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WITHDRAWN  
DEPARTMENT OF AGRICULTURAL ECONOMICS

# UNIVERSITY OF NOTTINGHAM

## Department of Agricultural Economics

SEPT. 1956

F. R. No. 137



*Calves  
Costs of  
Production*

### THE COSTS OF REARING SINGLE SUCKLED CALVES



"FARMER AND STOCKBREEDER" PHOTOGRAPH

A. BROWN B.Sc.

PRICE 2/-

F.R. No. 137.

THE COSTS OF REARING SINGLE SUCKLED CALVES.

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OCTOBER, 1956.

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SUMMARY.

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1. The report deals with the costs of rearing single and dual suckled calves. A comparison is also given of the costs of rearing single suckled calves and other methods of rearing.
2. All the food was charged at its market price or at the cost of production for non-saleable products.
3. The estimated cost of maintaining a breeding cow over its dry period, (24 weeks), was :

	£.	s.	d.
Food and grazing.	14.	8.	6.
Labour.	2.	17.	7.
Overheads.		12.	6.
	£ 17.	18.	7.

4. The estimated cost of rearing a single suckled calf to weaning, (age 32 weeks), was :

	Per calf.		
	£.	s.	d.
<u>Average cost of cow up to calving.</u>			
Direct costs.	20.	0.	10.
<u>Average cost of cow after calving and calf.</u>			
Feed and grazing.	6.	16.	3.
Manual labour.		16.	6.
Veterinary.		4.	11.
Bull charge.	2.	13.	9.
Total direct cost.	30.	12.	3.
Overheads up to calving.		14.	9.
Overheads after calving.		4.	2.
Total costs.	31.	11.	2.

5. Approximately 16 per cent of the calves were sold after weaning at an average price of £47. 17s. per head.
6. The costs of rearing calves up to 26 weeks old by different methods, including a charge for the calf, (or keep of the cow for a whole year and share of the bull), were :
- |   | £.  |
|---|-----|
| Whole milk only - Bucket fed.           | 34. |
| Whole milk for more than four weeks - " | 31. |
| Whole milk for less than four weeks - " | 27. |
| Milk substitute only - "                | 26. |
| Multiple suckled.                       | 28. |
| Single suckled.                         | 29. |
7. The cost position is clear, but as no attempt was made to value the calves it must be left to the farmers to decide which system yields the best margin over costs.
8. The estimated cost of rearing two calves per cow to 30 weeks old was £15. per calf.
9. All calves were eligible for the calf subsidy.

THE COSTS OF REARING SINGLE SUCKLED CALVES.

I. INTRODUCTION.

It is, or should be, accepted that the first six months of a beef animal's life is most important, having far reaching effects not only on its carcase quality, but also on the total cost of producing that carcase. The experiments carried out at Cambridge have shown that to produce a good end product it is essential that the calf should be well reared in its first six months, and not allowed to lose its calf flesh in the ensuing months. It must be provided with an adequate, nutritious and palatable diet. There are a number of ways of providing this diet depending primarily on whether the calves are bred from a beef herd or are the by-product of a dairy herd. The costs of five methods of feeding calves were given in a recently published report.<sup>1</sup> The following report deals with the costs of rearing single suckled calves to weaning and of maintaining a breeding cow over its dry period. There is also a comparison of the costs of rearing calves by different methods. Finally, details and costs are given of suckling two calves per cow where both cows and calves are out at grass.

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<sup>1</sup> "Rearing Calves in Dairy Herds". R. Bennett Jones. March, 1956. F.R. No. 134. University of Nottingham, Department of Agricultural Economics, St. Michael's House, Sutton Bonington, near Loughborough.

## II. SINGLE SUCKLING.

### Sample :

The sample was limited to beef herds which reared 12 or more **Spring** born calves. Data were collected from 14 such herds the majority of which were in Lincolnshire, though there were three in Derbyshire and one in Leicestershire. The most common breed of cattle was the Lincoln Red, but the Hereford, Galloway and Blue Grey were also represented.

This study covers a year in the breeding life of a cow extending from the time of weaning of one calf to the weaning of the subsequent one. It is primarily a study of the feed and labour costs of keeping the cow during the Winter of 1954-55 and the cow and calf during the Spring, Summer and Autumn of 1955.

Table 1 gives the average herd size and other details of herds and farms. There was considerable variation in herd size; in the largest herd there were 99 breeding cows and in the smallest only 14. The largest farm covered 1,000 acres of which 350 were down to grass whilst the smallest covered 100 acres of grassland.

### AVERAGE HERD AND FARM SIZE.

TABLE 1.

	14 farms.
Number of cows at start of enquiry.	40.6
Number of calves weaned.	34.9
Number of calves per cow.	0.86
Number of bulls per herd.	1.7
Age of calves at weaning (weeks).	32.0
Farm size (acres).	473.5
Grass acreage.	209.3

### COST OF MAINTAINING BREEDING COWS OVER THE DRY PERIOD.

The average cost of maintaining a breeding cow over the dry period is shown in Table 2. Only one herd was completely outwintered though others which had access to grass during the day were housed at night.



AVERAGE MAINTENANCE COST OF COWS OVER THE DRY PERIOD.  
(average number of weeks 24).

TABLE 2. Per cow.

	Quantity:				
	cwts.	qrs.	£.	s.	d.
Concentrates.	-	1		8.	4.
Oats.	1	2	1.	19.	10.
Barley.	-	2		11.	6.
Beans.	-	1		4.	8.
Beet pulp.	-	3		12.	3.
Dried grass.	-	3		16.	11.
Silage.	4	3		12.	0.
Roots.	10	1	1.	0.	9.
Hay.	15	0	6.	13.	4.
Straw, (feeding).	14	1	1.	1.	6.
Grazing.	-	-		6.	9.
Minerals.	-	-			8.
Total feed costs.			14.	8.	6.
Manual labour.			2.	10.	10.
Tractor labour.				5.	0.
Horse labour.				1.	9.
Total direct costs.			17.	6.	1.
Overheads.				12.	6.
Total costs excluding cow replacements.			17.	18.	7.

It should be noted that these figures exclude any allowance for the value of straw used for bedding or manure produced. All foods where possible have been charged at their estimated market value. The salient feature of the feed costs is the relative importance of hay to the other foods. Hay was fed to all the herds, straw to twelve, oats to nine and roots to six herds. The other foods were used less commonly, in fact silage and dried grass were fed to only one herd.

Not all the cows that were costed in the above table produced a calf, in fact of the 568 breeding cows at the start of the enquiry only 86 per cent reared a calf to weaning. The majority of the remaining 14 per cent were either barren or lost their calf at or soon after calving.

COST OF REARING A SINGLE SUCKLED CALF TO WEANING.

To arrive at the figures in Table 3 for the average cost of the cow per calf up to calving, the cost of maintaining the cows over the dry period in each herd was divided by the number of calves weaned in that herd, the sum of these averages was then divided by the number of herds to arrive at a cost per calf for the sample. The direct cost includes all the items in Table 2 except overheads, this figure is included as a separate item elsewhere in the table.

COST OF REARING A SINGLE SUCKLED CALF TO WEANING.  
(average age at weaning 32 weeks).

TABLE 3.

	Per calf.		
	£.	s.	d.
<u>Average cost of the cow up to calving per calf.</u>			
Feed costs.	16.	14.	2.
Manual labour.	2.	19.	3.
Tractor labour.		5.	7.
Horse labour.		1.	10.
<u>Direct cost.</u>	20.	0.	10.
Overheads.		14.	9.
<u>Average cow and calf costs per calf.</u>			
Grazing.	6.	8.	3.
Hay.		4.	0.
Pea straw.			11.
Dried grass.			5.
Calf nuts.			9.
Minerals.		1.	11.
Manual labour.		16.	6.
Veterinary.		4.	11.
Bull charge.	2.	13.	9.
Overheads.		4.	2.
<u>Total direct cost.</u>	30.	12.	3.
<u>Total cost (direct cost and overheads).</u>	31.	11.	2.

The cost per weaned calf does not include a charge for cow depreciation. Many farmers bred their own herd replacements hence no reliable estimate was forthcoming for the cost of the animal when it entered the herd. The average value which the owners put on their breeding cows was £50. but the actual price realised for cows sold during the costing period as barreners and culls was £68. The opening valuation of all the herds was only £180. higher than the closing valuation plus sales and receipts for casualties. Thus the calves should be debited with approximately 7s. Od. per head, but because valuations play such an important part in the calculations this item has been omitted.

The calves were born, depending on the weather, either outside or in yards. It was not the general practice to provide the cow or calf with supplementary feed whilst they were on grass though four farmers did so during calving and another fed a small quantity of hay per day to the cow and calves just prior to weaning.

Most of the 488 calves weaned were retained for rearing. Only 79 calves (from three herds) were sold - at an average of £45. 17s. per head. The estimated cost of rearing these particular calves was £32. 12s. so that a margin of £15. 5s. per head was realised. This does not include the calf subsidy of £5. or £7. 10s.<sup>1</sup> per head for which all the calves were eligible.

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<sup>1</sup> For calves born before the 1st April, 1955, the calf subsidy was £5. per head and £7. 10s. for those born after the 1st April.

III. COMPARISON OF SINGLE SUCKLING COSTS WITH OTHER METHODS OF REARING.

For comparative purposes it has been estimated what it would cost to rear calves to 26 weeks old by different methods; the figures have been tabulated in Table 4 below. The methods of rearing can be classified into two main groups, namely, suckled calves and those reared on the bucket.

ESTIMATED DIRECT COSTS OF REARING CALVES UNDER DIFFERENT SYSTEMS UP TO 26 WEEKS OLD. (adjusted to Spring milk prices).

TABLE 4.

	BUCKET REARED.				SUCKLED.	
	Whole milk only.	Whole milk for more than four weeks.	Whole milk for less than four weeks.	Milk substitute only.	Multiple suckled.	Single suckled.
	£. s.d.	£. s. d.	£. s.d.	£. s.d.	£. s. d.	£. s. d.
Total feed costs.	21.12.8.	18. 8. 9.	14. 6.7.	13. 5.6.	15. 7. 0. <sup>1</sup>	22. 0.10. <sup>2</sup>
Labour.	2. 5.0.	2. 5. 0.	2. 5.0.	2. 5.0.	2. 5. 0.	3.19. 8. <sup>3</sup>
Veterinary.	7.	2. 1.	2.1.	9.	3.10.	4.11.
Bull charge.	-	-	-	-	-	2.13. 9.
Calf.	10. 0.0.	10. 0. 0.	10. 0.0.	10. 0.0.	10. 0. 0.	-
<b>Total Costs.</b>	<b>33.18.3.</b>	<b>30.15.10.</b>	<b>26.13.8.</b>	<b>25.11.3.</b>	<b>27.15.10.</b>	<b>28.19. 2.</b>

<sup>1</sup> Includes a share of the food cost for the nurse cow.

<sup>2</sup> Includes total feed cost for the cow.

<sup>3</sup> Includes total labour cost for the cow.

The same labour charge has been adopted for all the bucket reared calves. Slight differences were revealed by the cost records<sup>1</sup>, but there is no evidence that these were significant. The veterinary charges were originally

<sup>1</sup> "Rearing Calves in Dairy Herds". R. Bennett Jones. F.R. No. 134.

calculated for calves reared to ages varying from 29 to 32 weeks old. It has been assumed that veterinary charges are more likely to be incurred before the calf is 26 weeks old rather than in the following weeks, and the amounts actually recorded have, therefore, been included in Table 4.

Single suckled calves were charged with the keep of the cow for a whole year and with a share of the cost of keeping a bull. For all the other rearing systems a charge of £10. has been included to cover the cost of the calf at birth.

These estimates show that a single suckled calf at 26 weeks old has cost less than calves reared entirely on whole milk or on whole milk for more than four weeks, but more than the other methods of rearing. However, from 26 weeks old until weaning time the single suckled calves cost on average 5s. Od. per week to feed compared with 11s. Od. per week for calves reared by other methods.

Since no estimates were available for the value of the bucket reared and multiple suckled calves it was impossible to compare the profitability of the different rearing methods.

IV. ANALYSIS OF GRAZING COSTS.

The figures given in Table 5 below are the costs per acre of grass grazed solely by the costed cattle or jointly with other classes of stock. Where grass was both grazed and mown a proportion of the rent and other charges was allotted to the grazing, e.g. if one hay crop was taken then one third of the rent and other costs were charged to the aftermath grazing.

GRASS COSTS ON 1,437 ACRES.

TABLE 5.

	Per acre.	
	£.	s.
Labour.		4.
Rent.	1.	17.
Drainage rate.		2.
Water rate.		1.
Artificial fertilisers.		9.
Lime.		3.
Spray or dust.		1.
Hedging.		5.
Ley establishment.		8.
Total.	3.	10.

NOTES ON A SPECIAL SYSTEM.

This report so far has dealt with the cost of single suckled calves. The cost of rearing calves on the bucket or by multiple suckling was described in Farmers' Report No. 134. But still another system is practised on one East Midlands farm. There the cows suckle their own calf and another. This differs from ordinary multiple suckling because the cow and both calves are out at grass. The results given below are for the year 1954-55.

The 18 Blue Grey cattle on this farm were purchased as heifers and they are expected to breed until at least 12 years of age. They are maintained on grass throughout the year and their management is designed to favour longevity and regular calving dates. A Lincoln Red bull is used and the calves, born in March, or thereabouts, have the propensity to grow quickly and at the same time fleshy; they are weaned in October. This gives the cow ample time to recover condition before the next calving.

Table 6 gives the average cost of keeping the cow over the Winter, 1954-55, that is the period between one weaning and the subsequent calving.

COST OF MAINTAINING COWS OVER THE DRY PERIOD.

TABLE 6.			No. of cows : 18.				
Cost of herd.				Quantity per cow.	Cost per cow.		
£.	s.	d.			£.	s.	d.
8.	2.	3.	Grazing.	0.5 acres.	9.	0.	
8.	18.	6.	Hay.	1.2 cwts.	9.	11.	
3.	3.	0.	Straw, (Oat).	2.4 cwts.	3.	6.	
9.	15.	0.	Labour.	3.3 hours.	10.	10.	
29.	18.	9.	Total direct costs.		1.	13. 3.	
2.	6.	3.	Overheads.		2.	8.	
32.	5.	0.	Total costs.		1.	15. 11.	

There were 18 cows ranging from  $5\frac{1}{2}$  to  $7\frac{1}{2}$  years old in the herd. After weaning in October, 1954, and until calving in March, 1955, they strip grazed nine acres of lucerne aftermath at a cost of 9s. Od. per head, this maintained the animals in a lean, but healthy condition. Three weeks prior to calving a ration of 6 lbs. hay and 12 lbs. oat straw was fed per day. Additional feed at this stage of pregnancy, that is about a month prior to parturition, is most important since during this time the calf makes most progress in liveweight gain and the cow's udder develops for the ensuing lactation. During the earlier months of pregnancy the cow can be kept in a lean condition at a low cost and suffer no detrimental effects to herself or the unborn calf.

Seventeen calves were born to the 18 cows and another 17 purchased calves were put to the cows. The average cost delivered on farm of the purchased calves was 11 guineas each. These orphan calves were mainly Hereford type and were delivered to the farm when the cows were expected to calve. No difficulties were encountered in getting the cows to adopt the orphan calves and all calves appeared to take their fair share of milk.

A creep feeding pen was provided in the field with a home mixed ration, composed mainly of ground oats fortified with bran, flaked maize, fish meal, dried skim milk plus vitamins and minerals. The calves soon started to nibble at the creep feed and after about six weeks were consuming 1 lb. daily which soon rose to 2 lbs. The daily allowance was maintained at the latter amount until the calves were weaned. From birth to weaning each calf consumed an average of just over 3 cwts. of concentrates. During this period, apart from a fortnight in July, the 18 cows and 34 calves grazed a 17 acre field at a cost of £1. 2s. Od. per calf. The other fortnight was spent on 17 acres which had previously been cut for hay and grazed by sheep, the cost per calf of this grazing came to 10d.

Table 7 gives the total costs per head and the cost per weaned calf to an average age of  $7\frac{1}{2}$  months. The total costs of maintaining the 18 cows over the Winter and the costs of the cows and calves in Summer were divided by the number of calves, that is, 34, to give the cost per calf.



COST OF HERD AND PER WEANING CALF.

TABLE 7.

Cost of herd. £. s. d.		Per calf. £. s. d.
8. 2. 3.	Winter grazing.	4. 10.
8. 18. 6.	Hay.	5. 3.
3. 3. 0.	Straw.	1. 10.
20. 3. 9.		11. 11.
38. 13. 7.	Summer grazing.	1. 2. 10.
177. 12. 0.	Creep feed.	5. 4. 6.
236. 9. 4.	Total feed.	6. 19. 3.
9. 15. 0.	Labour : Winter.	5. 9.
16. 14. 9.	Labour : Summer.	9. 10.
50. 0. 0.	Bull charge.	1. 9. 5.
196. 10. 0.	Purchased Calves	5. 15. 7.
509. 9. 1.	Total Direct Costs.	14. 19. 10.
6. 10. 8.	Overheads.	3. 11.
515. 19. 9.	Total Costs.	15. 3. 9.

The standard charge of £50. per year for the bull was divided by the total number of calves weaned irrespective of whether they were born on the farm or purchased. The total purchase price of the orphan calves was divided by the total number of calves to arrive at the cost per calf.

No cow depreciation has been charged to the calves. The cows varied from  $5\frac{1}{2}$  to  $7\frac{1}{2}$  years old and are expected to breed until they are at least 12 years old. Since no cows have been sold at this latter age it was impossible to forecast their value and hence no depreciation per year has been estimated.

The average cost per calf of £15. 3s. 9d. at weaning was very low;

they were, however, well grown and weighed on average just under 4 cwts. per head.

Grazing Costs :

The figures given in the table below were the costs per acre of the grass grazed by the costed animals either alone or jointly with other stock. Where hay crops were taken adjustments to the cost per acre according to the Appendix, (pages 16-17), were made, e.g. if one hay crop was taken then one third of the rent was charged to the aftermath grazing. The cost of the individual items was arrived at by averaging the costs of the nine acres grazed in Winter, and the 18 acres grazed for the remainder of the period, apart from a fortnight in July.

GRAZING COST, (DUAL SUCKLING FARM ONLY).

TABLE 8.

	Per acre.	
	£.	s.
Rent.		16.
Water rate.		5.
Labour.		1.
Hedging.		8.
Spray (liquid manure).		4.
Ley establishment.		4.
<b>Total.</b>	<b>1.</b>	<b>18.</b>

Grazing costs per cow and per calf were charged the full acreage cost unless other stock grazed the field when a proportion of the costs was taken, based on the number of grazing units of each class of stock. The grazing units were calculated by multiplying the number of animals by their stock equivalent unit and by the number of grazing days.

APPENDIX I.

STANDARD CHARGES USED AND PROCEDURES ADOPTED IN THE INVESTIGATION.

Labour :

The charges for labour were as follow, unless the farmer paid more than the standard rate, when the full amount was charged.

	<u>Rate per hour.</u>	
	s.	d.
Men.	3.	3.
Women	2.	4.
Youths.	2.	1.
Wheeled tractor.	4.	0.
Horse.	2.	0.

Machinery Depreciation and Repairs :

No charge has been made.

Overheads :

- (1) Overheads were calculated for each record on the basis of 5s. Od. for each £1. of direct manual labour.
- (2) Hedging - Ditching - Walling - a standard charge of 5s. Od. per acre was made.

Farm Yard Manure :

No attempt was made to credit the manure produced either on grass or in yards.

Feeding Stuffs :

- (1) Purchased feeding stuffs were charged at the actual price paid by the farmer.

Feeding Stuffs, continued :

(2) Home grown feeding stuffs were charged at the average market price for the period 1st October, 1954 to 1st April, 1955. An estimated cost of production figure was used for feed with no recognised market value.

	<u>At market price.</u>			<u>At cost of production.</u>		
	<u>per ton.</u>			<u>per ton.</u>		
	£.	s.	d.	£.	s.	d.
Oats.	25.	8.	4.			
Barley (seconds).	18.	0.	0.			
Barley.	27.	18.	4.			
Beans.	30.	10.	0.			
Kale.				2.	0.	0.
Mangolds.				2.	0.	0.
Swedes.				2.	0.	0.
Turnips.				2.	0.	0.
Dried grass.	20.	0.	0.			
Silage (grass).				2.	10.	0.
Meadow hay.	8.	10.	0.			
Seeds hay.	9.	0.	0.			
Wheat straw.	1.	10.	0.			
Barley straw.	1.	10.	0.			
Oat straw.	1.	10.	0.			

Grazing Costs :

The costs of grazing were allocated to the cattle in the enquiry according to the proportion of their grazing days to the total number of livestock grazing days.

	<u>Stock equivalent.</u>
Cow maintenance only.	1.0
Cow in calf.	1.2
Beef cow and calf.	1.8
Cattle over 2 years.	1.2
Cattle from 1-2 years.	1.0
Cattle from $\frac{1}{2}$ -1 year.	0.8
Sheep : Ewes and lambs.	0.5
: Others.	0.2
Horse.	1.2

Grazing Costs, continued :

A Winter grazing day, (1st November to 31st March, inclusive), on pasture other than foggage was counted as one fifth of a Summer grazing day. A Winter grazing day on foggage was counted as equal to a Summer grazing day. Where a hay crop was taken one third of the total costs were charged to aftermath.

Where two hay crops were taken one sixth of the total costs were charged to aftermath.

Leys :

The cost of establishment was spread over four years.

Manurial Residues :

No credit or debit was made. The cost of lime was spread equally over four years.

Bull Charge :

The cost of keeping a bull, (including depreciation), was taken to be £50. per year.

Cow Depreciation :

No cow depreciation has been charged for the reason stated on page 7.

APPENDIX II.

In order to comply with a standard procedure which has been agreed by the Conference of Provincial Agricultural Economists, Table 3 in the report is reproduced in this appendix with certain modifications. The modifications are as follow :

Feeding Stuffs :

All home grown foods have been charged at cost of production as given below :

	<u>Per cwt.</u>	
	s.	d.
Oats.	15.	2.
Barley.	12.	5.
Beans.	29.	6.
Dried grass.	15.	0.
Seeds hay.	6.	1½.
Meadow hay.	6.	3.
Straw.	1.	6.

Manurial Residues :

Manurial residues have been deducted from all the feed costs according to the recommendations given in the Seventh Report (1955) of the Scottish Standing Committee.

COST OF REARING A SINGLE SUCKLED CALF TO WEANING.

Average Cost of the Cow up to Calving per Calf :

	£.	s.	d.
Purchased concentrates.	1.	4.	0.
Purchased minerals.			9.
Homegrown concentrates.	2.	9.	0.
"    roots.	1.	1.	2.
"    silage.		11.	0.
"    hay.	4.	10.	0.
"    straw.		18.	5.
Grazing.		7.	7.
Manual labour.	2.	19.	3.
Tractor.		5.	7.
Horse.		1.	10.
Carried forward ...	14.	8.	7.

	£.	s.	d.
Brought forward ...	14.	8.	7.
<u>Average Cow and Calf Cost per Calf :</u>			
Purchased concentrates.			9.
Purchased minerals.	1.	11.	
Homegrown concentrates.			3.
"    hay.		2.	10.
Grazing.	6.	8.	3.
Manual labour.		16.	6.
Veterinary.		4.	11.
Bull charge.	2.	13.	9.
Overheads.		18.	11.
			<hr/>
Total.	£ 25.	16.	8.
			<hr/>

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