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Report No. G.23

UNIVERSITY OF DURHAM

FARM ECONOMICS BRANCH, KING'S COLLEGE,
NEWCASTLE UPON TYNE



THE ECONOMICS OF YARD-FED
CATTLE IN NORTHUMBERLAND, 1946-7.

By

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The Farm Economics Branch acknowledges with thanks the excellent co-operation given by the farmers who have made available the material on which this and previous Reports in the series are based.

Comments and inquiries arising out of the Report should be addressed to The Provincial Agricultural Economist.

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November 1947.

YARD FED CATTLE 1946-7.

The investigation into the economics of winter feeding, carried out by the Farm Economics Branch of King's College, is now in its third year, and the present report summarises the results during the winter of 1946-7 and compares them with previous seasons.

Once more the numbers of yard finished cattle costed have declined and some farms previously co-operating in the scheme are no longer represented. Several new farms have been included this year and in comparing the results with those of previous years* it must be remembered that the sample is not uniform. The 1946-7 costs come from 17 farms, situated in the Morpeth, Rothbury and Glendale areas, and include 530 cattle.

Table 1 shows the numbers and types of cattle fed.

Table 1.

Nos. and Types of Cattle Fed

	Home Bred	Irish	All Cattle
<u>1946-7</u>			
Bullocks	95	370	465
Heifers	47	5	52
Yearlings	13	-	13
Total	155	375	530
<u>1945-6</u>			
Bullocks	287	442	729
Heifers	40	31	71
Total	327	473	800
<u>1944-5</u>			
Bullocks	440	547	987
Heifers	47	66	113
Total	487	613	1100

Bullocks continued to outnumber heifers, but 1946-7 showed a substantial increase in the number of Irish cattle (70% of all cattle fed compared with 60% the previous year). Owing largely to the larger numbers of Irish stores, the proportion of black polled cattle increased to more than half the total. A few farms fed yearling calves and two small scale examples of this system are included in the costs. It is not possible however to judge from the limited information available whether this practice is likely to be more or less profitable than the fattening of larger cattle and no separate analysis of the figures has been made.

Table 2 gives details of the weights of the cattle.

* See Bulletins G.19 and G.21.

TABLE 2.

AVERAGE WEIGHTS and LIVEWEIGHT GAINS PER HEAD

	All Cattle			Graded Cattle Only		
	Bullocks	Heifers	Total	Bullocks	Heifers	Total
<u>1946-7</u>						
Weight when Finished	Cwts. 12.03	Cwts. 9.53	Cwts. 11.68	Cwts. 12.07	Cwts. 9.53	Cwts. 11.69
Estimated Store Weight	10.45	7.48	10.04	10.45	7.48	10.04
Live Weight Gain	1.58	2.05	1.64	1.62	2.05	1.65
<u>1945-6</u>						
Weight when Finished .	12.46	9.69	12.21	12.53	9.69	12.28
Estimated Store Weight	10.49	8.40	10.30	10.52	8.39	10.33
Live Weight Gain	1.97	1.29	1.91	2.01	1.30	1.95
<u>1944-5</u>						
Weight when Finished .	12.28	9.80	12.03	12.35	9.87	12.10
Estimated Store Weight	10.27	8.23	10.06	10.31	8.31	10.11
Live Weight Gain	2.01	1.57	1.97	2.04	1.56	1.99

The section of the table headed "All Cattle" includes all the 530 cattle costed. Of these, two became casualties and 17 were unfit to grade at the end of the feeding period and were either sold in the store market or turned out to grass for finishing.

The section headed "Graded cattle only" gives the results for the 511 animals which were actually fattened and graded. In 1946-7 the inclusion of the unfinished cattle had very little effect on the results. The number of casualties was small and the weights and values of cattle disposed of as stores were little inferior to those of graded beasts.

Average liveweight gains have declined steadily over the period but there is a considerable margin of possible error in the figures here. In the absence of weighing facilities, the weights of cattle entering the yards are in most cases merely estimates. These can, at best, be only approximately correct, although where the number of cases is large, this source of error tends to cancel out and give a reasonably satisfactory average. Since the calculated live weight gains depend upon the store weights recorded, they too, are subject to a fairly wide margin of error.

The finished weights of graded cattle are actual weights as recorded on the weighbridge.

As in previous years, the amount of liveweight increase varies widely. The following table shows the range. The figures for 1944-5 and 1945-6 are farm averages but for 1947 they are for individual lots of cattle of widely varying type and a more useful comparison is obtained if these are kept separate.

Table 3. Range of Live Weight Increases

	Over Not over	$\frac{1}{2}$ cwt.	1 cwt.	$1\frac{1}{2}$ cwt.	2 cwt.	$2\frac{1}{2}$ cwt.	Total
		1 cwt.	$1\frac{1}{2}$ cwt.	2 cwt.	$2\frac{1}{2}$ cwt.	3 cwt.	
No. of lots	1946-7	1	13	8	6	3	31
" " farms	1945-6	2	2	9	8	2	23
" " "	1944-5	3	12	9	5	3	32

The largest average gains in live weight were obtained in 1944-5 but in 1945-6 a higher percentage of farms recorded gains of more than 2 cwt. and it will be seen later (Table 7) that better gradings were obtained in the latter year. Several factors are likely to have been responsible for variations such as these. Amongst them the most important are weather conditions; quality and quantity of hay, straw and other fodder available; variations in the length of feeding period; the quality of the stores available for feeding and their condition when brought into the courts. Changes in the sample of farms costed and changes of policy on farms co-operating throughout the three years will also tend to affect not only the rate of liveweight increase but also other items in the costs.

The total liveweight gain per head needs to be related to the length of time taken to obtain the increase in weight. This averaged 17.25 weeks in 1946-7, a slightly shorter period than in the two previous years. Table 4 compares the weekly rates of increase and shows that, when compared on a uniform basis, the average rate of weight increase was rather less in 1946-7 than previously, except in the case of the small number of heifers costed.

Table 4.

Length of Feeding Period and Live Weight Gains

Year	Length of Feeding Period (weeks)			L/W Gain per Head per Week		
	All Cattle	Bullocks	Heifers	All Cattle	Bullocks	Heifers
				lbs.	lbs.	lbs.
1946-7	17.25	16.5	21.3	10.64	10.25	10.77
1945-6	18.4	18.7	15.8	11.62	11.80	9.14
1944-5	19.4	19.6	17.3	11.40	11.50	10.20

The length of time the various lots of cattle spent in the yards is shown in the table below.

Table 5.

Range in Length of Feeding Period

No. of Lots	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	Over 24	Total
1946-7	1	1	4	7	6	2	5	-	5	31
1945-6	-	2	1	4	5	5	4	1	1	23
1944-5	-	4	1	3	5	9	4	2	4	32

In 1945-6 the feeding period was fairly uniform, with a tendency for most farms to keep the cattle in the yards for about 16-20 weeks. In 1946-7, and to a less extent in 1944-5, there was a tendency for two separate policies to be represented. The majority of farms were feeding for about 4 months (12-18 weeks) but a smaller group (represented by the five lots fed for 20-22 weeks and the five lots over 24 weeks) fed their cattle throughout the winter.

Many of the cattle fed for the shorter period were stores coming off the grass in forward condition for finishing in the yards by about January or February. The longer feeding period was common on farms where arable cropping is important (especially those on lighter land) the main objective being to convert fodder and roughages into as much farmyard manure as possible.

This point is again illustrated by the analysis of dates of sale in Table 6.

Table 6.

Numbers of Cattle Graded each Month

Month	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
<u>1946-7</u>									
No.	-	12	80	121	119	115	59	5	511
%	-	2.3	15.7	23.7	23.3	22.5	11.5	1.0	100
<u>1945-6</u>									
No.	2	13	68	228	209	157	79	11	767
%	.3	1.7	8.9	29.7	27.2	20.5	10.3	1.4	100
<u>1944-5</u>									
No.	-	26	133	208	276	208	183	7	1041
%	-	2.5	12.8	20.0	26.5	20.0	17.5	.7	100

Table 7 analyses the grades obtained for cattle disposed of by sale or transfer.

TABLE 7. ANALYSIS OF GRADINGS.

	SS	S	A+	A	A-	B+	B	C+	Casualty	Not finished	Total
<u>1946-7</u>											
No.	73	178	137	78	25	11	8	1	2	17	530
%	13.8	33.6	25.8	14.7	4.7	2.1	1.5	.2	.4	3.2	100
<u>1945-6</u>											
No.	128	338	208	72	17	3	1	-	7	26	800
%	16.0	42.3	26.0	9.0	2.1	.4	.1	-	.9	3.2	100
<u>1944-5</u>											
No.	139	386	330	119	49	14	4	-	5	54	1100
%	12.6	35.1	30.0	10.8	4.4	1.3	.4	-	.5	4.9	100

The general average of grading was less good in 1946-7 than previously. After the blizzard in February and March, it was a common experience that cattle turned out in very lean condition to feed on the grass showed a disappointing killing out percentage. This may also have affected some of the later lots of yard fed beasts and, in any event, the tendency of graders to be on the safe side would be likely to operate to the disadvantage of animals graded in the later months.

The grading results of 1946-7 are more like those of 1944-5 than 1945-6. In both 1946-7 and 1944-5 approximately 48% of cattle were in the S or SS classes, compared with 58% in 1945-6. Again in these two years 11.7% and 11% of beasts respectively were graded A- or worse or failed to fatten. In 1945-6 only 5.8% came into this class (ignoring casualties in each case). Apart from the influence of changes in the sample, it is probable that both 1944-5 and 1946-7 were affected by bad weather to a greater extent than 1945-6. In the former year the bad harvest conditions and wet autumn led to poor quality fodder and in the latter the storm during February and March made feeding difficult.

II.

In this year's report some changes have been made in the methods of valuing home grown foods, which, although they have little effect on the total cost of the ration fed, affect the prices at which individual foods have been charged.

Home-grown oats, barley, beans and peas, hitherto charged at conservative market value, are now charged at average cost of production as estimated by the Ministry of Agriculture from cost studies made in a number of different districts. An addition is made as before to cover the cost of grinding or crushing.

The value of Oat straw has been obtained from the same source.

Straw for bedding is not charged.

Hay, roots and green crops are charged at cost of production as ascertained by investigations previously made in Northumberland, revised to allow for changes in wage rates and other costs.

All home-grown foods, therefore, are now valued at cost.

The only changes in principle occur in the case of oats and hay. The decision to charge these in previous years at market price and feeding value respectively was due partly to the absence of satisfactory cost figures. Such data are now available, and following some extension of this side of the Department's work, will continue to be available in future years. It seemed therefore desirable to bring all home-grown feeding stuffs on to a uniform basis of valuation, and all are accordingly now charged at cost of production. Costs obtained within the county are used for all crops except oats. No costings for the oat crop in Northumberland were available for the 1946 season and since the costs were considerably affected by the bad harvest conditions in that year, the national average has been used in preference to a figure based on local data obtained in previous years.

The actual values used are shown below, those employed in previous reports being given for comparison.

TABLE 8. Values of Home-Grown Foodstuffs

	1946-7		1944-5-6	
	£.	s. d.	£.	s. d.
Oats & Barley	15.	0.	14.	6.
Beans and Peas	15.	0.	1.	0.
Hay	3.12.	0.	4.	8.
Straw	2.	5.	2.	0.
Swedes	1.	4.	1.	1.
Mangolds	1.10.	6.	1.	6.
Kale	1.	5.	1.	2.

The quantities of food used per head and per week are shown in the following tables.

Table 9. Quantities of Foods Consumed per Head.

	1946-7	1945-6	1944-5
	Cwts.	Cwts.	Cwts.
Oats & Barley	5.1	6.0	5.9
Beans and Peas	.7	.7	.7
Total Home-grown Corn	5.8	6.7	6.6
Purchased Concentrates	.5	1.0	1.0
Total Concentrates	6.3	7.7	7.6
Roots and Green fodder	64.2	66.0	63.0
Hay	15.4	14.9	21.8
Straw	10.0	10.8	7.4

The amount of bulky fodder consumed has not varied greatly over the three year period, although there is a slight downward tendency in roots, and hay fell rather sharply after 1944-5 and was partly replaced by straw. The main feature of the 1946-7 figures was the decline in the quantity of concentrates fed. No doubt this is associated with the severe winter and the necessity of feeding much of the available corn to sheep and other stock.

In view of the rather shorter feeding period in 1946-7, it is desirable to supplement the comparison of foods consumed per head by an examination of consumption rates per week and also per cwt. of liveweight increase. This is done in the next table.

Table 10.

Foods Consumed per Week and per Cwt. Liveweight Gain

	Per Head per Week			Per Cwt. L/W Gain		
	1946-7	1945-6	1944-5	1946-7	1945-6	1944-5
	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
Oats & Barley .....	.30	.32	.31	3.1	3.1	3.0
Beans and Peas .....	.04	.04	.03	.4	.4	.3
Total Home-grown Corn	.34	.36	.34	3.5	3.5	3.3
Purchased Concentrates	.03	.06	.05	.3	.5	.5
Total Concentrates ...	.37	.42	.39	3.8	4.0	3.8
Roots	3.72	3.59	3.46	39.1	34.5	34.5
Hay .....	.89	.81	1.12	9.4	7.8	11.1
Straw .....	.58	.59	.38	6.1	5.7	3.7

When the quantities consumed are compared on a uniform basis, as in the above table, there is even less variation than in the per head figures. The smaller amount of concentrates (particularly purchased cakes) fed in 1946-7 was partly compensated by a more generous use of fodder. As in previous seasons the bulk of the home-grown corn ration consisted of oats, supplemented in some cases by beans or by purchased cake to improve the protein ratio. The greater quantity of fodder consumed and the reduction in concentrates were contributory factors to the reduced rates of live weight gain already referred to.

III.

The total costs of feeding are shown in the following table.

Table 11. Summary of Cost per Head

	1946-7	1945-6	1944-5
	£. s. d.	£. s. d.	£. s. d.
Value of Store Beast	35. 8. 6.	34.13. 6.	32.16.10.
Foods:			
Roots	3.18. 1.	3.13. 5.	3.12. 7.
Hay	2.15. 5.	3. 5. 5.	4.15. 8.
Straw	1. 2. 6.	1. 1. 8.	14. 8.
Home-grown Corn	4. 6.11.	5. 1. 3.	4.18. 9.
Purchased Concentrates.	7. 0.	12. 4.	14. 2.
Total Foods	12. 9.11.	13.14. 1.	14.15.10.
Labour	1. 8. 8.	1.10. 8.	1.11. 8.
Miscellaneous items	3.11.	3. 9.	3. 6.
Total Cost	49.11. 0.	50. 2. 0.	49. 7.10.

The value of store cattle increased steadily through the period, but the cost of feeding fell slightly. Food costs, however, are affected by changed methods of valuing home grown foods and, in order to determine how far this factor has affected the costs, the following table compares the cost of foods in 1946-7 as shown above with the figures that would have been

arrived at if the methods of valuation employed in the two previous years had continued to be used.

Table 12.

Comparison of Methods of Valuing Home Grown Foods

Food	Amount used	Cost at 1946-7 Values			Cost at Values previously used		
		£.	s.	d.	£.	s.	d.
Roots	Cwts. 64.2	3.	18.	1.	3.	7.	8.
Hay	15.4	2.	15.	5.	3.	7.	10.
Straw	10.0	1.	2.	6.	1.	0.	0.
Oats, Barley & Beans	5.8	4.	6.	11.	4.	7.	8.
Total Cost	-	12.	2.	11.	12.	3.	2.

The total cost of food is practically identical under the two systems of valuation, the higher cost of roots and straw given by the revised figures being offset by the reduced cost of hay. The value of home grown concentrates is practically the same for both methods. Here again the slightly higher value of oats and the reduction in beans under the revised scale tend to cancel one another. In comparing food costs as a whole therefore, the effects of the different method of valuation can be ignored.

In Table 13 the costs per week and per cwt. Liveweight gain are shown.

Table 13.

Cost per Head per Week and Per Cwt. Liveweight Gain

	Per Head per Week			Per Cwt. Liveweight Gain		
	1946-7	1945-6	1944-5	1946-7	1945-6	1944-5
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Roots	4. 5.	4. 0.	3. 9.	2. 7. 7.	1.18. 5.	1.16.10.
Hay	3. 3.	3. 6.	4.11.	1.13. 9.	1.14. 3.	2. 8. 7.
Straw	1. 4.	1. 2.	9.	13. 9.	11. 4.	7. 5.
Home-grown Corn.	5. 0.	5. 6.	5. 1.	2.12.10.	2.13. 0.	2.10. 1.
Purchased Concs.	5.	8.	9.	4. 3.	6. 6.	7. 2.
All Foods	14. 5.	14.10.	15. 3.	7.12. 2.	7. 3. 6.	7.10. 1.
Labour	1. 8.	1. 8.	1. 8.	17. 6.	16. 0.	16. 1.
Miscellaneous ..	3.	2.	2.	2. 5.	1.11.	1.10.
Total	16. 4.	16. 8.	17. 1.	8.12. 1.	8. 1. 5.	8. 8. 0.

The costs for 1946-7 differ little from those for the previous year. The figures do, however, show a slight but steady decline over the whole three years. The main factor on the costs side affecting profitability, however, is not the cost per beast or per week but the cost of producing each cwt. of liveweight increase. By this test the costs were less satisfactory in 1946-7 than in either of the previous years. The cost per cwt. of beef was definitely higher, the increase being spread over all cost items - food, labour, and miscellaneous charges. It is due not to a higher level of expenditure (as the per week figures show) but to a less satisfactory return in terms of liveweight gain for the money spent. Some of the reasons for this poorer return have already been mentioned in discussion of Table 3.

IV.

The prices received for cattle leaving the yards are summarised in the next table. Unfinished cattle are entered at market price if sold as stores or at estimated store value if retained on the farm.

Table 14. Average Values per Head of Cattle Sold

	1946 - 7			1945 - 6			1944 - 5		
	£.	s.	d.	£.	s.	d.	£.	s.	d.
Graded Cattle ...	48.	9.	8.	47.	4.	9.	44.	17.	4.
Unfinished Cattle	44.	11.	9.	40.	0.	2.	38.	5.	6.
Casualties	11.	0.	0.	33.	4.	5.	28.	15.	4.
All Cattle	48.	4.	4.	46.	17.	7.	44.	9.	5.

Apart from the two casualty beasts (one of which was condemned) the level of prices was higher throughout in 1946-7 and has risen steadily during the three years. This increase was achieved in spite of a falling off in the quality of the animals graded and was due to increases in the price per cwt. of beef. In 1945-6 during the period of the survey the price of Special grade Home-bred beef ranged from 76/- to 83/- per cwt. In 1946-7 the corresponding figures were 82/- to 88/6 per cwt. Other grades increased in proportion. This may be expressed another way by saying that a typical beast in 1945-6 was graded as Special and sold about the middle of March when it made, if home-bred, 81/- per cwt. The typical beast in 1946-7, sold out at the same time, was graded only A+ yet made 82/6d. per cwt.

When the cost of the store plus the cost of feeding are subtracted from the amount received for the beast when fat, the cash profit or loss on the feeding process is shown. Table 15 gives these details.

Table 15. Financial Margins per Head

	1946-7			1945-6			1944-5		
	£.	s.	d.	£.	s.	d.	£.	s.	d.
Average Return per Head	48.	4.	4.	46.	17.	7.	44.	9.	5.
Store Value	35.	8.	6.	34.	13.	6.	32.	16.	10.
Gross Feeding Margin ..	12.	15.	10.	12.	4.	1.	11.	12.	7.
Cost of Food, Labour &c.	14.	2.	6.	15.	8.	6.	16.	11.	0.
Net Margin (Loss)	1.	6.	8.	3.	4.	5.	4.	18.	5.

The above figures cover all cattle, including casualties and those not finished. On graded animals only the loss in 1946-7 was £1. 0. 3. but the risk of casualties and of animals failing to fatten is one which the feeder has to allow for, so that it is more accurate to average the results over all cattle. The man who has good luck and gets all his beasts to the grading centre may hope to do a shade better than the average, whilst hard feeders or casualties amongst the beasts may lead to considerably less favourable results.

The increased level of prices during the last three years is steadily reducing the gap between expenses and cash returns, but the gap has not yet been closed. A cash loss of 26/8d. plus a credit item of some 5 tons of farmyard manure is not, in certain circumstances, an unsatisfactory result, and in view of

the further increase in beef prices for the coming winter it would appear that yard feeding may regain some of its lost favour, if labour problems can be overcome.

The above results are averages. Individual farms and batches of cattle varied widely in their results. Some idea of the variation is given by the following tables showing the ranges in gross and net feeding margins respectively. The figures are the numbers of lots with margins within the limits shown.

Table 16. Range in Gross Feeding Margins per Head

Margin £	3-5	5-7	7-9	9-11	11-13	13-15	15-17	17-19	Over 19	Total
No. of farms										
1946-7	1	-	4	3	6	2	8	5	2	31
1945-6	1	-	2	5	6	7	2	-	-	23
1944-5	-	2	8	5	6	4	4	3	-	32

Table 17. Range in Net Feeding Margins per Head

Margin £	P r o f i t						L o s s					Total
	over 6	4-6	2-4	0-2	0-2	2-4	4-6	6-8	8-10	10-12	12-14	
No. of Farms												
1946-7	2	3	3	8	3	5	2	4	-	1	-	31
1945-6	-	1	1	2	4	10	3	-	-	2	-	23
1944-5	-	-	2	5	3	3	10	2	5	-	2	32

IV.

There remains the question of economic interpretation of the results. The pros and cons of the case have been discussed in earlier reports and are briefly repeated here.

As the results are presented, there is an ascertained average loss of 26/8d. per beast. If this loss is accepted as the "cost of manure produced for the benefit of crops" then manure has been provided at an average cost of 5/2d. per ton (allowing 6 cwts. per head per week over a feeding period of 17½ weeks), which is cheap.

This is one way of accounting. An alternative way would be to fix a value for farmyard manure and then credit this value to the cattle. Assuming, for the sake of argument, a value of £1 per ton, the loss of £1. 6. 3. per head would be converted into an average profit of £3. 19. 2. Although perfectly logical, this method breaks down in practice owing to the impossibility of obtaining an agreed value per ton for farmyard manure in all circumstances. Even were the quality of the manure uniform, its value to the farm depends upon such a variety of factors that precise valuation is almost impossible.

Taking the farms all together, the figures presented in this report appear to indicate that the whole elaborate process of growing roots, oats and hay, of buying store cattle, feeding and marketing them, yielded no direct profit. The economic gains, however, are considerable and are represented by (a) cheap muck, (b) the rotational benefits of growing roots and fodder crops, (c) outlets for straw and roughages and (d) winter employment for workers at a cost which, at least, covers wages, and at the same time holds together a necessary nucleus of regular labour on the farm.

The final test must be the profit over the joint operations, i.e., the whole farming system, which in effect, is a modern version of the original Norfolk system, and one which has proved adaptable to a very wide range of fluctuations in the general farming context. Whether alternative methods of maintaining land fertility, such as ploughing in leys, green manuring, sheep folding, and so on, can produce equivalent outputs at lower cost and maintain this position over comparable periods of time, is too wide a question to be answered here and would clearly require a much more comprehensive inquiry than has been attempted in the present investigation.

