Calf Cost Production O.S.

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COST OF CALF REARING - 1948-49

by

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The present campaign for increased production of home-fed beef has focussed attention on the economics of the enterprise. A considerable body of data has been collected on the profitability of keeping and feeding store cattle, but information on the cost of producing these store animals is limited. During the year of 1948-49, however, the Economics Department carried out an investigation into the cost of breeding and rearing calves up to the age of six or seven months old, and the results obtained are given in this report.

Six groups, totalling 108 cows of the Cross-Shorthorn beef class were recorded.

Three of these groups are situated in Caithness, one in Easter Ross, and two in Aberdeenshire.

The cows were kept solely for the purpose of producing calves, and therefore the cost of the calf, up to the time it is weaned, will be the cost of keep of the cow for the year. All the calves were reared by the normal method of suckling the cow, and no attempt was made or was necessary to measure the milk consumed. The systems of management employed, and the farming district in which each group is situated, vary considerably, so that average figures would be of little practical significance. For this reason, the individual results of each farm are shown. The first part of this report deals with the cost of keeping a cow through the winter and summer.

WINTER PERIOD

Information was obtained of the type and quantity of food consumed, the labour expended on the cows and any other charges attributable to them. The winter period extended from the date the cows were taken inside in the autumn of 1948, to approximately the end of April when they went out to grass. The values of the home-grown foods used, have been taken at cost of production, determined from the 1948 Crop Report issued by this Department, and are as follows:-

Turnips	39/6 per ton	Straw	38/1 per ton
Hay	127/- per ton	Oats	12/3 per cwt.

The cost per hour of the cattleman on each farm, was calculated from the actual wage paid including perquisites, and the number of hours worked per week. The range was from 1/10½ to 2/5 per man-hour.

A charge for overhead costs was allowed for on the basis of 5/3 per £ of man-labour expended on the cows, as recommended by the Conference of Scottish Agricultural Economists.

The cost of keeping a cow for one week during the winter, on each farm is shown in Table I.

TABLE I COST OF KEEPING A COW PER WEEK - WINTER

Farm	1	2	3	4	5	6
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Turnips	6. 3	2. 6	8. 3	8. 5	10. 1½	8. -
Straw - Total	3. 6	1. 5½	2. 3	2. -	4. 4	3.10
Hay	-. -	-. 9	-. -	-. -	2. 9	-. -
Oats	-. -	1.11½	1. 1	4. -½	-. 4½	-. 3
Other Foods	-. -	-. 1	-. -	-. -	-. -	-. -
Total Home-Grown Foods	9. 9	6. 9	11. 7	14. 5½	17. 7	12. 1
Add Purchased Foods	-. -	-. -	-. -	-. -	-. 7½	-. -
Total Foods	9. 9	6. 9	11. 7	14. 5½	18. 2½	12. 1
Add Man Labour	1. 6½	1. 9	1. 2½	3. 4	4. 1	3. 8
Horse Labour	-. -	-. 2	-. -	-. -	-. -	-. -
Miscellaneous	-. 1	-. -	-. -	-. -½	-. -	-. -¼
Overhead Costs	-. 5	-. 7	-. 4	-.10½	1. 6½	-. 6
Gross Cost	11. 9½	9. 3	13. 1½	18. 8½	£1.3.10	16. 3¼
Less Resid.Man.Values	2. 5	-. 8	1. 9	2. -	3.10½	2. 2½
Net Cost per Cow per Week	9. 4½	8. 7	11. 4½	16. 8½	19.11½	14. -¾

The range of cost per cow is considerable from 8/7 to 19/11½. The lowest cost occurred on a Caithness farm - Farm 2 - where the cows were turned out on hill-grazing during the day and taken inside at night. This practice was continued, with straw given as supplementary feeding, until February. Thereafter turnips and hay were also fed. The cost of this winter grazing is charged as under Other Foods, and the cost of horse labour - 1/4 per hour - was incurred while carting out the straw. Farm 5 alone used purchased feeding-stuff which was fed during the last three months the cows were inside.

On the farm where the greatest cost per week was incurred the largest quantity of turnips was fed per cow. This is illustrated in Table II where the quantities of food fed and man hours expended, are given.

TABLE II

MANHOURS AND QUANTITY OF FOOD FED - HUNDREDWEIGHTS

PER COW PER WEEK

Farm	1	2	3	4	5	6
Turnips	3.12	1.24	4.11	4.21	5.06	2.58
Hay	-	.12	-	-	.43	-
Straw	1.86	.75	1.18	1.04	2.24	1.37
Oats	-	.16	.09	.33	.03	.01
Other Foods	-	Grazing	-	-	.03	-
Total	4.98	2.27	5.38	5.58	7.79	3.96
Man-hours	.84	.80	.64	1.6	1.7	1.5

Farm 2 where the cows had winter grazing, used the least amount of turnips, and had the lowest cost per week. There appears to be a relationship between the cost per week, the quantity of turnips fed and the man hours per animal per week. The latter can be seen to vary to some extent with the total weight of food consumed.

The cost per cow for the winter period only, is shown in the Table below, together with the average duration of the period on each farm.

TABLE III COST PER COW - WINTER PERIOD

Farm	1	2	3	4	5	6
Number of Weeks	25.2	25.8	26.0	25.4	19.4	27.0
Cost per Cow for Winter	£11.16. 3	£11. 1. 6	£15. 5. 5	£21. 4. 5	£19. 7. 7	£18.19. 8

The average winter period extended to 25 weeks. Farm 5 had the shortest duration of the six groups and this in some measure counteracted this farm's high weekly cost.

SUMMER PERIOD

The winter period ended when the cows were put out to grass, at the end of April and beginning of May. Records were kept throughout the summer of the number and type of stock grazing on the farm, up to the date the cows were taken inside again for the winter. The summer period extended on the average to 25 weeks and ended generally about mid-October.

The number of days grazing of each type of stock was calculated and converted to a common unit so that each animal might bear a proportionate share of the grazing cost. The scale of units used is given overleaf.

LIVESTOCK UNIT TABLE

1 unit = 1 Horse
1 Cow
1 Bull
1 2-yr. old Bullock
2 Young Horses
2 Young Cattle
7 Breeding Sheep
14 Other Sheep.

Calves born in the spring have not been included since they would still be suckling the cows. In the case of young lambs, allowance was made only after the 1st August, and the scale used was 14 lambs = 1 unit.

Each field grazed on each farm was costed separately so that variations in the age and manurial treatment of the grass throughout the rotation could be taken into account. The majority of the fields were rotation leys of three or four years duration, but on all but one of the farms older pasture was also utilised. On one farm in Caithness the cows had the range of 600 acres of hill land, on which the cost of grazing is very low. This is explained on observing the factors included in the calculation of the grazing cost of one acre. The figures used in Table IV are averages.

TABLE IV AVERAGE GRAZING COST PER ACRE

Rent		-.16. 3	21%
Proportion of Laying down cost		-.13.11	18
Man Labour		-. 1. 9	2.1
Horse Labour		-. -. -	-
Tractor Labour		-. 1. 5	2
Manures Applied		1. 1. -	27.1
Residual Manurial Values B/F	1.17. 5		
Less C/F	1. 6.11	-.10. 6	13.5
Overhead Charges		-.12. 8	16.3
Gross Cost		3.17. 6	100.0
Less 2/3 of Cost removed by Hay where aftermath is grazed		-. 5. 2	
Net Cost		3.12. 4	

On old pasture, residual manurial values and establishment charges are quite small, while on hill land they are non-existent. Since the proportion of laying down cost and manurial residues amount to an appreciable percentage of the cost per acre, it follows that on the above types of grazing the grazing cost is comparatively low.

The total grazing cost of each farm was then allocated according to the number of livestock unit grazing days and the cost per animal per week ascertained.

Table V shows the cost per cow for one week on the grass.

TABLE V - COST OF KEEPING A COW PER WEEK - SUMMER

Farm	1	2	3	4	5	6
Grazing Cost	2/11	1/5	6/6	1/10	3/4	1/6
Man Labour	-/2	-/10½	-/4	-/6	-/1½	-
Miscellaneous	-	-	-	-/1	-	-
Overhead Charges	-/-½	-/3	-/1	-/1½	-/-½	-
Net Cost per Week	3/1½	2/6½	6/11	2/6½	3/6	1/6

Overhead charges were again made, as in the winter cost on each £ of direct man-labour on the cows. The cost of labour was incurred by the daily inspection of the cows while grazing. No figures were obtained for this on Farm 6. Farm 2 where the cows were grazing on hill-land had the cheapest grazing at 1/5 per week for each cow. Farm 6, however, although the grazing was largely rotational ley, carried a heavy stocking per acre with the result that the cost was also low. The highest cost occurred on Farm 3, where the number of stock carried per acre was lower than on the other farms of the sample. The cost per cow for the summer and also for the complete year are tabulated in the following table.

TABLE VI - COST PER COW - SUMMER PERIOD AND YEAR

Farm	1	2	3	4	5	6
Number of weeks grazing	26.2	23.4	26.3	24.9	26.3	22.5
Cost for summer period	£4. 1.11	£2.19. 6	£9. 1.11	£3. 3. 4	£4.12. 1	£1.13. 9
Cost for winter period	11.16. 3	11. 1. 6	15. 5. 5	21. 4. 5	19. 7. 7	18.19. 8
Total Cost per Cow - one yr.	15.18. 2	14. 1. -	24. 7. 4	24. 7. 9	23.19. 8	20.13. 5

The cost per cow for the summer period amplifies the differences already seen in the weekly cost. The total cost for the year shows a range of from £14. 1/- to £24. 7. 9 per cow - the average being £20.11/-. Farm 2 as expected, has the lowest cost, but the economical winter feeding of Farm 1 is reflected in the total cost.

It will be noted that no allowance has been made for depreciation on the cow. This has been omitted for two reasons (a) the breeding life of the cow is long and (b) the price received when the animal is sold is relatively high. The annual depreciation would therefore be quite small.

BULL SERVICE CHARGE

On the farms where a bull was kept, similar records and information as that obtained for the cows were got. The total cost of keep of the bull was calculated in the same way as has previously been explained, with the addition of the yearly depreciation of the bull. The total cost, thus ascertained, was

then divided by the number of animals served, and a charge per cow found. These costs are summarised in Table VII.

TABLE VII - SERVICE CHARGE PER COW

Farm	1	2	3	4	6
Number of Bulls	1	1	1	1	2
Cost of Keep - Winter	£12. 1. 7	£29.18. 9	£24.15. 1	£20. 7. 1	£61.17.10
Cost of Keep - Summer	4. 2. 2	2.19. 6	9. 1.11	3. 1. 6	4. -. -
Depreciation on Bull	8. 8. -	19. -. -	+2. -. -	22. -. -	13. 6. -
Total Cost of Bull	24.11. 9	51.18. 3	31.17. -	45. 8. 7	79. 3.10
No. of animals served	32	50	20	23	37
Costs per Animal	15/5	20/9	31/10	39/6	42/10

Farm 5 has been excluded from the above table since the bull used, was hired at a charge of 10/- per cow. Total figures for each period only are given. The range in cost of service is considerable - from 15/5 to 42/10. On Farm 1 the cost of winter keep is low in comparison with the other farms, and at the other extreme the standard of feeding, on Farms 2 and 6, during the winter is very high. On Farm 2, £29.18. 9 was the cost incurred for the wintering of one bull and on Farm 6 two bulls cost £61.17.10 or £30.18.11 each for the same period. In the former case this high cost is offset by the number of cows served, but on the latter farm only 37 were kept so that the cost per cow was very high.

Depreciation was calculated from the buying price, estimated or actual selling price and the average number of years retained. Appreciation of £2 occurred on Farm 3, where the price received when the animal was sold exceeded the buying price.

BREEDING AND REARING COST OF CALVES

The foregoing illustrates the total cost and bull service charge of a cow for one year, and since the cows were kept for no other purpose than the production of calves, the cost per calf born and reared can now be determined.

The number of calves covered by this investigation is as follows:-

Births	98	
Transfers to Cows	12	
Purchases	16	126
Sales	1	
Deaths	3	4
Total number reared		122

The "transfers to Cows" arose where other calves born on the farm were reared by the cows.

Analysis of the calving dates show that the majority of the cows calved from February to April.

1948			1949					
October	November	December	January	February	March	April	May	Total
5	4	4	1	28	31	15	10	98

The net cost per calf shown in Table VIII refers to each calf born and reared by the cows. Thus, transfers of other calves to be reared by the cows, and any calves purchased have been excluded.

TABLE VIII - COST PER HOME-BRED CALF REARED

Farm	1	2	3	4	5	6
Number of Cows	20	9	18	22	8	26
Total Winter Cost	£236. 7.10	£99.17. 6	£266. 3. 6	£532. 3. 2	£193. 9.10	£585.5.10
Total Summer Cost	69. 8. 8	26.15.11	163.12. 6	72.16. -	36.16. -	54.-. 3
Service Charge	15. 8. 4	9. 6. 9	28.13. -	43. 9. -	3. -. -	55.13. 8
Total Cost of Cows	321. 4.10	136. -. 2	458. 9. -	648. 8. 2	233. 5.10	694.19. 9
Less sale of suckling calves	-	-	-	5. -. -	-	-
Add Food to calves	-	-	-	-	1. 6. 8	-
Total Cost to Calves	321. 4.10	136. -. 2	458. 9. -	643. 8. 2	234.12. 6	694.19. 9
No. of Calves Sold	-	-	-	1	-	-
Calves born & reared	17	8	19	21	5	24
Cost per Calf born and Reared	18.17.10	17. -. -	24. 2. 7	30.12. 9	46.18. 6	28.19. 2

Table VIII shows the cost per calf reared to the age of seven or eight months old. It will be seen that the total cost of keeping all the cows for the year has been charged to the calves, less the price received from the sale of suckling calves. On Farm 5, the cost of a small quantity of purchased food fed to the calves has been added. This farm shows the greatest cost per calf born and reared and is entirely due to the high cost per cow in the winter. Farm 2 continues to have the lowest cost in the sample, but this position is altered in Table IX when calves, purchased and transferred in, are taken into account.

TABLE IX - COST PER CALF REARED

Farm	1	2	3	4	5	6
Calves Born & Reared	17	8	19	21	5	24
Number Purchased	7	-	-	2	4	3
Number Transferred in	5	-	1	-	-	6
Total Calves Reared	29	8	20	23	9	33
Cost B/F from Table VIII	£321. 4.10	136. -. 2	458. 9. -	643. 8. 2	234.12. 6	694.19. 9
Cost of Purchased Calves	62. -. -	-	-	14. -. -	22. 4. -	15. -. -
Value of Transfd. Calves	35. -. -	-	7. -. -	-	-	42. -. -
Food to Calves	-	-	-	-	2. 8. -	-
Total Cost to Calves	418. 4.10	136. -. 2	465. 9. -	657. 8. 2	259. 4. 6	751.19. 9
Cost per Reared Calf	14. 8. 5	17. -. -	23. 5. 5	28.11. 8	28.16. 1	22.15. 9

The purchase price of the bought-in calves has been added to the total cost brought forward from Table VIII and is allocated over all the calves reared. The average price paid was £7. 1/- per calf. The calves transferred to the cows for rearing have been valued at £7 per head.

The calf subsidy during the period covered by this report amounted to £4 per bull calf and £3 per heifer calf. No credit has been made for this, since the object of this investigation is the determination of the total cost of production of calves. The costs per calf in Tables VIII and IX show the effect of rearing less than one and more than one calf per cow. For example, in Farm 1, 17 calves were born and reared on 20 cows. The cost per calf was £18.17.10. Twelve more calves, however, making a total of 29 calves, were purchased or transferred in, and also reared by the cows. The cost per calf was thus reduced to £14. 8. 5. This figure is extremely small in comparison with the other farms, and is largely accounted for in the low cost of the winter feeding of the cows. On Farm 5, the reduction in cost per calf is even greater - from £46.13. 2 to £28.16. 1.

Although nine cows produced and reared only eight calves on Farm 2, the situation of the farm afforded hill-grazing throughout the summer and part of the winter, resulting in low costs per cow and therefore low costs per calf. Five of the calves, on this farm, were sold in mid-October, at £25 each leaving a profit of £8 per head.

If this sum of £25 per head is taken as the estimated selling price of seven or eight month-old calves on all the farms in this survey, then on four farms the calves would show a profit and on Farms 4 and 5 they would show a loss. It is significant that on both these farms the standard of feeding and hours of the cattlemen during the winter were very high and therefore the cost per cow was also high.

The profitability of calf-rearing depends on two factors both of which can, to some extent, be varied by the farmer. They are, - (1) the standard of winter-feeding to the cows and (2) the number of calves reared per cow. There can be no question of cutting down the winter ration, for the sake of economy to the detriment of both the cow and the calf. Yet in many cases the standard of feeding is equivalent to that of a feeding bullock, and is surely too high. The number of calves reared per cow appreciably affects the net cost per calf, but with the exceptions of Farm 1, where three calves were reared for every two cows, and Farm 6 where four calves were put to three cows, only one calf was reared per cow in this survey. Unless the milking quality of the cow is poor, then the advantage of rearing an extra calf should be taken even at the expense of slightly curtailing the suckling period.

There are two sources of supply of extra calves - the open market and feeding heifers from which one calf is taken. This latter method of obtaining calves seems to be gaining in favour in this area, and the following illustrates the cost of this system as it occurs on Farm 1.

HEIFERS - CALVED AND FATTENED

On Farm 1, twelve heifers were recorded in the same way as was done for the cows, throughout the year. These animals were bred on the farm and were in-calf when taken inside at 1st November, 1948. Two heifers, however, were found during the winter, not to be in-calf and were graded as fat off the grass in mid-July. The remaining ten calved as follows:- March 3; April 4; May 3. Five heifers reared their own calves while the other five calves were reared by the cows, and appear in Table IX as being transferred in - Farm 1. These five heifers which did not rear their calves, grazed during the summer and are being fattened off in the byre this winter.

The cost of keeping the heifers was calculated, using the same standards and methods already explained. The cost per animal per week for both winter and summer is summarised in Table X.

TABLE X - COST PER HEIFER PER WEEK

Winter		Summer	
Turnips	3. 1½d.	Grazing	2.11d.
Straw	3. 6	Man-labour	-. 2
Man-labour	1. 3½	Overheads	-. -½
Overheads	-. 4		
Gross Cost	8. 3	Gross Cost	3. 1½
Less Manurial Residues of Food	2. 3		
Net Cost per Week	6. -	Net Cost per Week	3. 1½

The average length of the winter period was 26 weeks making the cost per heifer for that time £7.16/-. The winter period ended on the 1st May, when the heifers were put out to grass. The grazing period averaged 23.3 weeks per animal so that the summer cost per heifer was £3.12. 9. The winter cost is low, since only turnips and straw were fed, with the result that the cost for the year - £11. 8. 9 - is also very low. No difference was made in the ration to the ten in-calf heifers and the two not in-calf. The heifers were valued at 1st November at £32 each, and the profitability of the two heifers sold fat can be determined. They were sold on the 13th July after grazing for 10.3 weeks.

TABLE XI - PROFITABILITY OF HEIFERS SOLD FAT

Open Valuation	£32. -. -
Cost per Heifer - Winter	7.16. -
Summer	1.12. 2
Bull Service Charge	-. 5. 9
	41.13.11
Average Selling Price	52.16. 9
Net Margin per Heifer - Profit	£11. 2.10

Both animals graded out super-special at 9½ hundredweights, and the high profit of £11. 2.10. per head, is largely due to the exceptionally low cost of the winter feeding. The bull service charge has been included although no calf was born. The bull used was on loan from another farm all through the summer only, so that the service charge per animal was arrived at by dividing the summer cost of the bull - £4. 0. 8 - by the total number of animals served. The number of animals was fourteen and the charge per animal, therefore, was 5/9d.

The result of the heifers which calved and are now being fattened is given overleaf, and is the cost per head up to the end of the summer grazing period.

TABLE XII - COST PER HEIFER - NOT REARING CALF

Opening Valuation	£32. -. -
Cost per Heifer - Winter	7.16. -
Summer	4. 1. 3
Bull Service Charge	-. 5. 9
Gross Cost	44. 3. -
Less Value of Calf Transferred to Cows	7. -. -
Cost of Heifer at 1st November, 1949	£37. 3. -

The value of the calf, transferred to the cows for rearing and taken at £7 per head, has been deducted from the gross cost of the heifer. The resulting net cost of the heifer at the end of summer is low. Even allowing for an increase in the cost of winter feeding in the above table, the heifer at the end of the summer will cost less than a feeding bullock bought at that time, and it is reasonable to assume that a definite profit will be realised on the heifer when the animal is fattened and graded. Moreover, the effect of the calf transferred to the cows for rearing, is to reduce the net cost per calf reared. There seems to be a distinct saving in costs when this method is employed, since two products are obtained both of which are much in demand - calves and beef.

The details of the calves born and reared by the remaining five heifers are given in Table XIII. The opening valuation of the heifers is not included since they were kept for the production of the calf only.

TABLE XIII - COST PER CALF BRED & REARED BY HEIFERS

Total Cost of Heifers - Winter	£39. -. -
Summer	20. 6. 3
Bull Service Charge	1. 8. 9
Total Cost of Heifers charged to Calves	60.15. -
Number of calves reared - 5	
Cost per Calf Born and Reared	£12. 3. -

The net cost per calf will be seen to be lower than those shown in Table IX. Heifers can be kept through the winter more cheaply than breeding cows, and so the cost per calf is much less.

The results of one farm are insufficient to draw definite conclusions regarding this system, but it seems clear that heifers will produce a cheaper calf than that obtained from breeding cows. If the calf is reared by a breeding cow, the heifer may then be fattened. The cost of keeping the heifer the extra nine months is almost balanced by the value of the calf produced, and it is probable that a profit may be made when the animal is fattened.

While the present position of high food and labour costs continue, there appears to be a place in the cattle breeding and feeding system, for a method such as this, where two products - calves and beef - are obtained.

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