OREGON AGRICULTURAL EXPERIMENT STATION

James T. Jardine, Director

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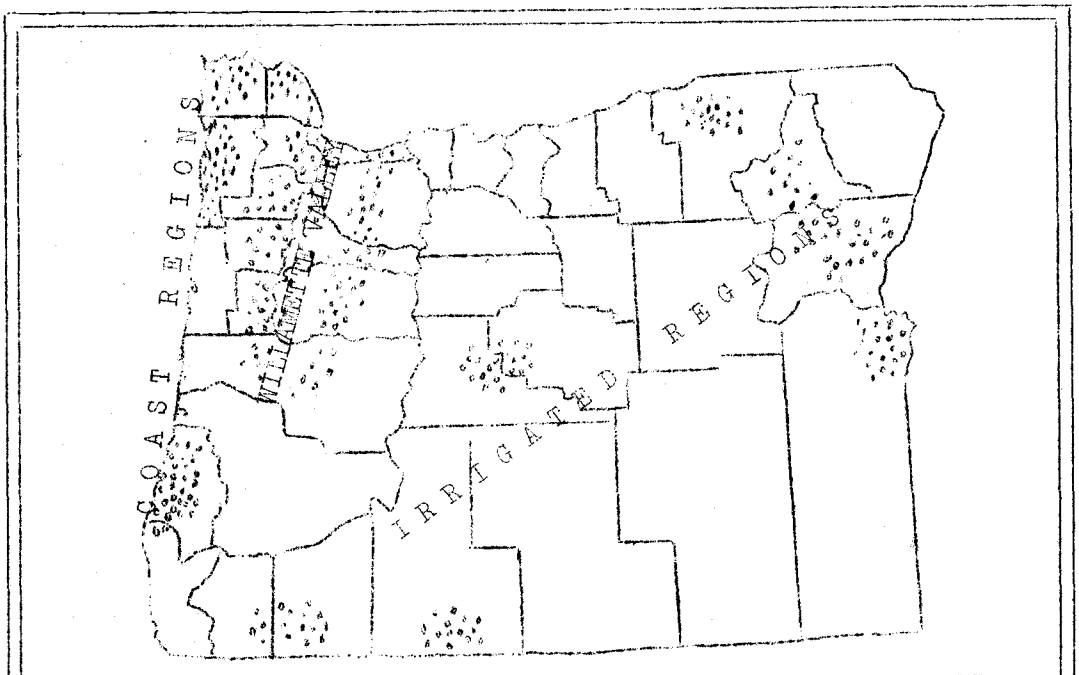
COST OF PRODUCING MILK AND BUTTERFAT IN OREGON IN 1929

Progress Report No. 1
Dairy Cost Study
(Purnell Fund)

DEPARTMENT OF FARM MANAGEMENT
AND
DEPARTMENT OF DAIRY HUSBANDRY
COOPERATING



REGIONS IN WHICH THE DAIRY COST STUDY IS BEING CONDUCTED

Corvallis, Oregon
December, 1930.

COST OF PRODUCING MILK AND BUTTERFAT

IN OREGON IN 1929

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COST OF PRODUCING MILK AND BUTTERFAT IN OREGON

by

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This report presents a brief summary of the results of the first year's work of the Dairy Cost Study, covering the period April 1, 1929, to April 1, 1930. At the completion of the study, which is to be continued for at least another year a complete summary and analysis of the data will be published as an Experiment Station bulletin.

DESCRIPTION OF THE STUDY

Purpose. The purpose of the study is to obtain information on questions such as the following:

1. What are the costs of producing dairy products in the different regions and for the various types of dairying?

2. How may costs be reduced, to increase profits and meet increasing competition?

3. In what regions of the state, on the basis of comparative costs, prices, markets, etc., can dairying advisedly be encouraged and increased?

4. What types of dairy farming are most profitable and what factors in the internal organization of a dairy farm are most important?

5. What is the economic place of dairying in Oregon agriculture?

Methods Used. The study is being carried on by the survey method. With the assistance of county agents and others familiar with local conditions an impartial selection was made of representative dairymen in each county

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Acknowledgements

The Oregon Experiment Station, and the writers, personally, thank the many farmers, county agents, creamerymen, dairymen, and others, whose willing cooperation has made this study possible. Special credit for helpful suggestions and assistance is due to numerous individuals, particularly to Professor H. D. Scudder and Professor P. M. Brandt under whose joint supervision the study is being conducted; and to R. S. Besse of the Farm Management staff, and Joseph Belanger, Gordon Laughlin, and Barnard Joy, senior students in farm management, who have assisted in the field work.

included in the study. During the first year of the study these dairymen have been visited twice by representatives of the Oregon Experiment Station to obtain data as to their costs of production. The figures obtained are based largely on careful, detailed estimates made by the dairymen, but books and records have been used whenever available.

Extent of the Study. A total of 551 farms have been included in the study for the first year. These farms kept 8734 cows, which produced during the year over six million gallons of milk, containing over two million pounds of butterfat. The study covers more than 5% of the total dairy production of Oregon.

The farms included in the study consisted of 301 in the Willamette Valley, 100 in the coast regions, and 150 in the irrigated regions of the state. The areas covered are shown in the map on the cover page. Counties that were included in each of the three divisions are as follows:

Willamette Valley: Benton, Clackamas, Lane, Linn, Marion, Multnomah, Polk, Washington, Yamhill.

Coast Regions: Clatsop, Columbia, Coos, Tillamook.

Irrigated Regions: Baker, Crook, Deschutes, Jackson, Josephine, Klamath, Malheur, Umatilla, Union.

Average Size of Farms and Dairy Herds. The average size of the dairy farms studied and of the herds on these farms are indicated by the following figures:

	Acres per farm	Milking Cows per farm	Young Stock per farm
Willamette Valley	171	13	9
Coast Regions	149	28	14
Irrigated Regions	167	14	11
All Regions	167	16	11

In addition to the above there was an average of one mature bull per farm. The young stock consists of young heifers and heifer calves, and an average of one bull calf per farm.

COST OF PRODUCING MILK AND BUTTERFAT IN 1929

The average costs of producing milk and butterfat in the different dairy regions in Oregon, and the average for the state, are shown in Table 1.

It should be kept in mind that the figures as shown here represent the total cost of production, not the cash cost, which is a very different figure as shown later in Table 3. The total cost includes not only all cash expense but also non-cash items such as home-grown feed, unpaid labor of the dairyman

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TABLE 1. SUMMARY OF COST OF PRODUCING MILK AND BUTTERFAT IN OREGON IN 1929

	Willamette Valley	Coast Regions	Irrigated Regions	All Regions
NUMBER OF FARMS	301	100	150	551
NUMBER OF COWS PER FARM	13	28	14	16
POUNDS OF MILK PER COW	6165	6298	5890	6140
AVERAGE TEST OF MILK	4.4%	4.3%	4.5%	4.4%
POUNDS OF BUTTERFAT PER COW	273	271	263	270
	Annual Cost Per Cow			
Roughage	$ 34	$ 28	$ 46	$ 35
Succulents	15	12	3	11
Concentrates	39	20	13	27
Pasture	5	17	11	10
TOTAL FEED	$ 93	$ 77	$ 73	$ 83
Labor	44	36	39	40
Use of buildings	8	6	5	7
Use of equipment	2	3	3	3
Sire cost	4	3	3	3
Interest on value of cows (5%)	5	5	5	5
Depreciation of cows	5	4	5	5
Miscellaneous	7	6	6	6
TOTAL GROSS COST PER COW	$ 168	$ 140	$ 139	$ 152
Credit for calves	5	4	6	5
Credit for manure	9	5	5	7
Credit for skim milk	5	1	14	6
TOTAL NET COST PER COW	$ 149	$ 130	$ 114	$ 135
COST PER 100 LBS. OF MILK	$2.42	$2.07	$1.94	$2.19
COST PER POUND OF BUTTERFAT	.55	.48	.43	.50

For explanation of cost items see page 10.

and his family, depreciation of buildings and equipment, and interest on the value of land, buildings, stock and equipment. In other words, a return equal to the average total cost of production as obtained in this study would give the dairyman wages for his work, 5% interest on his investment, and a sinking fund to replace worn out buildings and equipment.

The figures are for the milking cows only, not including young stock. They cover the cost of production of the milk or cream on the farm, ready to be sent to market, but do not include hauling or other marketing costs. For details of how the various items have been determined see page 10.

It is apparent that compared with these costs the butterfat price in 1930 has been very unsatisfactory for the average dairyman. It should be kept in mind, however, that these costs are for 1929 and that feed costs as well as the price of butterfat are lower in 1930. The effect of the drop in feed costs and price of butterfat on the management and profits of the dairy industry will be brought out by the continuation of the study for another year.

It should also be kept in mind that these figures are averages of a great many farms and that costs on individual farms vary both above and below the average. As will be seen in Table 4, many dairymen produced butterfat under 1929 conditions at low enough costs to make very gratifying returns even with 1930 prices.

Cost of production apparently is lowest in the irrigated regions. The higher cost in the coast regions, however, is offset by a higher price received for the product, which is sold chiefly in the form of whole milk for cheese making. The higher cost in the Willamette Valley apparently is caused chiefly by lack of pasture, lower quality of roughage, and consequent heavier feeding of grain.

As the analysis of the data is continued, it may be found that some of the cost figures will be modified. While it is not anticipated that such changes will be great, the reader should, nevertheless, keep in mind that these figures are preliminary and tentative, and are subject to revision in the final report.

Cost in Quantities of Feed and Labor. In Table 2 are shown the average amounts of feed and labor per cow in each region and for the state. These amounts are for the milking cows only, not including feed and care of young stock.

Feed and labor make up more than three-fourths of the total cost of milk and butterfat. Although prices of feed and wages for labor vary from time to time there is comparatively little change in the quantities that are used. By applying current prices to these amounts of feed and labor, the cost of production may be approximated for any price level.

Table 2. AMOUNTS OF FEED AND LABOR PER COW

ITEMS	AMOUNT PER COW ANNUALLY			
	Willamette Valley	Coast Regions	Irrigated Regions	All Regions
Roughage (lbs.)	5010	3610	7250	5110
Succulents "	5960	4665	1020	4330
Concentrates "	2094	962	677	1382
Pasture (days)	99	216	172	154
Operator's labor (hrs.)	90	67	86	81
Unpaid family labor "	38	28	38	35
Hired Labor "	21	22	12	19
Total Labor (hrs.)	149	117	136	135

Cash and Non-Cash Cost. Mention has been made of the importance of realizing that the total cost of production includes various non-cash items. In Table 3 the total average cost for the state has been divided into cash and non-cash cost. Only about half of the total cost consists of cash items.

The principal non-cash costs are the value of the labor of the dairyman and members of his family that is not paid for in cash; depreciation of buildings, equipment, and stock; and interest on the capital investment. In Table 3 these items have been itemized and grouped to bring out their comparative importance and make it possible to omit any of these charges if this should be desired for special purposes.

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Table 3. CASH AND NON-CASH COST OF MILK AND BUTTERFAT

All Regions - 1929

ITEMS		ANNUAL COST PER COW		
		Total Cost	Cash	Non-Cash
Purchased feed:	Roughage	$ 2.62	$ 2.62	$ --
	Succulents	.03	.03	--
	Concentrates	17.75	17.75	--
	Pasture	1.44	1.44	--
TOTAL PURCHASED FEED		$ 21.84	$ 21.84	$ --
Home-grown feed:	Roughage	$ 32.60	$ 16.30	$ 16.30
	Succulents	10.79	5.39	5.40
	Concentrates	8.70	4.35	4.35
	Pasture	8.84	4.42	4.42
TOTAL HOME-GROWN FEED		$ 60.93	$ 30.46	$ 30.47
Operator's labor		$ 25.68	$ --	$ 25.68
Unpaid family labor		8.43	--	8.43
Hired labor		6.04	6.04	--
TOTAL LABOR		$ 40.15	$ 6.04	$ 34.11
Building repairs		$ .61	$ .61	$ --
Equipment repairs		.56	.56	--
Sire maintenance		3.07	1.54	1.53
Veterinary expense		.61	.61	--
Bedding		.52	.26	.26
Taxes		1.15	1.15	--
Operation of auto or truck		.75	.75	--
Other miscellaneous expense		2.78	2.78	--
TOTAL MISCELLANEOUS		$ 10.05	$ 8.26	$ 1.79
Depreciation of buildings		$ 2.78	$ --	$ 2.78
Depreciation of dairy equipment		1.37	--	1.37
Depreciation of auto or truck		.09	--	.09
Depreciation of sires		.11	.07	.04
Depreciation of cows		5.10	3.16	1.94
TOTAL DEPRECIATION		$ 9.45	$ 3.23	$ 6.22
Interest on buildings		$ 3.22	$ --	$ 3.22
Interest on dairy equipment		.58	--	.58
Interest on auto or truck		.38	--	.38
Interest on sires		.29	--	.29
Interest on cows		5.46	--	5.46
TOTAL INTEREST		$ 9.93		$ 9.93
TOTAL GROSS COST		$152.35	$ 69.83	$ 82.52
Credit for calves		4.95	--	4.95
Credit for manure		6.81	--	6.81
Credit for skim milk		5.89	--	5.89
TOTAL NET COST PER COW		$134.70	$ 69.83	$ 64.87
COST PER 100 LBS. MILK		2.19	1.13	1.06
COST PER POUND OF BUTTERFAT		.50	.26	.24

Cost studies of feed crops have shown that about half of their cost is non-cash, and hence the home grown feed has been entered as half cash and half non-cash. Also approximately half of the sire maintenance is cash cost for items similar to the cash costs for the cows. About three-fifths of the depreciation charge on both cows and sire is cash cost for stock purchased and the cash costs in raising replacements. No charge is shown for interest on land since the use of the land for raising feed crops is covered by the value at which the feed has been charged to the cows.

The producer should realize, however, that much of the non-cash cost indirectly represents cash expenditure. Depreciation must be met sooner or later by cash expenditure for replacements. Even part of the interest, on many farms, is actual cash expenditure in the form of interest on borrowed money.

VARIATION IN COST

Table 4 shows the percentage of the dairymen in each region, and for the state, that were producing butterfat at different costs. In the state 2% of the dairymen had costs of less than 30¢, and 17% had costs under 40¢ per pound. At the other extreme, 9% of the dairymen were producing at costs of over 70¢ per pound.

Table 4. VARIATION IN COST OF PRODUCING BUTTERFAT

Cost per lb. of butterfat	Percentage of Farms			
	Willamette Valley	Coast Regions	Irrigated Regions	All Regions
Less than 30¢	1%	1%	6%	2%
30 - 39	9	12	29	15%
40 - 49	21	35	39	29%
50 - 59	34	25	17	28%
60 - 69%	21	21	7	17%
70 and over	14	6	2	9%
All Farms	100%	100%	100%	100%

With an average selling price in 1929 somewhere near 50 cents, it is apparent that a large part of the dairymen in Oregon were making very satisfactory profits, and that many were making a large profit. Many others, however, were producing at a big loss. What accounts for this wide variation in costs and profits on different farms?

Determining the factors that affect the cost of dairy products, and what an individual dairyman can do to change these factors to reduce his cost of production and thus increase his profit are the major objects of this study. As the study progresses it is anticipated that definite conclusions will be reached as to the most effective ways of reducing costs. The importance of one factor -- yield per cow -- has already appeared in this preliminary tabulation of the data.

RELATION OF YIELD PER COW TO COST

In Table 5 is shown the average cost of production with cows of varying yields of butterfat. The cost of 60¢ a pound with less-than-200-pound cows is nearly 50% greater than the cost of 42¢ a pound with 400-pound cows.

Table 5. COSTS ARE LOWER WITH HIGHER PRODUCING COWS

Lbs. Butterfat per Cow Annually	Number of Farms	Cost per Pound of Butterfat
Under 200	69	60¢
200-250	128	55¢
250-300	174	49¢
300-350	114	47¢
350-400	52	45¢
Over 400	14	42¢

In Table 6 the same relationship is shown for each of the three regions.

It is apparent that on the average better cows mean lower costs and larger profits. The relation of feeding practice and other management methods to production and cost will be brought out by further analysis of the data. Meanwhile a thorough study and knowledge of his individual costs should be of value to every dairyman.

Table 6. RELATION OF YIELD OF BUTTERFAT PER COW TO COST OF PRODUCING BUTTERFAT IN EACH REGION

Lbs. Butterfat per cow annually	Cost per Lb. Butterfat		
	Willamette Valley	Coast Regions	Irrigated Regions
Less than 200	69¢	65¢	50¢
200 -- 250	58	55	48
250 - 300	56	47	43
300 - 350	52	43	40
Over 350	47	44	38
Average	55¢	48¢	43¢

INDIVIDUAL COSTS

Each dairyman cooperating in this study receives an individual summary of the costs for his dairy. These individual cost figures are confidential and go only to the one man concerned.

The individual summary is given on the last page of this report. For comparison, average costs are also shown for the region in which the farm is located and for the dairymen who have the highest and lowest costs. Comparison, item by item, should indicate where the individual costs are satisfactory and where they are not, and thus suggest ways in which the business may be improved.

For those readers who are not cooperators, comparison of the high, low, and average costs by items should be of interest.

EXPLANATION OF COST ITEMS

Roughage. Hay raised is charged at sale value in the barn. Hay purchased is charged at actual cost. The average values per ton were: Willamette Valley $14; coast regions, $16; irrigated regions, $13; all regions $14.

Succulents. Except in the very few cases of sales of silage, in which the actual sale value has been used, all silage, kale and other green feed is charged at $5 per ton.

Concentrates. Grain and other concentrates purchased are charged at actual cost. Grain raised is charged at sale value on the farm. If chopped or ground, the prevailing commercial rate for chopping or grinding is included in the value of the feed. The average values per ton were: Willamette Valley, $37; coast regions, $41; irrigated regions, $38; all regions, $38.

Pasture. Valued at prevailing rates per head per month for pasture of similar quality. The average values per head per month were: Willamette Valley $1.56; coast regions, $2.79; irrigated regions, $1.96; all regions, $2.00.

Labor. Includes all labor used in feeding and caring for the milking herd, milking, and cooling and separating the milk, but not labor for raising feed crops, for care of young stock, or for hauling the milk or cream. Includes the work of the operator of the dairy, members of his family, and hired labor, all valued at prevailing wages for similar work and including the value of board if furnished. The average wage rate was 30¢ per hour, varying as follows: operator's labor, 32¢; family labor, 24¢; hired labor, 31¢.

Buildings and Equipment. The proportion that was estimated to be chargeable to the milking herd of the interest, depreciation and repairs on buildings and equipment used for the dairy. Interest is computed at 5%; depreciation is based on the value and estimated life of the building or piece of equipment. Purchases of milk cans, buckets, and similar equipment are included as repairs of equipment.

Sire Cost. The cost of maintaining the herd sire was computed separately and is pro-rated to the cows and heifers bred during the year. Breeding fees paid are also included in this item.

Interest on Value of Cows. Five per cent interest on the average value of the cows. The cows were valued at prevailing market price for cows of similar quality. The average value per cow was $113 at the beginning of the year and $106 at the end.

Depreciation of Cows. This figure represents death loss, and loss on cows sold, but does not include the drop in market value of cattle that occurred during the year. It is computed as follows: The sum of the value of cows sold and the value of the cows at the end of the year is subtracted from the sum of the values of the cows at the beginning of the year, the value of cows purchased and the value of heifers added to the milking herd. From this "net decrease" is then deducted any part of it that is accounted for by a drop in the value of the cows from the beginning to the end of the year, based on market prices.

If, instead of a "net decrease" as computed above, increase in value is shown, as a result of heifers developing or cows showing increased production, the increase has been credited as the item "increased value of cows" in the individual cost statements.

Miscellaneous. A number of smaller items are included under this heading of which the more important are veterinary expenses; medicines and tonics; fly spray; expense for tuberculosis and contagious abortion testing; dairy herd improvement association expense; bedding, salt; the proportion chargeable to the milking herd of the insurance on buildings, stock, and stored feed; taxes on the cows; and the amount of auto expense chargeable to the dairy, not including, however, use of the auto for marketing the milk or cream.

Credit for Calves. The estimated value at birth of the calves born during the year, averaging $5 per calf.

Credit for Manure. The dairyman's estimate of the value at the barn of the manure saved. Considerable labor is necessary for hauling manure and applying it, and some dairymen did not consider it worth anything above the labor of hauling. The average value placed on it, however, was $1 per ton, and the average amount saved was estimated as 6 1/2 tons per cow.

Credit for Skim Milk. On farms where milk was separated the skim milk is credited at a uniform value of 35¢ per hundred pounds (3¢ per gallon), with the exception that for a few farms where skim milk was bought or sold the actual sale price is used.

Credit for Increased Value of Cows. This item is explained under "depreciation of cows" above.

Average Number of Cows in Herd. The number of cows is based upon the total number of months that each cow was in the herd during the year, including the dry period. The average number of cows is obtained by dividing by 12 the total number of months for all cows in the herd at any time during the year.

Production per Cow. Although estimates of sales were used in a few cases, for most of the farms the amount of milk or butterfat sold was obtained either from records kept by the dairyman or from the dairy or creamery buying the product. If the product was sold as cream, the equivalent amount of whole milk produced was computed on the basis of the estimated butterfat test of the milk. To the amount sold is added the estimated amounts of milk fed to calves and used in the house, and the equivalent in milk of the cream used, including that churned into butter for home use. The total production of the dairy as thus obtained is divided by the average number of cows, (explained above) to obtain the average production per cow.

Oregon Experiment Station

D A I R Y C O S T S T U D Y

INDIVIDUAL COST REPORT FOR THE YEAR APRIL 1, 1929 - APRIL 1, 1930.

(Confidential)

Farm of: Address:

ITEMS	WILLAMETTE VALLEY			Your Farm
	30 High Cost Farms	30 Low Cost Farms	All Farms (301)	
AVERAGE NUMBER OF COWS PER FARM	9	12	13	
POUNDS OF MILK PER COW	5007	6459	6165	
AVERAGE TEST OF MILK	4.0%	4.9%	4.4%	
POUNDS OF BUTTERFAT PER COW	202	316	273	
	Annual Cost per Cow			
Roughage: hay, straw, etc.	$ 42	$ 24	$ 34	
Succulents: silage, kale, green feed, etc.	15	12	15	
Concentrates: grain mill feed, etc.	36	35	39	
Pasture	5	5	5	
TOTAL FEED	$ 98	$ 76	$ 93	
Labor (including unpaid labor of operator and family)	51	36	44	
Buildings : interest, depreciation, repairs	10	5	8	
Equipment: interest, depreciation, repairs	2	3	2	
Sire cost: maintenance of sire, or breeding fees	5	5	4	
Interest on value of cows (5%)	5	6	5	
Depreciation of cows (not including drop in cattle prices during year)	14	2	5	
Miscellaneous: insurance, taxes, veterinary, testing fees, bedding, salt, auto, etc.	6	7	7	
TOTAL GROSS COST PER COW	$ 191	$ 140	$ 168	
Credit for calves	5	8	5	
Credit for manure	9	9	9	
Credit for skim milk	3	10	5	
Credit for increased value of cows	—	—	—	
TOTAL NET COST PER COW	$ 174	$ 113	$ 149	
COST PER 100 LBS. OF MILK	3.50	1.75	2.42	
COST PER POUND OF BUTTERFAT	.87	.36	.55	

For explanation of cost items see page 10.