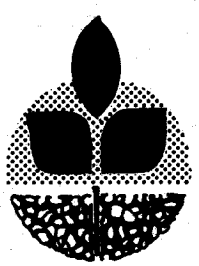
The Economics of Milk Production in Selected Pacific Northwest Milksheds

Special Report 552
June 1979



Agricultural Experiment Station
Oregon State University, Corvallis

SUMMARY

The objective of this study was to estimate the economic performance of Grade A dairy enterprises in seven Pacific Northwest milk production regions. The analysis was based on data obtained from personal interviews of a sample of 160 milk producers shipping milk to handlers regulated by federal and state milk marketing orders. For 1976, the overall weighted average net cost of milk production for all regions was $11.26 per hundredweight with a butterfat test of 3.8 percent. This milk sold for a weighted average price of $9.66 indicating that for 1976, producers were not able to cover the opportunity costs of their labor, management and capital. An important characteristic of these cost data was their variability. Thirteen percent of the enterprises had costs that were less than the price received. A detailed analysis of the average enterprises in each of the seven study regions is presented.

ACKNOWLEDGMENTS

The authors wish to express their gratitude to the dairy farmers who willingly took the time to provide information for this study. The assistance of James Burger, market administrator, U. S. Department of Agriculture, Puget Sound and Oregon-Washington Federal Milk Marketing Orders, also is appreciated greatly.

Funds for this project were provided by the Milk Stabilization Division, Oregon Department of Agriculture with Ray Hobson, administrator and William R. Wood, assistant administrator of the Division. Financial assistance also was provided by the Department of Agricultural Economics, Washington State University; the Department of Agricultural and Resource Economics, Oregon State University; and the Department of Agricultural Economics, University of Idaho.

CONTENTS

THE ECONOMICS OF MILK PRODUCTION IN SELECTED PACIFIC NORTHWEST MILKSHEDS

A. G. Nelson, G. S. Willett, K. H. Lindeborg, and H. A. Luke*/

INTRODUCTION

Dairy production in the Pacific Northwest has continued to undergo dramatic changes in recent years. Economic pressures stemming from higher feed, labor, and capital costs have caused dairy producers to upgrade their management and seek increased efficiency through larger herd sizes and higher milk production per cow. Dairy production enterprises in the Pacific Northwest represent a wide variety of resource situations and production systems. Thus, dairy farmers have each responded somewhat differently to the economic pressures.

Current information on the characteristics and economic performance of milk production enterprises in the Pacific Northwest is needed for several purposes. State and federal agencies need current information on production costs for making policy decisions affecting milk prices. Dairy farmers need such information to provide standards for comparing the profitability of their operations, provide information for investment planning, and to evaluate public policy decisions regarding milk marketing. Lenders can use this information to project the credit needs of the dairy industry and provide data for evaluating loan proposals. Finally, researchers, Extension educators, and other advisors can use this information to identify further informational needs and to plan programs to meet these needs.

---

*/ Respectively, the authors are associate professor, Department of Agricultural and Resource Economics, Oregon State University; Extension economist, Washington State University; professor, Department of Agricultural Economics, University of Idaho; and Extension dairy marketing economist, Washington State University and Oregon State University.

STUDY OBJECTIVES

The major objective of the study was to estimate the economic performance of Grade A milk production enterprises in selected major Oregon, Washington, and Idaho milksheds. Specific objectives of the analysis were to:

1. Estimate capital investments, production costs and returns, and various measures of profitability for milk production enterprises in major Pacific Northwest milksheds.
2. Determine the frequency distributions of milk production costs for these PNW dairy enterprises.
3. Provide a data base from which periodic updates of milk production costs can be made in the future.

METHODOLOGY

Geographical Scope of Study

Based on known geographic differences in dairying, the three-state area was divided into seven regions (Figure 1). The study was restricted to dairy producers shipping milk to handlers in these seven regions who were regulated by federal and state milk marketing orders. Demarcation of these seven regions was based on information from Extension dairy specialists and agents in the three states.

Survey Procedure

Most of the information in this report was obtained from personal interviews of a sample of 160 milk producers conducted during the summer of 1977. Information collected was for the 1976 calendar year.

Producers included in the sample were selected from complete listings of dairy farmers shipping milk to handlers regulated by federal and state milk marketing orders in the seven regions. The lists included the names of 2,083 producers and the volumes of milk shipped by each producer in 1976.

Because of the anticipated impact of the volume of milk sales on resource requirements and economic performance, the population of dairy producers was

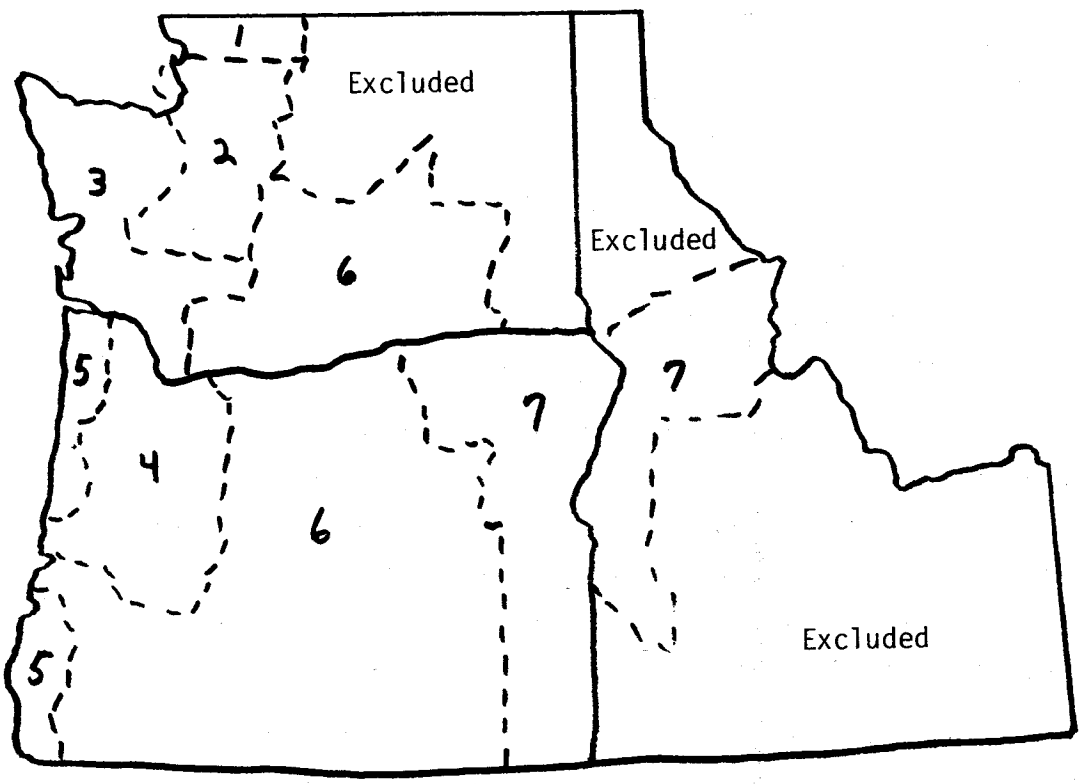


Figure 1. Regions Sampled in Pacific Northwest Dairy Enterprise Study.

divided into three size categories, defined according to 1976 volume of milk shipped. The three size categories were: small, less than 730,000 pounds of milk; medium, 730,000 to 1,460,000 pounds; and large, more than 1,460,000 pounds. A random sampling technique was used to select sample dairy producers from each of the three size categories. Consequently, the sample was stratified by geographic area and size of business. A summary of producer numbers appearing in the population and sample for each region appears in Table 1. The overall sampling rate was 7.7 percent.[1/]

The survey was designed to acquire the following information from each cooperating dairy farmer: (1) cow inventory, including number, breed, productivity, and value; (2) returns from milk production, cull cows, manure, and calves; (3) feeding program and costs; (4) description of and investment in facilities for housing cows, storing and handling feed, milking, and manure handling; (5) labor requirements and costs, and (6) other dairy enterprise expenses. Each interview required two to five hours, depending on the size and complexity of the business and the availability of records.

The interviews were conducted by trained enumerators to minimize data discrepancy from interview procedure. Data from the field schedule were summarized and transferred to working forms. From these data, reports were prepared for each dairy enterprise using the ODEAR (Oregon Dairy Enterprise Analysis Report) computer program which is available through the Department of Agricultural and Resource Economics, Oregon State University.

Copies of the reports were sent to cooperating dairy farmers, allowing them to compare their enterprises with averages for other dairy enterprises sampled in their region. These averages were reported for three size groups according to volume of milk produced. The reports included a financial summary, analysis factors relating to labor, capital, dairy herd, and feed program management, and calculations of milk production costs and returns. This provided useful information to producers and gave an opportunity to check for errors in data collection and processing.

Estimating Dairy Enterprise Investments, Costs, and Returns

The intent of the study was to analyze only the dairy enterprise, that phase of the farm operation directly involved with milk production. Thus, it

Table 1. Number of Milk Producers in Population and Sample by Region, Pacific Northwest Dairy Enterprise Study, 1976

Region	Total number of producers[1/]	Percent of total producers	Number of producers in sample[2/]	Percent of total sample
1. Whatcom County, Washington	499	24.0	26	16.2
2. Puget Sound, Washington	539	25.9	36	22.5
3. Southwestern Washington	267	12.8	24	15.0
4. Willamette Valley, Oregon	307	14.7	22	13.8
5. Oregon Coast	166	8.0	15	9.4
6. Central Washington & Oregon	221	10.6	16	10.0
7. Eastern Oregon & Idaho's Boise Valley	84	4.0	21	13.1
TOTAL	2,083	100.0	160	100.0

[1/] Number of producers shipping milk to handlers (distributors or cooperative associations) regulated by Federal Milk Marketing Orders as of November 1976.

[2/] See Appendix Table A-4 for a detailed break-down of the sample by region and enterprise size.

was necessary to isolate the capital investments, costs, and returns for that enterprise from the other activities commonly found on Pacific Northwest dairy farms. Feed and replacement animal production were not considered to be a part of the dairy enterprise. Thus, feed and replacement animals produced on the farm were charged to the dairy enterprise at market prices. Investments and costs for facilities and equipment included only those items directly involved in producing milk, housing the cow herd, storing feed, and removing manure. Where resources (e.g., tractors, feed storage facilities, etc.) were used jointly by milk production and other enterprises, the dairy producers were asked to indicate the proportion of total use allocable to the milk production enterprise. Only those labor and operating expenses directly attributable to the cow herd were allocated to the dairy enterprise. Returns included the value of milk produced, cull cows sold, new-born calves, and manure produced by the cow herd.

Capital Investments

Average investments for buildings, equipment, and vehicles were estimated by the following method:

$$\text{Average Investment} = \frac{\text{New Cost} + \text{Salvage Value}}{2}$$

New costs in this formula were based on 1976 replacement costs obtained from dairymen and dealers selling these items. The dairy farmers were asked to provide the specifications for their facility and equipment inventory. A standardized set of salvage values, expressed as a percent of new cost, was developed for all assets. The average investments calculated by this procedure are likely to be somewhat higher than the 1976 depreciated values actually appearing on the dairyman's depreciation schedule, but considerably lower than the 1976 start-up costs for a new entrant. The average investment should be interpreted as the average amount of capital tied up in these items during their period of use in the business.

Investments in cows, milk base (or quota), and land were those quoted by the sample dairy farmers for 1976. Cow numbers were estimated on a monthly basis and averaged to get a 1976 average herd size. Investments in base/quota for all producers, except those in the Puget Sound Order, represented the pounds owned as of December 31, 1976. Puget Sound producers must return, to the Order, one-third of any Class I base sold; thus, the base investment for these producers was determined on two-thirds of the base owned as of December 31, 1976.

Annual Income

Dairy enterprise returns included the value of milk production, cull cows, calves, and manure produced by the cow herd. Returns from milk included the value of milk used on the farm, as well as receipts from milk sold.[2/] The value of milk used on the farm was based on the prices received by the producer for 1976 milk sales. A value, estimated by the surveyed producers, was placed on all surviving one-week old bull and heifer calves and credited to the milk production enterprise. Actual receipts were used to determine the value of cull cow sales. Manure was valued at commercial fertilizer prices for the amount of nitrogen, phosphorous, and potassium contained in the manure and available for plant use during the first year following applications[3/] Nutrient amounts were varied by breed of cow to reflect the relationship between size of animal and volume of manure production.[4/]

Operating Costs

Annual production costs were grouped into three categories: (1) operating costs, (2) ownership costs, and (3) operator and family labor and management costs. Operating costs include those outlays that vary with the number of cows

supported by the facilities. They are such items as feed, veterinary, breeding, milk hauling, marketing, hired labor, repairs, cow testing, bedding, supplies, utilities, fuel, oil, interest on operating capital, herd replacements, interest on the cow investment and quota/base, and other miscellaneous outlays.

The quantity and cost of feed were based on producer records and detailed observations. Concentrates included all grains and supplements fed to the cow herd (both milking and dry cows); roughages included hay, silage, cannery waste, brewer's malt, green chop, and pasture. Costs for purchased feeds reflect prices paid for feed used during 1976. For feeds grown by the dairy farmers, the market price, i.e., the price they could have received from the sale of the feed, was used. The cost of pasture was based on a charge per head per day which was set according to the breed of cow and quality of forage.[5/]

The cost of hired labor included the cash wage, the value of housing, bonuses, utilities, milk consumed, fringe benefits, social security and workman's compensation insurance.

Herd replacement costs represent the number of cows the producers reported adding to their herds during 1976 to replace cows that either died or were culled. Prices paid by individual producers were used for purchased replacements and their estimate of 1976 average market prices for two-year old springer heifers was was used for raised animals.

Interest on operating capital was figured at 10 percent on one-twelfth of the total annual operating cost. A 10 percent rate, times the average investment, was used to determine interest costs on the cow and base (or quota) investment.

All other operating costs were taken directly from the producers' records. Again, these costs represented only those associated with the dairy enterprise. Where the records did not provide an enterprise breakdown for the items used in several enterprises (e.g., hired labor, repairs, property taxes, etc.), the producers were asked to estimate the expense attributable to the dairy enterprise.

Ownership Costs

Ownership expenses were the second major category of costs estimated in the study. These expenses are associated with the ownership of facilities, equipment, and land and are incurred regardless of the number of cows

in the herd. As used in this study, such costs include interest on the investment and depreciation. Interest costs were assumed to equal 10 percent of the average investment (as defined in the capital investments discussion above) in the above assets.

Depreciation was computed for buildings, equipment, and vehicles by the following straight line formula:

$$\text{Annual Depreciation Expense} = \frac{\text{New Cost - Salvage Value}}{\text{Years Useful Life}}$$

Purchase prices in 1976, obtained from the farmers and suppliers, and standardized salvage values and useful lives were used to estimate depreciation. Depreciation, when defined according to the replacement cost concept adopted here, represents the amount of capital that should be set aside annually to permit replacement of an asset at its current price.

A charge was also made for the land on which the buildings and corrals for the dairy enterprise were located. This amounted to only a few acres. Interest was charged against the land investment at 10 percent per year.

Unpaid Labor and Management Costs

The third major category of expenses was operator and family labor and management. Cooperating producers were asked to indicate the hours of labor they, other operators, and various family members devoted to the dairy enterprise during 1976. Producers were also asked to estimate the value of that labor, where the value represented the return various individuals must have to remain in dairying, given alternative employment opportunities.

An allowance for the management of the dairy enterprise was computed according to formula. Based on an updated relationship estimated by Cornell researchers, management costs for the dairy enterprise were estimated to be $2,100 plus $22 per cow.[6/] This approach assumes larger herds have a higher total management requirement, but a lower per-cow requirement, than smaller herds.

INSTITUTIONAL SETTINGS FOR PNW MILK MARKETS

Important to the interpretation of the results of this study are the differences in the state and federal milk marketing orders which prevail. All

producers included in this study shipped their milk during 1976 to handlers regulated by federal marketing orders. Several factors affect the prices for milk received by sample producers surveyed in this study. One of these is the differences in the marketing orders which regulate their markets.

The 2,083 producers in the seven study regions sell to handlers regulated by three federal orders: Puget Sound, Oregon-Washington, and Inland Empire. Fewer than 2 percent of the producers were associated with the Inland Empire Order and none of these producers were included in the sample. The Puget Sound Market Order accounted for about three-fifths of the remaining producers. All Oregon and Idaho producers surveyed, and 18 of those in Washington, marketed their milk to handlers regulated by the Oregon-Washington Federal Order. The milk of these producers is distributed to consumers in Western Oregon and in Central and Southwestern Washington.

The remaining sample producers, all in Washington State, marketed their milk to handlers regulated by the Puget Sound Order. These handlers supply most of the fluid milk products used by consumers in Seattle and the other metropolitan markets of the Puget Sound area.

An important characteristic of the two federal market orders affecting milk producer prices is their so-called basing plans. Under the basing plans at least two prices are applicable each month for determining the producer's receipts. In addition, most producers marketing milk under the Oregon-Washington Order are participants in a program under which their federal order milk base and income are assigned to the Milk Stabilization Division of the Oregon Department of Agriculture. These producers are then paid under a state authorized quota program administered by the Division. This is also a two-price system. Under two-price systems, the producers receive a higher price for milk delivered within the limits of their individual base or quota. This higher price is based on the higher return from distributing this milk primarily in the fluid milk market. Deliveries in excess of the base or quota allowed each producer are reimbursed at a lower price based on manufacturing uses.

The rules for calculating the total amount of base or quota to be allotted individual producers serving the market differ significantly under the three plans. The three programs are similar, however, in that the base or quota represents an allocation to each producer of a percentage of the fluid or Class I

milk market. The percentage assigned each producer changes from year to year based on prescribed rules and procedures. A key variable in these allocations, however, is the producer's performance in supplying the market during certain time periods. These time periods are different under the three programs, but they include, in general, either the months of lowest milk production, the months of maximum demand for fluid milk, or both.

Market rights allotted in the form of base or quota may be transferred among producers under each program. Because of the income advantages of these market rights, they can have an economic value. However, the rules under which transfers (purchases or sales) will be allowed differ significantly among the plans. The value of base or quota to a producer is influenced by several factors including the amount of the expected difference in milk prices, by the conditions under which transfers are permitted, and by how the future possibilities for earning, or losing, base or quota will be affected.

There are several other factors that affect producer receipts from milk sales. These include variations in hauling costs and/or location differentials based on distance of the processing plant from the market. Average prices received during the year also differ depending on the percent of butterfat in the milk produced, on seasonal pattern of milk production, and on premiums or dividends paid by the handlers.

PNW DAIRY INVESTMENTS, COSTS, AND RETURNS

An Overview

Results of the survey for each of the seven study regions are summarized in Table 2. These are the "weighted average" results for the survey. As described above, the sample of dairy producers was stratified by geographical region and volume of milk sales. To calculate these weighted averages, the results for each of the three size categories were weighted by the pounds of milk shipped by the total population of producers in that region and size category during 1976. The data for the weights were obtained from the USDA milk market administrator's office. The weights are provided in Appendix Tables A-1 and A-2. A more detailed analysis of the survey findings for each region is offered in subsequent sections.

Table 2. Weighted Average Butterfat Tests, Milk Prices, and Net Production Costs for Dairy Enterprises, Seven Pacific Northwest Regions, 1976

Region	Butterfat test	Milk price	Net cost	Price/Cost index[a]
	(%)	($/cwt.)	($/cwt.)	
1. Whatcom County, Washington	3.81	9.54	11.51	83
2. Puget Sound, Washington	3.71	9.37	10.92	86
3. Southwestern Washington	3.81	9.88	12.24	81
4. Willamette Valley, Oregon	3.81	9.94	10.96	91
5. Oregon Coast	4.03	10.22	11.70	87
6. Central Washington & Oregon	3.63	9.82	11.11	88
7. Eastern Oregon & Idaho's Boise Valley	3.86	8.99	10.47	86
All Regions	3.77	9.66	11.26	86

[a] Price/cost index equals milk price received divided by net cost per hundredweight, times 100.

Source: See Appendix Tables A-1, A-2, and A-3.

The net cost of milk production is calculated by subtracting the other income (cull cows, calves, and manure) from the total of all costs (operating, ownership, and unpaid labor and management). The 1976 weighted average net cost of milk production per hundredweight for all regions was $11.26 with a butterfat test of 3.77 percent. The net cost of production ranges from $10.47 at 3.86 percent butterfat in Region 7, the eastern Oregon and Idaho Boise Valley area, to $12.24 at 3.81 percent butterfat in Region 3, southwestern Washington. These production costs, however, must be evaluated in relation to the milk prices received by the dairy producers. The weighted average prices received vary among regions because of differences in butterfat tests as well as differences in the federal and state milk marketing regulations which apply (as described in the previous section).

To provide a basis for comparing the relationship between prices and costs among the regions, a price/cost index has been computed. This index is the ratio of the price received to the net cost multiplied by 100. An index of 100

Table 3. Distribution of Sample Dairy Producers by Price/Cost Index, Pacific Northwest, 1976

Price/Cost index[a]	Number of producers	Percent of sample
		(%)
40 to 50	2	1.3
50 to 60	7	4.4
60 to 70	20	12.5
70 to 80	27	16.9
80 to 90	52	32.5
90 to 100	30	18.8
100 to 110	18	11.3
110 to 120	4	2.5
	160	100.0

[a] Price/cost index equals milk price received divided by net cost per hundredweight, times 100.

represents a situation where the milk price is exactly equal to the net cost. For all seven regions, the price was found to be less than the net cost of production. Thus, the seven indices are all less than 100, ranging from a low of 81 to a high of 91. With prices less than the net costs, producers were not able to cover the opportunity costs of their labor, management, and capital.

When interpreting these results, it is important to recognize a wide variation among individual enterprises in their costs and profitability. This is illustrated in Table 3 and Figure 2. These data represent the frequency distribution of the price/cost index for the sample of 160 dairy producers. In 1976, 87 percent of these producers had production costs greater than the price received. For 68 percent of the sample producers, the price they received was 90 percent of their total production cost, or less. And for 49 percent, the price was 85 percent of cost, or less. The important factors contributing to this variation are herd size, capital investment, milk production per cow, labor efficiency, and location.[7]

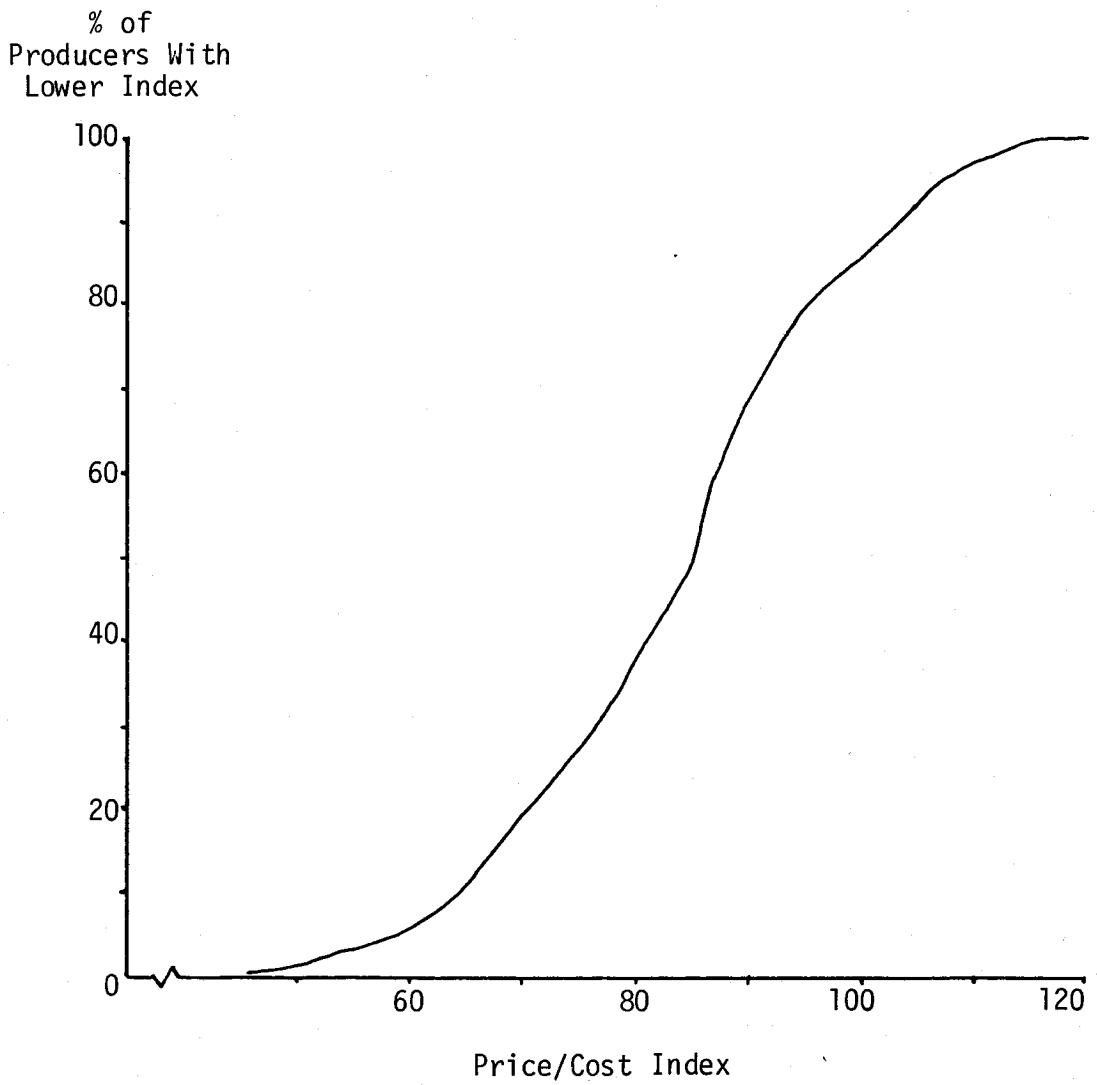


Figure 2. Sample Dairy Producers With Price/Cost Index Less Than Indicated Levels, Pacific Northwest, 1976.

Region One: Whatcom County, Washington

This and subsequent sections present a more detailed analysis of the 1976 investments, costs, and returns for the dairy producers surveyed in each of the seven study regions.

Whatcom County is the largest milk producing county in the Pacific Northwest. In 1976, there were 499 producers in this area selling milk under the Puget Sound Federal Milk Marketing Order.. Twenty-six Whatcom County dairy producers were surveyed in this study. The results are presented in Table 4. These data are the simple averages of those reported by the cooperating dairymen. They have not been weighted by the size category represented as was the case with the price and cost data presented in the preceding section.

Herd size for the sample dairy producers ranged from 35 to 243 cows and averaged 75 cows per herd. These cows produced an average of 14,396 pounds of 3.8 percent butterfat milk in 1976. Holsteins accounted for 84.2 percent of the 1,956 cows included in the survey; Guernseys represented 11.7 percent and Ayrshires, 4.1 percent.

The average capital investment was $144,899 per enterprise and $1,927 per cow. Included in that investment are facilities and equipment ($1,052 per cow), cows ($673 per head), land in farmstead ($106 per cow), and Class I milk base ($95 per cow).

Total income averaged $1,508 per cow. Receipts from milk sales and the value of milk used at home and on the farm accounted for 91 percent of that amount. Approximately 46 percent of the milk sales were covered by Class I base and the price received for all milk sold was $9.56 per hundredweight (simple average). Income from cull cows, calves, and manure averaged slightly more than $131 per cow.

Milk production costs were grouped into three categories: (1) operating, (2) ownership, and (3) unpaid (operator and family) labor and management. Operating costs averaged $8.97 per hundredweight of milk. These costs are those that will vary with the number of cows supported by facilities and equipment. Feed was the single largest cost item accounting for 56 percent of operating outlays. Ownership costs, including interest (10 percent) on the average investment and depreciation, averaged $1.50 per hundredweight. Thus, the

Table 4. Capital Investment, Income, and Costs for Sample Dairy Enterprises, Region 1, Whatcom County, Washington, 1976

No. of sample enterprises	26
Avg. number cows in herd	75.2
Lbs. milk per cow	14,396
Percent butterfat	3.76
Total hours labor	6,312

Item	Total Per Herd ($)	Total Per Cow ($)	Total Per Cwt. ($)
Investment			
Facilities and equipment	79,139	1,052.38	7.31
Land in farmstead	7,946	105.66	.73
Cows	50,633	673.31	4.68
Milk Base/quota	7,181	95.49	.66
Total	144,899	1,926.84	13.38
Income			
Value of milk production	103,531	1,376.74	9.56
Other (culls, calves, manure)	9,861	131.13	.91
Total income	113,392	1,507.87	10.47
Operating Costs			
Concentrates	24,018	319.39	2.22
Roughages	30,424	404.57	2.81
Other feed	272	3.62	.03
Total feed	54,714	727.58	5.06
Veterinary & breeding	2,315	30.78	.21
Hauling and marketing	4,347	57.81	.40
Hired labor	4,657	61.93	.43
Miscellaneous a/	12,924	171.86	1.19
Herd replacements	12,326	163.91	1.14
Interest on cow investment	5,063	67.33	.47
Interest on base/quota	718	9.55	.07
Total operating costs	97,064	1,290.75	8.97
Ownership Costs			
Depreciation of facilities & equip	7,596	101.01	.70
Interest on facilities, equip., land	8,709	115.81	.80
Total ownership costs	16,305	216.82	1.50
Total Operating & Ownership Costs	113,369	1,507.57	10.47
Unpaid Labor and Mngmt. Costs			
Operator labor	16,554	220.13	1.53
Family labor	2,577	34.27	.24
Management allowance	3,469	46.13	.32
Total unpaid labor & management	22,600	300.53	2.09
TOTAL ALL COSTS	135,969	1,808.10	12.55
DAIRY PROFIT (LOSS) b/	(22,577)	(300.23)	(2.08)
RETURN TO CAPITAL, UNPAID LABOR & MNGMT c/	14,513	192.99	1.34
RETURN TO UNPAID LABOR & MNGMT d/	23	0.31	0

a/ Includes repairs, insurance, property taxes, utilities, cow testing, bedding, supplies, fuel, oil, legal, accounting, dues, operating capital interest, etc.
b/ Total income minus total all costs.
c/ Total income minus total operating costs, plus interest on cow investment and base/quota, minus depreciation.
d/ Total income minus total operating and ownership costs.

combined operating and ownership cost was $10.47 per hundredweight. Operator and family labor and management charges (for 66 hours per cow per year) added an average of $2.09, bringing the full cost of milk production in Whatcom County to $12.55 per hundredweight.

Several measures of profitability were computed in the analysis. Returns to operator labor, management, and capital averaged $14,513 per enterprise, or about $193 per cow. This is equivalent to a -5.7 percent return on investment with a $22,600 annual charge for operator and family labor and management. Assuming a 10 percent capital cost, the return to operator/family labor and management was only $23 per enterprise. If all costs are considered, including a charge for capital (10 percent) and operator and family labor and management, the 26 dairy enterprises averaged a loss of $22,577.

Region Two: Puget Sound, Washington

Region 2 includes the six counties bordering the west side of the Puget Sound. This area contained approximately 539 dairy farms in 1976, all regulated by the Puget Sound Federal Milk Marketing Order. The major metropolitan areas of Seattle, Tacoma, and Everett receive the bulk of their dairy supplies from producers in this region. The survey included 36 dairy farmers from Region 2. Data for these producers are summarized in Table 5.

The cooperating producers averaged 127 cows per herd, but ranged between 39 and 231 cows. Cow productivity (15,662 pounds milk) was highest among the regions in the study. About 94.0 percent of the cows in the sample were Holsteins, followed by Jerseys with 4.8 percent and 1.2 percent Guernseys.

Capital investment for facilities, equipment, cows, land in farmstead, and Class I base averaged $206,625 per farm. That converts to $1,622 per cow for the region's average size herd.

Income from all sources averaged $205,965 per farm and $1,617 per cow. The average price received for milk has $9.33 per hundredweight. That price was based on 47.5 percent of milk sales covered by Class I base and 3.6 percent butterfat milk. Returns from milk production averaged $1,461 per cow, which was 90 percent of total income. Other income (culls, calves, manure) amounted to $155 per cow.

Table 5. Capital Investment, Income and Costs for Sample Dairy Enterprises, Region 2, Puget Sound, Washington, 1976

No. of sample enterprises	36
Avg. number cows in herd	127.4
Lbs. milk per cow	15,662
Percent butterfat	3.62
Total hours labor	8,461

Item	Total Per Herd ($)	Total Per Cow ($)	Total Per Cwt. ($)
Investment			
Facilities and equipment	101,775	798.86	5.10
Land in farmstead	10,415	81.75	.52
Cows	79,893	627.10	4.00
Milk Base/quota	14,542	114.14	.73
Total	206,625	1,621.85	10.35
Income			
Value of milk production	186,185	1,461.42	9.33
Other (culls, calves, manure)	19,780	155.26	.99
Total income	205,965	1,616.68	10.32
Operating Costs			
Concentrates	47,950	376.37	2.40
Roughages	51,654	405.45	2.59
Other feed	438	3.44	.02
Total feed	100,042	785.26	5.01
Veterinary & breeding	4,183	32.83	.21
Hauling and marketing	5,869	46.07	.29
Hired labor	12,664	99.40	.63
Miscellaneous a/	23,040	180.85	1.15
Herd replacements	21,288	167.10	1.07
Interest on cow investment	7,989	62.71	.40
Interest on base/quota	1,454	11.41	.07
Total operating costs	176,529	1,385.63	8.83
Ownership Costs			
Depreciation of facilities & equip	11,123	87.31	.56
Interest on facilities, equip., land	11,219	88.06	.57
Total ownership costs	22,342	175.37	1.13
Total Operating & Ownership Costs	198,871	1,561.00	9.96
Unpaid Labor and Mngmt. Costs			
Operator labor	22,809	179.03	1.14
Family labor	2,675	21.00	.13
Management allowance	4,745	37.24	.24
Total unpaid labor & management	30,229	237.27	1.51
TOTAL ALL COSTS	229,100	1,798.27	11.47
DAIRY PROFIT (LOSS) b/	(23,136)	(181.59)	(1.16)
RETURN TO CAPITAL, UNPAID LABOR & MNGMT c/	27,756	217.86	1.39
RETURN TO UNPAID LABOR & MNGMT d/	7,094	55.68	.36

a/ Includes repairs, insurance, property taxes, utilities, cow testing, bedding, supplies, fuel, oil, legal, accounting, dues, operating capital interest, etc.
b/ Total income minus total all costs.
c/ Total income minus total operating costs, plus interest on cow investment and base/quota, minus depreciation.
d/ Total income minus total operating and ownership costs.

Operating costs summed to $8.83 per hundredweight of milk. Feed accounted for 57 percent of that cost. Another major cost item was replacement animals which averaged $1.07 per hundredweight. The sample dairy producers reported an average of 46 hours per cow of operator and family labor and indicated a cost of $200 should be assigned to those resources. This cost, plus a $37 per cow management charge, added $1.51 to the cost of producing a hundredweight of milk, bringing the total of all costs to $11.47.

Returns to unpaid labor and management and capital averaged $27,756 per farm. Assuming an annual operator/family labor and management return of $30,229, that amounts to a -1.2 percent return on the total capital investment. If a 10 percent capital cost is charged to the dairy enterprise, the average per-farm return to operator/family labor and management was $7,094, a return of $1.21 per hour for those efforts.

Region Three: Southwest Washington

This nine-county area had 267 dairymen selling milk through either the Oregon-Washington or Puget Sound Federal Milk Marketing Orders in November 1976. Both the Portland and Seattle metropolitan areas are major markets for milk produced in this region. Twenty-four dairy producers were surveyed for this study. A summary of the data obtained from these businesses appears in Table 6.

The study farms reported herd sizes that ranged between 28 and 238 cows, with an average of 94 cows. Eighty-five percent of the cows on the survey farms were Holsteins, followed by Jerseys, 13.8 percent, and Guernseys, 1.2 percent. Average annual production for all cows was 13,540 pounds of 3.8 percent butterfat milk.

Capital investments averaged $1,774 per cow, or $166,572 for the average enterprise. Of that amount, buildings and facilities accounted for $885, land - $89, cows - $594, and milk base/quota - $206.

Income from milk, culls, calves and manure averaged $1,453 per cow. Milk income represented 92 percent of this total. The average price received for milk was $9.88 per hundredweight. Fourteen of the sample dairy farmers participated in the Puget Sound Order and 10 were in the Oregon-Washington Order. Approximately 67 percent of the milk sold was supported by Class I base or quota.

Table 6. Capital Investment, Income, and Costs for Sample Dairy Enterprises, Region 3, Southwest Washington, 1976

No. of sample enterprises	24
Avg. number cows in herd	93.9
Lbs. milk per cow	13,540.00
Percent butterfat	3.77
Total hours labor	7,578

Item	Total Per Herd ($)	Total Per Cow ($)	Total Per Cwt. ($)
Investment			
Facilities and equipment	83,118	885.18	6.54
Land in farmstead	8,363	89.06	.66
Cows	55,794	594.19	4.39
Milk Base/quota	19,297	205.51	1.52
Total	166,572	1,773.94	13.11
Income			
Value of milk production	125,611	1,337.71	9.88
Other (culls, calves, manure)	10,845	115.50	.85
Total income	136,456	1,453.21	10.73
Operating Costs			
Concentrates	31,594	336.46	2.48
Roughages	37,094	395.04	2.92
Other feed	421	4.48	.03
Total feed	69,109	735.98	5.43
Veterinary & breeding	2,062	21.96	.16
Hauling and marketing	6,200	66.03	.49
Hired labor	6,001	63.91	.47
Miscellaneous a/	15,212	162.00	1.20
Herd replacements	11,873	126.44	.93
Interest on cow investment	5,579	59.41	.44
Interest on base/quota	1,930	20.55	.58
Total operating costs	117,966	1,256.28	9.70
Ownership Costs			
Depreciation of facilities & equip	9,166	97.61	.72
Interest on facilities, equip., land	9,148	97.43	.29
Total ownership costs	18,314	195.04	1.01
Total Operating & Ownership Costs	136,280	1,451.32	10.71
Unpaid Labor and Mngmt. Costs			
Operator labor	24,291	258.69	1.91
Family labor	2,864	30.50	.23
Management allowance	4,166	44.37	.33
Total unpaid labor & management	31,321	333.56	2.47
TOTAL ALL COSTS	167,601	1,784.88	13.18
DAIRY PROFIT (LOSS) b/	(31,145)	(331.68)	(2.45)
RETURN TO CAPITAL, UNPAID LABOR & MNGMT c/	16,833	179.27	1.32
RETURN TO UNPAID LABOR & MNGMT d/	176	1.87	.01

a/ Includes repairs, insurance, property taxes, utilities, cow testing, bedding, supplies, fuel, oil, legal, accounting, dues, operating capital interest, etc.
b/ Total income minus total all costs.
c/ Total income minus total operating costs, plus interest on cow investment and base/quota, minus depreciation.
d/ Total income minus total operating and ownership costs.

Total operating and ownership costs averaged $1,451 per cow, or $10.71 per hundredweight of milk. Feed accounted for 59 percent of the total operating cost which was $1,256 per cow. An average operator and family labor and management charge of $334 per cow ($2.47 per hundredweight) was reported by the study dairy producers. That cost is based on an annual average of 61 hours of operator and family labor per cow.

Returns to operator and family labor, management, and capital averaged $16,833 per enterprise. If an interest cost of 10 percent is assigned to the average investment, returns to operator/family labor and management are only $176 total for the enterprise.

Region Four: Willamette Valley, Oregon

This region comprises the counties that make up the Willamette Valley of western Oregon. This is the major milk-producing area in Oregon supplying the metropolitan areas of Portland, Salem, and Eugene. A total of 307 Grade A dairy farms are in this area. Twenty-two dairy producers were sampled as a part of this study. The averages are indicated in Table 7.

The sample dairy enterprises had an average of 108 cows producing 13,685 pounds of milk at 3.8 percent butterfat. There were 17 Holstein herds, one Jersey, one Guernsey, and three with mixed breeds. The average total investment per cow was $1,676. Of this, $282 represented the value of market quota (an average of 28.2 pounds per cow at $10 per pound).

In 1976, average value of milk produced was $9.94 per hundredweight based on the butterfat test and quota milk sales equal to 76 percent of total sales. This provided an average gross income of $1,475 per cow, including credits for cull cows, calves, and manure.

Feed costs accounted for 58 percent of the operating costs. Operating costs are those that vary with the number of cows in the herd and totaled $1,297 per cow, or $9.48 per hundredweight of milk produced. Ownership costs (depreciation and interest on facilities, equipment, and land) added $149.41 to bring the total ownership and operating cost to $1,446 per cow, or $10.57 per hundredweight of milk produced.

Table 7. Capital Investment, Income, and Costs for Sample Dairy Enterprises, Region 4, Willamette Valley, Oregon, 1976

No. of sample enterprises	22
Avg. number cows in herd	107.9
Lbs. milk per cow	13,685
Percent butterfat	3.78
Total hours labor	5,898

Item	Total Per Herd ($)	Total Per Cow ($)	Total Per Cwt. ($)
Investment			
Facilities and equipment	70,873	656.78	4.80
Land in farmstead	9,580	88.78	.65
Cows	70,019	648.86	4.74
Milk Base/quota	30,401	281.73	2.06
Total	180,873	1,676.15	12.25
Income			
Value of milk production	146,666	1,359.15	9.94
Other (culls, calves, manure)	12,485	115.70	.85
Total income	159,151	1,474.85	10.79
Operating Costs			
Concentrates	38,188	353.89	2.59
Roughages	42,740	396.07	2.89
Other feed	766	7.10	.05
Total feed	81,694	757.06	5.53
Veterinary & breeding	2,819	26.12	.19
Hauling and marketing	7,249	67.18	.49
Hired labor	10,264	95.12	.70
Miscellaneous a/	12,519	116.01	.85
Herd replacements	15,337	142.13	1.04
Interest on cow investment	7,002	64.89	.47
Interest on base/quota	3,040	28.17	.21
Total operating costs	139,924	1,296.68	9.48
Ownership Costs			
Depreciation of facilities & equip.	8,078	74.86	.55
Interest on facilities, equip., land	8,045	74.55	.54
Total ownership costs	16,123	149.41	1.09
Total Operating & Ownership Costs	156,047	1,446.09	10.57
Unpaid Labor and Mngmt. Costs			
Operator labor	9,873	91.49	.67
Family labor	2,141	19.84	.14
Management allowance	4,448	41.22	.30
Total unpaid labor & management	16,462	152.55	1.11
TOTAL ALL COSTS	172,509	1,598.64	11.69
DAIRY PROFIT (LOSS) b/	(13,357)	(123.78)	(.90)
RETURN TO CAPITAL, UNPAID LABOR & MNGMT c/	21,192	196.40	1.44
RETURN TO UNPAID LABOR & MNGMT d/	3,105	28.77	.21

a/ Includes repairs, insurance, property taxes, utilities, cow testing, bedding, supplies, fuel, oil, legal, accounting, dues, operating capital interest, etc.
b/ Total income minus total all costs.
c/ Total income minus total operating costs, plus interest on cow investment and base/quota, minus depreciation.
d/ Total income minus total operating and ownership costs.

The 22 operators and their families averaged 33 hours of labor per cow per year for which a charge of $111 was made. An additional charge of $41 per cow was included for the dairy producers' management input. These labor and management costs bring the total production cost to $11.69 per hundredweight.

The average profit for the sample dairy enterprises of -$13,357 means that full compensation was not received for all the costs allocated to the production of milk. Assuming a 10 percent return on investment, the average return to operator and family labor and management was $3,105 for the year, or $.87 per hour. Looking at the profitability of the enterprise in another way, the dairy operators averaged a $16,462 return for unpaid labor and management and a 2.6 percent return on investment.

Region Five: Oregon Coast

In 1976, there were 166 dairy producers in these five Oregon coastal counties. The 15 sample producers had an average herd size of 88 cows (Table 8). The milk production per cow was 12,326 pounds annually with a four percent butterfat test. Seven of the 15 herds were Holstein, one was a Jersey herd, and the remaining herds were mixed breeds of Holstein, Guensey, Jersey, and Brown Swiss.

The total investment per cow averaged $1,498. Of this total, facilities and equipment represented $600, land - $55, cows - $624, and market quota - $118. Fewer than half the sample producers held a Oregon milk marketing quota. The remaining producers were on the federal base plan which was attributed no investment value because of the provisions of this marketing order.

The higher butterfat test for Oregon coast producers contributed to the higher milk price of $10.21 per hundredweight. The lower level of milk output, however, resulted in one of the lower gross incomes per cow compared to the other regions ($1,365).

Feed costs ($647 per cow) accounted for 56 percent of the total operating costs ($1,153 per cow). The total ownership cost for facilities, equipment, and land was $154, giving a total for operating and ownership costs of $1,307 per cow.

The operators and their families averaged 53 hours of labor per cow during 1976. This represented a cost of $189. The management allowance

Table 8. Capital Investment, Income, and Costs for Sample Dairy Enterprises, Region 5, Oregon Coast, 1976

No. of sample enterprises	15
Avg. number cows in herd	88.1
Lbs. milk per cow	12,326
Percent butterfat	4.03
Total hours labor	6,105

Item	Total Per Herd ($)	Total Per Cow ($)	Total Per Cwt. ($)
Investment			
Facilities and equipment	61,633	699.82	5.64
Land in farmstead	4,850	55.07	.44
Cows	54,991	624.40	5.03
Milk Base/quota	10,425	118.37	.95
Total	131,899	1,497.66	12.08
Income			
Value of milk production	110,882	1,259.02	10.21
Other (culls, calves, manure)	9,331	105.95	.86
Total income	120,213	1,364.97	11.07
Operating Costs			
Concentrates	22,954	260.63	2.11
Roughages	33,530	380.72	3.09
Other feed	495	5.62	.05
Total feed	56,979	646.97	5.25
Veterinary & breeding	2,361	26.81	.22
Hauling and marketing	6,113	69.41	.56
Hired labor	6,044	68.63	.56
Miscellaneous a/	13,347	151.56	1.23
Herd replacements	10,148	115.24	.93
Interest on cow investment	5,499	62.44	.51
Interest on base/quota	1,043	11.84	.10
Total operating costs	101,534	1,152.90	9.36
Ownership Costs			
Depreciation of facilities & equip	6,915	78.52	.64
Interest on facilities, equip., land	6,648	75.49	.61
Total ownership costs	13,563	154.01	1.25
Total Operating & Ownership Costs	115,097	1,306.91	10.61
Unpaid Labor and Mngmt. Costs			
Operator labor	11,752	133.44	1.08
Family labor	4,923	55.90	.45
Management allowance	4,038	45.85	.37
Total unpaid labor & management	20,713	235.19	1.90
TOTAL ALL COSTS	135,811	1,542.10	12.51
DAIRY PROFIT (LOSS) b/	(15,599)	(177.12)	(1.44)
RETURN TO CAPITAL, UNPAID LABOR & MNGMT c/	18,306	207.83	1.68
RETURN TO UNPAID LABOR & MNGMT d/	5,116	58.06	.46

a/ Includes repairs, insurance, property taxes, utilities, cow testing, bedding, supplies, fuel, oil, legal, accounting, dues, operating capital interest, etc.
b/ Total income minus total all costs.
c/ Total income minus total operating costs, plus interest on cow investment and base/quota, minus depreciation.
d/ Total income minus total operating and ownership costs.

amounted to $46 per cow. The total of all costs was $1,542 per cow or $12.51 per hundredweight.

In 1976, the sample dairy producers in the Oregon coastal counties had costs that exceeded their income by $177 per cow. Using a 10 percent interest charge for the dairy enterprise investment, the return to the unpaid labor and management was $5,116 per year or $1.10 per hour. On the other hand, if the unpaid labor and management are charged at full cost, the return on investment was -1.8 percent.

Region Six: Central Washington and Oregon

Of the seven regions, this is the most extensive geographically, encompassing eight counties in Washington, nine in Oregon, and one in Northern California. A total of 221 producers ship to handlers regulated by federal milk marketing orders in this region. Sixteen sample dairy producers were interviewed; one shipped under the Puget Sound Order and the rest under the Oregon-Washington Order.

This region had the highest average herd size of the seven regions at 132 cows (Table 9). Milk production per cow averaged 13,928 pounds with 3.6 percent butterfat. The herds were all Holstein except for one Guernsey herd. Of the 16 dairy enterprises surveyed, seven were in Oregon and nine in Washington.

The largest single investment category was investment in the herd amounting to $668 per cow. This was followed by the facilities and equipment investment at $506 per cow. The land was valued at $103 and the value of market quota and base averaged $291 per cow, bringing the total to $1,669.

Milk production accounted for 91 percent of the gross income for the average dairy enterprise in Region 6. The average price per hundredweight of milk was $9.78, and the total gross income per cow was $1,496, or $10.74 per hundredweight.

The total operating cost per hundredweight of milk was $9.45, or $1.29 less than the gross income per hundredweight of milk. The total operating cost was $1,316 per cow with feed accounting for 56 percent of the total. The ownership costs added $145 per cow, bringing the total for operating and ownership costs to $1,461.

Table 9. Capital Investment, Income, and Costs for Sample Dairy Enterprises, Region 6, Central Washington and Oregon, 1976

No. of sample enterprises	16
Avg. number cows in herd	131.6
Lbs. milk per cow	13,928
Percent butterfat	3.61
Total hours labor	7,532

Item	Total Per Herd ($)	Total Per Cow ($)	Total Per Cwt. ($)
Investment			
Facilities and equipment	79,825	606.57	4.36
Land in farmstead	13,538	102.87	.74
Cows	87,899	667.93	4.79
Milk Base/quota	38,330	291.26	2.09
Total	219,592	1,668.63	11.98
Income			
Value of milk production	179,256	1,362.13	9.78
Other (culls, calves, manure)	17,676	134.32	.96
Total income	196,932	1,496.45	10.74
Operating Costs			
Concentrates	48,731	370.30	2.66
Roughages	48,601	369.31	2.65
Other feed	430	3.27	.02
Total feed	97,762	742.88	5.33
Veterinary & breeding	2,903	22.06	.16
Hauling and marketing	9,250	70.29	.50
Hired labor	11,103	84.37	.61
Miscellaneous a/	17,004	129.21	.93
Herd replacements	22,564	171.46	1.23
Interest on cow investment	8,790	66.79	.48
Interest on base/quota	3,833	29.13	.21
Total operating costs	173,209	1,316.19	9.45
Ownership Costs			
Depreciation of facilities & equip.	9,709	73.78	.53
Interest on facilities, equip., land	9,336	70.94	.51
Total ownership costs	19,045	144.72	1.04
Total Operating & Ownership Costs	192,254	1,460.91	10.49
Unpaid Labor and Mngmt. Costs			
Operator labor	20,103	152.76	1.10
Family labor	3,762	28.59	.21
Management allowance	4,995	37.95	.27
Total unpaid labor & management	28,860	219.30	1.58
TOTAL ALL COSTS	221,114	1,680.21	12.06
DAIRY PROFIT (LOSS) b/	(24,182)	(183.76)	(1.32)
RETURN TO CAPITAL, UNPAID LABOR & MNGMT c/	26,637	202.41	1.45
RETURN TO UNPAID LABOR & MNGMT d/	4,678	35.54	.26

a/ Includes repairs, insurance, property taxes, utilities, cow testing, bedding, supplies, fuel, oil, legal, accounting, dues, operating capital interest, etc.
b/ Total income minus total all costs.
c/ Total income minus total operating costs, plus interest on cow investment and base/quota, minus depreciation.
d/ Total income minus total operating and ownership costs.

The total charges for unpaid labor and management for the average enterprise were $219 per cow. Of this total, $38 was a management allowance and the remaining $181 was a reimbursement for 36 hours of labor provided by the operator and family.

Subtracting the total of all costs ($1,680) from the income ($1,496) gave a loss of $184 per cow. Using the 10 percent interest charge assumed in the study, the actual return to unpaid labor and management was $4,678 per year or 98 cents per hour. The return to capital investment was -1 percent when unpaid labor, management, and all other factors were charged at their full costs.

Region Seven: Eastern Oregon and Idaho's Boise Valley

This region consists of four eastern Oregon counties and seven counties in the Boise Valley area of Idaho. A sample of 21 producers was surveyed of 84 identified in this region as shipping under federal marketing orders. Nineteen of these sample enterprises were in Idaho with two in Oregon. None of these sample producers had quota or base to which a value could be attributed.

The average herd size was 81 cows, each producing 13,016 pounds of milk with 3.85 percent butterfat (Table 10). The investment in facilities and equipment for these sample enterprises amounted to $720 per cow. Land was $116 and the cows were valued at $598 per head. The total investment was $1,434 per cow.

The sample producers in this area received the lowest price for milk ($9.08 per hundredweight) of the study regions. Milk production accounted for 89 percent of the total gross income amounting to $1,325 per cow.

The total operating costs amounted to $1,058 per head. Feed costs, $592, represented 56 percent of this total. Ownership costs (depreciation and interest) on the facilities, equipment, and land were $143 per head. The total operating and ownership costs were $1,201.

The operators and their families averaged 3,094 hours of labor per year or 38 hours per cow. For this input, a charge of $211 was included along with a $48 management allowance per cow.

Table 10. Capital Investment, Income, and Costs for Sample Dairy Enterprises, Region 7, Eastern Oregon and Idaho Boise Valley, 1976

No. of sample enterprises	21
Avg. number cows in herd	80.5
Lbs. milk per cow	13,016
Percent butterfat	3.85
Total hours labor	4,356

Item	Total Per Herd ($)	Total Per Cow ($)	Total Per Cwt. ($)
Investment			
Facilities and equipment	57,945	719.72	5.53
Land in farmstead	9,363	116.30	.89
Cows	48,128	597.79	4.59
Milk Base/quota	0	0	0
Total	115,436	1,433.81	11.01
Income			
Value of milk production	95,173	1,182.13	9.08
Other (culls, calves, manure)	11,464	142.52	1.09
Total income	106,637	1,324.65	10.17
Operating Costs			
Concentrates	20,260	251.64	1.93
Roughages	24,635	305.99	2.35
Other feed	2,741	34.04	.26
Total feed	47,636	591.67	4.54
Veterinary & breeding	1,774	22.03	.17
Hauling and marketing	2,745	34.10	.26
Hired labor	4,502	55.92	.43
Miscellaneous a/	12,187	151.37	1.17
Herd replacements	11,550	143.46	1.10
Interest on cow investment	4,813	59.78	.46
Interest on base/quota	0	0	0
Total operating costs	85,207	1,058.33	8.13
Ownership Costs			
Depreciation of facilities & equip.	4,756	59.07	.45
Interest on facilities, equip., land	6,731	83.60	.64
Total ownership costs	11,487	142.67	1.09
Total Operating & Ownership Costs	96,694	1,201.00	9.22
Unpaid Labor and Mngmt. Costs			
Operator labor	16,282	202.24	1.55
Family labor	690	8.57	.07
Management allowance	3,881	48.21	.37
Total unpaid labor & management	20,853	259.02	1.99
TOTAL ALL COSTS	117,545	1,460.02	11.21
DAIRY PROFIT (LOSS) b/	(10,908)	(135.49)	(1.04)
RETURN TO CAPITAL, UNPAID LABOR & MNGMT c/	21,489	266.91	2.05
RETURN TO UNPAID LABOR & MNGMT d/	9,945	123.53	.95

a/ Includes repairs, insurance, property taxes, utilities, cow testing, bedding, supplies, fuel, oil, legal, accounting, dues, operating capital interest, etc.
b/ Total income minus total all costs.
c/ Total income minus total operating costs, plus interest on cow investment and base/quota, minus depreciation.
d/ Total income minus total operating and ownership costs.

The total of all costs exceeded income by $135 per cow or $1.04 per hundredweight of milk produced. The annual return to unpaid labor and management amounted to $9,945, or $3.21 per hour, with 10 percent interest charged on the average investment. When unpaid labor and management is included at its full cost of $20,853 per year, the return to capital investment was computed to be one half of one percent.

CONCLUSIONS

A sample of 160 dairy farmers was selected to represent milk production from enterprises of varying size in seven Washington, Oregon, and Idaho milksheds. Only producers selling milk to handlers regulated by federal marketing orders were included in the study. The sample producers were surveyed to collect information on dairy enterprise investments, income, costs, and profits.

Based on the survey results, for 1976 the weighted average cost of milk production for the producers represented by this sample was $11.26 per hundredweight of milk. This figure applies for milk of 3.8 percent butterfat which sold for a weighted average 1976 price of $9.66 per hundredweight. An important characteristic of these cost data, however, are their variability. Based on a frequency distribution of the ratio of milk price to production costs, the milk price received was found to range from 47 percent to 120 percent of the net cost per hundredweight for these 160 enterprises. Thirteen percent of the enterprises had costs that were less than the price received. A detailed analysis of the average enterprise is presented for each of the seven study regions indicating the characteristics and economic performance.

Dairy producers, their lenders, and advisors will find the data provided in this report useful. Producers are encouraged to estimate the costs for their own operations. The format and procedures presented here can be used as a guide for that purpose. Findings also serve as a standard against which producers can compare their own cost figures.

This survey information is useful to policy-makers for monitoring the economic health of milk production enterprises in the Pacific Northwest. Caution should be exercised, however, in the application and interpretation of this information. Large variations were found in the costs of producing milk. Economic pressures will encourage the high-cost enterprises to leave dairying, but at the same time, the low-cost operations will be seeking to expand

their dairy herds. Thus, this cost of production information should be used only as a guide, along with other information, as a basis for formulating milk market policy. Other relevant information includes product demand and consumption, production variability and seasonality, production and price time trends, and transportation costs. Cost of production information is necessary but not sufficient for making the policy decisions.

FOOTNOTES

1/ The resources available for the project limited the sample size to 160 producers. This sample was allocated among the region and size strata. Two criteria were used in this allocation process. The first was the variance in the sizes of the dairy enterprises in each region and the second was the number of producers in each region. Those regions with smaller variances had lower sampling rates. Once the sample size for each region was determined, the sampling rates for each of the three size categories within that region were approximately proportional to the total population of producers in that strata. See Appendix Table A-4.

2/ To provide a check for accuracy, value of milk sales data were compared to records of the Milk Stabilization Division, Oregon State Department of Agriculture, and the Office of the USDA Milk Market Administrator.

3/ The cost of manure removal, storage, and transport to the field was considered to be a dairy enterprise expense.

4/ References used in developing these estimates were: (1) Darrell O. Turner, Guidelines for Manure Application in the Pacific Northwest, EM 4009, Cooperative Extension Service, Washington State University, February 1976, and (2) R. E. Hermanson, "Animal Manure Data Sheet," EM 3759 (Rev.), Cooperative Extension Service, Washington State University, February 1974.

5/ 1976 Annual Report Vocational Agricultural Farm Management and Record Analysis, Whatcom County, Farm Management Department, Whatcom Community College, Bellingham, WA.

6/ Earl M. Hughes, Jr., and B. F. Stanton, Time Spent on Entrepreneurial and Related Activities, 44 New York Dairy Farms, 1964-65, A. E. Research 187, Department of Agricultural Economics, Cornell University, Ithaca, NY, 1965.

7/ An analysis of these factors is contained in G. S. Willett, et al., An Economic Analysis of Milk Production Enterprises in Selected Washington Milksheds, EM 4392, Cooperative Extension Service, Washington State University, December 1978.

APPENDIX

Table A-1. Weights Based on Total Volume of Milk Production for All Producers by Size Category for Each Region, 1976

Region	Small enterprises[a/]	Medium enterprises[b/]	Large enterprises[c/]
	(%)	(%)	(%)
1. Whatcom County, Washington	20.2	44.8	34.9
2. Puget Sound, Washington	7.2	22.2	70.6
3. Southwestern Washington	12.4	28.5	59.0
4. Willamette Valley, Oregon	10.9	26.0	63.0
5. Oregon Coast	16.5	44.7	38.8
6. Central Washington & Oregon	9.4	22.2	68.5
7. Eastern Oregon & Idaho Boise Valley	35.7	52.8	11.5

[a/] Enterprises with less than 730,000 pounds annual production.
[b/] Enterprises with 730,000 to 1,460,000 pounds production.
[c/] Enterprises with more than 1,460,000 pounds annual production.

Source: Based on data provided the Milk Market Administrator, USDA.

Table A-2. Weights Based on Total Volume of Milk Production for all Producers by Region

Region	Weight
	(%)
1. Whatcom County, Washington	17.8
2. Puget Sound, Washington	32.4
3. Southwestern Washington	12.7
4. Willamette Valley, Oregon	15.4
5. Oregon Coast	6.7
6. Central Washington & Oregon	12.7
7. Eastern Oregon & Idaho Boise Valley	2.3
	100.0

Source: Based on data provided the Milk Market Administrator, USDA.

Table A-3. Average Butterfat Tests, Milk Prices, and Net Production Costs for Sample Dairy Enterprises by Size Category for Each Region, 1976

Region	Item	Small enterprises[a/]	Medium enterprises[a/]	Large enterprises[a/]
1	Butterfat test (%)	4.01	3.78	3.75
	Milk price ($/cwt.)	9.97	9.49	9.39
	Net cost ($/cwt.)	14.91	11.50	9.60
2	Butterfat test (%)	4.29	3.88	3.60
	Milk price ($/cwt.)	9.62	9.60	9.27
	Net cost ($/cwt.)	16.24	12.28	9.95
3	Butterfat test (%)	3.79	3.84	3.80
	Milk price ($/cwt.)	9.97	9.77	9.93
	Net cost ($/cwt.)	14.77	12.64	11.54
4	Butterfat test (%)	4.36	3.89	3.68
	Milk price ($/cwt.)	10.18	10.09	9.85
	Net cost ($/cwt.)	14.34	12.24	9.86
5	Butterfat test (%)	4.26	4.22	3.71
	Milk price ($/cwt.)	10.44	10.39	9.94
	Net cost	14.57	12.19	9.92
6	Butterfat test (%)	4.18	3.55	3.58
	Milk price ($/cwt.)	10.35	9.66	9.78
	Net cost ($/cwt.)	12.36	12.37	10.51
7	Butterfat test (%)	3.85	3.89	3.72
	Milk price ($/cwt.)	8.66	9.17	9.17
	Net cost ($/cwt.)	11.58	9.97	9.29

[a/] See footnotes in Table A-1 for size category definitions.

Table A-4. Number of Milk Producers and Size of Sample by Region and Size of Enterprise, 1976

Region	Size of enterprise[a/]	Total producers	Sample size
1. Whatcom County, Washington	Small	211	10
	Medium	208	13
	Large	80	3
2. Puget Sound, Washington	Small	143	4
	Medium	179	10
	Large	217	22
3. Southwestern Washington	Small	94	7
	Medium	95	10
	Large	78	7
4. Willamette Valley, Oregon	Small	100	4
	Medium	100	10
	Large	107	8
5. Oregon Coast	Small	56	4
	Medium	77	8
	Large	33	3
6. Central Washington & Oregon	Small	68	3
	Medium	73	7
	Large	80	6
7. Eastern Oregon & Idaho's Boise Valley	Small	47	7
	Medium	33	12
	Large	4	2
TOTAL		2083	160

[a/] See Table A-1 for size definitions.

Source: See Table 1.