

MISSOURI DAIRY FARMS

Requirements and Returns

A progress report on Project 508-Farm
Business Research Panel for Dairy Farms



ACKNOWLEDGMENT

The two-year Farm Business Research Panel for Dairy Farms has resulted from cooperative efforts by numerous individuals and groups. Recognition and appreciation is extended to the following:

1. More than 100 selected dairymen who have kept detailed records and sent monthly reports of data assembled;
2. Extension agents who have assisted the dairymen in 44 counties through instructions in record keeping, collection and correction of data, and interpretation of results;
3. The Farm Business Research Panel Supervisory Committee, consisting of Albert J. Dyer, Harold V. Walton, Joseph E. Edmondson, and Albert R. Hagan -- representing the Departments of Animal Husbandry, Agricultural Engineering, Dairy Husbandry, and Agricultural Economics, respectively; and
4. Eleven organizations and business firms which have contributed suggestions and financial resources to supplement support provided by the Agricultural Experiment Station and the Extension Service of the University, including:

Fluid milk organizations:*

Pure Milk Producers Association
Producers Creamery
Sanitary Milk Producers
Square Deal Milk Producers Association
St. Joseph Milk Producers Association, Inc.

Manufacturing companies:

Carnation Company
Kraft Foods Company
Milnot Company
Pet Incorporated
Producers Creamery

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Special recognition is accorded to the following staff members who have played a prominent role in organizing the Panel, processing the records, analyzing data, and interpreting results:

O. E. Allen Agricultural Economics Dept.
Carrol L. Kirtley . Agricultural Economics Dept.
Fred Meinershagen . Dairy Husbandry Dept.
Alfred Lane Dairy Husbandry Dept.

* Since the Research Panel started, the fluid milk organizations have been combined into "Mid-America Dairymen, Inc."

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MISSOURI DAIRY FARMS - Requirements and Returns

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INTRODUCTION

One hundred and two Missouri dairy farmers are cooperating with University of Missouri agricultural economists in this study to obtain up-to-date figures on dairymen's costs, expected income, and hours of labor. Such information is invaluable for people planning to go into dairying and for established dairymen who are seeking ways to improve their business.

This publication is a progress report from the 102 dairymen who participated in the "Farm Business Research Panel for Dairy Farms" in 1968. Figure 1 shows the location of their dairy farms in 44 counties.

Each dairyman provided a complete inventory of all resources used in his farm business unit, including a detailed account of all capital invested in his dairy enterprise. He also furnished descriptive data on his dairy herd, his facilities for handling the herd, and his management system. Then, he mailed in records each month throughout the year showing all cash receipts and expenses from his farming operations, new investments in his farm business, feed consumed by his milking herd and young stock, and the hours of labor used for milking and all other jobs associated with his dairy enterprise.

Records for all dairymen were processed in the University's Agricultural Economics Department for computer summary and analysis. Each Panel cooperator received monthly and quarterly summaries of his financial transactions

and a complete summary and analysis at the end of the year.

The purpose of this report is to reveal what happened in 1968 on the types of Missouri Dairy farms selected for the study. A more detailed report of analyses will follow completion of the study in 1970.

Five major kinds of information for the 1968 dairy operations are included in this report:

1. SIZE OF OPERATIONS--Acres per farm, numbers of cows, total pounds of milk produced, the value of production, and capital investments;
2. LABOR USED--Total hours and allocation among different jobs;
3. FEED CONSUMPTION AND COSTS--Quantities of different kinds of feed consumed and the costs of each;
4. COW TURNOVER AND CALF DEATH LOSSES; and
5. FINANCIAL RESULTS--Income, costs, and returns to capital, labor, and management.

Five different kinds of dairy operations are included in the Research Panel, based upon herd size and type of production. In the narration, tables, and charts which follow, these are designated as Panel segments. Dairy operations selected for each segment were as nearly alike as possible at the time the Panel was organized in 1967. The five segments are:

* Professor of Agricultural Economics, Extension Economist in Farm Management, and Graduate Research Assistant in Agricultural Economics, respectively.

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SIZE FACTORS IN DAIRYING

Several measures of size are often used in comparing farm business operations. The number of cows in the milking herd is a common comparative measure for dairy enterprises. Table I gives overall size comparisons among the five Panel segments.

The original goal was to have 25 or more herds in each segment of the Panel to allow sub-grouping within each for further comparisons. This number was exceeded in Segments 3, 4, and 5.

Difficulty was experienced in locating manufacturing milk producers who had suitable operations and who were willing to keep the necessary records. However, those included are considered to be good representatives of these kinds of operations and should provide valid and useful information for the comparative study.

Milk production exceeded one-half million pounds of milk per herd for the 102 dairy farms in the Panel. As might be expected, output was far greater for Segments 3, 4, and 5, which include more highly specialized dairy operations. Total milk production in 1968 topped one million pounds on several farms.

The total value of production is a good measure of the scale of operations of a farm business. This average value increased progressively through the five Panel segments, as was true with most of the other factors in Table I.

One departure from this upward trend through the five segments for most measures was the high acreage of crop and open pasture land in Segment 2. It averaged above that for any other segment. More of the manufacturing milk producers farmed more extensively than the average and more of them had other crop and livestock enterprises with additional land resources used for production other than dairy products.

For example, the value of dairy production accounted for 75.4 percent of

the value of all livestock production on Segment 1 farms and only 70.5 percent on Segment 2 farms. This ratio exceeded 95 percent in Segments 3, 4, and 5.

Most of the dairy farms were two to three-man operations with several of the Segment 4 and 5 farms requiring more than three full-time man equivalents of labor. Allocation of labor among various jobs differed considerably, as will be noted later.

Capital requirements are relatively high for all dairy farms in the study as shown in Line 7 of Table I. The average capital managed per farm was substantially greater for the more highly specialized operations in Segments 4 and 5.

Table II reveals some reasons for differences among the types of operations. The manufacturing milk producers (Segments 1 and 2) had relatively more of their total capital invested in land and improvements: 68.5 percent and 68.9 percent, compared to 62.8, 64.6, and 64.6 percent in the other three segments. But they had a smaller percent of total capital committed to livestock: 14+ percent, compared to about 18 percent on the farms producing fluid milk.

As a percent of total capital, the money invested in feed and supplies (4 to 5 percent) and in machinery and equipment (11 to 12 percent) was fairly uniform throughout Panel segments.

Two other items of interest are noted in Table II -- the capital managed per man and per cow. While the capital per cow is higher for Segments 1 and 2, this may be distorted somewhat because of investment of some capital in other livestock enterprises, as previously noted. However, even the more conservative investments typical on the farms of manufacturing milk producers tend to mount on a per-cow basis because of the smaller herds.

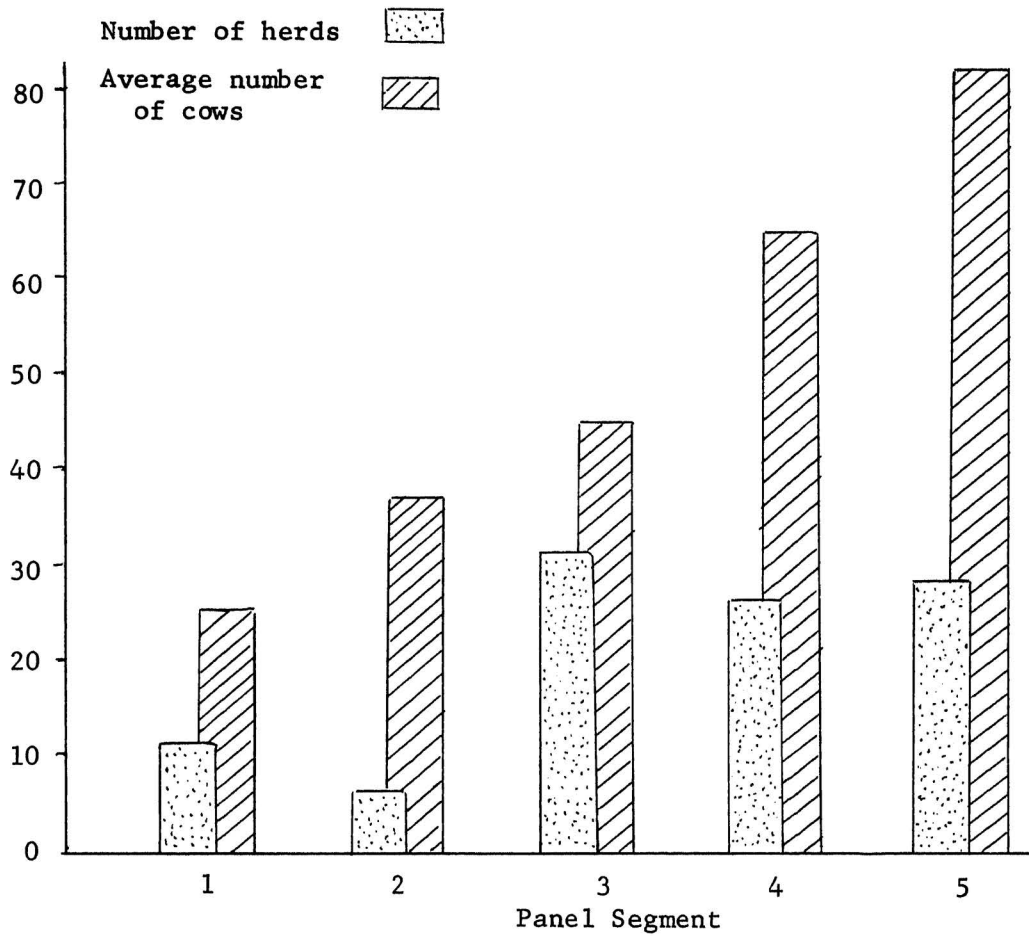


Figure 2. The number of herds and the average number of cows per herd in each segment of Dairy Research Panel, 1968.

TABLE I. Comparison of Size of Business Factors by Panel Segments, Dairy Research Panel, 1968.

Item	Panel Segment					All Farms
	1	2	3	4	5	
1. Average number of herds	11	6	31	26	28	102
2. Number of cows	25	37	45	65	82	58
3. Total lbs. milk produced	222,460	354,252	554,153	764,429	853,312	621,478
4. Total value all production	\$15,080	\$ 27,842	\$ 31,749	\$ 46,583	\$ 59,793	\$ 41,017
5. Acres crop and open pasture	197	443	258	396	411	339
6. Man equivalents	1.4	1.9	2.0	2.7	2.9	2.4
7. Total capital managed	\$73,386	\$130,135	\$106,273	\$162,471	\$213,826	\$147,327

TABLE II. Allocation of Capital Investments by Panel Segments, Dairy Research Panel, 1968.

Item	Panel Segment					All Farms
	1	2	3	4	5	
1. Total capital managed	\$73,386	\$130,135	\$106,273	\$162,471	\$213,826	\$147,327
2. Land and improvements	50,273	89,604	68,659	103,623	134,328	94,456
3. Livestock	10,883	18,671	19,618	30,525	37,772	26,271
4. Feed and supplies	3,602	6,620	6,261	9,770	14,415	9,076
5. Machinery and equipment	8,628	15,239	11,735	18,555	27,314	17,525
6. Capital managed per man	53,582	67,001	54,108	60,774	78,640	63,090
7. Capital managed per cow	2,935	3,517	2,362	2,500	2,608	2,540

LABOR USED FOR THE DAIRY ENTERPRISES

Labor is the scarcest resource on most Missouri dairy farms. This is particularly true near urban and industrial centers where farmers must pay more to compete with urban wages. Observations indicate that more dairymen have gone out of business because of labor shortages and labor problems than for any other reason.

Because of the severity of dairy labor problems, a primary objective of the Dairy Panel was to get up-to-date information on labor requirements. Such information is essential in planning new dairy operations and in making major adjustments in existing ones. Old labor standards of 80 to 120 hours per cow appeared too high when this study was begun. No on-the-farm labor data for different kinds of Missouri dairy operations were available for planning adjustments. Likewise, no data were at hand for planning labor needs for different kinds of jobs associated with the dairy enterprise.

Each cooperator in the Dairy Panel sent in monthly reports in 1968, showing the time spent with his milking herd and young stock and a breakdown of total time among various jobs. Labor informa-

tion was collected by timing routine jobs at periodic intervals and reporting the average time required for each job for the month.

Other non-routine jobs--such as feed preparation, disease control, manure hauling, and repair of buildings, fences, and equipment--were timed as performed. Then, the average time, in minutes, and the numbers of times performed were reported each month.

Labor Requirements Per Cow

A summary of this 1968 labor data on a per-cow basis is shown in Table III. Most striking at first glance is the low total labor requirement per cow in relation to past standards. The average total of 50 hours per cow for the entire Panel of 102 herds is far below earlier estimates. Even the small, least efficient herds in labor use (Segment 1) averaged only 66 hours per cow.

It should be noted that hours of labor for construction of new facilities are not included in the totals. Such work was considered chargeable to new investments rather than to annual operating obligations.

TABLE III. Annual Labor Requirements Per Dairy Cow by Jobs by Panel Segments, Dairy Research Panel, 1968.

Job	Panel Segment					Panel Avg.
	1	2	3	4	5	
	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.
1. Moving cattle for milking	4.3	4.5	4.1	3.2	2.3	3.2
2. Assembling and sanitizing equipment	5.3	2.8	3.2	2.6	2.2	2.7
3. Milking	39.0	24.4	31.6	26.9	26.9	28.5
4. Clean-up	6.0	3.5	5.6	5.1	4.7	5.1
5. Feeding	6.2	3.9	4.3	4.6	4.9	4.7
6. Manure disposal	1.9	0.9	2.5	2.7	3.4	2.8
7. Other	<u>3.3</u>	<u>2.1</u>	<u>3.1</u>	<u>4.0</u>	<u>3.0</u>	<u>3.2</u>
8. Total	66.0	42.1	54.4	49.1	47.4	50.2

Also, labor for handling replacements and other young stock was calculated separately and is not included in the per-cow totals in Table III. The total hours labor for the dairy enterprise can be derived for the entire Panel by adding 6.1 hours per cow for the year.

Labor Distribution by Jobs

For planning new dairy enterprises and major changes in present operations, a knowledge of labor needs for different jobs is of primary importance. The average annual time required, in hours, for all major jobs is summarized in Table III. More hours were required per cow for the smaller herds in Panel Segment 1, especially for milking, feeding, and handling equipment. This probably is a reflection of less automation and mechanization for these tasks. Except for milking time, little variation is evident among the other four Panel segments for individual jobs.

An explanation for the greater labor efficiency, for almost all jobs, for the relatively few herds in Segment 2 is not available from the records. Perhaps less rigid inspection requirements made it possible to omit some time-consuming tasks required of fluid milk producers.

Figure 3 shows the percentage distribution of labor among jobs. Milking time stands out as the big time-consuming job, requiring almost 57 percent of all labor.

Three other jobs are closely associated with the milking process: moving cattle for milking, assembling and sanitizing equipment, and clean-up after milking. These required another 21.8 percent of total labor. Thus, the milking process and these related functions required 78.6 percent of total labor needed for the average Panel herd.

Obviously, any substantial reduction in the hours of labor required per cow must be sought through improved labor efficiency in the milking process. For example, a 20 percent saving in labor needed for this part of the operation will reduce the annual time requirement by six hours per cow, while a 20

percent reduction in feeding time will save only one hour per cow.

Further differences among Panel segments in the annual percentage allocation of labor to different jobs are revealed in Table IV.

Effect of Herd Size on Labor Used

As revealed in Figure 4, some improvement in labor efficiency per cow is associated with increases in herd size. The most striking reduction in the hours of labor required per cow was found among manufacturing milk producers. Herds of less than 20 cows required more than 100 hours per cow per year while those of more than 40 cows required less than 40 hours.

This is understandable, since much of the total time for moving cattle, assembling and sanitizing equipment, cleaning up after milking, and feeding is fixed time and does not vary greatly with herd size. As herd size increases, the average time for these activities decreases rapidly.

Labor requirements per cow continued to decline up to the largest herds but decreased more slowly for herds of 50 cows or more.

Variations in Labor Requirements

Several variations in labor requirements among Panel segments, kinds of jobs, and herd sizes already have been noted. Perhaps even more significant are the variations among herds within each Panel segment.

A comparison of the herds with highest and lowest labor requirements per cow per year with the Panel segment average is in Table V. A rather wide variation is noted within each Panel segment. As might be expected, the herd with highest labor requirements was found among the small herds in Segment 1. Likewise, as expected, Segment 5 is the group in which lowest labor requirements per cow are found; they were less than 20 hours in 1968. Many of the drylot producers appear to have achieved a higher degree of automation and mechanization in herd management than many of those in the other Panel groups.

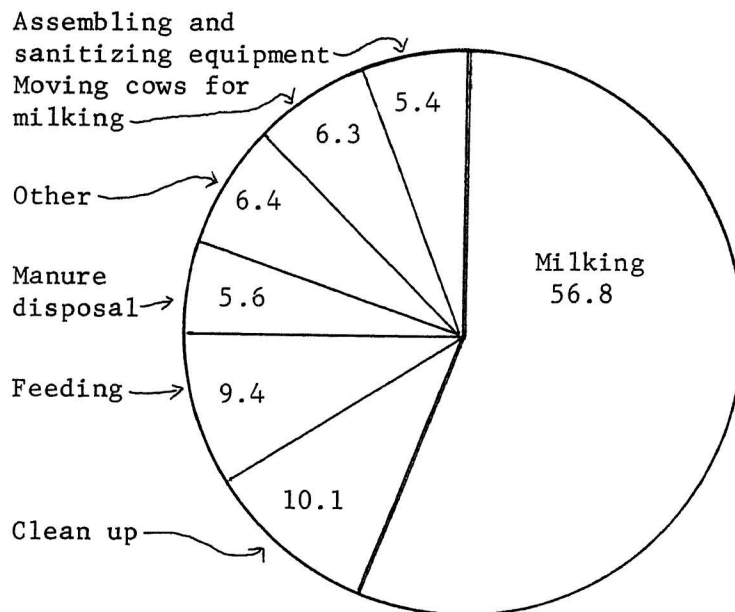


Figure 3. Percentage allocation of labor by jobs on 102 Missouri dairy farms - Dairy Research Panel data, 1968.

TABLE IV. Percent of Total Annual Labor Devoted to Various Jobs by Panel Segment, Dairy Research Panel, 1968.

Job	Panel Segment					Panel
	1	2	3	4	5	Avg.
	%	%	%	%	%	%
1. Moving cattle for milking	6.6	10.6	7.5	6.6	4.8	6.3
2. Assembling and sanitizing equipment	8.0	6.7	5.8	5.3	4.6	5.4
3. Milking	59.2	58.0	58.0	54.8	56.8	56.8
4. Clean up	9.1	8.4	10.3	10.4	10.0	10.1
5. Feeding	9.4	9.4	8.1	9.3	10.3	9.4
6. Manure disposal	2.9	1.8	4.6	5.5	7.2	5.6
7. Other	<u>4.8</u>	<u>5.1</u>	<u>5.7</u>	<u>8.1</u>	<u>6.3</u>	<u>6.4</u>
8. Total	100.0	100.0	100.0	100.0	100.0	100.0

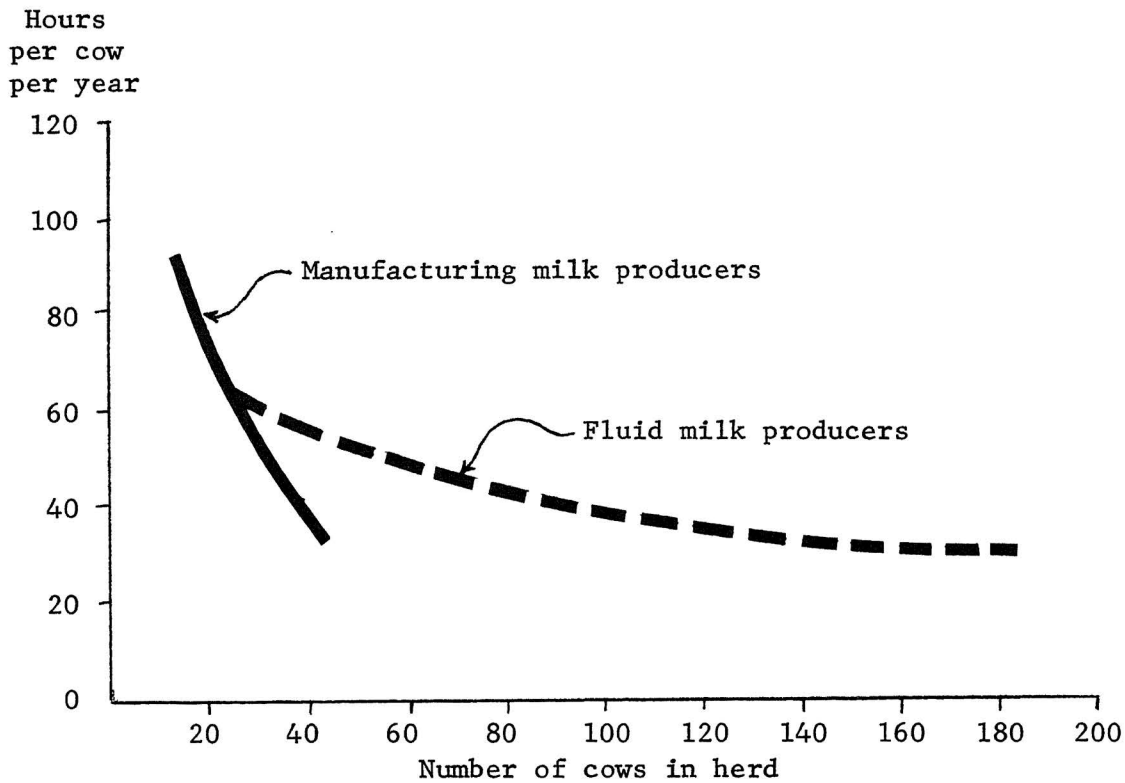


Figure 4. Effect of herd size on hours of labor required per cow per year, Dairy Research Panel Data, 1968.*

TABLE V. Annual Labor Requirements Per Cow for the High, Average, and Low Herds in Each Panel Segment, Dairy Research Panel, 1968.

Panel Segment	Hours Labor Per Cow Per Year		
	High	Average	Low
1	114.9	66.0	42.3
2	61.3	42.1	25.6
3	89.6	54.4	31.8
4	76.6	49.1	26.9
5	84.4	47.4	19.7

One of the biggest challenges in the Research Panel project is to identify the causes for variations in labor efficiency among the Panel segments and among the individual herds within each

group. An investigation and evaluation of these differences will constitute a major part of the analysis after completion of records for the two-year Panel project.

Labor Efficiency

Table VI includes a summary of the average total pounds of milk production for the herds included in each Panel segment and for the entire Research Panel. This milk output is then related to the man equivalents of labor and the total hours of labor to give the production per man and per hour of dairy labor.

The production of over one-fourth million pounds of milk per man and over 200 pounds per hour of dairy labor indicates a high level of productivity, but a rather wide variation among Panel segments may be noted in Table VI.

* Regression equation: $y = a - bx + cx^2$

— $y = 127.42277 - 2.64111x + 0.01134x^2$

- - - $y = 73.66137 - 0.40766x + 0.00095x^2$

TABLE VI. Labor Efficiency in Milk Production,
Dairy Research Panel Data, 1968.

	Panel Segment					All Farms
	1	2	3	4	5	
Total pounds milk produced	222,460	354,252	554,153	764,429	853,312	621,478
Pounds milk produced per man	158,900	186,448	277,077	283,122	294,211	258,949
Pounds of milk per hour of dairy labor	132	223	229	236	221	214

FEED CONSUMPTION AND COSTS

Each dairyman in the Research Panel provided a monthly report of the feed consumed by his milking herd and the young stock on hand.

Roughage--in the form of hay, haylage, silage, and pasture--was the primary home-raised feed input for the milking herds, averaging 5.3 tons per cow for all farms (Table VII). Variation was small in total roughage consumption per cow but the kinds of roughage used differed rather widely.

Drylot operators in Segment 5 relied largely on harvested and stored roughage,

which provided almost 94 percent of the total consumed. In contrast, the dairymen in Segment 2 relied most heavily on pasture, deriving over 57 percent of the total roughage from this source.

Costs of concentrate feed (grain and supplement) ranked above roughage in every Panel segment and accounted for 55 percent of the total feed cost for all farms. Expressed as percent, the cost of concentrates did not vary greatly among Panel segments, ranging from a low of 52.7 percent of total feed costs in Segment 5 to 59 percent in Segment 2.

TABLE VII. Annual Feed Consumption and Cost Per Dairy Cow by Panel Segments, Dairy Research Panel, 1968.*

Data	Panel Segment					All Farms
	1	2	3	4	5	
1. Number of herds	11	6	31	26	28	102
2. Average number of cows	25	37	45	65	82	58
3. Tons harvested roughage**	2.6	2.1	3.3	3.4	4.5	3.7
4. Tons pasture roughage**	2.7	2.8	2.4	2.2	.3	1.6
5. Pounds concentrate fed	4,213	4,367	5,429	4,721	5,214	5,332
6. Days on pasture	194	230	191	185	24	146
7. Cost of:						
8. Harvested roughage per cow	\$ 57.60	\$ 48.76	\$ 77.19	\$ 87.53	\$113.27	\$ 92.17
9. Pasture roughage per cow	24.54	25.25	21.33	19.85	2.58	14.93
10. Concentrate per cow	<u>113.22</u>	<u>106.60</u>	<u>135.96</u>	<u>135.72</u>	<u>129.24</u>	<u>131.07</u>
11. Total feed cost per cow	\$195.36	\$180.61	\$234.48	\$243.10	\$245.09	\$238.17
12. Feed cost per 100 lbs. milk***	2.20	1.89	1.90	2.07	2.36	2.22

* Feed for young stock and replacement heifers is not included.

** Roughage is measured in hay equivalents.

*** Feed costs were computed by applying standard prices to the quantities of each kind of feed reported by individual dairymen. Variations in concentrate costs were dependent, largely, upon differences in ration composition.

The cost of concentrates represented a higher direct cash outlay on most farms than that of roughage, which was raised on the farm in most cases.

Variations in the cost of concentrate feed per cow were dependent, largely, upon differences in the composition of the concentrate ration. For example, in Panel Segment 1, only 54.7 percent of the total cost of concentrate feed (\$110.22) was represented in home-mixed concentrate rations. In Panel Segment 2,

this same ratio was 95.2 percent of the total concentrate cost (\$106.60).

Feed for young stock, including replacement heifers, was reported separately from that for the cow herd. A brief summary of feed consumed by young stock is in Table VIII. Note that operators in Segment 1 appeared to rely more heavily on concentrate feed and less on roughage than those in other Panel groups.

TABLE VIII. Annual Feed Consumption by Young Stock Per Cow Unit by Panel Segments, Dairy Research Panel Data, 1968.

Feed Fed	Panel Segment				
	1	2	3	4	5
Tons harvested roughage*	.6	.5	1.0	1.0	1.0
Tons pasture roughage*	<u>.8</u>	<u>1.4</u>	<u>1.1</u>	<u>1.2</u>	<u>.8</u>
Tons total roughage*	1.4	1.9	2.1	2.2	1.8
Pounds concentrate	1,245	592	823	1,051	1,200

* Roughage is measured in hay equivalents..

COW TURNOVER AND CALF DEATH LOSSES

Successful dairymen are concerned about the loss of cows from the milking herd, the source of herd replacements, and death losses among dairy calves.

Cow Turnover

Dairy Panel cooperators reported the reasons for disposing of cows from their milking herds throughout 1968. The rate of disposal averaged 29 percent of the average number of cows in the milking herd for all farms and ranged from 22 percent to 30 percent among Panel segments (Table IX). A wide range in cow turnover among individual herds also is evident in Table IX, especially in Segment 4 in which one milking herd was almost completely replaced during the year.

The most striking contrast in Table IX is the lower cow disposal rate by the manufacturing milk producers in Panel Segments 1 and 2. The average herd life for all farms was approximately 3.4 years, as compared to 4.4 years for the herds of manufacturing milk producers,

and 3.3 years for those of dairymen producing fluid milk.

Low production was the predominant reason for culling individual cows in all Panel segments, accounting for 11 percent of the average herd. Breeding and mastitis problems ranked next as reasons for cow sales.

Source of Replacements

Young stock raised on the farm was the primary source of herd replacements, accounting for 27 percent of the average cow herd for all farms. The only exception was in Panel Segment 1 in which a higher proportion of the cows added to the herd came from purchases rather than from heifers raised. Further variations are revealed in Table X.

Calf Death Losses

Death losses of dairy calves seemed quite high for some herds and averaged more than 15 percent of the calves born on all farms. Variations among Panel segments and among individual herds within Panel segments are shown in Table XI.

TABLE IX. Reasons for Disposal of Cows as a Percent of the Cow Herd by Panel Segments, Dairy Research Panel Data, 1968.

Reason for Disposal	Panel Segment					All Farms
	1	2	3	4	5	
	%	%	%	%	%	%
Sold for:						
Low production	10	12	12	9	11	11
Breeding	4	2	6	7	6	6
Mastitis	2	3	4	3	5	4
Other disease	1	1	2	2	1	2
Dairy purpose	1	0	1	4	2	2
Other	1	3	2	2	1	2
Died	2	2	2	3	2	2
Trades, gifts	0	0	1	1	0	1
Total disposal	22	23	30	30	29	29
Range in percent disposal	8-58	11-42	8-59	11-98	15-45	8-98

TABLE X. Source of Cow Herd Replacements, as a Percent of the Average Number of Cows in the Milking Herd, by Panel Segments, Dairy Research Panel Data, 1968.

Source of Replacements	Panel Segment					All Farms
	1	2	3	4	5	
	%	%	%	%	%	%
From young stock	16	30	29	29	27	27
Cows bought	22	8	6	2	3	5
Trades, gifts, etc.	0	0	1	0	1	1
Total	38	38	36	31	31	32

TABLE XI. Mortality Rate of Dairy Calves, by Panel Segments, Dairy Research Panel Data, 1968.

Panel Segment	Death Loss as a Percent of Calves Born	Range in Percent Death Loss
1	14.5	0.0-40.0
2	15.9	0.0-25.0
3	13.6	5.3-42.6
4	15.4	0.0-31.1
5	15.6	1.7-32.8
All Farms	15.1	XXXXXXXX

FINANCIAL RESULTS

Financial and production records from individual dairymen were grouped by Panel segments to provide average performance data for each kind of production system. Each Panel member received a detailed summary and analysis of his own records and a special report of the same analytical measures by Panel segments for comparing with his own data.

Value of Production

While the dairy herd was the predominant livestock enterprise on all Panel farms, the manufacturing milk operations, Segments 1 and 2, were more diversified (Table XII). In Segment 1, the dairy enterprise contributed 75 percent of the total value of livestock production while the same ratio was only 70 percent in Segment 2. More than 95 percent of the value of all livestock production came from the dairy herd in the other three Panel groups. Most of the dairymen in these groups had no other livestock enterprises.

Variations in size of operation and in labor efficiency in milk production follow a consistent pattern throughout the five Panel segments. The value of dairy production in total, as well as per man and per hour of dairy labor, increased steadily from Panel Segments 1 through 5. While most of the increases were due to the larger herds and greater volume of production in the fluid milk groups, price differences between manufacturing and fluid milk also contributed to the spread between them.

It should be kept in mind that all of the value-of-production figures are gross amounts, without any deductions for fixed and variable costs of production. For example, the values of dairy production per man and per hour of labor do not, in any sense, represent net earnings for labor in the dairy enterprise. The data are useful, primarily, as comparative measures of size and gross labor productivity.

Returns to Factors of Production

Dairymen, just as other businessmen, expect to get paid for all the resources used in production, including their own capital, labor, and management. In analyzing the Dairy Panel records, total cash expenses (including operating expenses and new investments) were deducted from total cash receipts to get a "cash balance." This figure was adjusted for interest paid, home-used products, and inventory changes to arrive at "business and family earnings" for the year's business.

These "earnings" then were distributed among the various factors of production--the operator's labor, capital, and management--to arrive at returns for his resources. These returns then were averaged for the dairymen included in each Panel segment to get the data shown in Table XIII.

The interest allowance on capital was computed at 5 percent, considerably below the current "borrowing" rate but somewhat closer to the rate paid on savings accounts. Each dairyman reported the "going" rate for hired labor in his locality and these figures were averaged by Panel segments to get the labor figures on Line 3 of Table XIII.

As revealed in Table XIII, the average returns for all Panel farms were reasonably good in 1968, partially because of improvement in milk prices over recent years. However, dairymen with the smaller operations represented in Segment 1 realized lower returns for all resources than those in other Panel groups. The negative return to management (-\$2,227) for the average of this segment indicates a failure to earn the 5 percent interest on capital managed and the "going" hired labor rate for the operator.

Returns are rather closely correlated with the amount of capital and other resources committed to the farm business units. A surprising similarity is revealed

in Table XIII between the larger operations in Panel Segments 4 and 5. While the drylot operators in Segment 5 had somewhat larger herds and considerably higher capital investments, the rate earned on capital and the returns to management per year were almost identical.

Actually, wider variations in returns to resources were found among

dairymen within Panel segments than among the Panel groups. When analyzing the data at the close of the two-year Panel study, primary attention will be given to identifying factors which influence variations in returns and to determining the kinds of adjustments which would improve performance on low-earning farms.

TABLE XII. Value of Dairy and All Livestock Production by Panel Segments, Dairy Research Panel Data, 1968.

Item	Panel Segment					All Farms
	1	2	3	4	5	
1. Value of all livestock production	\$14,500	\$25,900	\$34,367	\$49,385	\$59,961	\$42,408
2. Value of all dairy production	10,941	18,259	32,678	46,974	57,380	39,738
3. Value of dairy production per man	7,815	9,610	16,339	17,398	19,786	16,558
4. Value of dairy production per hour of dairy labor	6.50	11.70	13.49	14.48	14.85	13.71

TABLE XIII. Returns to Factors of Production on Dairy Farms by Panel Segments, Dairy Research Panel Data, 1968.

Item	Panel Segment					All Farms
	1	2	3	4	5	
1. Total capital managed	\$73,386	\$130,135	\$106,273	\$162,471	\$213,826	\$147,327
2. Interest allowance on capital	3,669	6,507	5,314	8,124	10,691	7,366
3. Value of operator's labor	3,745	3,800	4,297	4,865	6,208	4,865
4. Return to labor and management	1,469	6,350	8,779	12,561	16,268	10,814
5. Return to labor and management per year	1,469	6,350	8,241	10,733	10,859	8,732
6. Return to capital and management	1,393	9,057	9,796	15,819	20,751	13,316
7. Percent return to capital and management	1.7	6.6	9.5	10.2	9.6	8.7
8. Return to management per year	\$-2,277	\$ 2,511	\$ 4,383	\$ 6,751	\$ 6,809	\$ 4,804

SUMMARY

The two-year Dairy Research Panel was started in 1968 to get up-to-date information on dairy farm requirements and returns. Selected dairymen were grouped into five separate Panel segments, representing five types of dairy operations--two for manufacturing milk producers and three for fluid milk producers. More than 100 dairymen provided complete financial, labor, and feed records each month during 1968.

A few highlights from the first year's records (1968) follow.

- * Total capital investments for the Dairy Panel farms were high--ranging from an average of \$73,386 in Panel Segment 1 to \$213,826 in Segment 5 (drylot, fluid milk producers).
- * Labor used per cow was far below earlier standards (80-120 hours per cow) ranging from 42 to 66 hours per cow through the five Panel groups, and from 20 to 115 hours per cow among individual herds.
- * Milking was the big time-consuming job on the dairy farms, requiring almost 57 percent of all dairy labor. Moving cattle for milking, assembling and sanitizing equipment, and clean-up after milking took another 21.8 percent of the total.
- * Labor requirements per cow decreased as herd size increased.
- * Roughage consumption (hay, haylage, silage, and pasture) averaged 5.3 tons per cow for all farms and varied less than one ton per cow among all Panel segments.
- * Concentrate feed (including grain and supplement) accounted for 55 percent of the total feed cost.
- * Total annual feed cost per cow averaged \$238 and ranged from \$181 to \$245 among Panel groups.
- * Cow turnover was rather high, averaging 29 percent for all herds. Low production was the predominant cause for disposal, accounting for 11 percent of the average Panel herd. Breeding and mastitis problems were next--6 percent and 4 percent, respectively.
- * Young stock raised on the farm furnished the primary source of dairy herd replacements.
- * Calf death losses varied from zero to 42.6 percent of the number of calves born, averaging 15.1 percent for all herds.
- * Value of all dairy production averaged almost \$40,000 and ranged from a low of \$10,941 in Panel Segment 1 to \$57,380 in Segment 5.
- * Returns to labor and management averaged almost \$11,000 for all farms and varied from \$1,500 to more than \$16,000 in Panel Segments 1 through 5.
- * Returns to capital and management averaged over \$13,000 for the entire Panel and ranged from a low of \$1,393 in Segment 1 to \$20,751 in Segment 5.