly with the milking operations and utensil and equipment cleaning. The labor requirements varied slightly with the size of herd and the labor-saving equipment utilized. Feeding the dairy herd varied from 10 to 20 percent of the total labor requirements. The time required for barn and calf-pen cleaning varied also, but usually averaged about 11 percent of the number of hours required annually for the dairy herd. Labor devoted to the care of calves, other than bedding and pen cleaning, approximated 15 percent of the total number of hours required annually. Other labor associated directly with the dairy operations includes fencing, feed grinding, and manure hauling. Under certain conditions, these operations combined accounted for approximately 8 percent of the total time. Under other conditions, the time required to perform these operations could easily double.

## Disease Loss

Death losses occurred on 64 percent of the farms in 1957. Death loss of calves was about 9.5 percent from birth to weaning. The death loss of mature cows was about 1 percent. The two most common calfhood diseases were scours and pneumonia. Mastitis accounted for nearly 50 percent of the disease problems of mature cows.

## Income

Income from a dairy herd is derived from the sale of livestock and cream, and from the farm and home use of dairy products. The proportion of income from the various sources varies by size and type of herd. Sale of cream is the most stable source of income. The proportion of income from sale of cream increases with the increased size of the dairy herd and varies from about 48 percent of the total income value for the 5- to 9-cow herd to 65 percent for the 15- to 29-cow herd.

Fifty-six percent of the cattle sold were feeder calves, and 30 percent were veal calves. The two main channels of cattle sales were terminal stockyards and licensed public auctions. More farmers sold cattle through public auctions in McHenry than in LaMoure County.

Budgets were constructed to show the returns from the various methods of marketing calves. The average input-output data found on farms surveyed were used in these budgets. The budget summaries represent typical group averages. Accordingly, they indicate the situation in a general way only. They are not the answer for particular farms with resources differing from those used in the budgets.

The budgets show economies of scale when identical practices are compared by size of herd, tables 2 through 9. For example, the net returns for beef-type milk cows producing 165 pounds of butterfat per cow and selling veal calves are $42 per cow for an 8-cow herd, $45 per cow for a 12-cow herd, and $50 per cow for a 16-cow herd. By selling feeder calves, net returns can be increased by about $9 to $14 per cow.

## INTRODUCTION

In 1955, North Dakota ranked 21st among the States in milk-cow numbers, 30th in cash receipts, and 33d in total gross farm income from sales of dairy products.

The proportion of farms with milk cows has declined in recent decades in North Dakota. In 1955, 7 in 10 farms had milk cows compared to 9 in 10 in 1930. Cream is the major product of the dairy enterprise in North Dakota; 89 percent of the milk marketed in 1955 was sold as farm-separated cream.

Many questions arise as to the place or role of the cream-producing enterprise on North Dakota farms. If one is to analyze the dairy enterprise with respect to its place as an alternative enterprise, information is needed on resource requirements, outputs, costs, and returns. This study is an attempt to assemble and analyze economic data for the cream enterprise on farms in the small-grain area of central North Dakota.

The specific area to which this study applies is made up of Census Economic Areas 3A and 3B, which includes 19 counties in the central part of the State (figure 1). The proportion of farms in Economic Areas 3A and 3B with milk cows and the proportion of farmers selling cream is similar to the State average. Agriculture in the area is devoted primarily to production of small grain. Acreage restrictions on wheat have created a need for alternative uses for cropland. In the long-run farm adjustment, there appears to be a need for increased hay and forage production in the cropping system, which in turn will require an increase in roughage consuming livestock. 2/ As 71 percent of the farms in central North Dakota have milk cows, dairy production may be considered as a possible alternative to cash grain.

### Purpose of the Study

Very few specific data are available concerning the inputs, outputs, and management practices of the cream-production enterprise in North Dakota. The purpose of this study was to assemble data on the resources

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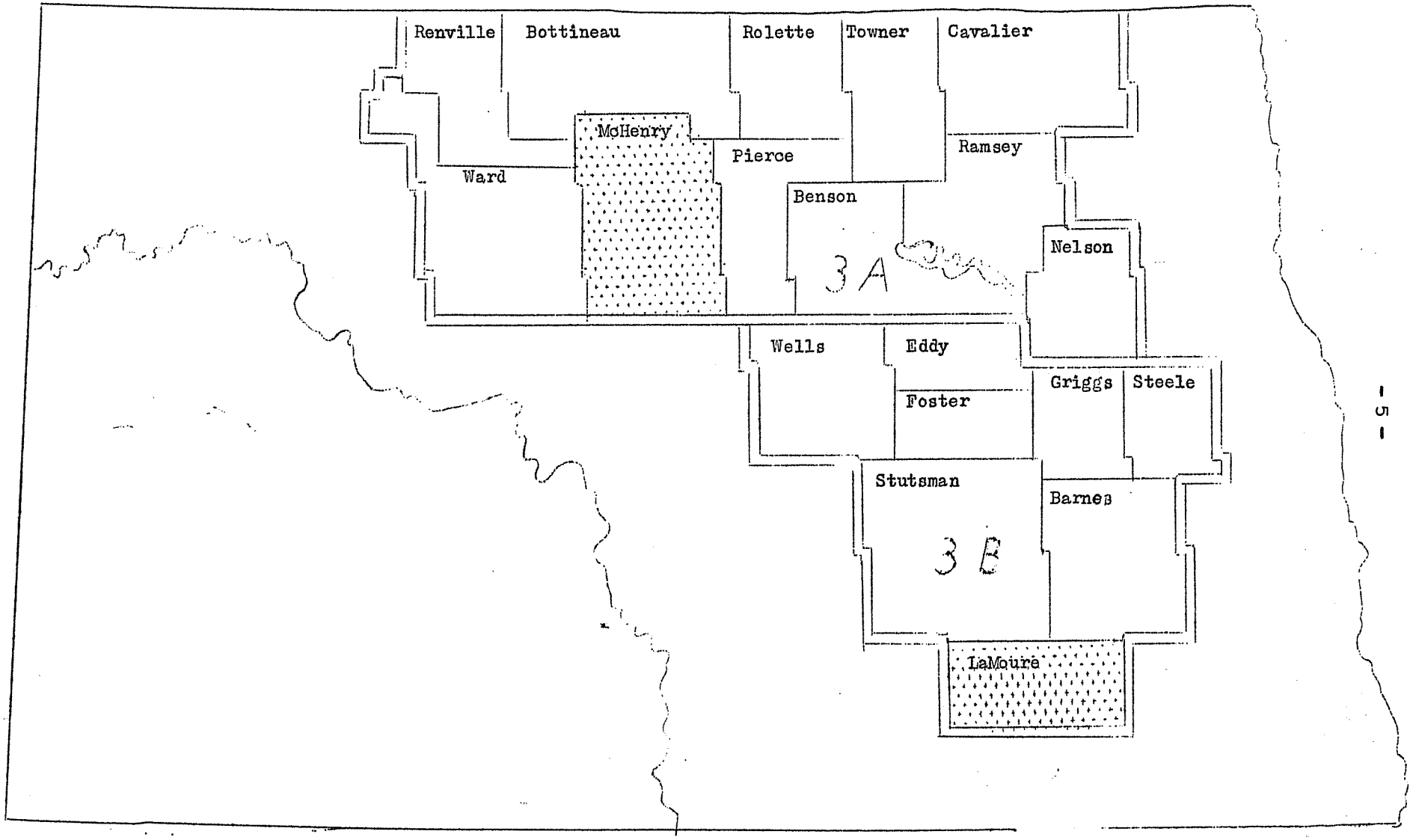
2/ Daly, Rex F., The Long-Run Demand for Farm Products, Agricultural Economics Research, Vol. VIII, No. 3, July 1956.

Figure 1.—Location of Census Economic Areas 3A and 3B




Counties sampled.

and management practices used for the cream enterprise on farms in the small-grain area of central North Dakota and to make an economic appraisal of the enterprise. The objectives of this study were:

1. To provide a description of the cream-production enterprise on farms in central North Dakota;

2. To determine input-output relationships for the resources used by the cream enterprise in central North Dakota;

3. To develop criteria to aid farmers and agricultural technicians in making an economic appraisal of the cream-production enterprise on individual farms and in organizing more profitable dairy enterprises.

## Method of Study

The primary data for the study were obtained from interviews with 83 farmers in McHenry and LaMoure Counties. The Census of Agriculture shows that a large proportion of the farms in this area have milk cows. Variations exist in feeding practices from north to south, mainly because of differences in climate. For example, more corn is grown for grain and silage in the southern than in the northern part of the area. LaMoure County harvested 2 acres of corn for each acre harvested in McHenry County in 1956.

Both counties are "fringe" areas with respect to market milk production; neither county has more than 35 or 40 grade A milk producers.

A stratified random sample was drawn in accordance with the following procedure:

(1) Lists of farmers with cattle were compiled from this 1957 personal property assessment rolls; (2) these lists were checked against the 1957 annual agricultural census schedule taken by the township assessors under the supervision of the State Department of Agriculture and Labor, to determine the number of cows kept for milk by each farmer; (3) farmers with less than 5 or more than 29 milk cows were eliminated from the lists; (4) farmers remaining on these lists were arranged alphabetically into three groups according to number of cows kept for milk: 5 to 9, 10 to 14, and 15 to 29; and (5) random samples were drawn from each group.

Farms with less than five milk cows were omitted from the sample because such a small enterprise contributes little to cash farm income, although it may be important from the standpoint of farm-produced food for the family. Only 1 percent of the dairy herds in the State had 30 or more cows. Consequently, herds of this size were omitted from the sample because they were not typical.

A total of 83 farm schedules were obtained, 41 in McHenry and 42 in LaMoure County (table 1). The number of farms in the sample accounted for approximately 5.4 percent of all farms in McHenry County and 6.6 percent in LaMoure County.

Table 1.--Number of farms in sample and percentage of all farms, McHenry and LaMoure Counties, by size of herd

| Number of milk cows | McHenry County | | LaMoure County | |
|---|---|---|---|---|
| | Number of farms in sample | Percentage of all farms | Number of farms in sample | Percentage of all farms |
| | Farms | Percent | Farms | Percent |
| 5 to 9 | 12 | 3.3 | 12 | 4.3 |
| 10 to 14 | 22 | 8.4 | 16 | 6.9 |
| 15 to 29 | 7 | 5.3 | 14 | 11.2 |
| Total sample | 41 | 5.4 | 42 | 6.6 |

A questionnaire was used to record data concerning management practices with the dairy herd, dairy inputs, outputs, and investment in the enterprise. Basic information on land use, crop production, and livestock other than milk cows was obtained to give an overall picture of each farm sampled and to determine the relationship between the dairy enterprise and other enterprises on the farm.

## BUDGETARY ANALYSIS

The budgetary analysis that follows largely reflects conditions on sample farms in 1957.

Data from the farm survey used in preparing budgets consisted of average inventory values for cattle, the predominant method of silage storage, equipment and machinery commonly used by the dairy enterprise, average length of pasture and feeding season, butterfat production for various levels of feeding, length of the lactation period, the average labor expended in the dairy enterprise, the percentage of death loss and the average veterinary costs, and average sales prices for cattle and butterfat for 1957.

Secondary sources of data included machinery and equipment dealers for the most popular equipment used on farms sampled, insurance and livestock trucking companies, annual State average prices of the Agricultural Marketing Service, U. S. Department of Agriculture, and, for production data, various departments of the State Agricultural College. Data used included the initial operating costs of machinery and equipment, costs of marketing and hauling livestock, taxes on personal property, and insurance rates.

A number of assumptions were formulated, some of which were based on actual data from either primary or secondary sources. These included

size of herd groupings and rate of herd replacement, a value for skim milk that was to be utilized for salable livestock other than dairy cattle, cost of hauling butterfat from farm to delivery point, a price for alfalfa hay and levels of roughage feeding for dairy cattle, fencing, and other miscellaneous costs, including values for dairy barns to determine insurance costs. Average butterfat percentages of whole milk by breeds were also assumed. Data used in formulation of the budgets are shown in appendix tables 9 through 12.

A series of budgets were constructed for various herd size groupings at specified levels of grain feeding and butterfat production. The budgets were for two different types of dairy cattle on the farms sampled. A resume of net returns for each type is shown in tables 2 through 9. Costs and returns for each type of herd at varying levels of butterfat production are summarized in tables 10 through 17.

Net returns as determined by the budgetary analysis is the gross income minus the cash operating expenses, depreciation on equipment, and interest on livestock and equipment. Costs of building repair, depreciation, and interest on investment were not included.

Results of the budgetary analysis illustrates several aspects of the dairy enterprise. One is the demonstration of returns to scale at any given level of feeding and its corresponding production. As herd size is increased, the net return per cow is also increased. Reasons for this are obvious. Fixed costs are spread over a larger herd thus reducing total costs per cow. Also, marginal increases for certain types of operating costs are negligible with either an increase in herd size or additional equipment. An example of this would be an addition of a second milker to a larger herd. The cost of a single-unit machine and its operation for an 8-cow herd varied from about $6.50 to $7.00 per cow compared with about $4.50 to $5.00 as herd size increases to 12 cows. The cost of 2 single-unit machines and operation decreased from $10.00 per cow for an 8-cow herd to $5.00 per cow for a 16-cow herd. The actual cost of operating the milk pump used for the second milker would be insignificant.

Second, many farmers are "overfeeding" in accordance with levels of butterfat production. "Overfeeding" may be classified in two distinct forms: (1) overfeeding can be an excess of amount of a type of feed that does not provide a balanced ration and (2) overfeeding can be an excess amount of total digestible nutrients for the production potential of the individual cow. For example, a cow producing 245 pounds of butterfat fed 15 pounds of oats daily may produce the same amount when fed 5 to 6 pounds of oats and a pound or two of a protein supplement. It seems likely that on many of the farms sampled the same level of production can be obtained with a lower level of grain feeding. An example taken from the budget data shows that a cow producing 165 pounds of butterfat and fed no grain returns approximately $20 more net income than one fed nearly $40 worth of grain and producing 192 pounds of butterfat. The budgets indicate that the highest return per cow for herds that were fed grain occurred in a Holstein herd producing 220 pounds of butterfat per cow and in a Shorthorn herd producing 188 pounds of butterfat.

The difference in average butterfat production from the lowest to the highest producing Shorthorn herd budgeted is 55 pounds per cow. For the Holstein herd, the difference is 90 pounds.

One can assume that the lowest and highest producing herds are nearly equal in production potential, therefore the level and quality of grain feeding is the more important determinant of butterfat production, and it is logical to assume that the higher level of butterfat production (220 to 264 pounds) can be attained with a lower cost of grain feeding.

Survey data on the rate of grain feeding and butterfat production also suggest that beef-type or crossbred cattle are inherently less responsive to heavier feeding than are dairy breeds. That is, aside from the quality of individual cattle, an additional 100 pounds of grain fed to beef-type or crossbred cattle will produce a smaller increase in butterfat production than an equal amount fed to cattle of dairy breeds. Most of the additional feed is used to produce gains in weight rather than increases in milk produced.

Calves not retained as herd replacements are sold usually as veal or feeder calves. Nearly 1 in 5 farmers sampled sold veal calves while slightly more than 20 percent sold feeder calves weighing up to 500 pounds. Income per cow was greater where feeder calves were sold rather than veal calves, but the difference was greater for Shorthorn herds than for Holstein. Whereas feeder calves sold from Shorthorn dairy herds will increase net returns by $14 per cow, Holstein feeder calves sold will return an increase of only $8 per cow more than when veal calves are sold. This difference is due largely to the spread in market prices for the breeds of calves sold.

Hourly returns to labor for the dairy enterprise are relatively low; they vary with the equipment used. Under present budgetary analysis the return to labor varied greatly; it did not exceed 90 cents per hour and ranged to a low of 7 cents per hour. The highest hourly returns recorded were for the larger herds and reflect the influence of returns to scale.

Farmers often have thought that net returns are higher from milking beef or beef-crossbred cattle than those from milking straight dairy-breed cattle. The reason given is that beef or crossbred cattle produce a higher quality market calf. When choosing the type of cow to milk, factors to consider are the breed characteristics, quality of the milking herd and level of butterfat production, type and cost of feeds used, and relative prices of butterfat and market cattle, as well as the total costs of production.

Results of the budgetary analysis show that when veal calves are sold from both Holstein and Shorthorn herds, net returns are higher for the Holsteins. Market prices for veal calves vary only slightly and Holstein calves usually outweight calves of other breeds at the same age. However, market prices are more favorable for feeder calves of beef breeds and crossbred cattle than for calves of dairy breeds. At a market weight of approximately 500 pounds, the price differential between Holstein and beef-breed calves in 1957 was about $2; at weights of 800 pounds or more, this price differential was about $3.50.

Table 2.--Net returns for Shorthorn milk cows with an average production of 165 pounds of butterfat by size of herd and kind of calves sold 1/

| Number of cows in herd | Sale of veal calves | | | | | | Sale of feeder calves | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hand milking | | One machine unit | | Two machine units | | Hand milking | | One machine unit | | Two machine units | |
| | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor |
| | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. |
| 8 | 42.08 | .26 | 35.39 | .22 | 31.97 | .21 | 56.20 | .34 | 49.53 | .31 | 46.41 | .30 |
| 12 | 45.21 | .33 | 40.65 | .32 | 38.32 | .31 | 54.33 | .40 | 49.77 | .39 | 47.44 | .38 |
| 16 | 49.89 | .42 | --- | --- | 44.73 | .43 | 62.47 | .53 | --- | --- | 57.31 | .55 |
| 24 | --- | --- | --- | --- | 56.49 | .64 | --- | --- | --- | --- | 70.78 | .80 |

1/ No supplemental grain feeding.

Table 3.--Net returns for Shorthorn milk cows with an average production of 188 pounds of butterfat by size of herd and kind of calves sold 1/

| Number of cows in herd | Sale of veal calves | | | | | | Sale of feeder calves | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hand milking | | One machine unit | | Two machine units | | Hand milking | | One machine unit | | Two machine units | |
| | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor |
| | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. |
| 8 | 44.07 | .27 | 36.89 | .23 | 33.47 | .22 | 57.70 | .35 | 51.01 | .32 | 47.59 | .31 |
| 12 | 47.28 | .35 | 42.72 | .33 | 40.39 | .33 | 56.35 | .41 | 51.79 | .40 | 49.46 | .40 |
| 16 | 52.25 | .44 | --- | --- | 47.39 | .45 | 64.83 | .55 | --- | --- | 59.97 | .57 |
| 24 | --- | --- | --- | --- | 49.64 | .56 | --- | --- | --- | --- | 66.75 | .75 |

1/ 870 pounds oats fed per cow annually.

Table 4.--Net returns for Shorthorn milk cows with an average production of 192 pounds of butterfat by size of herd and kind of calves sold 1/

| Number of cows in herd | Sale of veal calves | | | | | | Sale of feeder calves | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hand milking | | One machine unit | | Two machine units | | Hand milking | | One machine unit | | Two machine units | |
| | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor |
| | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. |
| 8 | 20.30 | .12 | 13.61 | .09 | 10.19 | .07 | 34.42 | .21 | 27.73 | .18 | 24.31 | .16 |
| 12 | 24.00 | .18 | 19.44 | .15 | 17.10 | .14 | 33.07 | .24 | 28.51 | .22 | 26.18 | .21 |
| 16 | 28.94 | .25 | --- | --- | 24.08 | .23 | 41.52 | .35 | --- | --- | 36.66 | .35 |
| 24 | --- | --- | --- | --- | 30.02 | .34 | --- | --- | --- | --- | 43.52 | .49 |

1/ 2,612 pounds oats fed per cow annually.

Table 5.--Net returns for Shorthorn milk cows with an average production of 220 pounds of butterfat by size of herd and kind of calves sold 1/

| Number of cows in herd | Sale of veal calves | | | | | | Sale of feeder calves | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hand milking | | One machine unit | | Two machine units | | Hand milking | | One machine unit | | Two machine units | |
| | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor |
| | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. |
| 8 | 32.20 | .20 | 25.52 | .16 | 22.10 | .15 | 46.33 | .28 | 39.64 | .25 | 36.22 | .24 |
| 12 | 35.94 | .26 | 31.39 | .24 | 29.05 | .23 | 45.01 | .33 | 40.46 | .32 | 38.14 | .31 |
| 16 | 40.89 | .35 | --- | --- | 36.02 | .35 | 53.46 | .45 | --- | --- | 48.60 | .47 |
| 24 | --- | --- | --- | --- | 41.99 | .47 | --- | --- | --- | --- | 55.49 | .62 |

1/ 3,138 pounds oats fed per cow annually.

Table 6.--Net returns for Holstein milk cows with an average production of 174 pounds of butterfat by size of herd and kind of calves sold 1/

| Number of cows in herd | Sale of veal calves | | | | | | Sale of feeder calves | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hand milking | | One machine unit | | Two machine units | | Hand milking | | One machine unit | | Two machine units | |
| | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor |
| | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. |
| 8 | 46.77 | .29 | 40.09 | .25 | 36.67 | .24 | 54.57 | .33 | 47.88 | .30 | 44.46 | .29 |
| 12 | 47.86 | .35 | 43.30 | .34 | 40.97 | .33 | 51.87 | .38 | 47.32 | .37 | 44.98 | .36 |
| 16 | 53.47 | .45 | --- | --- | 48.31 | .46 | 60.37 | .51 | --- | --- | 55.21 | .53 |
| 24 | --- | --- | --- | --- | 55.81 | .63 | --- | --- | --- | --- | 66.83 | .75 |

1/ No supplemental grain feeding.

Table 7.--Net returns for Holstein milk cows with an average production of 220 pounds of butterfat by size of herd and kind of calves sold 1/

| Number of cows in herd | Sale of veal calves | | | | | | Sale of feeder calves | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hand milking | | One machine unit | | Two machine units | | Hand milking | | One machine unit | | Two machine units | |
| | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor |
| | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. |
| 8 | 60.42 | .37 | 53.73 | .34 | 50.31 | .33 | 68.21 | .42 | 61.53 | .39 | 58.12 | .38 |
| 12 | 62.12 | .46 | 57.56 | .45 | 55.23 | .44 | 66.14 | .48 | 61.58 | .48 | 59.24 | .40 |
| 16 | 68.04 | .58 | --- | --- | 62.88 | .60 | 74.93 | .64 | --- | --- | 69.77 | .67 |
| 24 | --- | --- | --- | --- | 70.64 | .79 | --- | --- | --- | --- | 77.83 | .88 |

1/ 1,184 pounds oats fed per cow annually.

Table 8.--Net returns for Holstein milk cows with an average production of 245 pounds of butterfat by size of herd and kind of calves sold 1/

| Number of cows in herd | Sale of veal calves | | | | | | Sale of feeder calves | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hand milking | | One machine unit | | Two machine units | | Hand milking | | One machine unit | | Two machine units | |
| | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor |
| | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. |
| 8 | 60.18 | .37 | 53.50 | .34 | 50.08 | .33 | 67.98 | .41 | 61.29 | .39 | 57.87 | .38 |
| 12 | 61.85 | .45 | 57.30 | .45 | 54.96 | .44 | 65.45 | .48 | 61.31 | .48 | 58.98 | .47 |
| 16 | 67.77 | .57 | --- | --- | 61.98 | .59 | 74.67 | .63 | --- | --- | 69.51 | .67 |
| 24 | --- | --- | --- | --- | 70.76 | .80 | --- | --- | --- | --- | 77.95 | .88 |

1/ 2,403 pounds oats fed per cow annually.

Table 9.--Net returns for Holstein milk cows with an average production of 264 pounds of butterfat by size of herd and kind of calves sold 1/

| Number of cows in herd | Sale of veal calves | | | | | | Sale of feeder calves | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hand milking | | One machine unit | | Two machine units | | Hand milking | | One machine unit | | Two machine units | |
| | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor | Per cow | Per hour labor |
| | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. | Dol. |
| 8 | 50.07 | .31 | 43.38 | .27 | 39.96 | .26 | 57.86 | .35 | 51.17 | .32 | 47.75 | .31 |
| 12 | 51.73 | .38 | 47.18 | .37 | 44.84 | .36 | 55.75 | .41 | 51.19 | .40 | 48.86 | .39 |
| 16 | 58.27 | .49 | --- | --- | 52.49 | .50 | 64.54 | .55 | --- | --- | 59.38 | .57 |
| 24 | --- | --- | --- | --- | 61.49 | .69 | --- | --- | --- | --- | 68.68 | .77 |

1/ 3,990 pounds oats fed per cow annually.

Table 10.--Returns to labor and management for an 8-cow Shorthorn herd by kind of calves sold

| Item | Sale of veal calves | | Sale of feeder calves | |
|---|---|---|---|---|
| Size of herd: 8 cows, 1 bred heifer, 2 yearlings, 2 calves. Lactation period: 9 months. | Dollars | | Dollars | |
| PRODUCTION OF DAIRY HERD: | | | | |
| Whole milk production per cow 4,125 lbs. | | | | |
| Butterfat production per cow 165 lbs. | | | | |
| Butterfat test of whole milk 4 % | | | | |
| Number of calves saved 7 | | | | |
| INCOME FROM DAIRY HERD (App. table 1)..... | 1,434.84 | | 1,716.47 | |
| COSTS: | | | | |
| For dairy herd (App. table 1)..... | 947.22 | | 1,115.85 | |
| For operating separator (hand milking) 1/ ..... | 40.77 | | 40.77 | |
| For operating 1 milking machine 1/..... | 85.62 | | 85.62 | |
| For operating 2 milking machines 1/..... | 109.63 | | 109.63 | |
| Interest on cattle and equipment: | | | | |
| Hand milking ..... | 110.25 | | 110.25 | |
| 1 milking machine ..... | 118.90 | | 118.90 | |
| 2 milking machines ..... | 122.25 | | 122.25 | |
| | Per cow | Per hour labor | Per cow | Per hour labor |
| NET RETURNS: | | | | |
| Returns for labor and management (hand milking)..... | 42.08 | .26 | 56.20 | .34 |
| Returns for labor and management (one machine)..... | 35.39 | .22 | 49.53 | .31 |
| Returns for labor and management (two machines)..... | 31.97 | .21 | 46.11 | .30 |

1/ Includes depreciation, insurance, personal property taxes, and operating costs of equipment.

Table 11.--Returns to labor and management for a 12-cow Shorthorn herd by kind of calves sold

| Item | Sale of veal calves | | Sale of feeder calves | |
|---|---|---|---|---|
| Size of herd: 12 cows, 2 bred heifers, 4 yearlings, 4 calves. Lactation period: 9 months. | Dollars | | Dollars | |
| PRODUCTION OF DAIRY HERD: | | | | |
| Whole milk production per cow 4,700 lbs. | | | | |
| Butterfat production per cow 188 lbs. | | | | |
| Butterfat test of whole milk 4 % | | | | |
| Number of calves saved 10 | | | | |
| INCOME FROM DAIRY HERD (App. table 2)..... | 2,437.81 | | 2,775.76 | |
| COSTS: | | | | |
| For dairy herd (App. table 2)..... | 1,597.33 | | 1,826.45 | |
| For operating separator (hand milking) 1/..... | 93.87 | | 93.87 | |
| For operating 1 milking machine 1/..... | 139.80 | | 139.80 | |
| For operating 2 milking machines 1/..... | 164.44 | | 164.44 | |
| Interest on cattle and equipment: | | | | |
| Hand milking ..... | 179.25 | | 179.25 | |
| 1 milking machine ..... | 188.00 | | 188.00 | |
| 2 milking machines ..... | 191.35 | | 191.35 | |
| | Per cow | Per hour labor | Per cow | Per hour labor |
| NET RETURNS: | | | | |
| Returns for labor and management (hand milking)..... | 47.28 | .35 | 56.35 | .41 |
| Returns for labor and management (one machine)..... | 42.72 | .33 | 51.79 | .40 |
| Returns for labor and management (two machines)..... | 40.39 | .33 | 49.46 | .40 |

1/ Includes depreciation, insurance, personal property taxes, and operating costs of equipment.

Table 12.--Returns to labor and management for a 16-cow Shorthorn herd by type of calves sold

| Item | Sale of veal calves | | Sale of feeder calves | |
|---|---|---|---|---|
| Size of herd: 16 cows, 3 bred heifers, 5 yearlings, 5 calves. Lactation period: 9 months. | Dollars | | Dollars | |
| PRODUCTION OF DAIRY HERD: | | | | |
| Whole milk production per cow 4,800 lbs | | | | |
| Butterfat production per cow 192 lbs | | | | |
| Butterfat test of whole milk 4 % | | | | |
| Number of calves saved 14 | | | | |
| INCOME FROM DAIRY HERD (App. table 3) | 3,301.02 | | 3,807.95 | |
| COSTS: | | | | |
| For dairy herd (App. table 3) | 2,511.51 | | 2,817.24 | |
| For operating separator (hand milking) 1/ | 98.39 | | 98.39 | |
| For operating 1 milking machine 1/ | --- | | --- | |
| For operating 2 milking machines 1/ | 168.75 | | 168.75 | |
| Interest on cattle and equipment: | | | | |
| Hand milking | 228.00 | | 228.00 | |
| 1 milking machine | --- | | --- | |
| 2 milking machines | 235.45 | | 235.45 | |
| | Per cow | Per hour labor | Per cow | Per hour labor |
| NET RETURNS: | | | | |
| Returns for labor and management (hand milking) | 28.94 | .25 | 41.52 | .35 |
| Returns for labor and management (one machine) | --- | --- | --- | --- |
| Returns for labor and management (two machines) | 24.08 | .23 | 36.66 | .35 |

1/ Includes depreciation, insurance, personal property taxes, and operating costs of equipment.

Table 13.--Returns to labor and management for a 24-cow Shorthorn herd by kind of calves sold

| Item | Sale of veal calves | | Sale of feeder calves | |
|---|---|---|---|---|
| Size of herd: 24 cows, 4 bred heifers, 6 yearlings, 6 calves. Lactation period: 9 months. | Dollars | | Dollars | |
| PRODUCTION OF DAIRY HERD: | | | | |
| Whole milk production per cow 5,500 lbs. | | | | |
| Butterfat production per cow 220 lbs. | | | | |
| Butterfat test of whole milk 4 % | | | | |
| Number of calves saved 21 | | | | |
| INCOME FROM DAIRY HERD (App. table 4)..... | 5,291.29 | | 6,136.17 | |
| COSTS: | | | | |
| For dairy herd (App. table 4)..... | 3,776.74 | | 4,297.62 | |
| For operating separator (hand milking) 1/..... | --- | | --- | |
| For operating 1 milking machine 1/..... | --- | | --- | |
| For operating 2 milking machines 1/..... | 182.71 | | 182.71 | |
| Interest on cattle and equipment: | | | | |
| Hand milking..... | --- | | --- | |
| 1 milking machine..... | --- | | --- | |
| 2 milking machines..... | 324.15 | | 324.15 | |
| | Per cow | Per hour labor | Per cow | Per hour labor |
| NET RETURNS: | | | | |
| Returns for labor and management (hand milking)..... | --- | --- | --- | --- |
| Returns for labor and management (one machine)..... | --- | --- | --- | --- |
| Returns for labor and management (two machines)..... | 41.99 | .47 | 55.49 | .62 |

1/ Includes depreciation, insurance, personal property taxes, and operating costs of equipment.

Table 14.--Returns to labor and management for an 8-cow Holstein herd by kind of calves sold

| Item | Sale of veal calves | | Sale of feeder calves | |
|---|---|---|---|---|
| Size of herd: 8 cows, 1 bred heifer, 2 yearlings, 2 calves. Lactation period: 9 months. | Dollars | | Dollars | |
| PRODUCTION OF DAIRY HERD: | | | | |
| Whole milk production per cow 4,833 lbs. | | | | |
| Butterfat production per cow 174 lbs. | | | | |
| Butterfat test of whole milk 3.6 % | | | | |
| Number of calves saved 7 | | | | |
| INCOME FROM DAIRY HERD: (App. table 5) | 1,488.77 | | 1,719.92 | |
| COSTS: | | | | |
| For dairy herd (App. table 5) | 949.83 | | 1,118.64 | |
| For operating separator (hand milking) 1/ | 40.77 | | 40.77 | |
| For operating 1 milking machine 1/ | 85.62 | | 85.62 | |
| For operating 2 milking machines 1/ | 109.63 | | 109.63 | |
| Interest on cattle and equipment: | | | | |
| Hand milking | 124.00 | | 124.00 | |
| 1 milking machine | 132.65 | | 132.65 | |
| 2 milking machines | 136.00 | | 136.00 | |
| | Per cow | Per hour labor | Per cow | Per hour labor |
| NET RETURNS: | | | | |
| Returns for labor and management (hand milking) | 46.77 | .29 | 54.57 | .33 |
| Returns for labor and management (one machine) | 40.09 | .25 | 47.88 | .30 |
| Returns for labor and management (two machines) | 36.67 | .24 | 44.46 | .29 |

1/ Includes depreciation, insurance, personal property, taxes, and operating costs of equipment.

Table 15.--Returns to labor and management for a 12-cow Holstein herd by kind of calves sold

| Item | Sale of veal calves | | Sale of feeder calves | |
|---|---|---|---|---|
| Size of herd: 12 cows, 2 bred heifers, 4 yearlings, 4 calves. Lactation period: 9 months | Dollars | | Dollars | |
| PRODUCTION OF DAIRY HERD: | | | | |
| Whole milk production per cow | 6,111 lbs | | | |
| Butterfat production per cow | 220 lbs | | | |
| Butterfat test of whole milk | 3.6 % | | | |
| Number of calves saved | 10 | | | |
| INCOME FROM DAIRY HERD: (App. table 6) | 2,702.65 | | 2,980.03 | |
| COSTS: | | | | |
| For dairy herd (App. table 6) | 1,662.15 | | 1,891.36 | |
| For operating separator (hand milking) 1/ | 94.34 | | 94.34 | |
| For operating 1 milking machine 1/ | 140.27 | | 140.27 | |
| For operating 2 milking machines 1/ | 164.91 | | 164.91 | |
| Interest on cattle and equipment: | | | | |
| Hand milking | 200.75 | | 200.75 | |
| 1 milking machine | 209.50 | | 209.50 | |
| 2 milking machines | 212.85 | | 212.85 | |
| | Per cow | Per hour labor | Per cow | Per hour labor |
| NET RETURNS: | | | | |
| Returns for labor and management (hand milking) | 62.12 | .46 | 66.14 | .48 |
| Returns for labor and management (one machine) | 57.56 | .45 | 61.58 | .48 |
| Returns for labor and management (two machines) | 55.23 | .44 | 59.24 | .48 |

1/ Includes depreciation, insurance, personal property taxes, and operating costs of equipment.

Table 16.--Returns to labor and management for a 16-cow Holstein herd by kind of calves sold

| Item | Sale of veal calves | | Sale of feeder calves | |
|---|---|---|---|---|
| Size of herd: 16 cows, 3 bred heifers, 5 yearlings, 5 calves. Lactation period: 9 months. | Dollars | | Dollars | |
| PRODUCTION OF DAIRY HERD: | | | | |
| Whole milk production per cow 6,806 lbs. | | | | |
| Butterfat production per cow 245 lbs. | | | | |
| Butterfat test of whole milk 3.6 % | | | | |
| Number of calves saved 14 | | | | |
| INCOME FROM DAIRY HERD (App. table 7) | 3,917.94 | | 4,334.01 | |
| COSTS: | | | | |
| For dairy herd (App. table 7) | 2,479.31 | | 2,785.05 | |
| For operating separator (hand milking) 1/ | 98.07 | | 98.07 | |
| For operating 1 milking machine 1/ | --- | | --- | |
| For operating 2 milking machines 1/ | 168.43 | | 168.43 | |
| Interest on cattle and equipment: | | | | |
| Hand milking | 256.26 | | 256.26 | |
| 1 milking machine | --- | | --- | |
| 2 milking machines | 268.45 | | 268.45 | |
| | Per cow | Per hour labor | Per cow | Per hour labor |
| NET RETURNS: | | | | |
| Returns for labor and management (hand milking) | 67.77 | .57 | 74.67 | .63 |
| Returns for labor and management (one machine) | --- | --- | --- | --- |
| Returns for labor and management (two machines) | 61.98 | .59 | 69.51 | .67 |

1/ Includes depreciation, insurance, personal property taxes, and operating costs of equipment.

Table 17.--Returns to labor and management for a 24-cow Holstein herd by kind of calves sold

| Item | Sale of veal calves | | Sale of feeder calves | |
|---|---|---|---|---|
| Size of herd: 24 cows, 4 bred heifers, 6 yearlings, 6 calves. Lactation period: 9 months. | Dollars | | Dollars | |
| PRODUCTION OF DAIRY HERD: | | | | |
| Whole milk production per cow 7,333 lbs. | | | | |
| Butterfat production 264 lbs. | | | | |
| Butterfat test of whole milk 3.6 % | | | | |
| Number of calves saved 21 | | | | |
| INCOME FROM DAIRY HERD: (App. table 8) | 6,131.03 | | 6,824.48 | |
| COSTS: | | | | |
| For dairy herd (App. table 8) | 4,106.77 | | 4,627.65 | |
| For operating separator (hand milking) 1/ | --- | | --- | |
| For operating 1 milking machine 1/ | --- | | --- | |
| For operating 2 milking machines 1/ | 185.29 | | 185.29 | |
| Interest on cattle and equipment: | | | | |
| Hand milking | --- | | --- | |
| 1 milking machine | --- | | --- | |
| 2 milking machines | 363.15 | | 363.15 | |
| | Per cow | Per hour labor | Per cow | Per hour labor |
| NET RETURNS: | | | | |
| Returns for labor and management (hand milking) | --- | --- | --- | --- |
| Returns for labor and management (one machine) | --- | --- | --- | --- |
| Returns for labor and management (two machines) | 61.49 | .69 | 68.68 | .77 |

1/ Includes depreciation, insurance, personal property taxes, and operating costs of equipment.

## DESCRIPTION OF SAMPLE FARMS

The major type of farming in Census Areas 3A and 3B is spring wheat—small grain. In 1955 the average size of farm in Census Area 3A was 617 acres and 592 acres in 3B.

The average size of the sample farms in McHenry County was 1,119 acres and 619 acres in LaMoure County.

Acreages in the farms in the sample increased as size of herd and total number of animal units increased except in LaMoure County, where the average size of farm decreased for herds of 10 to 14 cows (table 18). In all other instances, the size of farm increased with herd size.

Table 18.—Average size of sample farms, by size of dairy herd, McHenry and LaMoure Counties, 1957

| Size of dairy herd | Average number of animal units per farm 1/ | Acreage per farm | |
|---|---|---|---|
| | | McHenry County | LaMoure County |
| | Number | Acres | Acres |
| 5 to 9 | 25.5 | 532 | 545 |
| 10 to 14 | 38.0 | 778 | 527 |
| 15 to 29 | 77.4 | 3,196 | 788 |
| Total | 44.4 | 1,119 | 619 |

1/ 1 milk cow, 2 yrs. or over = 1 A.U. | 1 calf = .4 A.U.
1 bull, 2 yrs. or over = 1 A.U. | 1 ewe = .14 A.U.
1 beef cow, 2 yrs. or over = .9 A.U. | 1 sow or gilt = .2 A.U.
1 yearling = .8 A.U. | 1 fall pig = .1 A.U.

The average percentage of cropland on farms in Census Area 3A was 79 percent; in Area 3B it was 75 percent. On the average, 45 percent of the farmland was cropland in McHenry County, which included a cattle ranch; in LaMoure County, it amounted to 77 percent.

### Land Use

Small grains occupied 68 percent of the cropland in LaMoure County and 65 percent in McHenry County (table 19). In each county, the acreage of wheat was larger than that of any other small grain. Oats were second to wheat in LaMoure County, while in McHenry County, oats ranked fourth. Most of the acreage of small grain was in wheat, flax, oats, and barley in each county; there were small acreages of rye, millet, and speltz.

Table 19.--Land use in percentage of total cropland on sample farms, McHenry and LaMoure Counties, 1957

| Land use | Percentage of total cropland | |
|---|---|---|
| | McHenry County | LaMoure County |
| | Percent | Percent |
| Small grain | 64.7 | 68.1 |
| Durum | 2.0 | 2.7 |
| Wheat | 22.7 | 18.9 |
| Barley | 13.2 | 13.7 |
| Oats | 9.8 | 15.8 |
| Rye | 1.1 | 1.9 |
| Flax | 15.6 | 14.5 |
| Other 1/ | .3 | .6 |
| Corn | 3.9 | 8.1 |
| Grain | .5 | 4.5 |
| Silage | 3.0 | 3.4 |
| Other 2/ | .4 | .2 |
| Tame hay and pasture 3/ | 14.8 | 12.3 |
| Alfalfa: | | |
| Hay | 9.7 | 7.5 |
| Pasture | 2.1 | 2.1 |
| Other tame grasses: | | |
| Hay | 1.3 | 2.0 |
| Pasture | 1.7 | .7 |
| Other: | | |
| Summerfallow | 15.8 | 10.1 |
| Conservation reserve | .3 | 1.3 |
| Idle | .5 | .1 |
| Total cropland | 100.0 | 100.0 |

1/ Includes acreages of millet and speltz.

2/ Includes corn for pasture, hogging down, and fodder.

3/ Includes acreages of millet, brome, oats, cane, crested wheat, clovers, sudan grass, and various mixtures of rye, alfalfa, and crested wheat for both hay and pasture.

LaMoure County farmers planted almost twice as much corn as those in McHenry County. Approximately half of the corn acreage in LaMoure County was harvested for grain, the rest for silage.

McHenry County had 15 percent of its cropland seeded to tame grasses compared with 12 percent for LaMoure County. Alfalfa was the most common type of forage grown in both counties.

McHenry County had more summerfallow--about 16 percent of the cropland as compared with 10 percent in LaMoure County.

In 1957, 18 of the 41 sample farmers in LaMoure County and 14 of the 42 in McHenry County seeded all their acreage allotment to wheat. Six of the sample farmers in LaMoure County and two in McHenry County seeded their full wheat allotment by using the two-for-one durum alternative. Sixteen of the sample farmers in LaMoure and 26 in McHenry County underseeded their wheat allotments. About 79 percent of the total wheat acreage allotment for the sample farms in LaMoure and 77 percent in McHenry County were seeded.

## Livestock

Three in four of the sample farms had another livestock enterprise in addition to the dairy herd.

Beef cattle and hog enterprises were the most common second livestock enterprise. In McHenry County, 17 of the farms had beef cattle, hogs, or both. In LaMoure County, 16 of the farms had beef cattle and 20 had hogs (table 20). These enterprises could be large enough to contribute materially to the farm cash income. Enterprises kept mainly for home consumption were not included.

The average number of animal units found on farms are shown in table 21. Generally, dairy cows were the largest enterprise from the standpoint of breeding herd numbers.

## Tenure

Seventeen of the sample farmers in McHenry County and 29 of those in LaMoure County owned the farms they operated. Fourteen of the McHenry County farmers were part-owners compared with five in LaMoure County, who rented some of the farmland they operated. One in four farmers in McHenry County and one in five in LaMoure County were full tenants.

Table 20.--Average number of livestock on sample farms, by size of dairy herd, January 1, 1958

| County and number of cows in herd | Beef cows | | Ewes | | Sows & gilts | | Chickens 2/ | |
|---|---|---|---|---|---|---|---|---|
| | Farms reporting | Average per farm | Farms reporting | Average per farm | Farms reporting | Average per farm | Farms reporting | Average per farm |
| | No. | No. | No. | No. | No. | No. | No. | No. |
| McHenry County | | | | | | | | |
| 5 to 9 | 2 | 23.0 | | | 2 | 5.0 | | |
| 10 to 14 | 7 | 15.6 | 3 | 35.3 | 10 | 2.8 | 3 | 141.7 |
| 15 to 29 | 3 1/ | 15.0 | 2 | 28.5 | 5 | 4.2 | 1 | 400.0 |
| All farms | 13 | 16.7 | 5 | 32.6 | 17 | 3.5 | 4 | 206.3 |
| LaMoure County | | | | | | | | |
| 5 to 9 | 5 | 22.8 | 3 | 40.6 | 4 | 4.0 | | |
| 10 to 14 | 6 | 12.7 | 4 | 50.0 | 6 | 7.6 | 7 | 149.0 |
| 15 to 29 | 5 | 19.2 | 4 | 50.0 | 10 | 7.2 | 5 | 157.0 |
| All farms | 16 | 17.9 | 11 | 47.5 | 20 | 6.7 | 12 | 152.0 |

1/ Excludes one rancher having 445 stock cows on hand January 1, 1958.

2/ Farms with less than 100 hens were omitted.

Table 21.--Average number of animal units per sample farm, by size of dairy herd, January 1, 1958

| County | 5 to 9 cows | 10 to 14 cows | 15 to 29 cows | All farms |
|---|---|---|---|---|
| | Number | Number | Number | Number |
| LaMoure | 32.1 | 39.2 | 43.1 | 35.8 |
| McHenry | 19.2 | 29.2 | 41.9 1/ | 28.1 |
| Total | 25.6 | 30.4 | 42.7 | 32.0 |

1/ Excludes one rancher with 978.2 animal units on January 1, 1958.

## Age of Farm Operators

The average age of operators of the sample farms was 43 years (table 22). The average age was nearly the same for both counties and for the herd size groups. The age for farmers from both counties ranged from 22 to 67 years.

Table 22.—Average age of sample farm operator, by county and size of dairy herd

| Size of herd | Number of farms | Age in years | | Range in years |
|---|---|---|---|---|
| | | McHenry County | LaMoure County | |
| | Number | Years | Years | Years |
| 5 to 9 | 24 | 43.7 | 43.4 | 29 to 60 |
| 10 to 14 | 38 | 42.4 | 44.7 | 25 to 62 |
| 15 to 29 | 21 | 44.1 | 40.4 | 22 to 67 |
| Total | 83 | 43.1 | 42.9 | 22 to 67 |

# THE DAIRY ENTERPRISE

## Breeds

Nearly half of the cows milked on sample farms were of a dairy breed. The remaining were either beef-breed or crossbred cows. Forty-three percent of the replacement heifers under 2 years of age were of a dairy breed. Percentages of each are shown in table 23.

McHenry County farmers had a smaller percentage of milk cows of a straight dairy breed in their herds than did farmers from LaMoure County. Forty percent of the milk cows on McHenry County farms were of dairy breeds compared with 57 percent for LaMoure County. Conversely, McHenry County farmers had almost 27 percent beef-type cows in their dairy herds while only 15 percent in LaMoure County were of beef breeds.

The most numerous breed on sample farms was Holstein Friesian (appendix table 13). Thirty-five percent of the cows and 29 percent of the replacement heifers were Holstein. Eighteen percent of the cows and replacement heifers were Shorthorn. In most instances, it was impossible to distinguish milk-type Shorthorns from the beef-type.

Only 2 percent of the cows, mainly in the dairy breeds, were eligible for registry.

A relationship between size of herd and type of cow milked was evident only in LaMoure County. As herd size increased from small to medium, the percentage of dairy-breed cows increased also.

Table 23.--Percentage of milk cows and replacement heifers by type of breed, sample farms, January 1, 1958

| Type of breed | McHenry County | | | | LaMoure County | | | |
|---|---|---|---|---|---|---|---|---|
| | Cows | Bred heifers | Yearling and heifer calves | All | Cows | Bred heifers | Yearling and heifer calves | All |
| | Percent | Percent | Percent | Percent | Percent | Percent | Percent | Percent |
| Dairy | 40.1 | 40.5 | 41.9 | 40.6 | 57.2 | 46.5 | 42.8 | 50.9 |
| Crossbreed | 33.3 | 22.8 | 21.7 | 29.2 | 27.4 | 41.4 1/ | 48.2 2/ | 36.3 |
| Beef | 26.6 | 36.7 | 36.4 | 30.2 | 15.4 | 12.1 | 19.2 | 12.8 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

1/ At least 12 percent were known to be crossed between dairy breeds.

2/ At least 25 percent were known to be crossed between dairy breeds.

## Value

In most instances, average values of cattle estimated by farmers were lower in McHenry than in LaMoure County. The average value of cows was 12 percent lower and the value of calves was 22 percent lower. The greater difference in the value of calves may be due to wider differences in age, size, and type of calf. Also, a higher percentage of calves in LaMoure County are of dairy breeds.

Holstein cows were estimated at slightly higher values than other breeds. The average value for Holstein cows was $206 per head in the McHenry County sample and $210 in LaMoure County. Average values for other dairy breeds in McHenry County varied from $185 per head for Brown Swiss to $209 for Guernsey cows. LaMoure County values for other dairy breeds ranged from $200 for Ayrshire cows to $215 for Guernseys.

Dual-purpose and beef-type breeds were estimated to be from $20 to $50 lower than dairy-breed cows. Crossbred cows were valued at $140 per head in McHenry and $172 in LaMoure County.

Registered cows were valued higher than grade cows of the same breed with few exceptions. Actual differences in value ranged from $25 to $100 per head; the greatest variation occurred with Holstein cattle. Appendix table 14 shows the average values by class and breed of cattle in the milking herd.

## Herd Size and Inventory Value

The number of milk cows and replacement heifers constituting the dairy herd varied from 5 to 46 in LaMoure County and from 8 to 43 in McHenry County. The average for all farms in the LaMoure County sample was 24 head compared with 18 in McHenry County.

Cows constituted from 39 to 77 percent of the total herd (table 24). Milk cows made up an average of 66 percent of the herd in McHenry County and 51 percent in LaMoure County. LaMoure County farmers had a larger proportion of replacement heifers.

Table 24.--Percentage distribution of milk cows and replacement heifers on sample farms, by size of herd, January 1, 1958

| Number of cows in herd | McHenry County | | | LaMoure County | | |
|---|---|---|---|---|---|---|
| | Cows | Replacement heifers | Total | Cows | Replacement heifers | Total |
| | Percent | Percent | Percent | Percent | Percent | Percent |
| 5 to 9 | 61.5 | 38.5 | 100.0 | 39.0 | 61.0 | 100.0 |
| 10 to 14 | 60.0 | 40.0 | 100.0 | 54.5 | 45.5 | 100.0 |
| 15 to 29 | 77.0 | 23.0 | 100.0 | 58.0 | 42.0 | 100.0 |

The average number of milk cows more than doubled from the 5 to 9 cow group to the 15 to 29 cow grouping while the number of replacement heifers remained relatively constant (table 25).

Table 25.--Average number of cows and replacement heifers on sample farms, by size of herd, January 1, 1958

| Number of cows in herd | McHenry County | | | LaMoure County | | |
|---|---|---|---|---|---|---|
| | Cows | All heifer replacements | Total | Cows | All heifer replacements | Total |
| | Number | Number | Number | Number | Number | Number |
| 5 to 9 | 8 | 5 | 13 | 7 | 11 | 18 |
| 10 to 14 | 12 | 8 | 20 | 12 | 10 | 22 |
| 15 to 29 | 17 | 5 | 22 | 18 | 13 | 31 |

Only three farmers, less than 4 percent, did not keep replacement heifers in 1957. In the past, one farmer bought replacements only as the need arose and a second farmer obtained replacements from his beef-cow herd.

The remaining 80 farmers kept replacement stock of all classes as follows: bred heifers, yearling heifers, and heifer calves. Forty percent of the respondents kept replacement stock of all three classes, 36 percent retained a combination of two classes while the remaining 24 percent kept only one class of replacement stock. There appeared to be no definite pattern of herd replacement between herd groupings or between counties. Appendix table 15 contains a detailed breakdown of the average number of replacement heifers by class.

Inventory values for the dairy herd were considerably higher in LaMoure than McHenry County. LaMoure County herd values ranged from $1,000 to $7,175, while those of McHenry County varied from a low of $830 to a high of $5,100.

Factors that affect individual herd values are as follows: number of each class of cattle in the herd, breed of cattle, and the farmer's estimate of market values. The average value for all herds in LaMoure County was $3,517 for 24 head, compared with an average for McHenry County of $2,578 for 18 head (table 26).

Table 26.--Average value of dairy herds, sample farms, January 1, 1958

| Number of cows in herd | McHenry County | | LaMoure County | |
|---|---|---|---|---|
| | Number of all cattle 1/ | Value of dairy herd | Number of all cattle 1/ | Value of dairy herd |
| | Number | Dollars | Number | Dollars |
| 5 to 9 | 13 | 1,616 | 18 | 2,386 |
| 10 to 14 | 20 | 2,677 | 22 | 3,166 |
| 15 to 29 | 22 | 3,793 | 31 | 4,807 |
| Average | 18 | 2,578 | 24 | 3,517 |

1/ Includes all young stock.

## Building Facilities

Ninety-eight percent of the dairy herds were housed in conventional, stanchion-type barns.

Most of these barns ranged in age from 30 to 50 years; only 4 barns and 2 milking parlors had been erected within the last 5 years. More

than 95 percent of the conventional barns were frame; they were of either the common Gambrel or gable-roof design, and 90 percent had at least a partial cement floor. Many barns were in fair or serviceable condition, but at least 10 percent were badly in need of repair.

Size of barns, in linear measurements, varied greatly. Approximately 50 percent of the barns had a lean-to on one or two sides. In terms of available stanchion area and barn room, 43 percent of the farmers were not utilizing the full capacity of their barn facilities while 35 percent of the farmers were overstocked or otherwise crowded.

The values of the barns are difficult to estimate. Age, condition, size, utility, and use in connection with other enterprises helped to make estimations difficult. Many of the barns should have been completely depreciated, and present replacement costs would be prohibitive. When the cost of materials for the new structure were obtainable, they ranged from $2,700 to $4,200 and the farmers provided their own labor for the construction.

Calves less than 6 months of age were usually kept in pens either in the cow barn or in the lean-to on the barn. Only three farmers had separate calfsheds for very young calves.

Calves from 6 months to a year old were usually housed separately in a shed, old barn, or shelter of some type. Calves over 1 year of age usually ran with the stock cows or in a separate pasture with a windbreak or shelter of some type for inclement weather.

Seventy-six percent of the farmers had either a milkhouse adjacent to the barn or a milkroom in the barn. The remaining farmers had no milkhouse facilities; they used the residence for washing and storing the milking equipment.

Most of the milkrooms and milkhouses afforded ample working and storage place. When properly equipped, the milkhouse serves as a place to separate, cool, and store cream, and to wash and store utensils and milking machines.

Approximately 90 percent of the farmers stored all or a part of the winter's hay supply outside. Although a small percentage of the respondents did not use their overhead or inside hay storage, 90 percent of the farmers used their haymows and did some inside hay feeding.

The use of corn silage in feeding was a common practice on the farms sampled. Fifty-eight percent of the farmers harvested some corn or silage. Sixty-one percent of the farmers using silage stored all of it in stacks piled on the ground (table 27). The rest of the farmers used their silos or both silos and outside storage.

Table 27.--Number of sample farms, by method of silage storage, 1957-58

| County | Used silos only | Stacked silage outside | Combination of silo and stacks | Total |
|---|---|---|---|---|
| | Farms | Farms | Farms | Farms |
| McHenry | 6 | 15 | 2 | 23 |
| LaMoure | 10 | 14 | 1 | 25 |
| Total | 16 | 29 | 3 | 48 |
| | Percent | Percent | Percent | Percent |
| | 33 | 61 | 6 | 100 1/ |

1/ Exceeds number of farms as some had more than one silo.

Although all types of silos were found on the farms surveyed, half were trench silos (table 28).

Table 28.--Number of silos on sample farms, by type of silo, January 1, 1958

| Type of silo | Number of silos | | Total |
|---|---|---|---|
| | McHenry County | LaMoure County | |
| | Number | Number | Number |
| Trench (earthen) | 3 | 9 | 12 |
| Trench (cement) | 1 | - | 1 |
| Upright (cement stave) | 3 | 5 | 8 |
| Upright (wooden) | - | 2 | 2 |
| Bunker (earthen) | 2 | - | 2 |
| Total | 9 | 16 | 25 |

Storage facilities for feed grains appeared to be adequate in most instances. Forty percent of the farmers used more than one granary for storing their feed grains. Many farmers ground feed only infrequently during the year or feeding season. Thus their grainbins would need to be "weather tight." Frame granaries and storage bins in the cowbarn were the most common types of storage for feed grains.

## Equipment and Machinery

Because of the nature of the dairy enterprise, certain types of equipment are necessary. The amount and type of equipment needed varies from farm to farm. The major determining factors are the characteristics of the building facilities and farmstead, individual methods of operation, and the amount of labor and capital available for the dairy enterprise.

A milk strainer, pails, and containers for storage are necessary in operating a dairy enterprise producing cream in North Dakota. Although not vital to the successful operation of a dairy enterprise, three-fourths of the farmers sampled owned one or more mechanical milkers (table 29). All except three were single-unit machines. The addition of a mechanical milker also necessitates the addition of a pipeline, a pump motor, and an overflow tank.

Table 29.--Number of sample farms with mechanical milkers, McHenry and LaMoure Counties, January 1, 1958

| Number of mechanical milkers | Number of farms with— | | | Total number of farms | Percentage of farms with milkers |
|---|---|---|---|---|---|
| | 5 to 9 cows | 10 to 14 cows | 15 to 29 cows | | |
| | Number | Number | Number | Number | Number |
| 1 | 7 | 4 | 1 | 12 | 19 |
| 2 | 9 | 21 | 15 | 45 | 73 |
| 3 | 1 | 2 | 2 | 5 | 8 |
| Total | 17 | 27 | 18 | 62 | 100 |

Milkhouse and milkroom facilities and equipment usually include a cream separator, wash sink, water heater, and cooler. All farms were equipped with cream separators. A small percentage of the farms were equipped with the following: wash sinks, 9 farms; various types of water heaters, 7 farms; refrigerated cooler, 1 farm; other type of cooler, 5 farms. Most operators used household facilities for washing milk utensils, and cooling and storage of cream.

Miscellaneous pieces of equipment utilized, at least partly, for the dairy herd are as follows in decreasing importance: clippers for dehorning, elastrator for castrating, nipple pails, syringe and hypodermic needles, feed carts, ventilating fans, and drinking cups in barns or milking parlors.

Additional machinery and equipment included feed-grinding equipment, stock tank heaters, hay balers, field choppers, power loaders, and stack movers (table 30). All machines and equipment were used, either directly or indirectly, in connection with the dairy enterprise.

Table 30.--Number of sample farms with specified items of equipment and machinery, January 1, 1958

| County | Hammer-mill | Burr mill | Other grinder | Stock tank heater | Hay baler | Field chopper | Power loader | Stack-mover |
|---|---|---|---|---|---|---|---|---|
| | Farms | Farms | Farms | Farms | Farms | Farms | Farms | Farms |
| McHenry | 25 | 4 | 2 | 26 | 10 | 14 | 30 | 4 |
| LaMoure | 11 | 2 | --- | 18 | 10 | 12 | 33 | --- |

## Replacement and Breeding Practices

The ultimate success of a dairy enterprise depends in part upon the replacement program. A replacement program usually evolves around a definite and regular system of culling the dairy herd and acquisition of replacements. Replacements are obtained by the retention of heifer calves or the purchase of cows, bred heifers, heifer calves, or a combination of these methods. Eighty percent of the farmers sampled retained heifer calves as replacements in 1957. Six of this group bought additional heifer calves. No information is readily available to show that either raising or buying replacements is more economical or a better method of herd replacement. It depends upon the individual situation and the time period. Success depends partly upon the quality of the milking herd from which replacements are either retained or purchased, relative market prices of milk and dairy cattle, and the managerial ability of the operator. The quality and productive capacity of the herd can be increased more rapidly by buying replacements if high-quality animals are available for purchase. The quality of raised replacements is limited if a beef-type bull is used as is common practice.

The production years of a cow depend upon many factors, both physical and inherent. These factors include the general health and condition of the cow, the production potential that is inherited from parents, and management and feeding.

Twenty-two farmers attempt to keep a milk cow from 5 to 7 years and 37 for 8 to 10 years. The length of time a cow is kept depends mainly upon its health and condition, the care given it, and other factors. Thirty-four farmers usually cull their dairy herd yearly. However, only six used a milk-weighing or butterfat-testing device as a guide. The rest were influenced by such things as length of lactation, daily milk production, appearance of the udder, and whether or not the cow is difficult to handle or "hard to milk."

The number of replacement calves needed yearly depends upon the size and age of the milking herd and rate of herd replacement. The number of heifer calves needed as replacements usually increased with herd size. Thirty-eight percent of the farmers in the 5- to 9-cow group needed two heifer calves a year to maintain their replacement program.

Farmers with 10 to 14 cows needed from 2 to 4 heifer calves yearly for replacement and farmers with 15 to 29 cows needed from 4 to 6 heifer calves.

Breeding program.—Ninety percent of the farmers sampled used a bull in their breeding program in 1957 and the rest used artificial insemination. Seventy percent of the farmers used a beef-type bull for breeding the dairy herd. Approximately 3 in 4 farmers in McHenry County compared with only 3 in 5 farmers in LaMoure County used a beef-type bull. The percentage of farmers using beef-type bulls decreased as the size of the dairy herd increased, thus reflecting the increasing importance of the dairy enterprise (table 31).

Table 31.--Type of bull used with the dairy herd, 1957

| Number of cows in herd | McHenry County | | LaMoure County | | Total | |
|---|---|---|---|---|---|---|
| | Number farms | Percentage using beef bull | Number farms | Percentage using beef bull | Number farms | Percentage using beef bull |
| | Number | Percent | Number | Percent | Number | Percent |
| 5 to 9 | 11 | 100.0 | 10 | 80.0 | 21 | 90.5 |
| 10 to 14 | 20 | 75.0 | 15 | 66.7 | 35 | 71.4 |
| 15 to 29 | 7 | 42.9 | 12 | 41.7 | 19 | 42.1 |
| Total | 38 | 76.3 | 37 | 62.2 | 75 | 70.5 |

Nearly 90 percent of the respondents owned the bulls they use. The rest rented or borrowed bulls. Bull rentals were usually in the form of "room and board" with one exception when a cash charge was involved in addition to feed and care.

Seventy percent of the bulls used were beef-type bulls, 40 percent of these were Herefords, and 24 percent were Shorthorns. Of the dairy breeds, Holstein bulls were the most common. Almost 45 percent of the 81 bulls used were registered (table 32).

The useful life of a bull is usually limited, almost 85 percent of the respondents used a bull only 2 or 3 years. To avoid undesirable effects of inbreeding was one reason that limited the useful life of a herd sire. Many farmers stated also that older bulls were more difficult to handle or manage. Beef-type bulls were used slightly longer than dairy-breed bulls. A few farmers reported having used beef-type bulls as long as 5 years, while in no instance was a dairy-type bull used longer than $3\frac{1}{2}$ years. The average useful life of a beef-type bull was 2.8 years compared with 2.6 for a dairy bull.

Table 32.—Breed of bulls used to sire the dairy herd, 1957

| Breed | McHenry County | | LaMoure County | | Total | |
|---|---|---|---|---|---|---|
| | Number of bulls | Number registered | Number of bulls | Number registered | Number of bulls | Number registered |
| | Number | Number | Number | Number | Number | Number |
| Hereford | 16 | 9 | 16 | 10 | 32 | 19 |
| Shorthorn | 12 | 4 | 7 | 2 | 19 | 6 |
| Angus | 4 | 2 | 1 | 1 | 5 | 3 |
| Holstein | 7 | 2 | 10 | 3 | 17 | 5 |
| Brown Swiss | 1 | 1 | 4 | 2 | 5 | 3 |
| Red Poll | 1 | - | 1 | - | 2 | - |
| Crossbred | 1 | - | - | - | 1 | - |
| Total | 42 | 18 | 39 | 18 | 81 | 36 |

Almost half the farmers practiced crossbreeding by using beef-type bulls on dairy-breed cows, dairy bulls with cows of dissimilar dairy breed, beef-type bulls with cows of dissimilar beef breed, or by using dairy or beef-breed bulls with crossbred cows. A fourth of the farmers practiced line breeding within their particular breed, while the rest practiced a combination of both breeding methods in their program.

The only significant difference in breeding methods was that approximately 50 percent more farmers practiced crossbreeding in McHenry County than in LaMoure County.

Reasons stated by farmers for using beef-type bulls were (a) they obtained better market calves, (b) a bull was needed for the beef cows, and (c) the dairy operation was a dual enterprise.

Only eight respondents used artificial breeding in 1957; five of these farmers were from LaMoure County. The specific reason for using artificial breeding was to upgrade the dairy herd.

Costs of artificial insemination varied with the distance traveled by the technician from his operating headquarters to the farm. Costs recorded in LaMoure County were $7.00 per cow, while those in McHenry County varied from $8.00 to $9.50 per cow.

Most farmers said artificial breeding was a cheaper method of improving their milking herd than owning high-grade dairy bulls and they were obtaining better heifer calves.

Twenty of the 75 farmers who used bulls in 1957 had previously used artificial insemination. The main reasons for discontinuing artificial

insemination were conceptual difficulties or getting cows settled, unreliable service because of distances, and difficulty contacting the technician. A few farmers indicated that the use of a bull was cheaper and more convenient.

Thirty percent of the farmers who had never used artificial insemination distrusted it. They were almost unanimous in mentioning the possibility of conceptual difficulties and the lack of reliable service as reasons for not having used artificial insemination.

Much of the problem concerning the limited use of artificial insemination is the lack of telephones and the distance to be traveled by the technician.

Almost half of the farmers attempt to have a cow bred during the first 21 or 42 days after freshening. One-third have cows bred no earlier than 42 days and as late as 105 days. The rest of the farmers have their cows bred to freshen in no particular season, allowed the bull to run regularly or frequently with the milking herd, or otherwise paid no particular attention to the breeding cycles.

Approximately one-fourth of the respondents indicated that size rather than age was the chief requisite in breeding first-calf heifers. While 53 percent of the farmers bred their heifers from the ages of 18 to 24 months, a small percentage reported heifers bred as early as 12 months of age and as late as 27 to 36 months (table 33).

Table 33.--Number of farms breeding heifers at specified ages

| Age at first breeding (months) | Number of farms | | |
|---|---|---|---|
| | McHenry County | LaMoure County | Total |
| | Number | Number | Number |
| 12 to 18 | 14 | 21 | 35 |
| 18 to 24 | 25 | 19 | 44 |
| Over 24 | 2 | 2 | 4 |
| Total | 41 | 42 | 83 |

Replacements purchased, 1957.--In 1957, 43 percent of the farmers bought cows, heifers, or calves as replacements or additions to the dairy enterprise. An additional 12 percent bought bulls only. Approximately the same percentage of farmers in both counties bought either bulls or other dairy cattle.

One hundred forty-five head of cattle were purchased in 1957. Forty-one percent were mature cows, 16 percent were bulls, and the rest were calves, bred heifers, and heifers that had had their first calves.

Seventy percent of the livestock purchased were Holstein and slightly over 82 percent were of dairy breeds (table 34).

Table 34.--Breeds and class of cattle purchased, McHenry and LaMoure Counties, 1957

| Breed of livestock | Calves | Bred heifers | First-calf heifers | Cows | Bulls | Total |
|---|---|---|---|---|---|---|
| | Number | Number | Number | Number | Number | Number |
| Holstein | 26 | 26 | 7 | 34 | 9 | 102 |
| Guernsey | | | 1 | 12 | | 13 |
| Brown Swiss | 2 | | | | 2 | 4 |
| Ayrshire | | | | 1 | | 1 |
| Crossbred | | | | 11 | 1 | 12 |
| Shorthorn | | | | 2 | 4 | 6 |
| Hereford | | | | | 4 | 4 |
| Angus | | | | | 3 | 3 |
| Total | 28 | 26 | 8 | 60 | 22 | 145 |
| | Percent | Percent | Percent | Percent | Percent | Percent |
| | 19.3 | 17.9 | 5.5 | 41.4 | 15.9 | 100.0 |

Of the cattle and calves purchased, 67.6 percent originated from North Dakota, 26.9 percent from Wisconsin, and the rest from Minnesota. Forty percent of the purchases were made from other farmers, 34 percent through auctions, either local farm auctions or licensed public auction yards. The rest were purchased through livestock dealers and truckers (appendix table 18).

Average prices paid for bred heifers, first-calf heifers, and mature cows varied from $120 to $225 per head in 1957. Most cattle purchased from out-of-State sources cost from 20 to 50 percent more than North Dakota cattle. Average prices paid for first-calf heifers and cows were approximately 15 percent higher than bred heifers. Holstein cows purchased brought the highest average prices, followed by Guernsey, Ayrshire, Shorthorn, and crossbreeds, in that order (appendix table 19). Cattle bought from farmers usually were purchased at lower prices than those obtained from other channels, while livestock dealers and truckers usually received the highest prices paid (appendix table 20).

Prices paid for bulls varied with size, age, and quality. Fifteen of the 22 bulls purchased were of serviceable age, and the rest were calves and yearlings. Prices paid for Holstein bulls ranged from $150 to $325 for an average price of $187. One H.I.R. Holstein bull was purchased at $325 and one Brown Swiss at $240. Average prices paid for

Angus, Hereford, and Shorthorn bulls were $228, $202, and $148, respectively. Prices of individual bulls ranged from $100 to $350.

Seven farmers knew the level of production of the herds from which additions or replacements were purchased (appendix table 21). Three obtained DHIA production records, one had a Herd Improvement Registry, and the rest had the seller's word.

Accessory charges for purchases were insignificant. Prices paid to livestock dealers and truckers included trucking charges. In a few instances, the purchase prices from private individuals included the cost of trucking. For purchases at auctions, the only cost to the buyer was the trucking cost from the auction site to his farm.

In general, farmers who had bought livestock in 1957 and those who had previously bought additions or replacements were satisfied. The general attitude was "you get what you pay for." Those not satisfied stated they had bought either poor milkers or diseased cows. In several instances, farmers believed that Brucellosis had been transmitted to their herds through cattle they had purchased although the fact was not definitely established. In 1957, all except six animals were health-tested.

## Milk Production Testing

The only accurate way to measure a dairy cow's productive ability is to test milk samples for butterfat content.

The services available for milk testing in many communities include Dairy Herd Improvement Association, owner-sampler, Weigh A Day a Month, and creamery testing. Farmers with sons in Future Farmers of America chapters usually have testing facilities available to them.

Milk testing for butterfat content and good record keeping can be invaluable in culling low-producing cows and in choosing heifer calves as replacements. "Boarder" cows are usually costly in terms of feed, labor, and utilization of space.

Only six of the farmers were testing milk samples for butterfat content (table 35). Those who tested agreed unanimously that it is a worthwhile service and used it as a basis for culling.

Table 35.--Number of respondents who tested or weighed milk samples, 1957

| County | Monthly test by-- | | Irregular test by-- | | Monthly milk weighing |
|---|---|---|---|---|---|
| | Creamery | WADAM 1/ | Creamery | F.F.A. | |
| | Number | Number | Number | Number | Number |
| LaMoure | 3 | 1 | 1 | | |
| McHenry | | | | 1 | 1 |

1/ "Weigh a Day a Month" sponsored by the N. Dak. Extension Service.

Sixteen percent of the farmers who did not test in 1957 had done so previously. Two-thirds of these farmers said that the testing service had been discontinued and they would test again if facilities were made available. Of the remaining 65 farmers who had never tested, 10 plan to test in the near future, 26 had no plans, and the rest believed that they could judge production well enough without testing, or that testing was too expensive, too much trouble, or in some other way not worthwhile.

## Pasture Use, 1957

Pastures are used for a part of the feed supply during the summer. Eighty-five percent of the farmers sampled used some native pasture during the grazing season of 1957, and the rest used tame pasture. Alfalfa or alfalfa mixtures were used for pasture by about a third of the farmers (appendix table 22). Other grasses and legumes used included brome, sudan grass, rye, crested wheat, oats, clovers, and Kentucky bluegrass. A source of supplemental feed supply is the aftermath grazing of stubble and cornfields. Forty-two percent of the farmers reported using small-grain stubble and 33 percent used cornfields for supplemental grazing.

Native pasture was used by most farmers as the initial spring pasture. Fifty-seven percent began using native pasture in the first 2 weeks of May. A few farmers started using native pasture in the first 2 weeks of April, while 10 waited until the first week in June. Almost three in four farmers began to use their pastures by the first 2 weeks in May. On an average, the pasture season opened approximately a week later in McHenry than in LaMoure County (table 36).

Table 36.--Average beginning and ending dates of pasture season, 1957

| McHenry County | | | | LaMoure County | | | |
|---|---|---|---|---|---|---|---|
| Beginning dates | | Ending dates | | Beginning dates | | Ending dates | |
| Average date | Number of farms | Average date | Number of farms | Average date | Number of farms | Average date | Number of farms |
| Date | Number | Date | Number | Date | Number | Date | Number |
| Apr. 22 | 4 | Aug. 13 | 2 | Apr. 14 | 8 | | |
| May 14 | 32 | Sept. 19 | 8 | May 11 | 28 | Sept. 21 | 3 |
| June 2 | 5 | Oct. 10 | 12 | June 1 | 5 | Oct. 15 | 19 |
| | | Nov. 12 | 8 | | | Nov. 7 | 11 |
| | | Dec. 12 | 5 | | | Dec. 9 | 4 |
| | | Still on Dec. 31 | 5 | | | Still on Dec. 4 | 4 |

The winter of 1957-58 was relatively mild and therefore conducive to a late pasture season. Eleven percent of the farmers extended their pasture season into January of 1958, although 76 percent had taken their dairy stock off pasture by the end of November (table 36).

Considering a cutoff date of January 1, 1958, the average length of pasture season was 11 days longer in LaMoure County than in McHenry. The length of pasture season in LaMoure County varied from 118 days to 250 days, while in McHenry County it varied from 87 to 247 days.

Influencing the length of pasture season are the amount, condition, and kind of pasture available per animal unit and method of grazing. Data for analysis of amount and condition of pasture available per animal unit are limited. However, as shown in tables 36 and 38, the length of the pasture season was extended by the use of several kinds of pasture.

Table 37.--Length of pasture season, by type of pasture, 1957

| Pasture use | McHenry County | | | LaMoure County | | |
|---|---|---|---|---|---|---|
| | Number of farms | Range of days | Average number of days | Number of farms | Range of days | Average number of days |
| | Number | Range | Number | Number | Range | Number |
| Native only | 11 | 87-175 | 143 | 7 | 122-179 | 150 |
| Native and/or tame | 15 | 92-219 | 157 | 6 | 118-184 | 157 |
| Includes small grain stubble | 11 | 107-245 | 189 | 10 | 143-183 | 164 |
| Includes corn-fields 1/ | 3 | 183-247 | 220 | 18 | 153-250 | 203 |

1/ Includes standing corn and corn harvested for grain and silage.

Table 38.--Length of pasture season, by number of pastures used, 1957

| Number of individual pastures | McHenry County | | | LaMoure County | | |
|---|---|---|---|---|---|---|
| | Number of farms | Range of days | Average number of days | Number of farms | Range of days | Average number of days |
| | Number | Range | Number | Number | Range | Number |
| 1 | 15 | 87-175 | 144 | 7 | 122-183 | 154 |
| 2 | | 113-219 | 171 | 9 | 118-245 | 180 |
| 3 or more | | 92-247 | 187 | 25 | 143-250 | 182 |

When only one kind of pasture is used, feeding of grain or roughage is needed earlier in the fall and possibly later in the spring than when several kinds of pastures are used. As data on the amount and condition of pasture are not available, it was difficult to determine whether farmers in the sample were providing enough feed for their cows during the period when the pastures did not supply enough nutrients to maintain milk production. This varies with the kinds of grasses used as pasture, the amount of available pasture per animal unit, and the method of handling pasture use. There was supplemental grain or roughage feeding while cattle were picking over small grain or corn stubble, or running in picked cornfields and on native or tame pastures. At least 50 percent of the farmers began a limited hay or grain feeding program by the middle of October. Many farmers would find it to their advantage to start supplemental feeding when the pastures first begin to decline and before milk production drops off.

The average length of the pasture season was 150 days when only native pasture in LaMoure County was used. The pasture season was increased to an average of 203 days when corn stubble or cornfields were used. The average length of the pasture season was 154 days when one kind of pasture was used, compared with 182 where three or more kinds were used. In McHenry County, the average pasture season was only 143 days on native pasture compared with 220 days with cornfields used in addition. The average pasture season increased from 144 to 187 days when the number of pastures used increased from one to three or more.

Approximately two-thirds of the farmers pastured their dairy animals apart from their other livestock; the others pastured their dairy stock with sheep, beef cattle, or both. Two-thirds of the farmers who used two or more pastures practiced a rotational grazing system while the remaining one-third grazed one field, them moved the cattle to a second pasture to let the first remain idle. The rotational pasture system works in two ways: (1) the cattle were pastured for a time period, then moved to a second pasture and returned to the first later in the season, and (2) cattle were grazed alternately in day and night time pastures.

## Feeding Practices

Hay.--Almost 90 percent of the farmers sampled fed some alfalfa or alfalfa hay mixture during 1957 (table 39). One-fourth of the farmers fed alfalfa hay exclusively, while 62 percent fed a mixture of alfalfa and native hay.

Loose hay was by far the most common hay fed. Only 11 farmers baled all their hay harvested while an equal number baled a part of it. Most of the hay baled was alfalfa or other tame hay. Only six farmers baled native hay. A slightly higher percentage of farmers in McHenry than in LaMoure County fed baled hay.

Sixty-five percent of the farmers fed hay twice daily and 25 percent three times daily. The remaining 10 percent fed hay either one or four times daily. Ninety percent of the farmers fed hay inside during the feeding season at least once daily, and one-fourth fed hay inside exclusively. Ten percent did no inside feeding of hay.

Table 39.--Number of farmers feeding various kinds of hay to dairy cattle during 1957

| County | Number of sample farmers who fed-- | | | | | | |
|---|---|---|---|---|---|---|---|
| | Alfalfa only | Alfalfa and native | Alfalfa and other1/ | Native only | Millet and native | Oats and native | Crested wheat and native |
| | Number | Number | Number | Number | Number | Number | Number |
| LaMoure | 12 | 22 | 2 | 4 | 2 | | |
| McHenry | 9 | 23 | 4 | 3 | | 1 | 1 |
| Total | 21 | 45 | 6 | 7 | 2 | 1 | 1 |

1/ Includess brome, cane, millet and oats.

The amount of hay fed per animal will usually vary with the particular year and between months of the same feeding season, depending upon the weather. Farmers who fed baled hay usually fed up to 2 to 2½ bales per cow daily.

Silage.--More than half the farmers fed silage in 1957, and all except one fed corn silage. Not all farmers, however, fed silage to all classes of dairy animals (table 40).

Table 40.--Number of farmers who fed corn silage, 1957

| County | Number feeding silage | Number who fed silage to-- | | | |
|---|---|---|---|---|---|
| | | Milking cows | Dry cows | Bred heifers | Yearling heifers |
| | Number | Number | Number | Number | Number |
| LaMoure | 25 | 25 | 21 | 20 | 20 |
| McHenry | 22 | 22 | 21 | 20 | 17 |
| Total | 47 | 47 | 42 | 40 | 37 |

Silage feeding usually begins later in the feeding season than does hay feeding. Many operators do not open the silo or stack until range cattle are brought in from the fields and pasture. Two-thirds of the farmers fed cows outside, and a third fed silage in the barn. Dry cows and heifers were fed outside. As most of the silage is stored in trench silos or stacked on the ground, tractor-powered loaders are easily employed, with very little manual labor and time involved.

Thirty-three farmers fed silage once daily, and 14 fed it twice daily. The amount of silage fed was difficult to estimate, as only a few farmers fed silage by hand. Estimates of daily quantities fed varied from three-fourths of a bushel to a bushel and a half daily per head, but one bushel was the most common amount fed. A bushel of silage may vary from 16 to 25 pounds, depending upon quality and condition of the silage.

Grain feeding.--Forty-six farmers fed a ground-feed ration during the entire year, 32 for a part of the year, while 5 fed no grain or ground feed (appendix table 23). Seasonal grain feeding ranged from 3 to 8 months. Three-fourths of the farmers fed grain or a ground-feed mix between 5 and 7 months with 6 months the most common period.

LaMoure County farmers fed a larger variety of grains and ground feeds than did those of McHenry County. Dairy feeds used in LaMoure County included oats, corn, screenings, millet, barley, commercial concentrates or dairy feeds, soybeans and soybean oil meal, ground alfalfa, and minerals. Feeds used in McHenry County included oats, barley, screenings, corn, commercial concentrates, or dairy feeds and molasses (table 41).

Table 41.--Number of farmers sampled who fed various kinds of feed, 1957

| Feed ration | McHenry County | | LaMoure County | |
|---|---|---|---|---|
| | Summer feeding | Winter feeding | Summer feeding | Winter feeding |
| | Number | Number | Number | Number |
| All oats | 16 | 26 | 9 | 12 |
| Oats, other 1/ 2/ | 8 | 11 | 13 | 25 |
| Ground ear corn | | | 2 | 2 |
| Ground ear corn and screenings | | | | 1 |
| Barley and screenings | | | | 1 |
| Total | 24 | 37 | 24 | 41 |

1/ McHenry County includes barley, corn, commercial feeds, molasses, and screenings.

2/ LaMoure County includes barley, corn, commercial dairy concentrates, millet, screenings, soybeans, and soybean oil meal.

Most ground feeds were simple and consisted of varying ratios of ingredients, that is oats and barley, 3/4 to 1/4; oats and millet, 1/2 to 1/2; or oats and corn, 2/3 to 1/3. Only 1 in 5 farmers used a feed that contained three or more ingredients. Most feed was ground; in two exceptions, whole oats were fed. Commercially prepared concentrate feeds were fed separately. Four farmers, three of whom were in LaMoure County,

indicated that they fed milk cows in accordance with production, with the larger quantities of grain fed to better cows.

LaMoure County farmers generally fed a larger grain ration than did those from McHenry County. Farmers in LaMoure County who fed ground feed throughout the year fed approximately 12 percent more grain. The farmers who fed for a portion of the year only fed approximately 15 percent more than farmers in McHenry County (table 42).

Table 42.--Annual amount of all ground feed fed per cow, 1957

| Number of cows in herd | McHenry County | | | | LaMoure County | | | |
|---|---|---|---|---|---|---|---|---|
| | Cows fed entire year | | Cows fed seasonally | | Cows fed entire year | | Cows fed seasonally | |
| | Number of farms | Pounds per cow | Number of farms | Pounds per cow | Number of farms | Pounds per cow | Number of farms | Pounds per cow |
| | Number | Pounds | Number | Pounds | Number | Pounds | Number | Pounds |
| 5 to 9 | 6 | 2449 | 4 | 966 | 7 | 2791 | 5 | 1823 |
| 10 to 14 | 12 | 2243 | 8 | 1214 | 5 | 3486 | 10 | 1799 |
| 15 to 29 | 4 | 2434 | 3 | 1554 | 12 | 2645 | 2 | 2122 |
| Total | 22 | 2333 | 15 | 1216 | 24 | 2863 | 17 | 1843 |

Twenty-four of the LaMoure County farmers fed grain during the summer. Nine of these fed a daily average of 6 pounds of oats, while the remaining farmers fed an average of 7¼ pounds of mixed ground feed.

The daily rate of winter feeding was usually increased over that of the summer. Farmers who fed straight oats fed an average of 7 2/3 pounds daily, an increase of 28 percent. Those farmers who used a grain mixture fed an average of 10 3/4 pounds daily, an increase of 48 percent (appendix table 24).

Three-fourths of the LaMoure County farmers who fed grain throughout the year increased their seasonal feeding rate, usually in the winter. The largest percentage increases were made by farmers who fed less than 6 pounds daily. The average percentage increased for those farmers who fed less than 3 pounds daily was 171 percent; farmers who fed from 3 to 6 pounds daily doubled their ration; while those farmers who fed from 6 to 11 pounds daily increased their feeding rate by an average of 77 percent.

McHenry County farmers followed a similar feeding pattern. Those who fed a mixed ration fed at a heavier rate in both summer and winter than did those who fed oats alone. Somewhat more of the McHenry County farmers fed grain during the summer. Farmers who fed straight oats fed

a daily average of 5 1/3 pounds in summer and 6 pounds in winter. Farmers who fed grain or a feed mixture fed 6 pounds daily in the summer and 9 1/4 pounds in the winter. Half the farmers who fed grain throughout the year increased their winter seasonal feeding rates. Farmers who fed less than 3 pounds daily increased their feeding rations by 269 percent, while those who fed from 3 to 6 pounds increased their daily ration by an average of 79 percent. An increase in ground feed of 63 percent was made by those who fed more than 6 pounds daily.

Approximately half the farmers in both counties fed a grain ration to dry cows and bred heifers, but only in winter. Dry cows were usually fed throughout the dry period and heifers were commonly fed from the time they were bred to calving time. About half fed at the same rate as the milking cows, while the remaining farmers commonly reduced the daily amount fed by half.

## Calf Feeding

Replacement heifers and market calves were usually fed alike, except that usually veal calves were kept on whole milk until they were ready for market.

The usual daily ration for young calves was milk, grain and a roughage. Calves usually were fed milk twice daily unless they were on pasture, then many farmers fed milk only once daily. A small amount of grain and hay was commonly fed twice daily. Silage, however, was fed only once daily. The common practice was gradually to increase the daily feed ration as the calf attains size and weight. However, feeding of skim milk was limited by the amount available.

The milk ration.--Two systems for feeding milk to calves were commonly followed by farmers in both counties. One was to change calves directly from whole to skim milk. The other involved a gradual change through diluting the whole milk.

New-born calves were usually weaned from the dam after 1 to 3 feedings and then placed on a milk ration (table 43). The use of a nurse cow was not common. Only 7 farmers indicated that they have used, either regularly or occasionally, nurse cows for feeding veal or other market calves.

Ninety-five percent of the farmers started their calves on a whole milk ration after they were weaned. Half of these farmers fed whole milk for 2 to 3 weeks then changed over either to skim milk or to a mixture of whole and skim milk (appendix table 25).

A combination of whole and skim milk was used as transition from whole to skim milk. Farmers indicated that calves maintained their health and weight when the change was not sudden or abrupt. The transitional feeding period was from 3 to 7 days, but a week was most frequent.

Table 43.--Calf-weaning practices used on farms sampled, 1957

| County | Number of farmers who wean calves at-- | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | Birth | 1 to 3 feedings | 2 to 3 days | 4 to 7 days | 10 to 21 days | 6 weeks | |
| | Number | Number | Number | Number | Number | Number | Number |
| LaMoure | 9 | 18 | 9 | 4 | 1 | 1 | 42 |
| McHenry | 3 | 25 | 8 | 3 | 1 | 1 | 41 |
| Total | 12 | 43 | 17 | 7 | 2 | 2 | 83 |
| | Percent | Percent | Percent | Percent | Percent | Percent | Percent |
| | 14.5 | 51.8 | 20.5 | 8.4 | 2.4 | 2.4 | 100.0 |

Eighty-one farmers fed skim milk, while two farmers added powdered skim milk to it. Although skim milk was fed for an average of 25 weeks, the length of time varied from 5 to approximately 52 weeks. A third of the farmers indicated that they fed skim milk as long as calves would drink it.

Nine farmers fortified or strengthened their skim milk feeding with calf meal, calf pellets, or other commercial supplements. These supplements were fed either dry or in the milk.

The length or duration of the milk feeding period usually had no significant influence on the daily quantities fed except when calves were placed on a whole-milk ration after weaning. Usually each change from whole milk to the succeeding ration was accompanied by an increase in the daily quantity fed (table 44). The average daily amount of whole milk fed was $1\frac{1}{2}$ gallons which was increased to $2\frac{1}{4}$ gallons when calves reached the skim milk feeding period.

The grain ration.--Usually, dry feed is first fed to calves from the first to the fourth week after birth. Calves are fed grain until they reach pasture age, in most instances about 6 months. A small percentage of farmers fed grain to calves beyond the first year (appendix table 26).

Oats were the main feed used and most farmers fed them whole. Other feeds were corn, barley, millet, and screenings.

The average daily amount of grain fed to calves increased as they became older. Calves under 3 months were fed an average of 1.4 pounds per day, while those over 12 months received an average of 4 pounds of grain daily (appendix table 27). In both instances, this was less grain than the calves could have eaten.

Table 44.--Kind and amount of milk fed daily per calf, McHenry and LaMoure Counties, 1957

| Daily amount fed (gallons) | Number of farmers who feed-- | | |
|---|---|---|---|
| | Whole milk | Whole/skim milk | Skim and powdered milk |
| | Number | Number | Number |
| Under 1 | 5 | 1 | |
| 1.0 to 1.9 | 48 | 19 | 10 |
| 2.0 to 2.9 | 24 | 11 | 40 |
| 3.0 to 3.9 | 2 | 4 | 13 |
| 4.0 to 4.9 | | | 4 |
| All they will drink | | | 14 1/ |
| Total | 79 | 35 | 81 |
| | Gallons | Gallons | Gallons |
| Average gallons per head daily | 1.50 | 1.75 | 2.25 |

1/ Not included in average.

The roughage ration.--New-born calves were fed hay as soon as they were fed grain, or from 1 to 4 weeks of age. Three in four farmers fed some alfalfa hay and a fourth of them fed alfalfa hay exclusively to calves. Fifty-seven percent fed some prairie hay, and 13 percent fed prairie hay exclusively. Hays of minor importance fed to calves were brome, crested wheat, millet, sweet clover, quackgrass, and oats. Only 6 percent of the farmers fed no hay to young calves. Naturally, feeding tapers off with the advent of the pasture season.

Three-fourths of the respondents who raised silage fed it to dairy calves. Although only a third of the farmers fed silage to calves less than 4 months old, 75 percent had fed silage regularly to calves by the time they reached 6 months of age.

Calves appeared to be getting an adequate diet from the standpoint of variety. When calves were not fed milk, grain, hay, or silage, the deficiency was usually made up with such feeds as calf pellets or calf-meal.

## Feed Expenditures

Thirty-eight of the 83 sample farmers in the two counties bought feed in 1957 (table 45). Thirty-five farmers bought less than $50 worth of feed while three bought feed in the amount of $300 or more.

Table 45.--Number of farmers who purchased feed for dairy herd, 1957

| County | Type of feed purchased | | | |
|---|---|---|---|---|
| | All feed 1/ | | Feed supplements, dairy and calf feed | |
| | Number of farms | Percentage of all farms in sample | Number of farms | Percentage of all farms in sample |
| | Number | Percent | Number | Percent |
| LaMoure | 16 | 38 | 9 | 56 |
| McHenry | 22 | 54 | 16 | 73 |
| Total | 38 | 46 | 25 | 66 |

1/ Excludes salt.

Although a larger percentage of farmers in McHenry than in LaMoure County bought dairy and calf feeds, the total amount of their purchases combined was only a fourth as large. Feeds purchased for the dairy herd included hay, grain, feed supplements, calf pellets, calfmeal, and commercial dairy feeds.

## Labor

Labor is not a critical factor of production in most North Dakota dairy enterprises. Most of the labor needed comes during a time of year when the labor force is under utilized. Moreover, most of the labor needed is furnished by the farm family. Only five farms maintained hired men during the entire year. The presence of a dairy enterprise enabled four of these farmers to keep hired labor for the entire year. Thirty of the farmers hired some help during part of the year, but mainly for seasonal work.

Average labor requirements per cow and calf ranged from 90 to 200 hours per year. This wide range was due to one or more factors, including herd size, individual farm and farmstead characteristics, barn floor plan and design, availability and use of labor-saving devices and equipment, number and frequency of chores involved in the enterprise, and number of people employed. Also, influencing the number of hours required, particularly for barn cleaning and roughage feeding, is the amount of time the dairy herd is outside during the winter. A number of farmers confined their cows to the barn only in bad weather, while through custom or habit others confined their dairy cattle for longer periods.

Milking operations.--Approximately 50 percent of the annual labor requirements are the milking and associated operations. This includes time needed to stanchion and prepare cows for milking, the actual milking operation, and for separating the cream. Three-fourths of the farmers separated cream during the milking operation, as separators were located either in the barn or in a nearby milkhouse.

Time required daily for milking will not vary appreciably if cows freshen throughout the year so the number milked are the same daily. Although there is some economy of scale, labor requirements for the milking operation increase more sharply with size of herd than do other operations (table 46). For example, on the average 497 man hours are required for milking an 8-cow herd compared with 702 hours for a 12-cow herd when cows are milked by hand for a 9-month period. Although the herd size is increased by 50 percent, the total annual increase in labor needed for the milking operation is 41 percent. The biggest saving of time associated with herd size is in chores other than milking. For a herd increase of 50 percent from 8 to 12 cows, the labor requirements for milking increased 41 percent, while the total labor requirements increased 25 percent.

Conversions from hand to milking machines decreased the annual amount of labor required for milking much more for the larger herds than for the smaller herds. This conversion reduced the labor in milking approximately 17 percent for one machine added for a herd of 5 to 9 cows but 20 percent for a herd of 10 to 14 cows. A second milking unit saved a larger percentage of labor with the larger herds. A herd increase of 33 percent (from 12 to 16 cows) raised the amount of average labor needed for milking by only 11 percent.

These examples are for a 9-month milking period. A 10-month milking period would increase the savings from machine milking.

Utensil cleaning.--Cleaning of utensils and equipment accounts for approximately 10 percent of the number of hours required annually for the dairy herd. Equipment requiring some daily cleansing included cream separator, milking machine, milk pails, and strainer. The time needed to clean the various items varied with the washing facilities available, the types of milker units, and the separators used. The average time required annually to clean utensils used in hand milking was 143 hours compared with an average of 185 hours in machine milking.

Feeding.--Feeding the dairy herd may average from 15 to 20 percent of the total number of hours required annually (table 47). The time required depends mainly upon the frequency of feeding, feed-storage facilities, equipment used for feeding, the types of feeds to be fed, and the duration of feeding periods.

The efficiency of feeding herds of various sizes or economy of scale is evident (appendix table 31). The additional time required to feed grain, hay, or silage to an additional cow is negligible. The average number of hours required monthly to feed eight cows ground feed daily, usually twice, was approximately 9½ hours. To feed twice as many cows, the average monthly labor needed was 13½ hours, an increase of only 40 percent. The same pattern existed when hay and silage was added to the feed ration. As the herd size increased, the amount of labor needed for feeding increased at a much lower rate.

Table 46.--Annual hours required for dairy herd by size of herd

| Type of operation | 8 cows | | | 12 cows | | | 16 cows | | 24 cows |
|---|---|---|---|---|---|---|---|---|---|
| | Average annual hours when cows are milked by-- | | | Average annual hours when cows are milked by-- | | | Average annual hours when cows are milked by-- | | |
| | Hand | One machine | Two machines | Hand | One machine | Two machines | Hand | One machine | Two machines |
| | Hours | Hours | Hours | Hours | Hours | Hours | Hours | Hours | Hours |
| Milking | 497 | 410 | 360 | 702 | 562 | 518 | 835 | 576 | 864 |
| Cleaning utensils | 143 | 185 | 185 | 143 | 185 | 185 | 143 | 185 | 185 |
| Feeding | 198 | 198 | 198 | 246 | 246 | 246 | 299 | 299 | 449 |
| Barn cleaning | 106 | 106 | 106 | 134 | 134 | 134 | 140 | 140 | 140 |
| Calf-pen cleaning | 45 | 45 | 45 | 50 | 50 | 50 | 52 | 52 | 52 |
| Manure hauling | 37 | 37 | 37 | 49 | 49 | 49 | 82 | 82 | 82 |
| Fencing | 62 | 62 | 62 | 62 | 62 | 62 | 62 | 62 | 62 |
| Feed grinding | 17 | 17 | 17 | 25 | 25 | 25 | 25 | 25 | 43 |
| Calf care | 11 | 11 | 11 | 16 | 16 | 16 | 20 | 20 | 28 |
| Calf feeding | 196 | 196 | 196 | 211 | 211 | 211 | 229 | 229 | 229 |
| Total hours | 1312 | 1267 | 1217 | 1638 | 1540 | 1496 | 1887 | 1670 | 2134 |
| Average hour per cow | 164 | 158 | 152 | 137 | 128 | 125 | 118 | 104 | 89 |

Table 47.--Percentage of labor requirements for hand milking by selected size of herd, seasonal and total

| Type of operation | 8-cow herd | | | | 12-cow herd | | | |
|---|---|---|---|---|---|---|---|---|
| | Percentage of annual hours for cows-- | | Total | | Percentage of annual hours for cows-- | | Total | |
| | On pasture (6 mos.) | Off pasture (6 mos.) | Hours | Percent | On pasture (6 mos.) | Off pasture (6 mos.) | Hours | Percent |
| | Percent | Percent | Hours | Percent | Percent | Percent | Hours | Percent |
| Milking, utensil cleaning | 53.5 | 43.2 | 640 | 48.8 | 57.2 | 45.5 | 845 | 51.6 |
| Feeding | 10.0 | 19.8 | 198 | 15.1 | 10.1 | 19.4 | 246 | 15.0 |
| Barn and calf pen cleaning | 7.1 | 15.5 | 151 | 11.5 | 6.9 | 15.1 | 184 | 11.2 |
| Miscellaneous 1/ | 15.5 | 3.8 | 116 | 8.8 | 13.9 | 4.1 | 136 | 8.3 |
| Calf feeding and care | 13.9 | 17.7 | 207 | 15.8 | 11.9 | 15.9 | 227 | 13.9 |
| Total percent | 100 | 100 | --- | 100 | 100 | 100 | --- | 100 |
| Total annual hours | 587 | 725 | 1312 | --- | 726 | 912 | 1638 | --- |
| Percent | 44.7 | 55.3 | 100 | --- | 44.3 | 55.7 | 100 | --- |

1/ Includes manure hauling, fencing, and feed grinding.

Barn cleaning.—The number of hours required for cleaning barn and calf pens may vary from about 7 to 16 percent of the total number of hours needed annually by the dairy herd. On the farms sampled, it averaged about 10 percent.

Barn cleaning falls into three distinct periods--cows outside except for milking, cows housed during the nights only, and cows housed both day and night except for exercise periods during the day.

When cows are outside except for milking, the time required for barn cleaning averaged approximately 7 hours a month. When cows are housed at night, however, labor requirements are increased to 11 hours per month for a herd of 5 to 9 cows and to 18 hours for a herd of 15 to 29 cows.

Labor requirements are increased by 60 percent for the small herd and by 16 percent for the herd of 15 to 29 cows when the dairy cows are confined both day and night.

The economy of scale for calf-pen cleaning is less distinct than that for cleaning cow stalls, gutters, and feed mangers. More important in the economy of labor utilization in calf-pen cleaning is the frequency of the operation performed. When calf pens are cleaned daily or every other day, approximately two and a half times more labor is used annually than when the pens are cleaned weekly or every 2 to 3 weeks.

Labor for calves.--Labor devoted to the care of calves, other than bedding and pen cleaning, includes feeding, dehorning, castrating and care devoted to the cow and calf at birth such as milking the cow out, starting the calf on pail feeding, cleaning the cow and calf, if need be, and disinfecting the navel. These miscellaneous chores and feeding commonly required approximately 15 percent of the total number of hours of labor required annually. Calf feeding occupies most of the time devoted to calf care; other chores are intermittent.

Miscellaneous labor.--Additional labor directly associated with the dairy operations are fencing, feed grinding, and manure hauling. Under certain conditions, these operations represent approximately 9 percent of the total time. Under other defined conditions, the time required to perform these operations could easily double.

At least as important as size of herd in economy of scale is the frequency of the operations involved. This is true of most operations. A certain amount of time is required to prepare or "set up" for each operation such as feed grinding, repairing or putting up new fence. Frequency of performance also affects the total number of hours required for certain operations when distance is involved. For example, hauling manure daily may require many trips with less than a full load; less frequent handling but with full loads would take less total time.

Fencing labor also varied with amount and number of pastures used and, most important, the types of livestock pastured. When sheep are pastured with dairy cattle, a better fence is required, and more labor is needed to keep the fence in good repair.

Labor for feed grinding varies with the amount of feed ground and the frequency of grindings. Of these, frequency is most important.

## The Labor Budget

In both counties studied, the dairy cattle were pastured for approximately 6 months. During this period the cows were in the barn only during the milking period. For another 3 months, they were in the barn only at night; for the remaining 3 months, they were in the barn 24 hours daily except for exercise periods. This pattern of housing management may vary with weather and the habits of the operator. Any change in the housing pattern affects labor requirements for such operations as feeding roughage and barn cleaning.

A budget of annual labor requirements for four sizes of dairy herds was prepared (tables 48 and 49). Basic data are shown in appendix tables 29 through 34. These estimates assume that cows are on pasture for 6 months, indoors at night for a 3-month period, and indoors 24 hours daily for 3 months; that each cow is milked for a 9-month period and that cows are milked on a year-round basis. We assume further that 6 pounds of ground grain per cow are fed daily the entire year. Hay is fed for 6 months and silage is fed for 3 months. Operation such as calf-pen cleaning and manure hauling are done weekly or less frequently. Calf care is based on one calf per year per cow.

The economy of scale comes about in two ways--one with an increase of herd size and the other with the use of machine milking. Annual labor requirements vary from 164 hours per cow for an 8-cow herd hand milked to 89 hours for a 24-cow herd machine milked with two units. Doubling the size of hand-milked herds from 8 to 16 cows reduces total labor per cow from 164 to 137 hours. Tripling the size of machine-milked herds--from 8 to 24 cows--reduces total labor per cow from 152 to 89 hours.

Seasonal labor requirements.--With the pattern of seasonal housing assumed here, about 45 percent of the annual labor input occurs during the 6 months cows are on pasture, regardless of size of herd and whether the milking is by hand or machine. Fifty to 57 percent of this pasture season labor is directly associated with the milking operation.

Of the winter labor requirements, milking comprises from 40 to 45 percent, feeding about 20 percent, and calf care and barn cleaning the rest.

Table 48.--Percentage of labor requirements for milking with one milker unit, by size of herd, seasonal and total

| Type of operation | 8-cow herd | | | | 12-cow herd | | | |
|---|---|---|---|---|---|---|---|---|
| | Percentage of annual hours for cows-- | | Totals | | Percentage of annual hours for cows-- | | Totals | |
| | On pasture (6 mos.) | Off pasture (6 mos.) | Hours | Percent | On pasture (6 mos.) | Off pasture (6 mos.) | Hours | Percent |
| | Percent | Percent | Hours | Percent | Percent | Percent | Hours | Percent |
| Milking and utensil cleaning | 50.1 | 39.9 | 595 | 47.0 | 55.1 | 43.3 | 747 | 48.5 |
| Feeding | 10.8 | 20.9 | 198 | 15.6 | 10.6 | 20.2 | 246 | 16.0 |
| Barn and calf-pen cleaning | 7.6 | 16.4 | 151 | 11.9 | 7.2 | 15.7 | 184 | 12.0 |
| Miscellaneous | 16.6 | 4.0 | 116 | 9.2 | 14.6 | 4.3 | 136 | 8.8 |
| Calf feeding and care | 14.9 | 18.8 | 207 | 16.3 | 12.5 | 16.5 | 227 | 14.7 |
| Total | 100 | 100 | --- | 100 | 100 | --- | --- | 100 |
| Total annual hours | 561 | 706 | 1267 | --- | 678 | 862 | 1540 | --- |
| Percent | 44.3 | 55.7 | 100 | --- | 44.1 | 55.9 | 100 | --- |

Table 49.--Percentage of labor requirements for milking with two milker units, by selected size of herd, seasonal and total

| Type of operation | 16-cow herd | | | | 24-cow herd | | | |
|---|---|---|---|---|---|---|---|---|
| | Percentage of annual hours for cows-- | | Total | | Percentage of annual hours for cows-- | | Total | |
| | On pasture (6 mos.) | Off pasture (6 mos.) | Hours | Percent | On pasture (6 mos.) | Off pasture (6 mos.) | Hours | Percent |
| | Percent | Percent | Hours | Percent | Percent | Percent | Hours | Percent |
| Milking and utensil cleaning | 57.2 | 45.3 | 761 | 45.6 | 56.0 | 42.8 | 1049 | 49.2 |
| Feeding | 9.8 | 21.4 | 299 | 17.9 | 13.1 | 27.6 | 449 | 21.0 |
| Barn and calf-pen cleaning | 6.1 | 13.8 | 192 | 11.5 | 5.5 | 11.8 | 192 | 9.0 |
| Miscellaneous | 14.2 | 5.2 | 169 | 10.1 | 13.7 | 5.2 | 187 | 8.8 |
| Calf feeding and calf care | 12.7 | 14.3 | 249 | 14.9 | 11.7 | 12.6 | 257 | 12.0 |
| Total | 100 | 100 | --- | 100 | 100 | 100 | --- | 100 |
| Total annual hours | 738 | 932 | 1670 | --- | 924 | 1210 | 2134 | --- |
| Percent | 44.2 | 55.8 | 100 | --- | 43.3 | 56.7 | 100 | --- |

## Death Losses and Disease

Death losses.--Death losses cannot always be avoided, but under good management they can be minimized. Death losses incurred from calving, pneumonia, scours, and accidents account for 56 percent of all losses on the farms sampled (table 50). Fifty-three of the 83 farmers interviewed experienced death losses in 1957.

Table 50.--Number of dairy animals that died from various causes, sample farms, 1957

| Cause of death loss | Number of-- | | | Total number of dairy | Percent loss |
|---|---|---|---|---|---|
| | Cows | Yearling to 2-year olds | Calves | | |
| | Number | Number | Number | Number | Percent |
| Pneumonia | | 1 | 19 | 20 | 17.5 |
| During calving | 1 | | 14 | 15 | 13.2 |
| Stillborn | | | 12 | 12 | 10.5 |
| Scours | | | 8 | 8 | 7.0 |
| Bloat | 2 | 1 | 5 | 8 | 7.0 |
| Shipping fever | | | 6 | 6 | 5.3 |
| Overeating and choke | 1 | | 4 | 5 | 4.4 |
| All other 1/ | 5 | 1 | 15 | 21 | 18.4 |
| Unknown | 3 | | 16 | 19 | 16.7 |
| Total | 12 | 3 | 99 | 114 | 100.0 |

1/ Losses from lightning, toxic weed spray, hardware disease, infections, freezing and rabies.

Losses of calves were heaviest; 58 percent of the farmers lost one or more from the 1957 calf crop. Of 1,045 cows that had calved, 99 calves either died or were stillborn. Excluding stillbirths, the death loss was approximately 8 percent; stillbirths raised the death-loss rates an additional 1½ percent.

The incidence of death losses of mature cows was relatively low, 1.15 percent of the cows that had calved in 1957. Thirteen percent of the farmers sampled lost one cow; one farmer lost two cows. Losses of yearlings and 2-year olds were negligible. Death losses were approximately the same in both counties.

Disease and illness.--Positive measures, such as vaccination and other preventative treatments, can minimize veterinary and medicinal costs and death losses. The most common preventive against specific diseases is vaccination. Three-fourths of the farmers vaccinated for

Brucellosis (table 51). Other preventive treatments included regular feeding of antibiotics and vitamins in ground feed and a program of administering a penicillin injection to each fresh cow.

Table 51.--Number and percentage of farmers who regularly vaccinated calves, 1957

| County | Total number of farmers | Number of farmers who vaccinate for-- | | |
|---|---|---|---|---|
| | | Brucellosis | Black Leg | Shipping fever |
| | Number | Number | Number | Number |
| LaMoure | 26 | 23 | 13 | 3 |
| McHenry | 37 | 34 | 20 | 1 |
| Total | 63 | 57 | 33 | 4 |
| | Percent | Percent | Percent | Percent |
| | 100 | 90 | 52 | 6 |

Diseases of calves.--Forty percent of the farmers encountered some type of disease or illness with their calves. The two most common were scours and pneumonia. Lice, pinkeye, and shipping fever were troublesome. A small percentage of farmers could not identify some afflictions.

General treatments included the use of antibiotics and sulfa drugs administered orally with the feed or by hypodermic injections. In addition to the use of antibiotics, a common remedy for scours was a reduction in the volume of milk fed and to dilute whole milk with water.

Cow diseases.--Half the operators had one or more cows with some ailment. Mastitis accounted for almost 50 percent of the ailments; it was treated largely by the operators. Other diseases or ailments in order of decreasing importance were Brucellosis, Milk Fever, calving troubles, bloat, pneumonia, foreign objects, infections, and lumpy jaw.

Approximately half of the farmers utilized the services of a veterinarian. Although farmers in general treated mastitis infections themselves, veterinarians were called for other afflictions.

Veterinarian costs appeared to be commensurate with the severity of the ailment, the services performed, and the distance traveled. Veterinarian charges including medicine ranged from $10 to $80, with charges from $15 to $25 most common.

Medicinal costs for the year of 1957 varied from $2.50 to $37.00 per farm. More than 90 percent of the farmers who bought medicines and antibiotics had annual costs of less than $20, an average of $8 per farm.

## Livestock Sales

Sales of cattle and calves in 1957 accounted for approximately 36 percent of the cash receipts from the dairy enterprise. The percentage of cash receipts from sales of dairy animals was slightly higher in McHenry County than in LaMoure County.

Seventy-seven farmers sold a total of 630 head of cattle and calves of which 56 percent were feeder calves, 30 percent were cull cows, and 9 percent were veal calves. The remaining 5 percent were bulls, cows, and heifers sold for either slaughter or breeding purposes.

More than 85 percent of the mature dairy stock sold was culled from the dairy herd for such reasons as low production, age, disease, or other factors that limited the animal's usefulness.

Approximately 1 in 5 farmers sold veal calves. Calves usually sold at vealer weights were those of Guernsey, Ayrshire, and Brown Swiss breeds. Three-fourths of these farmers sold veal calves at specified weights, usually within a range of 200 to 225 pounds. The remaining fourth used market prices as a guide instead of selling calves at specific weights.

Fifty-nine farmers sold calves or yearlings as feeders. Calves commonly sold at feeder-calf weights were of Red Poll, Holstein, Angus, Hereford, and Shorthorn breeds or crossbred. Many farmers were of the opinion that calves from dairy-breed crosses sold at prices comparable to calves from a beef breed. Some farmers kept their calves longer to utilize cheap feeds, roughage, pasture and skim milk; they were sold as yearlings in the fall of the second year or later.

Nearly 30 percent of the respondents sold calves at weights of 350 to 500 pounds. Two-thirds of these said they received a higher price for the lighter weight calves and that this type of operation was most profitable for them.

The largest percentage of the farmers (43 percent) sold yearlings at weights of 550 to 650 pounds. Some said they would carry calves to heavier weights if they were not hampered by feed and pasture shortages, limited facilities, or lack of capital.

Of the remaining farmers, 27 percent sold yearlings at weights of 700 to 850 pounds or more. The yearlings were mainly grassfed; they were sold off pasture after the second summer. These farmers indicated that usually they had an abundance of roughage and pasture and that the cost of the weight gains was slight.

Approximately 13 percent of the farmers sampled usually fed out their cattle to slaughter weights. These included the Holstein and Brown Swiss breeds, crossbred cattle, and those of beef breeds.

The cattle were usually kept from 20 to 24 months, and some were finished in a drylot. A higher percentage of feeding was done in LaMoure than in McHenry County probably because more corn is raised in the former.

Method of sale.--The two main channels of cattle sales were through terminal stockyards and licensed public auctions. In LaMoure County, more than 83 percent of the dairy animals were sold through terminal yards and 11 percent were sold through public auctions. The remaining 6 percent were sold either to a packer direct or to private individuals. In contrast, 57 percent of the McHenry County dairy stock were sold through terminal stockyards, 24 percent through public auctions, 11 percent through livestock dealers, and the rest to a packer or private individual.

Livestock prices.--The average annual price received in 1957 for all cows did not indicate a significant difference by method of sale or type of cow sold. The average price of $12.25 per hundredweight received in 1957 varied only 35 cents for cull cows of dairy breeds, crossbreeds, and beef breeds. Nearly 80 percent of the observations of terminal market sales fell within a range of $11.00 to $13.75 per hundred and approximately 13 percent were from $10.00 to $10.75 per hundred. Cows that weighed above 1,300 and below 900 pounds commonly brought prices of $11.00 per hundred or less. Prices received for cull cows sold through auction yards were slightly higher and averaged $13.15 per hundred.

Prices for calves to be fed out, by cattle feeders or other farmers, varied much more than those for cull cows or veal calves. Average prices received for calves sold through terminal markets were nearly $2.00 higher per hundred than for calves sold through other channels. The average price received by farmers for calves sold through terminal markets was $16.95 per hundredweight. Dairy-type calves averaged $16.30 compared with $17.00 for beef-crossed and beef-type calves. When market weights were established, there was little significant difference in prices received for weights less than 700 pounds; dairy-type calves averaged $17.30 per hundred compared to $19.25 for beef-type animals. At weights of more than 700 pounds, the average price received for dairy-type animals was $15.10 compared with $18.40 per hundred for beef-type.

Cost of sales.--The cost of sales varied with the method of sale. These costs usually include trucking, commission, yardage, feed and bedding, insurance, brand inspection, and a levy made by the National Meat Board for advertising purposes.

The largest individual item of sales expense was transportation. All livestock shipments made by sample farmers were made by truck. One-fourth of the farmers hauled their own livestock and two-thirds hired all their trucking of livestock. Trucking rates varied by the distance traveled--the greater the distance, the higher the rate charged (table 52). Trucking rates varied only slightly between firms.

Table 52.--Schedules of truck rates charged in 1957

| Origin | Destination | Rate | Distance (miles) |
|---|---|---|---|
| LaMoure | Fargo | 45¢/cwt. 1-2/ | 100-150 |
| McHenry | Fargo | 55 to 85¢/cwt. 1-2/ | 200-280 |
| Fargo | So. St. Paul | 50¢/cwt. 2-3/ | 250 |

1/ Additional charge of 5 cents per cwt. for each additional loading stop.

2/ Included 3 percent Federal tax now discounted.

3/ Flat rate.

Items that make up the cost of sales at all public markets, licensed livestock auctions, and terminal markets are posted in these markets as required by law. Commission fees charged will vary according to the volume of livestock sold. Table 53 shows the marketing charges at the Union Stockyards at West Fargo, but does not take volume into consideration as most farmers sold cattle in single or small lots.

Table 53.--Schedules of charges for Union Stockyards, West Fargo, North Dakota, 1957

| Class of cattle sold | Commission (per head) | Yardage (per head) | Feed and bedding (per head) | Miscellaneous (per head) | Total (per head) |
|---|---|---|---|---|---|
| | Dollars | Dollars | Dollars | Dollars | Dollars |
| Bulls | 1.95 | 1.50 | .25 | .25 | 3.85 |
| Cattle and calves over 300 pounds | 1.40 | .86 | .25 | .25 | 2.76 |
| Calves under 300 pounds | .80 | .50 | — | .20 | 1.50 |

1/ Brand inspection at 15 cents per head and the National Meat Board charge varied from 5 cents to 10 cents per head. Yard insurance provided for farmers is free of charge.

The cost of sales as charged by licensed livestock auction yards are not uniform by areas. Table 54 shows a comparison of selling costs as charged by two auction yards, each in a different area of North Dakota.

Table 54.--Schedule of charges for two licensed livestock auction yards, 1957 1/

| Licensed livestock auction market | Class of cattle sold | Commission (per head) 2/ | Yardage (per head) | Feed (per head) | Brand inspection (per head) | Insurance (per head) |
|---|---|---|---|---|---|---|
| A | All cattle | 2% | None | Actual cost | .15 | .05 |
| B | Calves up to 650 lbs. | 7.5-2.4% 3/ | None | .25 | .15 | .05 |
| B | All other cattle | 5.5-2.0% 4/ | None | .25 | .15 | .05 |
| B | Milk cows | $10.00 5/ | None | .25 | .15 | .05 |

1/ Source: Unpublished data from NDAC Agricultural Economics Department.

2/ Commission charge is based on total gross sales receipt.

3/ Based on gross sales from $20 to $175 graduated in amounts of $25 over gross sales of $50.

4/ Based on gross sales from $50 to $250 on a graduated scale. A $5.00 per head commission charged for all amounts over $250.

5/ Special sales for dairy livestock.

## Cream Sales

Farm-separated cream is the most important product for sale from the dairy enterprise. Cash receipts from sale of cream exceeded those from sales of dairy cattle and calves for more than two-thirds of the respondents.

The volume of butterfat sold depends upon several factors other than physical production--mainly the volume of home and farm consumption of whole milk and cream. The average volume of butterfat sold usually varied with the size of the dairy herd. Farms with herds of 5 to 9 cows sold an average of 1,241 pounds of butterfat in 1957, while farms with herds of 10 to 14 cows sold 2,269 pounds, and those with herds of 15 to 29 cows sold an average of 3,538 pounds of butterfat (table 55).

Table 55.--Average annual butterfat sales, 1957

| Number of cows in herd | Range of butterfat sold | Pounds of butterfat sold for farms with following types of cows in dairy herd | | | | Average butterfat sold per cow |
|---|---|---|---|---|---|---|
| | | Beef and crossbred | Dairy-beef mixed | Dairy | Average | |
| | Pounds | Pounds | Pounds | Pounds | Pounds | Pounds |
| 5 to 9 | 639-1858 | 1043.7 | 1385.3 | 1629.0 | 1240.9 | 162.5 |
| 10 to 14 | 1135-3421 | 1807.6 | 2743.6 | 2511.1 | 2269.1 | 191.7 |
| 15 to 29 | 1890-8680 | 4117.0 1/ | 3255.0 | 3788.8 | 3538.4 | 208.4 |
| Average | --- | 1544.8 | 2580.9 | 2873.4 | 2278.2 | 192.0 |

1/ Single observation.

Prices of butterfat.--The average annual prices received for butterfat were slightly higher in McHenry than in LaMoure County. Average annual prices received by LaMoure County farmers varied from 59 to 67 cents and averaged 61.4 cents per pound of butterfat. McHenry County farmers received an annual price of 61.6 cents per pound of butterfat with a range from 60 to 68 cents.

Butterfat prices received by farmers were generally higher during the late fall, winter, and early spring. Prices received for butterfat sold during May through September were commonly from 1 to 3 cents below prices received during the other months. In addition to the seasonal variation of butterfat prices, there was a 1- to 2-cent differential in the price received for sweet and sour cream. Most farmers sold both kinds of cream during the year.

Marketing channels, 1957.--The marketing structure varied slightly between the two counties. Forty-three percent of the farmers from LaMoure County sold their cream directly to cooperative creameries compared with 10 percent in McHenry County (table 56). Approximately 27 percent from both counties sold their cream through at least two different channels. The main reason for this is that many farmers take along cream to sell on their weekly or periodical shopping trips to town. Other reasons include a change of processors because of dissatisfaction over cream prices or cream tests, while a few farmers purposely sell cream to several buyers to check prices and cream tests.

Table 56.—Marketing facilities used by farmers of McHenry and LaMoure Counties, 1957

| Direct shipping or sales to— | McHenry County farms | | LaMoure County farms | | Total farms | |
|---|---|---|---|---|---|---|
| | Number | Percent | Number | Percent | Number | Percent |
| Centralizer Creamery | 8 | 19 | 4 | 10 | 12 | 14 |
| Co-op Creamery | 4 | 10 | 18 | 43 | 22 | 27 |
| Independent Creamery | 11 | 27 | --- | --- | 11 | 13 |
| Cream Station 1/ | 6 | 15 | 9 | 21 | 15 | 18 |
| Two or more outlets | 11 | 27 | 11 | 26 | 22 | 27 |
| Independent cream buyer | 1 | 2 | --- | --- | 1 | 1 |
| Total | 41 | 100 | 42 | 100 | 83 | 100 |

1/ Cream stations can be buying for centralizer, co-op or independent creameries, or they can be operated independently to re-sell cream to bidders.

Transportation.—Usually transportation is furnished by the farmers. Rail shipments of cream are of minor importance in LaMoure County, while approximately 40 percent of the McHenry County farmers used rail transportation for part or all of their yearly cream sales.

Truck pickup routes were used widely in LaMoure County where one-third of the farmers used this service. The pickup service was inexpensive; costs varied from 1 to 2 cents per pound of butterfat.

The distance traveled from farm to most usual point of delivery varied from 1 to 15 miles in LaMoure and up to 18 miles in McHenry County. The average distance traveled to the common delivery point in LaMoure County was 6 1/2 miles compared with approximately 7 3/4 miles in McHenry County. Farmers who traveled gravel roads throughout averaged 1 1/2 miles less in LaMoure and 1 mile less in McHenry County than did those who traveled a combination of graveled and hard-surfaced roads. Most operators were of the opinion that road conditions would disrupt travel to towns only in 1 year in 10. Usually, cream can be held over safely for several days, if necessary.

Frequency of cream deliveries.—The number of weekly cream deliveries may depend upon season of the year, size of farm, volume of work and available labor, volume of cream for sale, distance to market and farm facilities for storage and cooling of cream. Although two weekly deliveries are made on the LaMoure County pickup route the year around, a third would be made if the volume were to warrant an additional pickup.

Apparently distance to the delivery point did not influence the average number of weekly cream deliveries within a radius of 13 miles in either county. Cream was usually delivered twice weekly during the winter; it varied during the summer from 5 deliveries every 2 weeks to 3 deliveries

weekly. From distances of more than 13 miles, cream deliveries were more infrequent, especially during the winter when they averaged one a week.

Herd size and volume of cream sold influenced the frequency of cream deliveries to some degree. Farmers who had 15 or more cows delivered cream 2 to 3 times weekly in summer.

## Butterfat Production

Butterfat production per cow depends upon many factors, especially in a dairy enterprise whose principal product for sale is cream. The more important variables are the inherited production potential of the cow, and the breeding and feeding management practices used. Other aspects of dairy management include length of lactational period and regularity of milking. In cream-producing enterprises other factors that affect volume of production include the setting of the cream separator and the temperature of the milk at time of separation.

The only accurate way to measure a cow's production is to place her on test. Production data obtained from most farmers sampled in McHenry and LaMoure Counties were calculated from records of cream sales plus estimates of farm and home consumption of whole milk and cream. Although these estimates are not highly accurate, they do serve as an indication of relative production.

The average production in 1957 for all cows on the farms sampled was approximately 225 pounds of butterfat per cow. Average production tended to increase with an increase in herd size, possibly because of the increased numbers of dairy breed cows in the larger sized herds (table 57).

Table 57.--Average butterfat production per cow, 1957

| County | Average butterfat production for herds with-- | | | Average |
|---|---|---|---|---|
| | 5 to 9 cows | 10 to 14 cows | 15 to 29 cows | |
| | Pounds | Pounds | Pounds | Pounds |
| LaMoure | 210.4 | 225.1 | 239.2 | 229.1 |
| McHenry | 193.8 | 223.4 | 237.7 | 220.0 |
| Average | 201.9 | 224.2 | 238.0 | 224.9 |

Thirty-three of the 78 herds for which production data were calculated had averages of less than 200 pounds of butterfat. Production averaged lower in the smaller herds than in the larger sized herds (appendix table 35).

Beef-type and crossbred cows had an average production of 191.5 pounds of butterfat compared with 222.4 pounds for herds of mixed dairy, beef and crossbred cows, and 254.3 pounds of butterfat for dairy-breed cows (table 58).

Table 58.--Average butterfat production per cow by type of cow milked, 1957

| County | Average production by type of herd for cows— | | | Average |
|---|---|---|---|---|
| | Beef and crossbred | Mixed beef, crossbred and dairy | Dairy | |
| | Pounds | Pounds | Pounds | Pounds |
| LaMoure | 199.5 | 208.9 | 258.5 | 229.1 |
| McHenry | 184.9 | 236.8 | 246.9 | 220.0 |
| Average | 191.5 | 222.4 | 254.3 | 224.9 |

Twenty of the 33 herds that had an average production of less than 200 pounds of butterfat in 1957 were made up of either crossbred or beef-type cattle. Of the 29 beef or crossbred cow herds, 20 had an annual production of less than 200 pounds of butterfat compared with 7 of the 27 mixed (appendix table 36).

Normally, a cow can be expected to produce approximately 70 percent of her annual production during the first 6 months of a 10-month lactation period. Production for the following 3 months would approximate 24 percent and for the 10th month, 6 percent. Twenty-eight farmers milked their cows for less than 9 months (appendix table 37). Average production varied from a low of 176.9 pounds of butterfat for cows milked less than 8 months to an average of 232 pounds per cow when milked a minimum of 9 months or longer (table 59).

Feeding management, particularly of grains and concentrates, may account for the relatively low milk production by some of the farmers sampled. An accurate measure of the effect on milk production of various feeds and feeding levels can be obtained only through controlled experiments and accurate recording of the data. Even then, the results may not be universally true, as individual animals may respond differently under similar conditions.

Table 59.--Average butterfat production per cow, by length of lactation period, McHenry and LaMoure Counties, 1957

| Length of lactation period | Average butterfat production for herds of-- | | | Average |
|---|---|---|---|---|
| | Beef and crossbred | Mixed beef, crossbred and dairy | Dairy | |
| | Pounds | Pounds | Pounds | Pounds |
| Under 8 mos. | 174.9 | 184.1 1/ | --- | 176.9 |
| 8 to 8.9 mos. | 177.9 | 309.5 1/ | 191.7 | 192.2 |
| 9 mos. & over | 211.9 | 236.8 | 240.3 | 232.0 |
| Average | 192.1 | 237.8 | 228.9 | 219.1 |

1/ Single observations.

Butterfat production tended to increase as the total yearly amount of grain fed per cow increases (table 60). Whether or not cows of better breeding would exceed these levels of production cannot be ascertained without further detailed analysis. When concentrates were included in the ground feeds for herds fed more than 2,500 pounds per cow annually, the herd averages were usually more than 250 pounds of butterfat per cow.

Table 60.--Average annual butterfat production by annual amount of ground feed per cow, McHenry and LaMoure Counties, 1957

| Herd type | Amount of ground feed per cow | | | | Average |
|---|---|---|---|---|---|
| | None | 1-1500 pounds | 1501-3000 pounds | 3000 lbs. and up | |
| | Pounds | Pounds | Pounds | Pounds | Pounds |
| Beef-crossbred | 166.9 | 173.9 | 189.4 | 227.5 | 190.9 |
| Mixed cows | 168.3 | 209.8 | 246.0 | 245.9 | 229.0 |
| Dairy cows | 174.3 | 277.8 | 239.5 | 264.9 | 254.4 |
| Average | 168.3 | 214.0 | 228.7 | 247.6 | 225.9 |

Improved feeding and milking practices that entail very little added cost probably would increase milk production 15 to 30 percent.

## Income From Dairy Herd, 1957

Income from a dairy herd comes from sales of livestock, sales of cream, and the value of dairy products used on the farm and in the home. The dairy enterprise can also be credited for the value of skim milk when it is utilized in feeding other livestock.

Sales of cream provided the largest share of the dairy income and sales of cattle usually are second. In several instances, income from cattle sales was unusually high in 1957 because of culling of bangs-infected herds. The amount of income due from farm and home use was about the same for the three sizes of herds, ranging between 9 and 12 percent. Table 61 shows the average gross returns by size and type of herd.

## Appraisal of the Dairy Enterprise

Farm enterprises are not without advantages or disadvantages and farmers are quick to recognize this fact, especially with relation to the dairy enterprise.

In terms of dollars and cents, a dairy enterprise furnishes a weekly income to pay current living expenses. In addition, it provides milk and cream for family use. Many of the farmers sampled who had farms of 480 acres or less said they would have to give up farming were it not for the dairy enterprise helping them over "lean" periods. In addition, dairying offers winter employment and better utilization of family labor, especially on a small farm. Small farms are offered diversification and fuller utilization of resources. Seven in eight farmers utilized fully their skim milk, while the others either gave or threw away all or part of their skim milk. Other advantages offered do not apply to dairy cattle alone, but to all types of livestock that graze and consume roughage. Pastures are better utilized; and with more land in pastures and hay, soil erosion is held to a minimum. Also, cheap homegrown feeds are marketed on the farm.

Although 1 in 5 farmers believed that dairying had no disadvantages, the remaining farmers offered their viewpoints. Nearly 65 percent of them stated that the biggest disadvantage of dairying were that the chores were too confining and that there was some interference with fieldwork, in either spring or fall. Other disadvantages cited were the volume of work involved relative to the return, the expense of hauling cream to distant market outlets, better management needed for dairy cattle, and added work in cold weather.

A fourth of the farmers plan either to increase or upgrade their dairy herds within the next several years. They plan to change to dairy-breed cattle and use either dairy bulls or artificial breeding. An additional fifth of the farmers plan changes in cropping systems, changes in feeding and marketing systems for their calves, or expansion and repair of existing buildings and of new outbuildings for the dairy herd. Changes in the cropping systems include expansion of tame pastures and more feed for cattle.

Only one respondent plans to quit dairying, while a few others said they would reduce the number of cows milked.

Table 61.—Gross returns, by size and type of herd, McHenry and LaMoure Counties, 1957

| Number of cows in herd | Type of cows | Average number of cows | Average value from— | | | Total |
|---|---|---|---|---|---|---|
| | | | Cattle sales | Cream sales | Home and farm use | |
| | | | Dollars | Dollars | Dollars | Dollars |
| 5-9 cows | Beef & crossbred | 7.4 | 571 | 635 | 164 | 1,369 |
| | Mixed | 7.9 | 552 | 834 | 226 | 1,612 |
| | Dairy | 7.3 | 874 | 824 | 131 | 1,829 |
| | Total | 7.6 | 594 | 710 | 178 | 1,482 |
| 10-14 cows | Beef & crossbred | 11.5 | 719 | 1,122 | 239 | 2,080 |
| | Mixed | 12.7 | 1,068 | 1,689 | 219 | 2,976 |
| | Dairy | 11.7 | 606 | 1,565 | 229 | 2,400 |
| | Total | 12.3 | 800 | 1,410 | 230 | 2,440 |
| 15-29 cows | Beef & crossbred | 18.0 1/ | 1,810 | 2,511 | 110 | 4,432 |
| | Mixed | 17.6 | 900 | 2,067 | 335 | 3,301 |
| | Dairy | 17.2 | 722 | 2,315 | 281 | 3,318 |
| | Total | 17.5 | 870 | 2,210 | 296 | 3,376 |

1/ Single observation.

# APPENDIX TABLES

Appendix table 1.—Budget summary for 8-cow Shorthorn herd, by kind of calves sold

| Item | Sale of veal calves | | | Sale of feeder calves | | |
|---|---|---|---|---|---|---|
| | Unit | Unit value | Total value | Unit | Unit value | Total value |
| | | | Dollars | | | Dollars |
| INCOME: | | | | | | |
| Butterfat market value, 1957 | 1,320 lbs. | .615 lb. | 811.80 | 1,320 lbs. | .615 lb. | 811.80 |
| Sale of: 5 calves | 190 lbs. | 20.00 cwt. | 190.00 | 490 lbs. | 19.25 cwt. | 471.63 |
| 1 long yearling heifer | 700 lbs. | 18.40 cwt. | 128.80 | 700 lbs. | 18.40 cwt. | 128.80 |
| 1 cull cow | 1,150 lbs. | 13.50 cwt. | 155.25 | 1,150 lbs. | 13.50 cwt. | 155.25 |
| Value of skim milk 1/ | 317 cwt. | .47 cwt. | 148.99 | 317 cwt. | .47 cwt. | 148.99 |
| Total value | | | 1,434.84 | | | 1,716.47 |
| EXPENSES: 2/ | | | | | | |
| Feed: Oats (cows) | None | | | None | | |
| Whole oats (young stock) | 1,915 lbs. | 1.50 cwt. | 28.73 | 3,553 lbs. | 1.50 cwt. | 53.30 |
| Roughage (cows) 3/ | 20.00 ton | 15.00 ton | 300.00 | 20.00 ton | 15.00 ton | 300.00 |
| Roughage (young stock) | 8.50 ton | 15.00 ton | 127.50 | 11.50 ton | 15.00 ton | 172.50 |
| Roughage (bull) | 3.50 ton | 15.00 ton | 52.50 | 3.50 ton | 15.00 ton | 52.50 |
| Whole milk | 22.72 cwt. | .615 BF | 55.89 | 22.72 cwt. | .615 BF | 55.89 |
| Skim milk | 74.00 cwt. | .47 cwt. | 34.78 | 257.00 cwt. | .47 cwt. | 120.79 |
| Pasture (taxes and rental value) | | | 112.00 | | | 112.00 |
| Veterinarian & medicine costs | | | 23.00 | | | 23.00 |
| Death loss (cash reserve) | | | 28.65 | | | 28.65 |
| Marketing costs (cattle) | | | 13.02 | | | 19.32 |
| Trucking costs (cattle) | 28.00 cwt. | .45 cwt. | 12.60 | 43.00 cwt. | .45 cwt. | 19.35 |
| Transportation costs (BF) | | | 24.59 | | | 24.59 |
| Fencing costs | | | 36.75 | | | 36.75 |
| Taxes and insurance on cattle | | | 32.21 | | | 32.21 |
| Miscellaneous (operating) | | | 65.00 | | | 65.00 |
| Total | | | 947.22 | | | 1,115.85 |

1/ Nine pounds of skim milk equal feeding value of one pound of soybean oil meal ($4.25/cwt. if fed to other livestock).

2/ No charge for buildings.

3/ Equivalent of 25 pounds of good alfalfa hay per day for 180 days. Three pounds of silage can be substituted for one pound of hay.

Appendix table 2.—Budget summary for 12-cow Shorthorn herd, by kind of calves sold

| Item | Sale of veal calves | | | Sale of feeder calves | | |
|---|---|---|---|---|---|---|
| | Unit | Unit value | Total value | Unit | Unit value | Total value |
| | | | Dollars | | | Dollars |
| INCOME: | | | | | | |
| Butterfat market value, 1957 | 2,256 lbs. | .615 lb. | 1,387.44 | 2,256 lbs. | .615 lb. | 1,387.44 |
| Sale of: 6 calves | 190 lbs. | 20.00 cwt. | 228.00 | 490 lbs. | 19.25 cwt. | 565.95 |
| 2 long yearling heifers | 700 lbs. | 18.40 cwt. | 257.60 | 700 lbs. | 18.40 cwt. | 257.60 |
| 2 cull cows | 1,150 lbs. | 13.50 cwt. | 310.50 | 1,150 lbs. | 13.50 cwt. | 310.50 |
| Value of skim milk 1/ | 541 cwt. | .47 cwt. | 254.27 | 541 cwt. | .47 cwt. | 254.27 |
| Total value | | | 2,437.81 | | | 2,775.76 |
| EXPENSES: 2/ | | | | | | |
| Feed: Oats (cows) | 104.40 cwt. | 1.50 cwt. | 156.60 | 104.40 cwt. | 1.50 cwt. | 156.60 |
| Whole oats (young stock) | 36.30 cwt. | 1.50 cwt. | 54.45 | 58.14 cwt. | 1.50 cwt. | 87.21 |
| Roughage (cows) 3/ | 30.00 ton | 15.00 ton | 450.00 | 30.00 ton | 15.00 ton | 450.00 |
| Roughage (young stock) | 16.00 ton | 15.00 ton | 240.00 | 20.00 ton | 15.00 ton | 300.00 |
| Roughage (bull) | 3.50 ton | 15.00 ton | 52.50 | 3.50 ton | 15.00 ton | 52.50 |
| Whole milk | 34.08 cwt. | .615 BF | 83.84 | 34.08 cwt. | .615 BF | 83.84 |
| Skim milk | 147.00 cwt. | .47 cwt. | 69.09 | 404.00 cwt. | .47 cwt. | 189.88 |
| Pasture (taxes and rental value) | | | 168.00 | | | 168.00 |
| Veterinarian & medicine costs | | | 32.00 | | | 32.00 |
| Death loss (cash reserve) | | | 44.40 | | | 44.40 |
| Marketing costs (cattle) | | | 20.04 | | | 27.60 |
| Trucking costs (cattle) | 48.60 cwt. | .45 cwt. | 21.87 | 66.40 cwt. | .45 cwt. | 29.88 |
| Transportation costs (BF) | | | 42.40 | | | 42.40 |
| Fencing costs | | | 36.75 | | | 36.75 |
| Taxes and insurance on cattle | | | 50.39 | | | 50.39 |
| Miscellaneous (operating) | | | 75.00 | | | 75.00 |
| Total | | | 1,597.33 | | | 1,826.45 |

1/ Nine pounds of skim milk equal feeding value of one pound of soybean oil meal ($4.25/cwt. if fed to other livestock).

2/ No charge for buildings.

3/ Equivalent of 25 pounds of good alfalfa hay per day for 180 days. Three pounds of silage can be substituted for one pound of hay.

Appendix table 3.--Budget summary for a 16-cow Shorthorn herd, by kind of calves sold

| Item | Sale of veal calves | | | Sale of feeder calves | | |
|---|---|---|---|---|---|---|
| | Unit | Unit value | Total value | Unit | Unit value | Total value |
| | | | Dollars | | | Dollars |
| INCOME: | | | | | | |
| Butterfat market value, 1957 | 3,072 lbs. | .615 lb. | 1,889.28 | 3,072 lbs. | .615 lb. | 1,889.28 |
| Sale of: 9 calves | 190 lbs. | 20.00 cwt. | 342.00 | 490 lbs. | 19.25 cwt. | 848.93 |
| 2 long yearlings heifers | 700 lbs. | 18.40 cwt. | 257.60 | 700 lbs. | 18.40 cwt. | 257.60 |
| 3 cull cows | 1,150 lbs. | 13.50 cwt. | 465.75 | 1,150 lbs. | 13.50 cwt. | 465.75 |
| Value of skim milk 1/ | 737 cwt. | .47 cwt. | 346.39 | 737 cwt. | .47 cwt. | 346.39 |
| Total value | | | 3,301.02 | | | 3,807.95 |
| EXPENSES: 2/ | | | | | | |
| Feed: Oats (cows) | 417.92 cwt. | 1.50 cwt. | 626.82 | 417.92 cwt. | 1.50 cwt. | 626.88 |
| Whole oats (young stock) | 47.49 cwt. | 1.50 cwt. | 71.24 | 77.52 cwt. | 1.50 cwt. | 116.28 |
| Roughage (cows) 3/ | 40.00 ton | 15.00 ton | 600.00 | 40.00 ton | 15.00 ton | 600.00 |
| Roughage (young stock) | 21.50 ton | 15.00 ton | 322.50 | 27.00 ton | 15.00 ton | 405.00 |
| Roughage (bull) | 3.50 ton | 15.00 ton | 52.50 | 3.50 ton | 15.00 ton | 52.50 |
| Whole milk | 45.44 cwt. | .615 BF | 111.78 | 45.44 cwt. | .615 BF | 111.78 |
| Skim milk | 184.00 cwt. | .47 cwt. | 86.48 | 514.00 cwt. | .47 cwt. | 241.58 |
| Pasture (taxes and rental value) | | | 224.00 | | | 224.00 |
| Veterinarian & medicine costs | | | 36.00 | | | 36.00 |
| Death loss (cash reserve) | | | 58.28 | | | 58.28 |
| Marketing costs (cattle) | | | 27.30 | | | 38.24 |
| Trucking costs (cattle) | 65.60 cwt. | .45 cwt. | 29.52 | 92.60 cwt. | .45 cwt. | 41.67 |
| Transportation costs (BF) | | | 57.80 | | | 57.80 |
| Fencing costs | | | 56.50 | | | 56.50 |
| Taxes and insurance on cattle | | | 65.73 | | | 65.73 |
| Miscellaneous (operating) | | | 85.00 | | | 85.00 |
| Total | | | 2,511.51 | | | 2,817.24 |

1/ Nine pounds of skim milk equal feeding value of one pound of soybean oil meal ($4.25/cwt. if fed to other livestock).

2/ No charge for buildings.

3/ Equivalent of 25 pounds of good alfalfa hay per day for 180 days. Three pounds of silage can be substituted for one pound of hay.

Appendix table 4.—Budget summary for a 24-cow Shorthorn herd, by kind of calves sold

| Item | Sale of veal calves | | | Sale of feeder calves | | |
|---|---|---|---|---|---|---|
| | Unit | Unit value | Total value | Unit | Unit value | Total value |
| | | | Dollars | | | Dollars |
| INCOME: | | | | | | |
| Butterfat market value, 1957 | 5,280 lbs. | .615 lb. | 3,247.20 | 5,280 lbs. | .615 lb. | 3,247.20 |
| Sale of: 15 calves | 190 lbs. | 20.00 cwt. | 570.00 | 490 lbs. | 19.25 cwt. | 1,414.88 |
| 2 long yearling heifers | 700 lbs. | 18.40 cwt. | 257.60 | 700 lbs. | 18.40 cwt. | 257.60 |
| 4 cull cows | 1,150 lbs. | 13.50 cwt. | 621.00 | 1,150 lbs. | 13.50 cwt. | 621.00 |
| Value of skim milk 1/ | 1,267 cwt. | .47 cwt. | 595.49 | 1,267 cwt. | .47 cwt. | 595.49 |
| Total value | | | 5,291.29 | | | 6,136.17 |
| EXPENSES: 2/ | | | | | | |
| Feed: Oats (cows) | 753.12 cwt. | 1.50 cwt. | 1,129.68 | 753.12 cwt. | 1.50 cwt. | 1,129.68 |
| Whole oats (young stock) | 60.68 cwt. | 1.50 cwt. | 91.02 | 109.82 cwt. | 1.50 cwt. | 164.73 |
| Roughage (cows) 3/ | 60.00 ton | 15.00 ton | 900.00 | 60.00 ton | 15.00 ton | 900.00 |
| Roughage (young stock) | 28.00 ton | 15.00 ton | 420.00 | 37.00 ton | 15.00 ton | 555.00 |
| Roughage (bull) | 3.50 ton | 15.00 ton | 52.50 | 3.50 ton | 15.00 ton | 52.50 |
| Whole milk | 68.16 cwt. | .615 BF | 167.67 | 68.16 cwt. | .615 BF | 167.67 |
| Skim milk | 221.00 cwt. | .47 cwt. | 103.87 | 771.00 cwt. | .47 cwt. | 362.37 |
| Pasture (taxes and rental value) | | | 336.00 | | | 336.00 |
| Veterinarian & medicine costs | | | 49.00 | | | 49.00 |
| Death loss (cash reserve) | | | 82.65 | | | 82.65 |
| Marketing costs (cattle) | | | 30.06 | | | 63.48 |
| Trucking costs (cattle) | 88.50 cwt. | .45 cwt. | 39.83 | 133.50 cwt. | .45 cwt. | 60.08 |
| Transportation costs (BF) | | | 100.15 | | | 100.15 |
| Fencing costs | | | 78.00 | | | 78.00 |
| Taxes and insurance on cattle | | | 91.31 | | | 91.31 |
| Miscellaneous (operating) | | | 105.00 | | | 105.00 |
| Total | | | 3,776.74 | | | 4,297.62 |

1/ Nine pounds of skim milk equal feeding value of one pound of soybean oil meal ($4.25/cwt. if fed to other livestock).

2/ No charge for buildings.

3/ Equivalent of 25 pounds of good alfalfa hay per day for 180 days. Three pounds of silage can be substituted for one pound of hay.

Appendix table 5.—Budget summary for 8-cow Holstein herd, by kind of calves sold

| Item | Sale of veal calves | | | Sale of feeder calves | | |
|---|---|---|---|---|---|---|
| | Unit | Unit value | Total value | Unit | Unit value | Total value |
| | | | Dollars | | | Dollars |
| INCOME: | | | | | | |
| Butterfat market value, 1957 | 1,392 lbs. | .615 lb. | 856.08 | 1,392 lbs. | .615 lb. | 856.08 |
| Sale of: 5 calves | 210 lbs. | 20.00 cwt. | 210.00 | 510 lbs. | 17.30 cwt. | 441.15 |
| 1 long yearling heifer | 710 lbs. | 15.00 cwt. | 106.50 | 710 lbs. | 15.00 cwt. | 106.50 |
| 1 cull cow | 1,150 lbs. | 12.25 cwt. | 140.88 | 1,150 lbs. | 12.25 cwt. | 140.88 |
| Value of skim milk 1/ | 373 cwt. | .47 cwt. | 175.31 | 373 cwt. | .47 cwt. | 175.31 |
| Total value | | | 1,488.77 | | | 1,719.92 |
| EXPENSES: 2/ | | | | | | |
| Feed: Oats (cows) | None | | | None | | |
| Whole oats (young stock) | 1,915 lbs. | 1.50 cwt. | 28.73 | 3,553 lbs. | 1.50 cwt. | 53.30 |
| Roughage (cows) 3/ | 20.00 ton | 15.00 ton | 300.00 | 20.00 ton | 15.00 ton | 300.00 |
| Roughage (young stock) | 8.50 ton | 15.00 ton | 127.50 | 11.50 ton | 15.00 ton | 172.50 |
| Roughage (bull) | 3.50 ton | 15.00 ton | 52.50 | 3.50 ton | 15.00 ton | 52.50 |
| Whole milk | 22.72 cwt. | .615 BF | 50.30 | 22.72 cwt. | .615 BF | 50.30 |
| Skim milk | 74.00 cwt. | .47 cwt. | 34.78 | 257.00 cwt. | .47 cwt. | 120.79 |
| Pasture (taxes and rental value) | | | 112.00 | | | 112.00 |
| Veterinarian and medicine costs | | | 23.00 | | | 23.00 |
| Death loss (cash reserve) | | | 33.45 | | | 33.45 |
| Marketing costs (cattle) | | | 13.02 | | | 19.32 |
| Trucking costs (cattle) | 29.10 cwt. | .45 cwt. | 13.10 | 44.50 cwt. | .45 cwt. | 20.03 |
| Transportation costs (BF) | | | 26.21 | | | 26.21 |
| Fencing costs | | | 36.75 | | | 36.75 |
| Taxes and insurance on cattle | | | 33.49 | | | 33.49 |
| Miscellaneous (operating) | | | 65.00 | | | 65.00 |
| Total | | | 949.83 | | | 1,118.64 |

1/ Nine pounds of skim milk equal feeding value of one pound of soybean oil meal ($4.25/cwt. if fed to other livestock).

2/ No charge for buildings.

3/ Equivalent of 25 pounds of good alfalfa hay per day for 180 days. Three pounds of silage can be substituted for one pound of hay.

Appendix table 6.—Budget summary for 12-cow Holstein herd, by kind of calves sold

| Item | Sale of veal calves | | | Sale of feeder calves | | |
|---|---|---|---|---|---|---|
| | Unit | Unit value | Total value | Unit | Unit value | Total value |
| | | | Dollars | | | Dollars |
| INCOME: | | | | | | |
| Butterfat market value, 1957 | 2,640 lbs. | .615 lbs. | 1,623.60 | 2,640 lbs. | .615 lb. | 1,623.60 |
| Sale of: 6 calves | 210 lbs. | 20.00 cwt. | 252.00 | 510 lbs. | 17.30 cwt. | 529.38 |
| 2 long yearling heifers | 710 lbs. | 15.00 cwt. | 213.00 | 710 lbs. | 15.00 cwt. | 213.00 |
| 2 cull cows | 1,150 lbs. | 12.25 cwt. | 281.76 | 1,150 lbs. | 12.25 cwt. | 281.76 |
| Value of skim milk 1/ | 707 cwt. | .47 cwt. | 332.29 | 707 cwt. | .47 cwt. | 332.29 |
| Total value | | | 2,702.65 | | | 2,980.03 |
| EXPENSES: 2/ | | | | | | |
| Feed: Oats (cows) | 142.10 cwt. | 1.50 cwt. | 213.15 | 142.10 cwt. | 1.50 cwt. | 213.15 |
| Whole oats (young stock) | 36.30 cwt. | 1.50 cwt. | 54.45 | 58.14 cwt. | 1.50 cwt. | 87.21 |
| Roughage (cows) 3/ | 30.00 ton | 15.00 ton | 450.00 | 30.00 ton | 15.00 ton | 450.00 |
| Roughage (young stock) | 16.00 ton | 15.00 ton | 240.00 | 20.00 ton | 15.00 ton | 300.00 |
| Roughage (bull) | 3.50 ton | 15.00 ton | 52.50 | 3.50 ton | 15.00 ton | 52.50 |
| Whole milk | 34.08 cwt. | .615 BF | 75.45 | 34.08 cwt. | .615 BF | 75.45 |
| Skim milk | 147.00 cwt. | .47 cwt. | 69.09 | 404.00 cwt. | .47 cwt. | 189.88 |
| Pasture (taxes and rental value) | | | 168.00 | | | 168.00 |
| Veterinarian & medicine costs | | | 32.00 | | | 32.00 |
| Death loss (cash reserve) | | | 50.85 | | | 50.85 |
| Marketing costs (cattle) | | | 20.04 | | | 27.60 |
| Trucking costs (cattle) | 49.80 cwt. | .45 cwt. | 22.41 | 67.80 cwt. | .45 cwt. | 30.51 |
| Transporation costs (BF) | | | 50.35 | | | 50.35 |
| Fencing costs | | | 36.75 | | | 36.75 |
| Taxes and insurance on cattle | | | 52.11 | | | 52.11 |
| Miscellaneous (operating) | | | 75.00 | | | 75.00 |
| Total | | | 1,662.15 | | | 1,891.36 |

1/ Nine pounds of skim milk equal feeding value of one pound of soybean oil meal ($4.25/cwt. if fed to other livestock).

2/ No charge for buildings.

3/ Equivalent of 25 pounds of good alfalfa hay per day for 180 days. Three pounds of silage can be substituted for one pound of hay.

Appendix table 7.—Budget summary for a 16-cow Holstein herd, by kind of calves sold

| Item | Sale of veal calves | | | Sale of feeder calves | | |
|---|---|---|---|---|---|---|
| | Unit | Unit value | Total value | Unit | Unit value | Total value |
| | | | Dollars | | | Dollars |
| INCOME: | | | | | | |
| Butterfat market value, 1957 | 3,920 lbs. | .615 lb. | 2,410.80 | 3,920 lbs. | .615 lb. | 2,410.80 |
| Sale of: 9 calves | 210 lbs. | 20.00 cwt. | 378.00 | 510 lbs. | 17.30 cwt. | 794.07 |
| 2 long yearling heifers | 710 lbs. | 15.00 cwt. | 213.00 | 710 lbs. | 15.00 cwt. | 213.00 |
| 3 cull cows | 1,150 lbs. | 12.25 cwt. | 422.64 | 1,150 lbs. | 12.25 cwt. | 422.64 |
| Value of skim milk 1/ | 1,050 cwt. | .47 cwt. | 493.50 | 1,050 cwt. | .47 cwt. | 493.50 |
| Total value | | | 3,917.94 | | | 4,334.01 |
| EXPENSES: 2/ | | | | | | |
| Feed: Oats (cows) | 384.48 cwt. | 1.50 cwt. | 576.72 | 384.48 cwt. | 1.50 cwt. | 576.72 |
| Whole oats (young stock) | 47.49 cwt. | 1.50 cwt. | 71.24 | 77.52 cwt. | 1.50 cwt. | 116.28 |
| Roughage (cows) 3/ | 40.00 ton | 15.00 ton | 600.00 | 40.00 ton | 15.00 ton | 600.00 |
| Roughage (young stock) | 21.50 ton | 15.00 ton | 322.50 | 27.00 ton | 15.00 ton | 405.00 |
| Roughage (bull) | 3.50 ton | 15.00 ton | 52.50 | 3.50 ton | 15.00 ton | 52.50 |
| Whole milk | 45.44 cwt. | .615 BF | 100.60 | 45.44 cwt. | .615 BF | 100.60 |
| Skim milk | 184.00 cwt. | .47 cwt. | 86.48 | 514.00 cwt. | .47 cwt. | 241.58 |
| Pasture (taxes & rental value) | | | 224.00 | | | 224.00 |
| Veterinarian & medicine costs | | | 36.00 | | | 36.00 |
| Death loss (cash reserve) | | | 66.90 | | | 66.90 |
| Marketing costs (cattle) | | | 27.30 | | | 38.24 |
| Trucking costs (cattle) | 67.60 cwt. | .45 cwt. | 30.41 | 94.60 cwt. | .45 cwt. | 42.57 |
| Transporation costs (BF) | | | 75.13 | | | 75.13 |
| Fencing costs | | | 56.50 | | | 56.50 |
| Taxes and insurance on cattle | | | 68.03 | | | 68.03 |
| Miscellaneous (operating) | | | 85.00 | | | 85.00 |
| Total | | | 2,479.31 | | | 2,785.05 |

1/ Nine pounds of skim milk equal feeding value of one pound of soybean oil meal ($4.25/cwt. if fed to other livestock).

2/ No charge for buildings.

3/ Equivalent of 25 pounds of good alfalfa hay per day for 180 days. Three pounds of silage can be substituted for one pound of hay.

Appendix table 8.—Budget summary for a 24-cow Holstein herd, by kind of calves sold

| Item | Sale of veal calves | | | Sale of feeder calves | | |
|---|---|---|---|---|---|---|
| | Unit | Unit value | Total value | Unit | Unit value | Total value |
| | | | Dollars | | | Dollars |
| INCOME: | | | | | | |
| Butterfat market value, 1957 | 6,386 lbs. | .615 lb. | 3,927.39 | 6,386 lbs. | .615 lb. | 3,927.39 |
| Sale of: 15 calves | 210 lbs. | 20.00 cwt. | 630.00 | 510 lbs. | 17.30 cwt. | 1,323.45 |
| 2 long yearling heifers | 710 lbs. | 15.00 cwt. | 213.00 | 710 lbs. | 15.00 cwt. | 213.00 |
| 4 cull cows | 1,150 lbs. | 12.25 cwt. | 563.52 | 1,150 lbs. | 12.25 cwt. | 563.52 |
| Value of skim milk 1/ | 1,696 cwt. | .47 cwt. | 797.12 | 1,696 cwt. | .47 cwt. | 797.12 |
| Total value | | | 6,131.03 | | | 6,824.48 |
| EXPENSES: 2/ | | | | | | |
| Feed: Oats (cows) | 957.6 cwt. | 1.50 cwt. | 1,436.40 | 957.6 cwt. | 1.50 cwt. | 1,436.40 |
| Whole oats (young stock) | 60.68 cwt. | 1.50 cwt. | 91.02 | 109.82 cwt. | 1.50 cwt. | 164.73 |
| Roughage (cows) 3/ | 60.00 ton | 15.00 ton | 900.00 | 60.00 ton | 15.00 ton | 900.00 |
| Roughage (young stock) | 28.00 ton | 15.00 ton | 420.00 | 37.00 ton | 15.00 ton | 555.00 |
| Roughage (bull) | 3.50 ton | 15.00 ton | 52.50 | 3.50 ton | 15.00 ton | 52.50 |
| Whole milk | 68.15 cwt. | .615 BF | 150.91 | 68.16 cwt. | .615 BF | 150.91 |
| Skim milk | 221.00 cwt. | .47 cwt. | 103.87 | 771.00 cwt. | .47 cwt. | 362.37 |
| Pasture (taxes and rental value) | | | 336.00 | | | 336.00 |
| Veterinarian and medicine costs | | | 49.00 | | | 49.00 |
| Death loss (cash reserve) | | | 95.25 | | | 95.25 |
| Marketing costs (cattle) | | | 30.06 | | | 63.48 |
| Trucking costs (cattle) | 91.70 cwt. | .45 cwt. | 41.27 | 136.70 cwt. | .45 cwt. | 61.52 |
| Transporation costs (BF) | | | 122.82 | | | 122.82 |
| Fencing costs | | | 78.00 | | | 78.00 |
| Taxes and insurance on cattle | | | 94.67 | | | 94.67 |
| Miscellaneous (operating) | | | 105.00 | | | 105.00 |
| Total | | | 4,106.77 | | | 4,627.65 |

1/ Nine pounds of skim milk equal feeding value of one pound of soybean oil meal ($4.25/cwt. if fed to other livestock).

2/ No charge for buildings.

3/ Equivalent of 25 pounds of good alfalfa hay per day for 180 days. Three pounds of silage can be substituted for one pound of hay.

Appendix table 9.--Annual production and feeding data per cow used in budgets

| Class of cattle | Type of cattle | Production (lbs.) | Annual rates of feeding-- | | | |
|---|---|---|---|---|---|---|
| | | | Alfalfa | Grain | Whole milk | Skim milk |
| | | | Tons | Pounds | Pounds | Pounds |
| Milk cow | Beef or crossbred | 165 BF | 2½ | None | --- | --- |
| do. | do. | 188 BF | 2½ | 870 | --- | --- |
| do. | do. | 192 BF | 2½ | 2,612 | --- | --- |
| do. | do. | 220 BF | 2½ | 3,138 | --- | --- |
| do. | Holstein | 174 BF | 2½ | None | --- | --- |
| do. | do. | 220 BF | 2½ | 1,184 | --- | --- |
| do. | do. | 245 BF | 2½ | 2,403 | --- | --- |
| do. | do. | 264 BF | 2½ | 3,990 | --- | --- |
| Bred heifers | Either | --- | 2½ | 323 | --- | --- |
| Yearling heifers | do. | --- | 1½ | 323 | --- | --- |
| Calves | do. | --- | 3/4 | 323 | 284 | 3,675 |
| Feeder calves | Holstein | 510 lbs | 3/4 | 323 | 284 | 3,675 |
| do. | Shorthorn | 490 lbs | 3/4 | 323 | 284 | 3,675 |
| Veal calves | Holstein | 210 lbs | 1/4 | 50 | 284 | --- |
| do. | Shorthorn | 195 lbs | 1/4 | 50 | 284 | --- |
| Bull | Either | --- | 3½ | --- | --- | --- |

Appendix table 10.--Investment costs used in budgets

| Item and description | Unit value |
|---|---|
| | Dollars |
| Bull: | |
| Dairy or beef | 250.00 head |
| Milk cow: | |
| Holstein (grade) | 205.00 head |
| Shorthorn (grade) | 175.00 head |
| Bred heifer: | |
| Holstein | 160.00 head |
| Shorthorn | 145.00 head |
| Yearling heifer: | |
| Holstein | 90.00 head |
| Shorthorn | 80.00 head |
| Heifer calf: | |
| Holstein | 50.00 head |
| Shorthorn | 50.00 head |
| Cream separator (depreciation rate 16 yrs.) | 300.00 |
| Hammermill (depreciation rate 16 yrs.) | 550.00 |
| Milk pump 1/3 HP (depreciation rate 15 yrs.) | 190.00 |
| Milker (single unit) (depreciation rate 15 yrs.) | 135.00 |
| Pipeline--for milkers (depreciation rate 15 yrs.) | 12.00 + 1.00/cow |
| Miscellaneous: 1/ | |
| 8-cow herd | 61.00 |
| 12-cow herd | 73.00 |
| 16-cow herd | 85.00 |
| 24-cow herd | 109.00 |
| Barn and outbuildings | (no charge) |
| Value of buildings: 2/ | |
| 8-cow herd | 3,000.00 |
| 12-cow herd | 4,000.00 |
| 16-cow herd | 5,000.00 |
| 24-cow herd | 6,000.00 |
| Pasture (taxes plus rental value): | |
| 8-cow herd | 112.00 |
| 12-cow herd | 168.00 |
| 16-cow herd | 224.00 |
| 24-cow herd | 336.00 |
| Silage storage (stacked on ground) | (no charge) |

1/ Includes strainers, milk cans, milk pails, clippers, elastrator, syringe, hypodermic needles, etc.

2/ To establish insurance protection and cost of repair and upkeep.

Appendix table 11.--Annual operating and miscellaneous costs used in budgets

| Item and description | Unit values | Item and description | | Unit values |
|---|---|---|---|---|
| Taxes: | | Operating costs: | | |
| Registered bull | $3.15 head | Hammermill | Upkeep | 2% purchase cost |
| Grade bull | 2.37 do. | | Electricity | 8.4 KW/ton of feed |
| Registered cow | 2.37 do. | Separator | Upkeep | 2% purchase cost |
| Grade cow | 1.86 do. | | Electricty | 2/ |
| Yearlings | 1.44 do. | Milking equipment | Upkeep | $15.00/unit |
| Calves | .70 do. | | Electricty | 3/ |
| Hammermill, cream separator | 2.05 | Fencing costs | 8-12 cow herd | $36.25/year |
| Milking equipment (1 milker) | .75 | | 16-24 cow herd | 58.50/year |
| Milking equipment (2 milkers) | 1.07 | Medicine and antibiotics | | 1.00/cow |
| Insurance: | | Veterinary costs - | 8-cow herd | 15.00 |
| Buildings (continuous foundation) | .92/$100 1/ | | 12-16 cow herd | 20.00 |
| All personal property | .40/$100 1/ | | 24 cow herd | 25.00 |
| Death loss: | | Artificial insemination | | 7.00/cow |
| Cows | 1.15% | Miscellaneous 4/ | 8-cow herd | 65.00/year |
| Calves | 9.5% | | 12-cow herd | 75.00/year |
| | | | 16-cow herd | 85.00/year |
| | | | 24-cow herd | 105.00/year |

1/ Fire and extended coverage.

2/ Two and one-half hours of use = 1 KW hour.

3/ Two and one-half hours of use = 1 KW hour.

4/ Includes milk pails, strainer pads, disinfectant, fly spray, block and loose salt, etc.

Appendix table 12.--Average sales and purchase prices used in budgets, 49 through 52, for year of 1957

| Item and description | Unit value |
|---|---|
| PRICES RECEIVED: | |
| Bull: | |
| Dairy or beef | $250.00 head |
| Cull cows: | |
| Dairy (1,150 lbs.) | 12.25 cwt. |
| Beef (1,150 lbs.) | 13.50 cwt. |
| Feeder calves: | |
| Dairy (under 700 lbs.) | 17.30 cwt. |
| Beef (under 700 lbs.) | 19.25 cwt. |
| Dairy (over 700 lbs.) | 15.00 cwt. |
| Beef (over 700 lbs.) | 18.40 cwt. |
| Veal calves: | |
| Dairy or beef | 20.00 cwt. |
| Butterfat | .615 lb. |
| Skim milk (value of) | .47 cwt. |
| PRICES PAID: | |
| Marketing charges: | |
| Bulls | 3.85 head |
| Cattle (over 300 lbs.) | 2.76 head |
| Calves (under 300 lbs.) | 1.50 head |
| Trucking: | |
| Cattle | .45 cwt. |
| Butterfat | 2.00 cwt. |
| Feed: | |
| Oats | 1.50 cwt. |
| Alfalfa hay | 15.00 ton |
| Miscellaneous: | |
| Electricity | .03/KW hour |
| Barbed wire | 9.75 spool |
| Posts | 1.00 each |
| Staples and insulators | 3.00 |
| Milk cans - 5 gallon | 12.00 each |

Appendix table 13.--Number of milk cows and replacement heifers, by breed, sample farms, January 1, 1958

| Breed | McHenry County | | | | LaMoure County | | | |
|---|---|---|---|---|---|---|---|---|
| | Cows | Bred heifers | Yearling and heifer calves | Total | Cows | Bred heifers | Yearling and heifer calves | Total |
| | Number | Number | Number | Number | Number | Number | Number | Number |
| Holstein | 165 | 31 | 71 | 267 | 192 | 17 | 104 | 313 |
| Brown Swiss | 4 | 1 | 4 | 9 | 71 | 22 | 30 | 123 |
| Guernsey | 19 | | 8 | 27 | 31 | 5 | 16 | 52 |
| Ayrshire | 2 | | | 2 | 1 | | | 1 |
| Red Poll | | | | | 14 | 2 | 9 | 25 |
| Crossbreed | 158 | 18 | 43 | 219 | 148 | 41 | 178 | 367 |
| Shorthorn | 102 | 27 | 65 | 194 | 77 | 12 | 34 | 123 |
| Angus | 15 | | | 15 | | | | |
| Hereford | 9 | 2 | 7 | 18 | 6 | | | 6 |
| Total | 474 | 79 | 198 | 751 | 540 | 99 | 371 | 1010 |

Appendix table 14.--Average value of milk cows and replacement heifers, by breed, sample farms, January 1, 1958 1/

| Breed | McHenry County | | | | LaMoure County | | | |
|---|---|---|---|---|---|---|---|---|
| | Cows | Bred heifers | Yearling heifers | Heifer calves | Cows | Bred heifers | Yearling heifers | Heifer calves |
| | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars |
| Holstein 2/ | 300 | 186 | | | | | | |
| Holstein | 206 | 144 | 88 | 43 | 210 | 174 | 95 | 52 |
| Guernsey 2/ | | | | | 250 | | | |
| Guernsey | 209 | | 105 | 37 | 215 | 180 | 125 | 50 |
| Brown Swiss 2/ | | | | | 200 | | | |
| Brown Swiss | 185 | 125 | | 41 | 213 | | 75 | 55 |
| Ayrshire 2/ | 250 | | | | | | | |
| Ayrshire | 200 | | | | 200 | | | |
| Red Poll | | | | | 166 | 120 | 70 | 65 |
| Shorthorn | 165 | 136 | 77 | 42 | 192 | 152 | 84 | 52 |
| Hereford | 155 | 120 | 110 | 40 | 200 | | | |
| Angus | 150 | | | | | | | |
| Crossbreed | 140 | 89 | 56 | 29 | 172 | 139 | 96 | 46 |
| Average | 174 | 132 | 78 | 39 | 197 | 151 | 95 | 50 |

1/ Estimated by farmers interviewed.

2/ Registered cows.

Appendix table 15.--Average composition of dairy herd, sample farms, January 1, 1958

| Milk cows | Cows | Bred heifers | Yearling heifers | Heifer calves | Total |
|---|---|---|---|---|---|
| | Number | Number | Number | Number | Number |
| | | | (McHenry County) | | |
| 5-9 | 8 | 1 | 1 | 3 | 13 |
| 10-14 | 12 | 2 | 2 | 4 | 20 |
| 15-29 | 18 | 3 | 1 | 1 | 22 |
| | | | (LaMoure County) | | |
| 5-9 | 7 | 3 | 3 | 5 | 18 |
| 10-14 | 12 | 3 | 3 | 4 | 22 |
| 15-29 | 17 | 2 | 5 | 6 | 31 |

Appendix table 16.--Number and value of dairy herds, sample farms, LaMoure County, January 1, 1958 1/

| Total value of head (dollars) | 5 to 9 cows | | 10 to 14 cows | | 15 to 29 cows | |
|---|---|---|---|---|---|---|
| | Number of farms | Average value per head | Number of farms | Average value per head | Number of farms | Average value per head |
| | | Dollars | | Dollars | | Dollars |
| 1000-1999 | 5 | 1,482 | | | | |
| 2000-2999 | 4 | 2,664 | 7 | 2,439 | | |
| 3000-3999 | 1 | 3,935 | 5 | 3,254 | 7 | 3,562 |
| 4000-4999 | 1 | 4,250 | 4 | 4,330 | 2 | 4,172 |
| 5000-6999 | | | | | 3 | 6,573 |
| Over 7000 | | | | | 2 | 7,150 |
| Total | 11 | 2,386 | 16 | 3,166 | 14 | 4,807 |

1/ All animals including young stock.

Appendix table 17.--Number and value of dairy herds, sample farms, McHenry County, January 1, 1958 1/

| Total value of herd (dollars) | 5 to 9 cows | | 10 to 14 cows | | 15 to 29 cows | |
|---|---|---|---|---|---|---|
| | Number of farms | Average value per farm | Number of farms | Average value per farm | Number of farms | Average value per farm |
| | | Dollars | | Dollars | | Dollars |
| Up to 999 | 1 | 830 | | | | |
| 1000-1999 | 8 | 1,548 | 3 | 1,452 | | |
| 2000-2999 | 2 | 2,280 | 10 | 2,426 | 2 | 2,830 |
| 3000-3999 | | | 6 | 3,239 | 2 | 3,320 |
| 4000-4999 | | | 2 | 4,085 | 2 | 4,575 |
| 5000-6999 | | | | | 1 | 5,100 |
| Total | 11 | 1,616 | 21 | 2,677 | 7 | 3,793 |

1/ All animals including young stock.

Appendix table 18.—Number of dairy animals purchased by sample farmers, by state or origin and type of purchase, 1957

| Item | Purchased from— | | | | | Total |
|---|---|---|---|---|---|---|
| | Private party | Dealer | Trucker | Licensed Pub. Auc. | Farm auction | |
| | Number | Number | Number | Number | Number | Number |
| Calves from— | | | | | | |
| North Dakota | 7 | | | 5 | 2 | 14 |
| Wisconsin | | | 15 | | | 15 |
| Bred heifers from— | | | | | | |
| North Dakota | 12 | | | 2 | 2 | 16 |
| Wisconsin | | 3 | 3 | 2 | | 8 |
| Minnesota | | | | | 2 | 2 |
| First-calf heifers from— | | | | | | |
| North Dakota | | 1 | | | 2 | 3 |
| Wisconsin | | 5 | | | | 5 |
| Cows from— | | | | | | |
| North Dakota | 26 | | | 3 | 15 | 44 |
| Wisconsin | | 4 | 2 | 4 | | 10 |
| Minnesota | | | | 6 | | 6 |
| Bulls from— | | | | | | |
| North Dakota | 13 | 3 | | 3 | 2 | 21 |
| Wisconsin | | 1 | | | | 1 |
| Total | 58 | 17 | 20 | 25 | 25 | 145 |

Appendix table 19.--Average price per head of heifers and cows on sample farms, by breed and state of origin, 1957

| Class | Origin | | | |
|---|---|---|---|---|
| | North Dakota | Minnesota | Wisconsin | Average |
| | Dollars | Dollars | Dollars | Dollars |
| Bred heifers | 120.00 | 155.00 | 225.50 | 155.00 |
| Holstein: | | | | |
| With records | 153.00 | 155.00 | | 153.50 |
| Without records | 78.00 | | 225.50 | 162.00 |
| First-calf heifers | 117.00 | | 218.00 | 180.00 |
| Holstein | 136.00 | | 218.00 | 194.50 |
| Guernsey | 80.00 | | | 80.00 |
| Cows | 170.00 | 206.00 | 206.00 | 180.00 |
| All breeds: | | | | |
| With records | 229.00 | | | 229.00 |
| Without records | 163.00 | 206.00 | 206.00 | 175.00 |
| Holstein | 190.00 | 225.00 | 210.00 | 197.50 |
| With records | 229.00 | | | 229.00 |
| Without records | 179.50 | 225.00 | 210.00 | 184.50 |
| Guernsey | 179.00 | 170.00 | 200.00 | 185.00 |
| Ayrshire | 180.00 | | | 180.00 |
| Shorthorn | 165.00 | | | 165.00 |
| Crossbreed | 123.00 | | | 123.00 |

1/ No other breeds recorded.

Appendix table 20.--Average purchase price per head of dairy stock by sample farmers, type of purchase and state of origin, 1957

| Item | Type of purchase | | | | | Average price |
|---|---|---|---|---|---|---|
| | Private party | Dealer | Trucker | Licensed Pub. Auc. | Farm auction | |
| | Dollars | Dollars | Dollars | Dollars | Dollars | Dollars |
| Calves from-- | | | | | | |
| North Dakota | 60.00 | | | 56.00 | 90.00 | 63.00 |
| Wisconsin | | 28.00 | | | | 28.00 |
| Bred heifers from-- | | | | | | |
| North Dakota | 136.00 | | | | 67.50 | 120.00 |
| Wisconsin | | 223.00 | 225.00 | | 230.00 | 225.00 |
| Minnesota | | | | | 155.00 | 155.00 |
| First-calf heifers from-- | | | | | | |
| North Dakota | | 160.00 | | | 96.00 | 117.00 |
| Wisconsin | | 218.00 | | | | 218.00 |
| Cows from-- | | | | | | |
| North Dakota | 162.00 | | | 158.00 | 187.00 | 170.00 |
| Wisconsin | | 210.00 | 210.00 | 200.00 | | 206.00 |
| Minnesota | | | | 206.50 | | 206.50 |

Appendix table 21.--Production history of Holstein cattle purchased, by sample farms, 1957 1/

| Class | State of origin | Type of purchase | Production history | |
|---|---|---|---|---|
| | | | Production (lbs. BF) | Source |
| Calves | N.Dak. | Private sale | 300-400 | Farm records |
| Bred heifers, cows | N.Dak. | do. | 500-700 | DHIA |
| Cows | N.Dak. | do. | 400 | Seller's claim |
| Bred heifers | Minn. | Farm auction | 480 | Seller's claim |
| Bred heifers | N.Dak. | Private sale | 500 | DHIA |
| Bull | N.Dak. | do. | 514 | Herd Improvement, Reg. |
| Calves, cows | N.Dak. | Farm auction | 500 | DHIA |

1/ Information not available on other breeds.

Appendix table 22.--Kind of pastures used on sample farms, 1957

| Kind of pastures used | McHenry County | LaMoure County | Total |
|---|---|---|---|
| | Number | Number | Number |
| Native grass | 35 | 36 | 71 |
| Small grain stubble | 15 | 20 | 35 |
| Cornfields 1/ | 3 | 18 | 21 |
| Alfalfa | 3 | 7 | 10 |
| Alfalfa-brome | 8 | 2 | 10 |
| Brome | 9 | 1 | 10 |
| Hay meadows | 4 | | 4 |
| Sudan grass | | 4 | 4 |
| Alfalfa mixtures 2/ | 2 | 2 | 4 |
| Alfalfa haylands | 1 | 2 | 3 |
| Rye | | 2 | 2 |
| Other 3/ | 4 | 3 | 7 |

1/ Includes corn harvested for grain and silage, and standing corn.

2/ Includes various combinations of brome, clover, crested wheat, sweet clover, and rye.

3/ Includes clover, crested wheat, Kentucky bluegrass, oats, sweet clover, and rye.

Appendix table 23.--Number of sample farmers who fed grain to dairy cows, by season and size of herd, 1957

| Number of cows in herd | McHenry County | | | | LaMoure County | | | |
|---|---|---|---|---|---|---|---|---|
| | All year | Winter only | Summer only | No grain | All year | Winter only | Summer only | No grain |
| | Number | Number | Number | Number | Number | Number | Number | Number |
| 5-9 | 6 | 4 | | 2 | 7 | 5 | | |
| 10-14 | 12 | 6 | 2 | 2 | 5 | 10 | | 1 |
| 15-29 | 4 | 3 | | | 12 | 2 | | |
| Total | 22 | 13 | 2 | 4 | 24 | 17 | | 1 |

Appendix table 24.--Number of sample farmers who fed oats or grain supplement, by amount fed per cow daily, 1957

| Amount fed daily | McHenry County | | | | LaMoure County | | | |
|---|---|---|---|---|---|---|---|---|
| | All oats | | Mixed grain and supplement | | All oats | | Mixed grain and supplement | |
| | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter |
| | Number | Number | Number | Number | Number | Number | Number | Number |
| 1.5-2.9 | 4 | 4 | | | 2 | 2 | 3 | 1 |
| 3.0-5.9 | 7 | 13 | 3 | 1 | 3 | 2 | 4 | 2 |
| 6.0-8.9 | 4 | 8 | 4 | 6 | 3 | 5 | 3 | 11 |
| 9.0-11.9 | 1 | 1 | 1 | 2 | 1 | 3 | 2 | 5 |
| 12.0-17.9 | | | | | | | 3 | 7 |
| 18.0-22.9 | | | | | | | | 3 |
| Total | 16 | 26 | 8 | 11 | 9 | 12 | 15 | 29 |
| | Pounds | Pounds | Pounds | Pounds | Pounds | Pounds | Pounds | Pounds |
| Average | 5 1/3 | 6 | 6 | 9 1/4 | 6 | 7 2/3 | 7 1/4 | 10 3/4 |

Appendix table 25.--Number of sample farms who fed calves specified kinds of milk, various periods, McHenry and LaMoure Counties, 1957

| Period | Whole milk | Whole and skim milk | Skim milk | Milk, all kinds |
|---|---|---|---|---|
| | Number | Number | Number | Number |
| 1 week | 9 | 28 | | |
| 2 weeks | 22 | 4 | | |
| 3 weeks | 21 | 1 | | |
| 4 weeks | 15 | | | |
| 5 weeks | 1 | | 1 | |
| 6 weeks | 8 | | 1 | |
| 7 weeks | 1 | | 1 | |
| 8 weeks | 2 | | | |
| 3 months | | | 6 | 3 |
| 4 months | | | 4 | 5 |
| 5 months | | | 11 | 6 |
| 6 months | | | 21 | 12 |
| 7 to 9 months | | | 16 | 26 |
| 10 to 12 months | | 1 | 12 | 22 |
| Varied 1/ | | | 8 | 8 |
| Total | 79 | 34 | 81 | 82 |

1/ Length of time varied with amount of skim milk available for calf feeding and the pasture season.

Appendix table 26.--Number of sample farmers who fed grain to calves at specified ages, 1957

| Kind of grain | McHenry County | | | | LaMoure County | | | |
|---|---|---|---|---|---|---|---|---|
| | Age 1-3 months | Age 4-6 months | Age 7-12 months | Age Over 12 months | Age 1-3 months | Age 4-6 months | Age 7-12 months | Age Over 12 months |
| | Number | Number | Number | Number | Number | Number | Number | Number |
| Whole oats | 28 | 28 | 15 | 5 | 21 | 15 | 7 | 2 |
| Ground oats | 8 | 8 | 2 | 1 | 7 | 8 | 4 | 4 |
| Screenings | | | | | 1 | 1 | | |
| Ground corn | | | | | 2 | 2 | 1 | 1 |
| Ground barley | | | | | 1 | 1 | 1 | 1 |
| Other 1/ | 1 | 2 | 3 | 2 | 9 | 9 | 8 | 5 |
| No grain feeding | 4 | 3 | 21 | 33 | 1 | 6 | 21 | 29 |

1/ McHenry County includes mixtures of oats, corn, barley, and screenings. LaMoure County includes these materials plus millet.

Appendix table 27.--Number of sample farmers who fed specified amounts of grain per calf daily, McHenry and LaMoure Counties, 1957

| Amount fed daily (quarts) | Age 1-3 months | Age 4-6 months | Age 7-12 months | Age Over 12 months |
|---|---|---|---|---|
| | Number | Number | Number | Number |
| Less than 1.0 | 9 | 4 | | |
| 1.0 to 1.9 | 22 | 10 | 2 | |
| 2.0 to 2.9 | 16 | 27 | 9 | 4 |
| 3.0 to 3.9 | 1 | 5 | 8 | 3 |
| 4.0 to 4.9 | 2 | 6 | 4 | 3 |
| 5.0 and over | | 1 | 2 | 1 |
| Not known | 28 | 21 | 16 | 10 |
| No grain | 3 | 9 | 42 | 62 |
| Total | 83 | 83 | 83 | 83 |
| | Quarts | Quarts | Quarts | Quarts |
| Average daily amount | 1.4 | 2.2 | 3.25 | 4 |

Appendix table 28.--Number of sample farmers who purchased specified kinds of dairy concentrates, calf feeds, and feed supplements, 1957 1/

| Feed 2/ | McHenry County | LaMoure County | Total number of farms |
|---|---|---|---|
| | Number | Number | Number |
| Dairy concentrate | | | 8 |
| 40% protein | | 2 | |
| 36% protein | 1 | 2 | |
| 32% protein | 2 | 1 | |
| Calf feeds | | | 12 |
| Pellets | 2 | 2 | |
| Meal | 8 | | |
| Feed supplements | | | 9 |
| Myzon | 3 | | |
| Vitamins | 1 | 1 | |
| Molasses | 2 | 1 | |
| Soybean meal | | 2 | |

1/ Eighty-three farmers in sample.

2/ Excludes salt.

Appendix table 29.--Average time required for milking operations per month, by size of herd, sample farms, 1957

| Number of cows in herd | Hand milking | | One milking unit | | Two milking units | | Clean utensils | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Hours per month-- | |
| | Average number of cows milked | Hours per month per cow | Average number of cows milked | Hours per month per cow | Average number of cows milked | Hours per month per cow | With milker(s) | Without milker |
| | Number | Hours | Number | Hours | Number | Hours | Number | Hours |
| 5 to 9 | 7 | 6.9 | 7 | 5.7 | 8 | 5.0 | 15.4 | 12 |
| 10 to 14 | 12 | 6.5 | 10 | 5.2 | 12 | 4.8 | 15.4 | 12 |
| 15 to 29 | 17 | 5.8 | --- | --- | 17 | 4.0 | 15.4 | 12 |

Appendix table 30.--Average time required to care for calves, by size of herd, sample farms, 1957

| Number of cows in herd | Feeding | | Calving 1/ | Dehorning and castrating |
|---|---|---|---|---|
| | Hours per month for-- | | | |
| | Summer months | Winter months | Hours per year | Hours per year |
| | Hours | Hours | Hours | Hours |
| 5 to 9 | 12 1/5 | 20 2/5 | 7 | 2 2/3 |
| 10 to 14 | 12 1/5 | 23 | 12 | 3 3/5 |
| 15 to 29 | 15 1/4 | 23 | 22 | 3 3/5 |

1/ Care administered to cow and calf, average 1 hour per freshening.

Appendix table 31.--Average time required for feeding grain, hay, and silage on sample farms, 1957

| Number of cows in herd | Grain only | | | Grain and hay | | | Grain, hay and silage | | |
|---|---|---|---|---|---|---|---|---|---|
| | Average number of cows fed | Hours per month per cow | Total hours per month | Average number of cows fed | Hours per month per cow | Total hours per month | Average number of cows fed | Hours per month per cow | Total hours per month |
| | | Hours | Hours | | Hours | Hours | | Hours | Hours |
| 5-9 | 7 | 1 1/5 | 8 2/5 | 7 | 3 2/3 | 25 2/3 1/ | 9 | 2 4/5 | 25 1/5 1/ |
| 10-14 | 11 | 1 | 11 | 11 | 2 1/3 | 25 3/5 | 14 | 2 1/2 | 35 |
| 15-29 | 15 | 5/6 | 12 1/2 | 15 | 2 1/3 | 35 | 22 | 2 1/4 | 49 1/2 |

1/ The reasons for the discrepancy in hours between the grain and hay, and grain, hay, and silage system of feeding may be due to the difference in average number of cows fed and variation in systems of feeding.

Appendix table 32.--Average time required for barn cleaning and hauling manure on sample farms, 1957

| Number of cows in herd | Cow stalls and gutters | | | Calf pens | | Manure hauling | | |
|---|---|---|---|---|---|---|---|---|
| | Hours per month when cows are— | | | Hours per year when cleaned-- | | Hours per year when hauled-- | | |
| | On pasture | Outside during day | Inside day and night | Weekly or periodically | Daily | Periodically | Daily | Average |
| | Hours | Hours | Hours | Hours | Hours | Hours | Hours | Hours |
| 5-9 | 3 | 11 1/4 | 18 | 45 | 122 | 27 | 51 | 37 |
| 10-14 | 4 | 16 3/4 | 20 | 50 | 130 | 36 | 68 | 49 |
| 15-29 | 4 | 17 4/5 | 20 3/4 | 52 | | 79 | 91 | 82 |

Appendix table 33.--Average annual time required for feed grinding, sample farms, 1957

| Annual amount ground (tons) | Feed ground on farms | | | | | Feed ground in town | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Annual hours for number of times ground | | | | | Annual hours for number of times ground | | | | |
| | 1 to 5 | 6 to 10 | 11 to 29 | Over 20 | Average annual hours | 1 to 5 | 6 to 10 | 11 to 20 | Over 20 | Average annual hours |
| | Hours | Hours | Hours | Hours | Hours | Hours | Hours | Hours | Hours | Hours |
| Under 10 | 9 2/3 | 13 1/2 | 21 | 28 | 16 3/4 | 8 | 14 | 24 1/2 | | 17 1/5 |
| 10 to 19 | 9 2/3 | 11 2/3 | 32 | 35 | 24 3/4 | | 21 1/2 | 35 | 54 | 36 |
| 20 to 29 | | | 43 | | 43 | | | 31 1/2 | 56 | 41 1/2 |
| 30 to 39 | | | | | | | | | | |
| Over 40 | | | | | | | | | | |
| Average | 9 2/3 | 12 4/5 | 32 3/4 | 32 | --- | 8 | 17 | 30 4/5 | 55 | |
| | Number | Number | Number | Number | Number | Number | Number | Number | Number | Number |
| Number of farms | 9 | 9 | 14 | 9 | --- | 3 | 5 | 15 | 4 | |

Appendix table 34.--Number of sample farms, by number of hours required annually for fencing and fence repair, 1957

| Hours required | Number of farms with-- | | | | Total | Average annual hours required |
|---|---|---|---|---|---|---|
| | Dairy cattle | Dairy and beef cattle | Dairy and other 1/ | Dairy sheep and other 1/ | | |
| | Number | Number | Number | Number | Number | Number |
| Under 20 | 3 | 1 | | 1 | 5 | 8 |
| 20 to 39 | 8 | 2 | 3 | 1 | 14 | 28 |
| 40 to 79 | 12 | 8 | 5 | 3 | 28 | 52 |
| Over 80 | 5 | 7 | 12 | 8 | 32 | 152 |
| Total | 28 | 18 | 20 | 13 | 79 | 86 |
| | Hours | Hours | Hours | Hours | Hours | Hours |
| Average hours | 62 | 70 | 103 | 131 | --- 2/ | --- |

1/ Includes swine and beef.

2/ Not available.

Appendix table 35.--Number of sample farms with specified average production of butterfat per cow, by size of herd, McHenry and LaMoure Counties, 1957

| Butterfat per cow (pounds) | 5 to 9 cows | 10 to 14 cows | 15 to 29 cows | All herds | |
|---|---|---|---|---|---|
| | Farms | Farms | Farms | Farms | Percent |
| 100 to 149 | 2 | 2 | 2 | 6 | 7.7 |
| 150 to 199 | 12 | 12 | 3 | 27 | 34.6 |
| 200 to 249 | 6 | 8 | 8 | 22 | 28.2 |
| 250 to 299 | 2 | 6 | 4 | 12 | 15.4 |
| 300 to 349 | 2 | 5 | 1 | 8 | 10.3 |
| 350 to 399 | | 1 | 2 | 3 | 3.8 |
| Total | 24 | 34 | 20 | 78 | 100.0 |

Appendix table 36.--Number of sample farms with specified average production of butterfat per cow, by breed, McHenry and LaMoure Counties, 1957

| Butterfat per cow (pounds) | Number of farms with herds of-- | | | Total |
|---|---|---|---|---|
| | Beef or crossbreed | Mixed: dairy, beef or cross-breed | Dairy | |
| | Farms | Farms | Farms | Farms |
| 100 to 149 | 4 | 2 | | 6 |
| 150 to 199 | 16 | 5 | 6 | 27 |
| 200 to 249 | 6 | 11 | 5 | 22 |
| 250 to 299 | 2 | 5 | 5 | 12 |
| 300 to 349 | 1 | 4 | 3 | 8 |
| 350 to 399 | | | 3 | 3 |
| Total | 29 | 27 | 22 | 78 |

Appendix table 37.--Number of sample farms with specified lactation periods, by breed of cow, 1957

| Breed type | Number of farmers who milk cows from-- | | | | | |
|---|---|---|---|---|---|---|
| | 6 to 6.9 months | 7 to 7.9 months | 8 to 8.9 months | 9 to 9.9 months | 10 to 10.9 months | 11 to 11.9 months |
| | Number | Number | Number | Number | Number | Number |
| Shorthorn | 1 | 1 | 6 | 8 | 3 | |
| Hereford | 1 | | 2 | | | |
| Crossbreed | 2 | 3 | 5 | 7 | 1 | |
| Holstein | | | 3 | 11 | 10 | 12 |
| Guernsey | | | 2 | 5 | 1 | |
| Brown Swiss | | | 1 | 2 | 4 | |
| Ayrshire | | | 1 | 1 | | |
| Red Poll | | | | 2 | | |
| Total | 4 | 4 | 20 | 36 | 19 | 12 |

Appendix table 38.--Frequency distribution of herd butterfat production averages, by annual amount of grain and concentrates fed, McHenry and LaMoure Counties, 1957

| Average butterfat per cow (pounds) | Grain fed per cow annually— | | | | | All farms |
|---|---|---|---|---|---|---|
| | None | 1 to 750 pounds | 751 to 1500 lbs. | 1501 to 3000 lbs. | 3001 and up | |
| | Number | Number | Number | Number | Number | Number |
| 100 to 149 | 2 | | 2 | 2 | | 6 |
| 150 to 199 | 2 | 2 | 9 | 9 | 5 | 27 |
| 200 to 249 | 1 | 1 | 5 | 7 | 8 | 22 |
| 250 to 299 | | 1 | 1 | 8 | 2 | 12 |
| 300 to 349 | | | 2 | 4 | 1 | 7 |
| 350 to 399 | | | 2 | | 1 | 3 |
| Total | 5 | 4 | 21 | 30 | 17 | 77 |

Appendix table 39.--Home consumption, McHenry and LaMoure Counties, 1957

| Whole milk | | | Cream | | | Butter | | |
|---|---|---|---|---|---|---|---|---|
| Daily use | Average annual use | Farms | Annual use: Range | Annual use: Average | Farms | Annual use: Range | Annual use: Average | Farms |
| Gallons | Gallons | Number | Gallons | Gallons | Number | Pounds | Pounds | Number |
| Less than 1/2 | 137 1/ | 15 | Under 10 | 5 1/3 | 3 | Under 100 | 81 | 4 |
| 1/2 | 182 | 15 | 10-19 | 14 1/4 | 6 | 100-149 | 106 | 6 |
| 3/4 | 274 | 8 | 20-29 | 24 1/2 | 13 | 150-199 | 156 | 1 |
| 1 | 365 | 25 | 30-39 | 34 1/2 | 5 | 200-299 | 265 | 4 |
| 1 1/4 | 456 | 1 | 40-49 | 45 3/4 | 17 | 300-399 | 365 | 1 |
| 1 1/2 | 547 | 11 | 50-59 | 52 | 2 | | | |
| Over 1 1/2 | 803 2/ | 4 | Over 60 | 100 | 16 | | | |
| Other 3/ | | 4 | | | | | | |
| Total | | 83 | Total | | 62 | Total | | 16 4/5/ |

1/ Average, 1 1/2 quarts daily.

2/ Average, 2 1/5 gallons daily.

3/ Skim milk is used for table or whole milk is purchas ed.

4/ Two additional farmers purchased half or more of yearly consumption.

5/ Three additional respondents indicated butter was made on farm but the production figures could not be determined and are reflected in the annual use of cream or whole milk.