

PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF AGRICULTURE

# DAIRY-FARM SURVEY

Preliminary Report on Forty-five Dairy-farms in the Chilliwack, Courtenay, and Ladner Districts

FOR THE YEAR ENDING MAY 1st, 1920

*By*

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*THE report as submitted is based on a preliminary survey which it is planned to extend to other farms and districts during the coming years. The conclusions on one year's operations are consequently tentative.*



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# British Columbia Dairy-farm Survey.



URING the summer of 1920 the Animal Husbandry Department of the University of British Columbia conducted a dairy-farm survey in three milk-producing districts of the Province. Two of the districts were in the Fraser Valley and one on Vancouver Island. The survey included twenty-six farms in the Chilliwack District, thirteen in the Ladner area, and fifteen in the vicinity of Courtenay, on Vancouver Island.

## WHY AND HOW THE SURVEY WAS MADE.

The purpose of the survey was to determine the factors that make for profit or loss on dairy-farms as they are operated in British Columbia.

In order to get the necessary information a fieldman went to each farmer included in the survey and secured detailed records of each farmer's receipts and expenses for one year. The year's business included in the survey extended from May 1st, 1919, to April 30th, 1920. In addition to the business transacted during the year, an inventory of all live stock, equipment, buildings, and land was taken for both the beginning and end of the year.

From the figures gathered directly from the farmers as above, and with the co-operation of feed-houses and creameries that were able to give detailed accounts of the feed the farmers bought and the milk the farmers sold, data have been secured from which several conclusions have been drawn.

## EXPLANATION OF TERMS USED.

*Labour Income.*—The labour income is the difference between the total receipts and total expenses on the farm. The expenses include interest on capital at 7 per cent., depreciation on buildings and machinery during the year, wages for labour, including family help, but does not include wages for the operator of the farm. No record is made of farm products used in the house except in case of beef and pork. In other words, the labour income is the return the farm operator receives as wages after allowing for interest on investment and depreciation on equipment. Farms which show a minus labour income may even yet provide a living for the farmer. In these cases he lives on such interest on capital as the farm actually pays, or it may be wages which are allowed to members of the family, but which are not paid in cash by the operator. If, however, he must pay interest on investment and wages for work performed by his family, two alternative courses are open to him, either he must eventually leave the farm or so arrange his operations that his labour income will be increased.

Labour income represents the wages the farm returns to the operator for his labour and management of the farm. It is used as a means of comparing the efficiency of one farm with that of another. Variations in labour incomes are due in many cases to unavoidable circumstances, but largely they are due to factors that come more or less within the farmer's control.

*Animal Unit.*—A mature cow kept on the farm for a year is termed an animal unit. All other live stock is reduced to the animal unit basis according to the amount of feed consumed and the number of months kept. A farm having 30 animal units has sufficient live stock to consume the same amount of feed as would 30 cows in one year.

*Live-stock Index.*—This is a measure of the efficiency of the live stock. A farm having a live-stock index of 100 would be one where the gross live-stock receipts per

animal unit were equal to the average for the survey. A live-stock index of 90 would indicate that the gross receipts per animal unit were below average, and one of 110 would indicate that gross receipts per animal unit were above average.

*Crop Index.*—This is the measure of efficiency in the production of crops. It is based on yields per acre. A crop index of 110 would indicate that the crop yields were above average, and a crop index of 90 would indicate that the crop yields were below average for the survey.

*Diversity Index.*—This expresses the percentage of total farm receipts that come from the sale of milk and milk products. A diversity index of 100 would indicate a farm where all receipts came from dairy cattle. A diversity index of 50 would indicate a farm where only 50 per cent. of receipts came from milk and milk products, the other 50 per cent. coming from other sources.

*Tillable Area.*—As rough pasture land and other untillable land adds to the feeding capacity of the farm, they must be considered in the total tillable area. To reduce the whole farm to a tillable area basis it is estimated that 3 acres of rough land and 10 acres of pastured woods produce feed equal to 1 acre of tillable land. Thus to the tillable area of a farm is added one-third of the rough land and one-tenth of the pastured woods. The total is known as the tillable area of the farm.

### THE EFFECT OF GOOD CROPS AND GOOD LIVE STOCK ON LABOUR INCOME.

TABLE NO. 1.

Groups.	Poor Live Stock.	Good Live Ctock.
Poor crops .....	(1) 13 farms, minus \$313 43	(3) 19 farms, \$333 06
Good crops .....	(2) 10 farms, \$230 87	(4) 6 farms, \$1,207 65

The farmers of Group No. 1 grew poor crops and fed the crops to poor live stock, with the result that the returns from the farms neither paid wages nor interest on investment.

Group No. 2 grew good crops and fed the crops to poor live stock and made a gain over Group No. 1 of over \$500 per farm, thus showing the great effect of good crop yields even when fed to poor live stock.

Group No. 3 grew poor crops, but fed this to good live stock and made over \$600 gain over Group No. 1. It should also be noted that Group No. 3 surpassed Group No. 2 by over \$100, thus showing that on dairy-farms, where the great percentage of receipts come from the cows, it is even more important to have good live stock than to have good crops.

The farmers of Group No. 4 have grown good crops and have kept good live stock and their return is over \$1,200 net. This is a gain of over \$700 over Group No. 2 and \$600 over Group No. 3.

The table shows that to get a fair return from the farm good live stock and good crops are essential factors.

### THE LABOUR INCOME AS IT IS AFFECTED BY THE PURE-BRED SIRE.

TABLE NO. 2.

Kind of Sire and No. of Years in Use on Farm.	No. of Farms.	Average No. of Years P.B. Sire in Use.	Labour Income.
Grade sire .....	11	...	Minus \$ 41 95
Pure-bred sire, 1 to 5 years .....	20	3.2	Plus 216 04
Pure-bred sire, 6 to 10 years .....	11	7.6	" 495 85
Pure-bred sire, 11 years and over .....	6	16.5	" 550 36

This table needs but little explanation. As soon as the dairyman can begin the improvement of his herd by the use of good pure-bred sires his labour income begins to increase. The extent of this increase is brought out very clearly in the labour-income column of the table. It is not a case then of "Can I afford a good sire?" but "Can I afford to be without a good pure-bred sire from which to raise my heifers?"

**THE INFLUENCE OF THE PURE-BRED SIRE ON THE AMOUNT AND COST OF BUTTER-FAT.**

TABLE No. 3.

Kind of Sire and No. Years in Use on Farm.	Average No. of Lb. Butter-fat per Cow.	Average Cost of producing 100 Lb. Butter-fat.
Grade sire .....	219.7	\$119 11
Pure-bred sire, 1 to 5 years .....	221.9	103 22
Pure-bred sire, 6 to 10 years .....	232.2	93 43
Pure-bred sire, 11 years and over .....	252.6	77 27

A very striking case is here presented in favour of the pure-bred sire and against the grade sire. It will be noticed that the number of pounds of butter-fat per cow increases with the number of years the pure-bred sire has been used on the farm. The sire's influence is shown very clearly as well in the cost of production of the butter-fat. Again, "Can I as a dairyman afford to be without the use of a good pure-bred sire?"

**A COMPARISON OF DIFFERENT FEEDING PRACTICES WITH GOOD AND POOR LIVE STOCK.**

TABLE No. 4.

Description.	Medium Feeding.	Good Feeding.
<i>Poor Live Stock.</i>		
Cost of feed per cow .....	\$81.88	\$112.67
Total digestible nutrients per cow .....	2,658	3,541
Pounds butter-fat per cow .....	186.4	211.8
Labour income .....	Minus \$163.86	\$135.80
<i>Good Live Stock.</i>		
	Medium Feeding.	High Feeding.
Cost of feed per cow .....	\$77.02	\$124.78
Total digestible nutrients per cow .....	2,426	3,974
Pounds butter-fat per cow .....	240.9	275.6
Labour income .....	\$679.63	\$509.39

This table shows that medium feeding of poor live stock resulted in a loss to the farmers. They were not even able to pay interest on investment. Good feeding of the same class of live stock was more remunerative, however, there being a gain of about \$300 per farm over the group of farmers who were medium feeders. This shows that by judicious use of feeds poor cows respond to a considerable extent. Good live stock, however, gives a much greater labour income. The medium feeders with good live stock fed over \$35 worth less of feed than the good feeders with poor live stock, but the good cows responded in much heavier butter-fat production. They also returned a much larger labour income in spite of the fact that they were fed less. The high feeders of good live stock secured a greater butter-fat production per cow, but they fed too heavily for the most profitable immediate returns. This last group, however, may finally come out ahead, as they will secure good advertising through their high-producing cows and no doubt will sell some breeding stock at fairly high figures. It is quite possible then that their labour incomes will be somewhat higher in future years.

A COMPARISON OF RENTED AND OWNED FARMS.

TABLE No. 5.

Averages.	Owners.	Renters.
No. of farms	21	9
Animal units per acre	0.49	0.39
Crop area per man	17.3	27.8
Crop area per horse	12.4	15.3
Average No. of acres	63	82
Crop index	100	77
Live-stock index	99	104
Animal units per farm	32.3	31.1
Per cent. of capital, buildings, and machinery	28	19
Operator's capital	\$27,298.16	\$4,622.19
Farm receipts	5,192.94	5,110.24
Farm receipts per acre	80.84	63.41
Owner's interest on investment at 7 per cent. and renter's rent	1,929.23	980.00
Per cent. of interest on farm capital that rent equals	.....	4.28
Labour income	\$231.41	\$1,238.93

In studying the above table it will be seen that the owners keep more live stock per acre, which in turn would tend to keep the land more productive by providing more barnyard manure. The owners have less acreage per man and per horse, indicating that they cultivate the soil more intensively. This is also borne out by the owner's crop index. The renter's crop index is only 77 as compared to 100 in the case of the owners. The difference in quality of live stock is not sufficient to comment upon, both owners and renters having live stock about average for the survey. The owners have a greater percentage of capital in buildings and machinery, in that the renters do not own buildings. The operator's capital is also less in case of the renters, as they do not have capital invested in land.

A very marked difference is shown when we compare the owner's interest on farm capital at 7 per cent. and renter's rent. The owner's interest has been allowed at 7 per cent. and the rent the renters pay is equal to 4.28 per cent. interest on farm capital. This accounts for the difference here. The difference in labour income of the two just about balances the difference between the 7 per cent. the owners are allowed on their capital and the 4.28 per cent. the renters pay in rent. The conclusion one would draw from a study of this table would be that from the standpoint of financial returns as shown in labour income the renters have the advantage.

**RATE OF INTEREST ON FARM CAPITAL THAT FARMS RETURN.**

We have found that several farms in the survey return a minus labour income; other farms show a very fair return. These minus labour incomes are the result of farms not being able to pay interest on capital at 7 per cent. If the farms do not pay 7 per cent. interest on capital, then what interest on investment do they return to the farmer? We have found that, after allowing wages to the farm operator at the rate of \$80 per month on a group of 37 farms, the average rate of interest the farms returned was 3.8 per cent. This is very close to the return the landlords get when they rent their farms, which is 4.28 per cent. interest on capital. When we consider that the landlords have yet to pay depreciation on buildings out of that rent, it would bring their return for capital invested to practically the same figure as the average owners get by operating their own farms.

EFFECT OF DIVERSITY ON SMALL, MEDIUM, AND LARGE FARMS.

TABLE No. 6.

Size.	Per Cent. Receipts from Dairy Cattle.	Group.	No. of Farms.	Average Acres.	Average Diversity Index.	Average Crop Index.	CROP AREA.		Average Labour Income.	Best Labour Income.
							Per Man.	Per Horse.		
Small, up to 35 acres	Below 80 per cent. . . .	1	6	28.0	72	86	15	11	\$ 228 15	\$ 948 98
	80 per cent. and over.	2	4	17.6	89	73	10	7	87 22	296 95
Medium, 36 to 100 acres	Below 80 per cent. . . .	3	13	61.7	63	92	21	14	572 95	2,408 64
	80 per cent. and over.	4	14	68.3	88	92	18	12	339 11	1,898 17
Large, over 100 acres	Below 60 per cent. . . .	5	6	239.5	40	104	35	25	2,129 98	6,681 67
	60 per cent. and over.	6	9	139.0	76	104	29	17	340 86	2,433 49

Table No. 6 shows a comparison of farms according to size and also the effect of diversification from dairying on different-sized farms. Groups 1, 3, and 5 on small, medium, and large farms respectively include farmers who have diversified their farm operations, or, in other words, have received a greater proportion of their farm receipts from cash crops than have Groups 2, 4, and 6. Groups 2, 4, and 6 include farmers on the three sizes of farms who have specialized in dairying to a greater extent than Groups 1, 3, and 5.

In comparing the labour incomes of Groups 1, 3, and 5, it may be seen that the larger the farm the greater the labour income. This is due to the fact that the men on the larger farms operate at lower cost per acre. They conduct a larger business and reap the benefit in increased labour income according to the size of the business. The cash crops that have made this result possible on the large farms are mainly grain and hay. Most of these large farms are located in the Ladner area. Grain and hay sold for high prices during the year covered by this survey. Another year may not show such a marked difference in favour of cash-crop farmers. The farmers in that district realize that such a practice depletes the soil of its fertility. Just to what extent cash crops of hay and grain may be grown without affecting soil-fertility has not been definitely determined. Such practices may not apply to other districts included in the survey. However, other side-lines, such as hogs, sheep, poultry, or possibly fruit, may be incorporated as cash crops to good advantage. The cash crops adopted should depend upon the farmer's experience, the type of soil, climate, and market conditions.

In comparing Groups 2, 4, and 6, the groups who have received a less proportion from cash crops than Groups 1, 3, and 5, it will be seen that the labour incomes do not increase as does the size of the farm. The farmers on medium-sized farms who specialized in dairying received a marked increase in labour income over the same class on small farms. Those who had large farms and specialized in dairying over 60 per cent. made practically the same labour income as did the same class on medium-sized farms. This would indicate that it would have been a better policy in case of Group 6 to have arranged the farm business so that a greater percentage of receipts come from cash crops. The average labour income of Groups 1 and 2 are both low. Their size seems to be such that it is difficult to keep a sufficient number of cows to give a fair income, compared with the two larger-sized groups. On small farms, in order to secure an income proportionate to the larger farms, some cash crops which would give greater returns per acre should have been incorporated with the dairying, which would have given greater returns per acre than did cows alone. To summarize, then, it would appear that cash crops or side-lines are instrumental in raising labour incomes on all sizes of farms.

It may be noted that the farmers of Groups 1, 3, and 5 were able to employ labour more economically than did the farmers of Groups 2, 4, and 6, as is indicated by the columns headed "Crop area per man" and "Crop area per horse."

The farm operations should be so planned that the greatest return is received for labour expended and capital invested. Such side-lines as hogs, sheep, poultry,

grain, or perhaps fruit may be incorporated where these would fit in well with the organization of dairy-farms. This would assist in economizing on labour, also in using to advantage by-products of the dairy and in making greater use of products of little value in the production of milk.

The crop-index column shows that the larger farms grew the best crops. This is contrary to expectations. The farmers on small acreage should produce the heaviest yielding crops. Although their crop acreage is small, it cannot be overlooked, and high yields would cut down feed bills quite materially and thus add directly to their labour income.

The column headed "Best labour incomes" shows what was actually done on some farms during the year this survey covered. The largest labour incomes on the small farms were not very high for that year, indicating the difficulty that many faced when they specialized in dairying on small farms.

#### FACTORS WHICH INFLUENCE THE COST OF PRODUCING BUTTER-FAT.

TABLE NO. 7.

GROUPS.	No. of Farms.	Capital per Acre.	Per Cent. Labour of Farm Receipts.	Crop Index.	Per Cent. Farms with Pure-bred Sire 5 Years and over.	Lb. Fat per Cow.	Cost of 100 Lb. B.F.
Below \$76 . . . . .	12	\$391 85	17.15	100.7	66.6	253.3	\$ 62 90
\$76 to \$100 . . . . .	12	382 34	25.4	91.8	50.0	224.8	90 46
Above \$100 . . . . .	21	432 94	19.5	87.0	39.0	215.0	128 53

In order to determine why the cost of producing butter-fat varies on different farms, Table No. 7 was prepared to show what had the greatest influence. The average price the farmer received for his milk was \$76 per 100 lb. of butter-fat. The groups are so arranged in the table that the farmers who produced butter-fat at a profit are those of the first group. The second and third groups have produced butter-fat at a loss. Capital per acre plays some part in varying butter-fat costs. Those who produced at a cost of over \$1 per pound have an average of \$432 invested per acre, which is much above the first two groups, who produce at considerably less cost. The "\$76 to \$100" group have least capital per acre, but they employ labour unprofitably, which is shown in column "Per cent. labour of farm receipts"; thus they were not able to overtake the first group. The crop-index column is self-explanatory. To secure greatest returns and thus lessen cost of production, good crops are necessary, as is shown previously in this report.

The breeding of the herd has a very marked effect in lowering costs. It may be noted that the percentage of farms having a pure-bred sire on the farm for five years or over is much higher with the farmers producing at lowest cost. As the percentage of farms having pure-bred sires on the farm five years and over decreases, the cost of production of butter-fat increases.

The heavy-producing cows are the only ones that should be maintained in the herd. A glance at the above table will show the relationship between good breeding and high production and low cost.

#### THE COST OF PRODUCING BUTTER-FAT.

For the purpose of determining the cost of producing butter-fat only those farms could be used where at least 50 per cent. of the revenue came from milk. All sources of revenue other than milk were considered as side-lines. These side-lines would have the effect of raising or lowering the cost of production of butter-fat, depending on whether the side-lines were in themselves profitable or otherwise.

This explains the necessity of rejecting all farms which had less than 50 per cent. of their revenue coming from milk alone.

The method of determining the cost of producing butter-fat may best be shown by actual figures from one farm.

FARM NO. 50—A RENTED FARM.

Size .....	90 acres.
Number of cows .....	14
Pounds butter-fat sold .....	4,383
Total farm capital .....	\$30,379.95
Operator's capital .....	5,179.95

<i>Farm Expenses.</i>	<i>Revenue from Sources other than Milk.</i>
Labour hired .....	Crops sold .....
Feed bought .....	Eggs .....
Seed bought .....	Increase and sales of
Repairs .....	cattle, hogs, and
Taxes .....	poultry .....
Rent .....	Increase in feed and
Other farm expense...	supplies .....
Depreciation on build- ings and machinery.	
Interest on capital at 7 per cent. ....	
Labour of operator....	

Total farm expenses \$5,285 49  
Revenue from side-  
lines ..... 2,025 50

Total receipts from  
side-lines .....\$2,025 50

Cost of producing milk .....	\$3,259 99
4,383 lb. butter-fat cost .....	\$3,259 99
100 " " " .....	74 38

The cost of producing butter-fat on 47 farms was calculated by the method here shown. This includes farms in the districts of Chilliwack, Courtenay, and Ladner. The average cost of production was found to be \$92.97 per 100 lb. of butter-fat or 93 cents per pound.

As the cost of production per 100 lb. of butter-fat varied on different farms from \$50.76 to \$193.85, it can readily be seen that the average price as determined by the survey is merely approximate.

SUMMARY.

As previously stated, the conclusions of one year's investigation of farm operations cannot be considered final. In a purely tentative sense the following are submitted:—

1. Good crop yields were essential to good returns. (Table No. 1.)
2. High quality live stock had a greater effect in raising labour incomes than did good crop yields. (Table No. 1.)
3. Farmers who used grade sires operated at a loss. Those who used pure-bred sires increased their labour incomes in proportion to the number of years they had used them. (Table No. 2.)
4. The cost of producing butter-fat was lower where the pure-bred sire was used. (Table No. 3.)
5. The breeding of the herd had greater influence towards increasing labour incomes than had feeding. (Table No. 4.)
6. Renters made greater labour incomes than did owners. (Table No. 5.)

7. Owned farms returned interest on total capital at 3.8 per cent. during the year covered by this survey. (Page 5.)

8. The farmers who carried cash crops, such as hogs, sheep, poultry, grain, potatoes, etc., along with the cows made greater labour incomes than those who neglected these side-lines. (Table No. 6.)

9. The outstanding factors that influenced the cost of production of butter-fat were as follows:—

Breeding of the herd.

Production per cow.

Yield of crops.

Efficiency in management of labour.

Investment per acre. (Table No. 7.)

10. There existed a wide variation between different farms in the cost of producing butter-fat. This range was from 51 cents to \$1.94 per pound. (Page 10.)

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