AUGUST, 1955

ECONOMIC REPORT No. 35

ECONOMICS OF LIVESTOCK PRODUCTION

REPORT ON BREEDING CATTLE

1953-54

by

J. D. ROWBOTTOM, B.Sc.

EDINBURGH AND EAST OF SCOTLAND COLLEGE OF AGRICULTURE

(Department of Economics), 22 Rose Street, Edinburgh, 2, Scotland

R.564

DEPARTMENT OF ECONOMICS

STAFF

D. WITNEY, B.Com.
J. D. NUTT, B.A., N.D.A.
D. M. R. LEASK, B.Sc.
W. B. DUTHIE, B.Sc.
C. J. BLACK, B.Sc., B.Litt., N.D.A.
J. A. MACLENNAN, B.Sc.
J. D. ROWBOTTOM, B.Sc.
B. PEART, B.A.
HELEN L. SMITH, B.Sc.
A. S. HORSBURGH, B.Sc.
R. T. BUCHANAN, M.A.

RECENT PUBLICATIONS

FINANCIAL RESULTS OF EAST OF SCOTLAND FARMS:-

GROUP	1950-1951	1951-1952	1952-1953	1953-1954
	No. of Farms			
1. Hill Sheep Farms 2. Stock-rearing Farms	53*	57*	58	56
3. Stock-raising and Feeding Farms 4. Arable Farms 5. Dairy Farms	178	173*	183	166
	231	230	241	222

COSTS OF MILK PRODUCTION - 1950-51, 1951-52, 1952-53, 1953-54.

ECONOMICS OF LIVESTOCK PRODUCTION:-

(a) Commercial Egg Production: 1950-51,* 1951-52.*
(b) Cattle Rearing: 1951-52, 1952-53.

ENTERPRISE COSTS:-

(a) Economics of Silage-making in East of Scotland, 1950, 1951, 1952,* 1953.
(b) Crop Cost Studies - Wheat and Barley, 1952, 1953.

DAIRY LABOUR IN THE EAST OF SCOTLAND.

HILL AND UPLAND FARMING IN ROXBURGHSHIRE.

ECONOMICS OF BRACKEN ERADICATION, 1951, 1952, 1953.

TEAM WORK IN GRASS SILAGE MAKING.

* Out of print

Inquiries regarding the above publications should be addressed to either the Secretary of the College or the Provincial Agricultural Economist.

C O N T E N T S

I. INTRODUCTION.

II. GENERAL DESCRIPTION OF FARMS STUDIED.

III. COSTS OF PRODUCTION.

IV. RETURNS AND PROFITS.

V. FEEDING.

VI. COMPARISON OF LOW COST AND HIGH COST HERDS.

VII. SUMMARY.

APPENDIX. Notes on Costing Methods.

I. INTRODUCTION

Of late, beef has been very much to the fore, whether we are discussing it as a food commodity from the standpoint of the consumer, or looking at beef production as a farm enterprise from the producer's standpoint. This report, the third in the series, deals with breeding herds and the production of weaned calves, the first stage in the long process of producing beef.

At the beginning of the war the total beef cattle population in Scotland was approximately 608,000 and, as is not surprising, in the early war years the number of beef cattle began to decline; by 1942 the numbers stood at 540,000 head of all ages. From then on, however, the beef cattle population began to increase, and by 1945 had surpassed the pre-war figure and stood at 636,500. Since then their numbers have gone on steadily increasing until by 1954 there were approximately 50 per cent more beef cattle on Scottish farms than in 1939.

TABLE I. BEEF CATTLE NUMBERS IN SCOTLAND

(Thousands)

Year	1939	1940	1941	1942	1943	1944	1945	1946
Numbers	608	620	536	541	569	599	636	648
Year	1947	1948	1949	1950	1951	1952	1953	1954
Numbers	644	671	726	764	777	772	844	904

Very much the same trend is shown by the beef cattle numbers in the area with which this report deals, i.e. the area served by the Edinburgh and East of Scotland College of Agriculture.

TABLE II. BEEF CATTLE NUMBERS IN THE EAST OF SCOTLAND

Year	BEEF CATTLE NUMBERS (Thousands)			
	TOTAL	Breeding Stock *	Other Stock	
			Over 2 yrs.	Under 2 yrs.
1939	209	38	64	107
1940	202	38	61	103
1941	164	33	44	87
1942	176	33	58	85
1943	183	34	66	83
1944	193	35	73	85
1945	205	39	77	89
1946	211	42	78	91
1947	207	43	75	89
1948	217	47	79	91
1949	237	52	80	105
1950	246	58	75	113
1951	242	57	71	114
1952	243	56	76	111
1953	266	63	84	119
1954	274	67	74	133

* i.e. bulls, cows and heifers

The /

The interesting point brought out in the above table is not so much the fact that the beef cattle population has increased since before the war as the change in the composition of the beef herd in the East of Scotland. In 1939 the number of breeding animals (bulls, cows and heifers in calf) stood at 38,000, i.e. 18 per cent of the total beef cattle population. Although, following the same trends as the other classes of beef cattle, the number of breeding animals fell in the early war years, the decrease was not so great either absolutely or relatively as in the other classes, and by 1954 the numbers of breeding animals at 67,000 showed an increase of 75 per cent over the pre-war number and accounted for 27 per cent of the total beef cattle population. This reflects a change in the pattern of beef production in the East of Scotland. On many of the low ground arable farms on which before the war only feeding cattle were kept there are now herds of breeding cows. These farms now rear, if not all, a fair proportion of their store cattle requirements.

Imports of Irish cattle into the United Kingdom in 1953 amounted to 438,000 head, a reduction of 36 per cent compared with the pre-war imports. The difficulty of obtaining stores both in the requisite numbers and of the desired quality may have induced many low-ground arable farmers to maintain a breeding herd of their own to be sure at least that part of their store beasts were of the desired quality.

II. GENERAL DESCRIPTION OF FARMS STUDIED

During 1953-54 breeding herds have been costed on eighteen farms and included in the preparation of this report, their distribution being in the East of Scotland, as follows; Angus 8, Fife 4, Berwick 4, Roxburgh 2, and Perth 1. The average size of farm was 546 acres rented at 22s.5d. per acre although the range in size of the individual farms comprising the sample was very wide, from the largest of 1101 acres to the smallest of 104 acres. The rental value per acre also showed wide variations in individual cases, from as low as 15s.0d. per acre in the case of a semi-upland stock rearing farm to 40s.0d. per acre for a low-ground arable farm.

Of the eighteen herds studied the majority were out-wintered, only 5 being housed during the winter months. There was much variation between individual farms in the breed of cows kept. All the in-wintered herds were Blue-Greys or crosses and most of those out-wintered on the low-ground arable farms were also Blue-Greys. On the higher lying farms the hardier Highlanders, Galloways and their crosses were kept, these being crossed with either a Shorthorn or Aberdeen-Angus bull.

III. COSTS OF PRODUCTION

Cost per Cow per Annum and Cost per Weaned Calf

In the table below the cost of keeping a breeding cow for a year is set out. In the sample studied the cost per weaned calf was the same as the cost of keeping a cow for a year, as set out in Table III, as there were no deaths among the calves born and no calves were purchased.

TABLE III. /

TABLE III. COST PER COW PER ANNUM AND COST PER WEANED CALF PRODUCED 1953-54

No. of Herds Studied	18	
Average Farm Size (Acres)	546 acres	
Average Herd Size	43 cows	
COSTS		£ s. d.
Foods		
Purchased	£-. 8.11	
Home-Grown	12. 3. 2	
Grazing	6.14.11	
Total		19. 7. -
Labour		
Winter	1.13. 3	
Summer	-.11.10	
Total		2. 5. 1
* MISCELLANEOUS		1.14.11
HERD MAINTENANCE		3. 6. 7
TOTAL COSTS		£26.13. 7

* Includes overheads, vet. expenses, haulage, etc.

In the production of livestock or livestock products, foods account for by far the greatest part of total costs in all cases, and maintaining a breeding cow for a year is no exception, as can be seen from the above table. Foods - purchased, home-grown and grazing - make up almost three-quarters of the total cost, though purchased foods played little part in the feeding of these breeding cows.

Herd maintenance was the second largest item in the costs and accounted for approximately 12 per cent of the total cost. This item of costs showed very wide fluctuations from a herd with a cost of only 6s.5d. per cow per annum to one with a herd maintenance cost of £9.6s.2d. per cow in which a large proportion of the cows were discarded during the year.

A THREE YEAR COMPARISON /

A THREE YEAR COMPARISON

1951-52, 1952-53, 1953-54

Table IV below compares the cost of producing a weaned calf for the three years 1951-52, 1952-53 and 1953-54.

TABLE IV. COST PER WEANED CALF 1951-52, 1952-53 and 1953-54

YEAR	1951-52	1952-53	1953-54
Average No. of Weaned Calves per Herd	35	34	·43
Weaned Calves Produced as Percentage of Cows in Herd	97%	100%	100%
COSTS	£ s. d.	£ s. d.	£ s. d.
Foods			
Purchased	£-.12. -	£1. 4. -	£-. 8.11
Home-Grown	11.12. 5	13. -.11	12. 3. 2
Grazing	5.15. 2	6.13. 1	6.14.11
Total	17.19. 7	20.18. -	19. 7. -
Labour			
Winter	1.18. 7	1.18. -	1.13. 3
Summer	-. 8. 7	-. 9. 4	-.11.10
Total	2. 7. 2	2. 7. 4	2. 5. 1
MISCELLANEOUS*	1.17. 1	1.14. 3	1.14.11
HERD MAINTENANCE	2. 1. 6	1.16. 2	3. 6. 7
PURCHASED CALVES	-. 2. 3	-. 2. 8	-. -. -
	£24. 7. 7	£26.18. 5	£26.13. 7

* Includes overheads, vet. expenses, haulage, etc.

Since the commencement of this investigation in 1951-52, the cost of producing a weaned calf has increased by £2.6s.0d. but showed a slight decrease between 1952-53 and 1953-54. Labour and miscellaneous costs remained fairly steady over the three years but food and herd maintenance costs fluctuated each year. Food costs increased by £2.18s.5d. between the first two years and then in the final year decreased by £1.11s.0d.; thus the overall increase in food costs over the three year period was $7\frac{1}{2}$ per cent. Herd maintenance costs first showed a slight decrease and then between 1952-53 and 1953-54 these costs increased greatly to £3.6s.7d. per weaned calf produced, thus showing an overall increase of 61 per cent for the three year period.

RANGE IN COST PER WEANED CALF /

RANGE IN COST PER WEANED CALF

Table V below shows the distribution of costs for the eighteen herds included in this report, and a comparison with the previous two years.

TABLE V. DISTRIBUTION OF COSTS

YEAR		Under £20	£20 - £25	£25 - £30	£30 - £35	Over £35	Total
1951 - 1952	No.	8	9	5	2	3	27
	Per Cent	30	33	18	7	11	100
1952 - 1953	No.	5	6	6	3	4	24
	Per Cent	20	26	26	12	16	100
1953 - 1954	No.	1	8	6	2	1	18
	Per Cent	6	44	33	11	6	100

The range in cost per weaned calf over the 3-year period was very wide from the lowest cost of £19.0s.9d. (for a herd on a semi-upland stock rearing farm out-wintered on the hill and fed on hay, straw and roots) to the highest cost of £36.13s.3d. (where the herd was out-wintered on a low ground arable farm and received oats, beet pulp, straw and hay.)

In 1953-54 although the range in cost was still very wide there were proportionately fewer herds to be found in the extreme groups and more in the average group.

IV. RETURNS AND PROFITS

The following table shows the returns and profits per weaned calf produced during each of the three years 1951-52, 1952-53, and 1953-54.

TABLE VI. RETURNS AND PROFITS PER CALF

YEAR	1951-52	1952-53	1953-54
Weaned Calves Sold as Percentage of Calves Produced	27%	16%	30%
Cost per Calf	£ s. d. 24. 7. 7	£ s. d. 26.18. 5	£ s. d. 26.13. 7
Selling Price per Calf	31.15. 2	33.10.11	37. 7. 2
Profit * per Calf	£7. 7. 7	£6.12. 6	£10.13. 7

* Excluding Subsidies.

As the above table shows, the profit per weaned calf was highest in 1953-54 when the average selling price reached the figure of £37.7s.2d. per calf, which was an increase of almost 18 per cent compared with the 1951-52 selling price. It must, however, be remembered that the majority of the calves produced by these herds are not sold as weaned calves but carried on to a further stage before selling. It is very likely that only the early-born and best calves are sold at the October sales while the others may be sold as yearlings or advanced stores from the higher lying farms, and in the case of the low ground arable farms the calves are bred, reared and finally fattened on the farm on which they were born.

V. THE FEEDING OF BREEDING COWS

Table VII below sets out the types and average quantities of feeding stuffs fed to the breeding cows in the sample of eighteen herds studied and compares this with the previous two years.

TABLE VII. AVERAGE QUANTITIES OF FOOD PER ANNUM 1951-52, 1952-53, 1953-54

Cwts. Per Cow Per Annum

YEAR	1951-52	1952-53	1953-54
FOODS	cwts.	cwts.	cwts.
Concentrates			
Purchased	.45	.9	.41
Home-Grown	1.00	1.4	1.02
TOTAL	1.45	2.3	1.43
BULK FOODS			
Roots	28.1	30.7	18.75
Hay	7.5	9.2	8.11
Straw	21.2	19.7	21.20
Silage	15.5	21.0	14.76
Green Fodder	1.4	3.6	3.79
Draff	.1	.3	-
TOTAL BULK FOODS	73.8	84.5	66.61
GRAZING COST PER COW	£5.14. 5	£6.13. 1	£6.14.11

The /

The main point brought out by the above table is the reduction in the quantities of foods fed over the three years. The quantity of concentrates fed during 1953-54 was almost the same as that for the first year. Double the amount of purchased foods were fed in 1952-53 compared with the other two years. Bulk foods, the quantities of which showed a big rise in the second year, dropped to 66.61 cwts. per cow in 1953-54, which was 7 cwts. less than for the first year of the investigation. The change in the quantities of the individual feeding stuffs fed is probably due to a large extent to the change in the sample, the number of in-wintered herds being much less in the current year's sample than in the other two years.

The figures in the above table show the average quantities of foods fed but there was great variation in these quantities and types of foods fed in individual cases. It may be of interest then to look at some individual rations. Broadly speaking, the sample can be divided into three groups, viz. (a) herds in which concentrates are fed, (b) herds where roots form the main part of the ration, and (c) herds where silage forms the main part of the ration.

TABLE VIII. TYPICAL RATIONS FED TO BREEDING COWS

Cwts. Per Cow Per Annum

GROUP	(a)	(b)	(c)
FOODS	cwts.	cwts.	cwts.
Concentrates			
Purchased	2.13	-	.92
Home-Grown	2.13	-	1.77
TOTAL	4.26	-	2.69
BULK FOODS			
Roots	4.45	57.12	-
Hay	1.90	1.48	5.44
Straw	11.84	33.24	20.38
Silage	41.00	-	47.56
Green Fodder	-	-	-
Draff	-	-	-
TOTAL BULK FOODS	59.19	91.84	73.38

The above table illustrates a typical ration from each of the three groups and brings out the wide variations which occur in the feeding of breeding cows.

VI. /

VI. COMPARISON OF LOW COST AND HIGH COST HERDS

The table below compares the two herds which had the lowest costs per cow with the two herds with the highest costs per cow.

TABLE IX. LOW COST AND HIGH COST HERDS

A Comparison

	Average Two Low Cost Herds	Average Two High Cost Herds
FARM TYPES	Semi-Upland Stock Rearing Farms	Low Ground Arable Farms
AVERAGE FARM SIZE (Acres)	674	723
AVERAGE HERD SIZE	33	68
COST PER COW PER ANNUM	£ s. d.	£ s. d.
Foods	9. -. 6	15.10. 7
Grazing	2. 4. 8	11.11. 2
Labour	2. -. 3	2. 1. 1
Miscellaneous	1.13. 1	2. -. 6
Herd Maintenance	6. -. 1	3.17. 2
TOTAL COST	20.18. 7	35. -. 6
FEEDING (cwts. per cow)	cwts.	cwts.
Concentrates		
Purchased	.03	-
Home-Grown	.23	.37
TOTAL	.26	.37
BULK FOODS		
Roots	1.61	9.53
Hay	11.97	9.50
Straw	26.03	45.66
Silage	-	-
Green Fodder	-	13.57
TOTAL BULK FOODS	39.61	78.26

The two low cost herds were situated on semi-upland stock rearing farms where the cows were Highland and Shorthorn crosses in contrast to the two high cost herds which were on low ground arable farms and the cows were Blue-Greys or crosses. The table illustrates the difference in two systems of managing a breeding herd. In the case of the low cost herds, the hardy cows out-wintered on the hill are given the minimum of feeding and thus feeding costs are relatively low. On the other hand the Blue-Greys out-wintered on the arable farms are well done to and feeding costs per cow are fairly high. There is also a big difference in the cost of grazing between the two groups. The cows on the upland farms were mainly grazed on permanent pastures and hill/

hill grazings while the lowland cows were mainly on rather high cost rotational grass. The high cost of grazing in this case may also be due to a certain extent to understocking of the grass.

As no calves were sold off these farms at the weaned calf stage but carried on, it is not possible to give a comparison of returns and profits for each of the groups. It may well be that the calves of the low ground arable farms, being of first rate quality would, if sold, fetch a price commensurate with their high cost of production. The figures in the table do nothing more than compare two systems of calf production.

VII. SUMMARY

1. The introduction to this report gives figures relating to the national beef herd, showing how beef cattle numbers have greatly increased since 1939, and also showing the changes in the composition of the cattle population in the East of Scotland.

2. In 1953-54, cost studies were carried out on 18 herds of suckling cows widely scattered over the college area. The average farm size was 546 acres rented at 22s.5d. per acre. The average herd size was 43 breeding cows ranging from a herd of 152 cows to one of 11 cows. Included in the sample were hill herds of Highlanders, Galloways and their crosses and on the low ground arable farms herds of Shorthorns and Blue-Grey crosses. Almost all were crossed with either Shorthorn or Aberdeen-Angus bulls.

3. The average cost of producing a weaned calf for the 18 herds studied was £26.13s.7d. but this showed a very wide range from as low as £19.0s.9d. to £36.13s.3d.

4. A three year comparison shows that the cost of producing a weaned calf has risen by £2.6s.0d. per calf since 1951-52, due to rising costs of food and herd maintenance.

5. A study of the types and quantities of foods fed to breeding cows shows that concentrates play little part in their feeding, and that home-grown foods - roots, hay, silage and straw - were the main foods fed. There was however great variation from the average in individual cases, and examples are given of typical rations fed to individual herds.

6. A comparison of the two lowest cost herds and the two highest cost herds in effect does little but compare two systems of management: it might be of more value if carried on beyond the weaned calf stage. The low cost herds were hardy breeds out-wintered on semi-upland farms whereas the high cost herds were Blue-Greys out-wintered on low ground farms. The main differences in costs were to be found in the feeding and grazing costs. In the case of the low cost herds the cows received the minimum of feeding and were grazed on permanent pasture and rough grazings whereas the high cost herds were liberally fed and grazed on rotational grass.

A C K N O W L E D G M E N T

Grateful acknowledgment is made of the valuable help given by farmers taking part in this investigation, not only by keeping the necessary records and furnishing us with all the other information needed, but for their unfailing courtesy shown on the occasion of our visits. Each collaborating farmer receives a summary of his own costs set out alongside those of the average cost.

APPENDIX

NOTES ON COSTING METHODS

Manual Labour

This was charged at hourly rates ruling on the farm, adjusted to include holidays: any overtime was charged at rates paid. Manual work done by the farmer was charged at the average hourly rate prevailing on the farm.

Horse Work Charged at 1s.6d. per hour.

Tractor Work Charged at 3s.9d. per hour for wheel tractors and 5s.9d. per hour for track laying tractors.

Foods

Purchased Foods were charged at purchase price less a deduction for the manurial value of the foods fed.

Home-Grown Foods were charged at cost of production. The following were the charges per cwt. for the home-grown foods:-

Oats	16s.11d.
Straw	3s. 0d.
Hay	8s. 6d.
Roots	2s. 6½d.
Silage - Grass	1s.11d.
- Arable	2s. 4d.
Green Oats	1s.10d.

Grazing

The total grazing available on each farm was costed and proportioned between the various stock on the following basis:-

	Stock Equivalent
Cow	1 Unit
Calf at Foot	1/3 "
Stirk	2/3 "
Ewes	1/6 "
Lambs at Foot	1/18 "
Lambs Weaned	1/9 "
Feeding Sheep	1/6 "
Horse	1 "

Overheads

These were charged at suitable rates agreed by the Scottish Conference of Agricultural Economists. No charge was made for interest on capital or for any managerial work undertaken by the farmer.