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ECONOMICS OF LIVESTOCK PRODUCTION

WINTER FATTENING OF CATTLE, 1947 - 48

by

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INTRODUCTION

In the autumn of 1948 a brief Interim Report[*] was issued on an investigation into the costs of fattening cattle in courts during the 1947-48 winter. This report gave a general description of the investigation and the average costs of production. Each co-operating farmer also received a statement of his own production costs. In the present Report the available information is examined in greater detail and some of the more important features are emphasised.

Forty-eight farmers co-operated in the investigation; one farmer kept records of four separate lots of cattle and two others each kept records of two separate lots. Thus details of fifty-three lots of fattening cattle, comprising a total of 3093 beasts have been recorded. These cattle were kept on farms in seven of the counties in the East of Scotland College area.

NUMBERS OF CATTLE FATTENED.

Not all the cattle put into the courts were turned out fat. Some were not fit for grading at the end of the feeding period while there were, inevitably, some casualties and deaths. The number of cattle actually graded as fat was 2590; there were 20 casualties and 10 deaths from one cause or another. The number of cattle which did not reach grading standards was 473; these animals were classified as stores at the end of the fattening period and their costs excluded from the investigation.

The following table shows the distribution of the numbers fattened on the farms from which records were received; the table also gives the location of these farms. The numbers for which records were kept were not necessarily the total numbers of cattle kept on these farms and will be re-:ferred to as "lots" rather than "herds" or some other term, which might be taken as referring to all the cattle on the farm. The number of beasts in each lot varied considerably and the table shows the distribution of the numbers recorded.

TABLE I. COURT FEEDING OF CATTLE IN EAST OF SCOTLAND 1947-48
DISTRIBUTION OF 53 LOTS STUDIED

3093 CATTLE — AVERAGE SIZE OF LOT: 58 BEASTS

County	Under 20	20-39	40-59	60-79	80-99	100 & Over	Total No. of Lots
Angus	1	-	2	2	3	2	10
East Perth	-	3	-	-	3	-	6
Fife	5	1	3	1	1	3	14
Midlothian	1	3	1	-	1	1	7
East Lothian	-	-	2	-	1	-	3
Berwick	5	1	2	1	1	-	10
Peebles	1	1	-	-	-	-	2
Roxburgh	-	-	-	-	-	1	1
TOTALS	13	9	10	4	10	7	53

The /

[*] Economics of Livestock Production: Winter Fattening of Cattle
Interim Report by J.D. Nutt and E. Stewart

The average number of cattle in all lots was 58 and ranged from 7 to 168; the average number of cattle graded as fat was 49. The size distribution shows a greater number of the small lots, i.e. less than the average of 58; this is in keeping with what would be expected on the general run of arable farms in this area - a greater number of medium and small farms with fewer large farms capable of carrying heavy stocks of cattle through the winter.

GENERAL DESCRIPTION.

The origin, breed, age and condition of the store cattle varied considerably from farm to farm and depended on such factors as whether the overall economy of the farm allowed the farmer's own stock to be reared and ultimately fattened, the quantity and quality of available foodstuffs and the farmer's own liking for this or that type of beast. Of the cattle under review almost two-thirds, 63%, were imported stores. The home-bred cattle, 37% of the total, were either purchased as stores for fattening (29%), purchased as calves or young stores and reared to the fattening stage (7%), or bred on the farm (1%). These figures indicate the extent to which the arable farmer is almost entirely dependent on buying either imported or home-bred stores to fill his courts and make the dung for maintaining the fertility of the farm. There is little doubt that this is one of the major factors to be reckoned with when considering the economics of this enterprise on the farm.

The condition of the stores when put into the courts was, in the main, good; 69% were described as being in "good" condition, 28% as being in "fair" condition and only 3% were in admittedly "poor" condition. Farmers who supplied the records were also asked to estimate the ages of their stock and though it is difficult to be accurate on this point, the details supplied help to build up the picture of the types of cattle being fattened. Equal numbers were described as being either 2½ or 3 years old and these in all amounted to 52% of the total. A further 12% were between 2½ and 3 years old. Only a few, 9%, were said to be over 3 years of age and about the same were less than 2 years old. The balance, 19%, were said to be 2 to 2½ years old.

The cross-bred was by far the most popular type of animal. Out of the 3093 cattle under review, 2693 were cross-bred types in which the Shorthorn Aberdeen Angus Cross predominated; of the remaining 400 there were 119 Aberdeen Angus and 281 Shorthorn.

The weights of these animals at the beginning of the feeding period, either the known weight over a weighbridge or the farmer's best estimate, ranged from extreme limits of 5 cwts. for the lightest store to 17½ cwts. for a "near fat" animal. The majority were estimated to be in the region of 10 cwt. per head.

Thus, the type of store beast which is most commonly met with for the purpose of winter fattening may be summed up as - a cross-bred, imported store of good quality and in good condition and weighing somewhere about 10 cwts.

PRODUCTION OF WINTER BEEF

I. COSTING PROCEDURE.

A few notes on how the various items of cost have been compiled will be helpful when considering the costs of producing winter beef.

INITIAL COST OF STORES

These are the actual costs of the stores purchased at the time of going into the courts. In those cases where stores had been on the farm for some time, the farmer's estimates of their market values were taken. In this way all the cattle included in this study have been brought in on the same basis - market price..

PURCHASED FOODS /

PURCHASED FOODS

All foods purchased whether concentrates or roughages have been charged at cost (including haulage to the steading) less the manurial values.

HOME-GROWN FOODS

These have been charged at prices intended to cover costs of production, including carting to a point within close proximity to the courts, from which stage the foods are handled by the cattleman and/or assistants. For "average" conditions the following costs or values were used. In the case of corn crops, these include grinding or rolling. The manurial values were deducted from these costs.

Crop	Price per ton	Crop	Price per ton
	£ s. d.		£ s. d.
Oats	15.10. 0	Swedes & Turnips	1.15. 0
Beans	22. 0. 0	Mangolds	1.15. 0
Mashlum	17. 0. 0	Kale	1. 6. 8
Hay (Rotation)	5. 6. 8	Cabbage	1.10. 0
Oat Straw	2. 8. 4	Silage	2. 6. 8

No charge has been made for the value of the straw used as litter.

LABOUR

This is based on the actual wages (including perquisites) paid to the cattleman. Where the farmer worked with the cattle his time has been included at current rates. Other labour comprised the help given to the regular cattleman in such tasks as slicing turnips and bedding courts and has been charged at appropriate rates.

POWER

Any costs for tractor or horse work used in feeding or bedding cattle have been charged at rates varying from 1/3d. per hour for horses to 3/- per hour for wheeled tractors.

SUNDRY EXPENSES

Included in these are small expenses directly chargeable to the cost of beef production, e.g. haulage of cattle and veterinary fees.

OVERHEADS

An appropriate share of certain general farm expenses has been calculated at the rate of 5/- per £ of the direct labour bill incurred in beef production. The basis on which this item is calculated is in keeping with the recommendations made by the Scottish Conference of Agricultural Economists.

CREDITS

Any receipts for animals which died or were sold as casualties have been deducted from the Total Costs to give the Net Costs.

UNGRADED STORE ANIMALS

All expenses incurred in connection with these animals have been excluded from the costs.

II. AVERAGE COSTS AND RETURNS.

The average figures for the 2590 fat cattle are given in Table II and show a net cost of £63. 2. 2d. per head and a selling price of £61.13.11d. Thus /

Thus, the average loss per head amounted to £1. 8. 3d. The table shows that the cost of the store beast, averaging just over £46, is by far the heaviest item of cost and takes up nearly three-quarters of the total. The cost of food comes next taking up rather more than one-fifth of the total. All other items of cost only account for one twenty-fifth of the total and, with the exception of labour, are so small as to be of negligible importance.

TABLE II. AVERAGE COSTS AND SELLING PRICES PER HEAD

Item	All Cattle (53 Lots) 2590 HEAD		Cattle Showing Profits (26 Lots) 1180 HEAD		Cattle Showing Losses (27 Lots) 1410 HEAD	
	Per Head	Per Cent	Per Head	Per Cent	Per Head	Per Cent
	£ s. d.	%	£ s. d.	%	£ s. d.	%
Cost of Store Beast	46.12. -	73.5	44.15. 2	74.8	48. 2.11	72.5
Feeding Costs:-						
¤ Food - Home-grown	2.18. 2	4.6	10. 1.10	16.9	12. 6. 8	18.5
Purchased	11. 6. 6	17.8	2.12. 1	4.4	3. 3. 4	4.8
Labour	1.16. 4	2.9	1.13. 9	2.8	1.18.11	2.9
Overheads	-. 9. 2	.7	-. 8. 5	.7	-. 9. 8	.8
Power	-. 1. 5	.1	-. 1. 4	.1	-. 1. 6	.1
Sundry Expenses	-. 4. 7	.4	-. 3. 5	.3	-. 5. 7	.4
TOTAL FEEDING COSTS	16.16. 2	26.5	15. -.10	25.2	18. 5. 8	27.5
GROSS COSTS	63. 8. 2	100.0	59.16. -	100.0	66. 8. 7	100.0
Less Credits	-. 6. -		-. 4. 4		-. 7. 6	
NET COSTS	63. 2. 2		59.11. 8		66. 1. 1	
SELLING PRICE	61.13.11		61.14. 6		61.13. 4	
NET PROFIT			2. 2.10			
NET LOSS	1. 8. 3				4. 7. 9	

¤ These are net costs after deducting manurial residues.

COST OF STORES.

There can be little doubt that the high price of stores, which tends to increase automatically with any increase in the levels of the fixed fat stock prices, constitutes the major problem in winter fattening of cattle on farms where stores must be purchased. On those farms where the practice is to rear home-bred stores there is the probability that the estimated market price of the store cattle which has been used in these costs includes a margin of profit. This will offset the actual loss which may be shown in the fattening stage and the cattle as a whole may show a profit. /

profit. Such farms, however, are in the minority and so long as present economic conditions exist in agriculture, it is more than likely that any increase in the final fat prices will be passed on to the price of the store beast. The feeder is left with only one avenue open to him to make any significant reduction in his costs, namely the costs of the foods fed to his cattle. Alternatively, he may make some radical alteration in his farm organisation which will reduce the number of store cattle which he must keep to maintain the fertility of the farm.

COST OF FOODS.

On an average, the cost of feeding stuffs amounted to £14. 4. 8d. per head of which £11. 6. 6d. (or 17.8% of the total cost) represented the cost of home-grown foods and £2.18. 2d. represented the cost of purchased foods. The emphasis is immediately placed on the cost of the home-grown foods. It has already been stated that home-grown foods have been charged at figures representing costs of production on the farm. It is certain that the higher the efficiency in the production of such foods on the farm, the lower will be their costs and, hence, the lower the costs of feeding the winter cattle. Thus, it must be remembered that the necessary use of average costs of producing home-grown foods may obscure the real position on the individual farm. The converse of what has been said in this connection is equally true. Low efficiency in crop production will lead to high costs of food and heavier losses on individual farms than are shown.

NET LOSS.

As the prime aim of most arable farmers fattening cattle is the production of dung for the growing of cash crops, the average loss of £1. 8. 3d. per head must be taken as part of the cost of growing such crops.

LIVE WEIGHT INCREASES AND GRADING.

The average gain in weight amounted to 9.45 lb. per head per week or 1.35 lb. per head per day. The rate of live weight increase is lower than the commonly accepted pre-war figure of 1½-2 lb. per head per day and may be regarded as the result of the changed methods of feeding arising from the scarcity of purchased cakes. In spite of these difficulties, a high proportion of the fat cattle reached good quality standards. Of the 2590 fat cattle, 25% graded SS, 42% graded S, 19% graded A+, 19% graded A and only 5% graded lower than A.

A comparison of the profitable cattle with the unprofitable cattle shows that the former group made a profit of £2. 2.10d. per head, whereas the latter group lost £4. 7. 9d. per head.

These differences in profitability are shown to depend largely on such factors as the initial cost of the store and the heavier feeding costs of the unprofitable cattle. The average selling price of both groups per head was approximately the same. There are, however, a number of other features connected with the fattening of these cattle which also help to explain the differences in profitability. These are set out below in the following table.

TABLE III. /

TABLE III. PROFITS AND LOSSES IN CATTLE FEEDING
SOME COMPARISONS

	Cattle Showing Profits (26 Lots)	Cattle Showing Losses (27 Lots)
Weight of Store Beast	9.79 cwt.	10.39 cwt.
Weight of Fat Beast	11.70 cwt.	11.97 cwt.
Buying Price per Live Cwt.	£ 4.11. 5	£ 4.12. 8
Selling Price per Live Cwt.	£ 5. 5. 6	£ 5. 3. 1
Food Consumed per Head - Home-grown	£10. 1.10	£12. 6. 8
- Purchased	£ 2.12. 1	£ 3. 3. 4
Cost of Food per Cwt. Live Weight Increase	£ 6.12.11	£ 8. 3. 6
Fattening Period	138 days	149 days
Average Live Weight Increase per day	1.55 lb.	1.19 lb.
% Home-bred Stores	48%	24%
% Imported Stores	52%	76%
Grading - SS	31%	20%
S	42%	42%
A+	15%	23%
A	6%	11%
Others	6%	4%
Breeds -		
Hereford Cross and Shorthorn Cross	57%	74%
Aberdeen Angus Cross	39%	16%
Various	4%	10%

It will be noted that the profitable group has smaller stores. They make an average increase in weight of 1.91 cwt. as compared with the 1.58 cwt. of the unprofitable group. There is little difference in the cost price per live cwt. of the stores in both groups with the profitable group 1/3d. per cwt. live weight cheaper. The selling price per head shows that the profitable animals sell for 2/5d. per cwt. live weight more than do the unprofitable animals. There is a difference in the cost of foods amounting to £2.16.11d. per head in favour of the profitable group. This is to be expected as the unprofitable animals are bigger beasts and, on the average, are fed for 11 days longer. It costs the profitable cattle £6.12.11d. per head for food per cwt. live weight increase as compared with £8. 3. 6d. for the unprofitable group; the profitable have been the better doers. They also grade better with 11% more SS grades and only 8% fewer A+ grades.

It may be concluded that three factors have been responsible for the differences in the profits. These are -

(a) an average selling price for the unprofitable cattle which was actually slightly lower per live cwt. than that of the profitable ones. This was due to two causes. First, these heavier animals do not grade as well as the lighter ones; second, there was a greater proportion of imported stores which, if fattened for more than two months in the country, are priced at 5/- per cwt. less.

(b) the higher cost for the unprofitable cattle as stores, £3. 7. 9d. per head. This was due both to a heavier beast and to a higher buying price - higher by 1/3d. per live cwt.

(c) /

(c) the high cost of food consumed by the unprofitable cattle per head and per cwt. live weight increase (£2.16. 1d. per head and £1.10. 7d. per cwt. live weight increase respectively more than that consumed by the profitable animals), although the live weight gain was lower by .36 lb. per day.

There are also differences in the numbers of the three main breed types - the Shorthorn Cross, the Aberdeen Angus Cross and the Hereford Cross found in the profitable and unprofitable groups. The profitable cattle have 57% of Shorthorn and Hereford Crosses and 39% of Aberdeen Angus Crosses, whereas the unprofitable cattle have 74% of Shorthorn and Hereford Crosses, and 16% Aberdeen Angus Crosses.

FOODS FED.

It has been shown how the groups differ in respect of the monetary value of the foods consumed. A table showing the average composition of the rations is set below.

TABLE IV. FOODS FED (LB. PER HEAD PER DAY)

Foods	Cattle Showing Profits 26 Lots	Cattle Showing Losses 27 Lots
Concentrates	4½ lb.	4½ lb.
Draff	3½ "	3 "
Hay	6½ "	6½ "
Straw	8½ "	9 "
Succulents	56 "	65 "

It will be seen that the only significant differences between the two groups is in the amount of roots and green fodder fed. This amounts to 9 lb. per head per day.

As was pointed out in Table III, the stores in the unprofitable group are more than ½ cwt. per head heavier. It is apparent that the 27 unprofitable lots of cattle were not being fed so intensively as the 26 profitable lots.

From the point of view of daily live weight increase per head and the cost per live weight increase per head, the better policy would appear to be to feed intensively rather than economise and feed smaller rations in relation to the weight of the fattening beast for a longer period.

The ration of concentrates fed, which is much below the pre-war rate, consisted of ⅓ by weight of home-grown concentrates.

COMPARISON OF IMPORTED AND HOME-BRED CATTLE

It has been shown in the previous tables that of the 2590 cattle fattened by far the greater number were imported stirks. These amounted to 64% of the total. The remainder, 36%, were made up of home-bred animals, either own-bred and reared or purchased stores. The relative performances of the home-bred and the imported are set out below. These figures are available for the 855 home-bred and the 1607 imported animals.

Average /

	Home-bred Cattle	Imported Cattle
Av. Number Days Fattening	122 days	159 days
Av. Initial Weight	9.40 cwt.	10.64 cwt.
Av. Final Weight	11.04 "	12.43 "
Av. Increase in Weight in Cwts.	1.64 "	1.79 "
Av. Increase per Day	1.51 lb.	1.27 lb.

Home-bred cattle, largely Aberdeen Angus Crosses, made weight increases of about $\frac{1}{4}$ lb. per head per day more than did the imported cattle. The imported stores - predominantly Shorthorn and Hereford Crosses, are much larger animals - on the average $1\frac{1}{4}$ cwt. per head heavier than the home-bred.

The percentage grades attained by these two main classes are given below.

Grades	Home-Bred	Imported
SS	34%	18%
S	35%	45%
A+	21%	20%
A	6%	12%
Other Grades	4%	7%
	100%	100%

The differences in the "Super Special" and "Special" grades are noteworthy. Home-bred cattle have almost twice as many SS grades and a little more than two-thirds as many S grades. The numbers in the A+ grade are approximately the same but the home-bred animals only had half the number of A and lower grades.

No figures are available as to the profitability of the two groups but with imported stores costing more to buy, finishing at poorer grades, and often priced at 5/- per cwt. live weight less, the advantage would appear to be with the home-bred cattle.

COMPARISONS OF COSTS OF PRODUCTION

It has been possible to separate the cattle into four groups based on their final weights. The relative costs and performances of these groups are set out below in Table V.

TABLE V. /

TABLE V. COSTS AND OTHER COMPARISONS PER HEAD - FOUR WEIGHT GROUPS

Item	Group 1 276 Cattle	Group 2 208 Cattle	Group 3 645 Cattle	Group 4 1461 Cattle
Final Weight	Under 10 cwt.	10- 11 cwt.	11- 12 cwt.	Over 12 cwt.
Cost of Stores	£35.12.11	£41.14. 5	£43.16. 9	£49.13. 1
Cost of Food	12. 8. 2	14. 3. 9	12.10.11	15.13. -
Other Costs	2.14. 3	3. 6. -	2.15. 3	2.13. 2
TOTAL COST	50.15. 4	59. 4. 2	59. 2.11	67.19. 3
Less Credits	-. 6. 6	-. 7. 7	-.10. -	-. 7. 8
NET COST	50. 8.10	58.16. 7	58.12.11	67.11. 7
Selling Price	50. 5. 7	56. -. 9	59.17. 9	65. 7. 8
NET PROFIT NET LOSS	-. 3. 3	2.15.10	1. 4.10	2. 3.11
Av. Weight as Store	7.94 cwt.	9.19 cwt.	9.71 cwt.	10.84 cwt.
Av. Weight Fat	9.45 "	10.75 "	11.41 "	12.66 "
Av. Weight Gain	1.51 "	1.56 "	1.70 "	1.82 "
Cost of Foods per cwt. Live Weight Increase	£10. -. 3	£11. 4. 2	£ 9. -. 1	£10. 1. 2
Av. No. Fattening Days	129 days	147 days	140 days	149 days
Av. Weight Gain per Day	1.34 lb.	1.19 lb.	1.36 lb.	1.37 lb.
Store Price per Live Cwt.	£ 4. 9. 9	£ 4.10.10	£ 4.10. 4	£ 4.11. 7
Fat Animal per Live Cwt.	£ 5. 6. 5	£ 5. 4. 3	£ 5. 5. -	£ 5. 3. 4
GRADE	D I S T R I B U T I O N			
	%	%	%	%
SS	15	33	28	25
S	29	37	30	50
A+	34	20	24	14
A	13	5	15	5
Others	8	5	3	6
TOTAL	100%	100%	100%	100%
STORE TYPE	D I S T R I B U T I O N			
	%	%	%	%
Imported	5	26	55	84
Home-Bred	43	68	45	14
Home-Bred Reared on Farm	3	-	-	2
Own-Bred Reared on Farm	49	6	-	-
TOTAL	100%	100%	100%	100%

By far the greater number of the fat cattle are included in the 11-12 cwt. group, 645 head, and the over 12 cwt. group, 1461 head; the numbers in the two lighter groups are much smaller. The distribution of the numbers in the four groups confirms the general practice at the present time to feed to the heavier weights and it is the numbers in the two heavier which are of the greatest importance in determining the average profitability or otherwise of the winter feeding of cattle.

The figures for these two groups of cattle give strong support to the suggestion made earlier in this report that better results can be obtained, not from the heaviest category of store cattle finishing at the heaviest weights, but from animals weighing rather less than 10 cwts. as stores and finishing at 11 to 12 cwt. The average figures show that these animals cost slightly less per live cwt. when purchased, £4.10. 4d. as compared with £4.11. 7d., and cost considerably less per head in food, labour etc. to feed, £15. 6. 2d. as compared with £18. 6. 2d. Thus, although both these lots of cattle put on approximately the same daily live weight gain of 1.36 lb., the cost of this increase was less in the case of the lighter cattle, 2s. 2¼d. as compared with 2s. 5½d. The lighter animals also required a slightly shorter fattening period than the heavier ones, an average of 140 compared with 149 days.

At the conclusion of the fattening period the advantage lay with the heavier beast so far as grading was concerned. They had a slightly lower proportion in the SS grade, 25% as compared with 28%, but had a much higher proportion of the S grade, 50% as against 30%. In the lower grades the advantage also lay with the heavier animals which had lower percentages of the grades carrying the lower prices. In spite of this overall advantage in grading, the actual selling price per cwt. of the heavier cattle was less than that of the 11-12 cwt. group. This can be explained only on the basis of differences in the types of animals included in the two groups and the effect of the lower prices ruling for imported stores. The lighter group, with an average selling price of £5. 5s. per cwt., had 55% of imported stores and 45% home-bred stores; the heavier group, with an average selling price of £5. 3. 4d. per cwt., had 84% of imported stores and 16% home-bred animals.

SUMMARY.

1. This investigation concerns fifty-three lots of cattle totalling 3093 of which 2590 were fattened.

2. The average number of cattle in each lot was 58. Of the total number of stores 69% were in good condition, 28% were fair and 3% were admittedly poor. These animals were mainly Crosses of the Shorthorn, Aberdeen Angus and Hereford breeds.

3. Imported cattle amounted to 63% of the total and were mainly Shorthorn Crosses; 29% were home-bred, largely Aberdeen Angus Crosses. The imported animals were heavier per head by 1¼ cwt.

4. The importance of dung in arable crop production, a by-product of fat beef production, must be taken into account when considering the overall average loss of £1. 8. 3d. per head.

5. The average net cost of fattening 2590 cattle was £63. 2. 2d. per head. The revenue was £61.13.11d. per head giving a net loss of £1. 8. 3d. per head.

6. Twenty-six lots, 1180 cattle, showed an average profit of £2. 2.10d. per head and twenty-seven lots, 1410 cattle, an average loss of £4. 7. 9d. per head.

7. The profitable lots of cattle showed better daily live weight increases, lower food consumption and better grading per head. They also had a lower percentage of imported animals.

8. /

8. The lower selling price of 5/- per cwt. live weight for imported stores kept for more than two months in this country, is an important factor in determining whether cattle make a profit or a loss.

9. Home-bred cattle graded almost twice as many SS grades and made better daily live weight increases than imported animals.

ACKNOWLEDGMENT

Grateful acknowledgment is made of the help given by the farmers who took part in this investigation and supplied the necessary records and other information. It is hoped that the information given in this report will help to show the true position of beef production in the farm economy.