Sheep – Cost of production

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AN INVESTIGATION INTO SOME FINANCIAL AND PHYSICAL ASPECTS OF LOWLAND SHEEP FARMING IN MID DEVON

1952-53 and 1953-54

by
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Price Two Shillings and Sixpence

I, COURTENAY PARK,
NEWTON ABBOT,
DEVON.

FOREWORD

During the past 50 years the sheep population of this island has declined appreciably while other major enterprises have increased. With the decline of arable farming after 1870 it is not surprising that arable sheep in particular suffered a severe decline, so that to-day, despite the partial revival of corn growing in this country, arable sheep, as such, are a small segment of our agriculture. Even on the traditional areas of chalk uplands, for example, the Dorset Downs, the dairy cow and the ley have now replaced the 'golden hoof' in maintaining soil fertility. Even so, the system of arable sheep has persisted in a modified form in some localities, of which the red sandstone soils of Devon are an example. This is by tradition malting barley land and the crop is of some importance in the agriculture of these districts. Despite the war-time upheavals, the system of sheep management has not changed a great deal over the past 20 years since the enterprise was last studied in some detail. Perhaps it would be truer to say that the developments which were noted 20 years ago and which were severely arrested once again by war-time needs are again taking shape. At any rate, the following extracts of comments made in connection with the 1935 study might easily be taken as being applicable to-day. "Owing to the increase in the number of grass flocks and a corresponding decline in arable flocks, the supply of fat lambs has become unbalanced ---------- there has been a tendency amongst certain farmers to advance the time of lambing --------- one of the chief problems of very early lambing would seem to be that of food supply. Although advocates of pasture improvement have claimed that it is possible to fatten out winter and spring lambs with grass, generally it has been found that any substantial increase in this practice must be accompanied by an increase in winter-spring fed arable crops".

One thing is certain — farming is a dynamic undertaking: always changing. Providing the data needed to facilitate changes, is part of the Economist's service to Agriculture.

S.T.M.

ACKNOWLEDGEMENTS

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INTRODUCTION

The data for this report were collected on a sample of farms situated mainly within the triangular section formed by Crediton, Broadclyst, and Teignmouth on the fertile red loam soils of Mid-Devon. The study was undertaken during the two-year period 1952-1954, but whereas during the initial year it was confined to the winter fattening or hogging aspect only, in the second year the investigation was extended to cover the entire sheep enterprise.

In this report, the results of the breeding and fattening aspects are presented separately, and in the case of the latter, very little change in cost and price conditions enable the results of both years to be presented in a combined form. Altogether, financial and physical data were collected for 33 breeding enterprises and 70 fattening enterprises, with 37 of the latter being completed during the initial year of the study. No winter fattening was undertaken on three of the farms constituting the breeding sample of the study.

The climatic conditions prevailing during the 1952 and 1953 crop years were generally very favourable throughout the South West. Rainfall during the months of March, April and May was somewhat above average in both years, and whilst this did not unduly delay sowing dates, it did provide for excellent growing conditions. Harvesting conditions for both hay and corn were on the whole quite good.

A study of the cropping and stocking on the sample farms shows that the system practised on these red loam soils is predominantly one of mixed farming, with corn, cattle, sheep, pigs and poultry each contributing to farm output. The average size of farm was 253 acres of crops and grass, but ranged from 80 acres to just over 400 acres. Tillage occupied over 38% of the total farm acreage, with corn accounting for approximately 75% and forage and other crops for 25% of this area. Nearly 60% of the entire corn acreage was devoted to barley, followed by oats 18%, wheat 13% and mixed corn 9%. Cash root cropping was unimportant, with this break being devoted almost completely to stock feed.

In terms of total livestock, the average numbers maintained per 100 acres of crops and grass were:- Cattle 29; Sheep 81; Pigs 14 and Poultry 65. Rental Values averaged nearly 40s. 0d. per acre of crops and grass.

Sheep management policies varied considerably on the survey farms. For example, six of the farms visited did not maintain a breeding flock, and here the enterprise consisted entirely of winter fattened

purchased stores. On seven farms the lamb crops were all sold fat and on four of these autumn purchases were made for hogging on roots. A further twenty-five farmers sold some of their lambs fat, and in some instances, the remaining numbers were augmented with purchased stores. Finally, there were thirty-five farmers who kept all their lambs for winter hogging, some of whom procured additional store sheep during the autumn and early winter.

With regard to breeds, on nearly all the survey farms the flocks were composed of one type of ewe, either pure bred or cross-bred. The majority of farmers also kept one breed of ram, but thirteen had two breeds, and in one case there were three breeds maintained. Where more than one breed of ram was kept, the data did not show any apparent specialisation in terms of breeding for fat lamb production or for hogging.

The predominant practice on these study farms was the use of a Down type ram on Long Wool type ewes, and in this respect the most popular cross was between the Devon Long Wool and Suffolk ram. During the inter-war years, the consumer demand for early fat lambs and small mutton joints favoured the Dorset Down cross, and there is evidence to support this in the text of an earlier report.* In more recent years, however, the price schedule has encouraged larger weights, and the Suffolk ram, which produces later maturing lambs of greater weights of meat and wool, has tended to replace the Dorset Down. On the other hand, the freedom of choice granted the consumer with the end of control in 1954, has found expression once again in the demand for a small, lean joint, and this may well contribute to the Dorset Down ram regaining, in the near future, the popularity it enjoyed during the inter-war years.

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* "Changes in the Practice of Sheep Farming on the Red Loams of Mid-Devon". S.T. Morris, M.Sc., Seale-Hayne Agricultural College. Pamphlet No. 45, July, 1935.

SHEEP BREEDING AND REARING ON LOWLAND FARMS

1. Fat and Store Lamb Production

This aspect of the investigation, completed during the year 1953-1954, was undertaken on 33 farms. The total number of ewes put to ram in the autumn of 1953 was 3,166, equivalent to 96 ewes per costed flock, but this ranged from 42 ewes to 176 ewes per flock. Fifteen of the costed flocks consisted of 100 ewes or under, and five of these were composed of less than 50 ewes. Only two of the remaining eighteen flocks had more than 150 ewes.

A total of 68 rams were on hand at the beginning of the year, which represents 1 ram for every 46·5 ewes.

With regard to flock maintenance, home-reared ewe replacements were used on 14 of the costed farms, and in two instances these were augmented by purchased ewes. On 9 farms, flock numbers were maintained solely by annual purchases, usually during late summer or early autumn, whilst no replacements were undertaken on the remaining 10 farms. In all, a total of 805 replacements were introduced into the flocks during the study year, and with an initial total of 3,166 ewes recorded, this represents a replacement rate of just over 25%. The breeders were normally maintained as long as they continued to be productive, with the culls being invariably fattened off. Only two farmers disposed of their culled ewes for further breeding.

The dates at which lambing commenced and ended varied quite considerably on the study farms. With the exception of three Dorset Horn flocks which lambed during September and October, the date of commencement varied from about Christmas to mid-February, but with January being by far the most frequent date. In nearly all instances the bulk of the lambs had been born within six weeks from the commencement of lambing, although in four cases, this period extended to eleven weeks.

The 1954 crop yielded a total of 3,403 lambs reared, equivalent to 1·1 per ewe put to ram. Just over 54% of this total number, or 1,852 lambs, were retained on the farms either for winter fattening or for future breeding. These were assessed at an average value of £6. 13s. 0d. per head for an estimated deadweight of 52½ lb. With the exception of 7 lambs which died, the remainder, a total of 1,544 lambs, were graded during the spring and summer at the carcase value and deadweight of £8. 17s. 1d. and 52 lb. respectively. The monthly distribution of lamb sales during 1954 was as follows -

1954	March	April	May	June	July & August	Total
No. Sold	183	115	318	836	92	1544
% Total	11.9	7.4	20.6	54.2	5.9	100
Estimated D.W. per Head (lb.)	53.0	53.0	53.9	50.4	53.6	-
Av. Realisation Price/lb. D.W. (d.)	41	41¼	41¼	41¼	36½	-

Output, in terms of the value of lambs reared per ewe, averaged £8. 4s. Od. whilst the sales of wool from the ewes, rams and lambs amounted to £3. 7s. Od. for a clip of just under 15 lb. Together, therefore, these two items give a total output of £11. 11s. Od. per ewe put to ram.

The weight of wool obtained from the ewes, rams and lambs averaged 14½ lb. per ewe, but varied from about 7 lb. to 20 lb. per ewe. The following data give some indication how this variation ranged between the different breeds.

AVERAGE WOOL CLIP BY BREED

Ewe		Ram	lb.
South Devon	X	South Devon	20
Devon Long Wool	X	Devon Long Wool	19
Devon Long Wool	X	Suffolk)	13
Devon Long Wool	X	Hampshire)	
Down Type	X	Down Type	9¾

The production costs incurred in maintaining the breeding flock for the year, together with the cost of rearing the 1954 lamb crop amounted to £6. 5s. Od. per ewe put to ram. Food costs accounted for 43.3% of this total, labour for 14.1% and miscellaneous items for 42.6%.

Grazing accounted for over 50% of the total charges incurred on foods, and in all, 1,324 acres of grazing were devoted to the sheep during the breeding year. This is equivalent to 0.42 acres per ewe put to ram. Roots and greenfodder, which amounted to approximately 42% of food costs, were consumed at the rate of 22 cwt. or 0.07 acres per ewe. Here, the

most popular crops were mixed roots and turnips or swedes, with the former invariably consisting of two rows of swedes and one of kale. Cake and corn and hay were relatively unimportant, and were fed at the rate of 15¾ lb. and 27 lb. per ewe respectively, which together are equivalent to the produce of 0·02 feed acres. Altogether, therefore, 0·51 feed acres were consumed annually per ewe put to the ram, which represents 2 ewes for every feed acre devoted to the breeding enterprise.

The manual labour requirements for shepherding amounted to 5·75 hours per ewe, and accounted for 13·1% of total costs. This is equivalent to the requirement of 11 man hours per 100 ewes per week. Under miscellaneous costs, flock depreciation was by far the most important item, and at £2. 3s. 6d. per ewe represented nearly 35% of the total production costs incurred.

Margins varied considerably on the study farms, but only in one isolated case was a deficit margin incurred. This particular farm made a loss of £1. 3s. 0d. per ewe, whilst the highest surplus margin earned amounted to £7. 8s. 0d. per ewe. The overall margin averaged £5. 6s. 0d. per ewe put to ram, or £10. 12s. 0d. per feed acre.

The number of lambs reared per ewe was found to be an important factor influencing the level of profitability on individual farms. The comparative data presented in Table 3 for the five farms with the lowest lambing percentage and the five with the highest percentage clearly reveal this. In the former, where on average 0·88 lambs were reared, the margin amounted to £2. 9s. 7d. per ewe put to ram; in the second group of farms, where 1·30 lambs were reared per ewe, the margin attained was £5. 15s. 2d. — or £3. 5s. 7d. more than in the low percentage group. This significant difference is entirely attributable to the much higher level of lamb output, since costs in the high percentage group were over 13s. 0d. more per ewe than in the low percentage group.

The high lambing percentage flocks were fed at a relatively higher plane of nutrition, with approximately 3¼ lb. more concentrates and 34½ lb. more hay being consumed per ewe than on the low percentage farms. Almost identical amounts of forage were fed in both groups.

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2. Cost of Rearing Ewe Replacements

During 1953-1954, the net cost of rearing ewe replacements from birth to tupping averaged £3. 16s. 6d. per head.

From birth to approximately six months, the net cost was £2. 12s. 9d. and this was derived by dividing the total net cost of maintaining a ewe for one year (£2. 18s. 0d.) by the average number of lambs reared per ewe (1·10).

In maintaining the ewe replacements from six months to tupping at about eighteen months, the total costs incurred averaged £2. 19s. 9d. per head. Against this must be offset the value of the wool sold at £1. 16s. 0d. (8 lb. clip), thus giving a net cost of £1. 3s. 9d. During this period, foods accounted for just over 70% of the total costs, labour for 18·5% and miscellaneous costs for 11·5%.

Roots and greenfodder, which accounted for approximately 55% of the total charges incurred on foods, were consumed at the rate of nearly 26 cwt. or 0·07 acres per ewe. Grazing accounted for a further 43% of total food costs, with a requirement of 0·32 acres per ewe. Cake and corn and hay were fed at 1·74 lb. and 15·83 lb. per head respectively, equivalent to the produce of less than 0·01 feed acres. During this twelve months period, therefore, approximately 0·40 feed acres were consumed per ewe which is equivalent to 2·5 ewes per feed acre. The shepherding requirement of 3·58 hours per ewe represents the equivalent of nearly 7 hours per 100 ewes per week.

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Table 1. SHEEP BREEDING AND REARING - 33 FLOCKS

REVENUE ACCOUNT
1953 - 1954

	No.	£	£
OPENING VALUATION			
Rams	68	1077	
Ewes	3166	30938	32015
PURCHASES			
Rams	22	491	
Ewes	466	4889	5380
TRANSFERRED-IN	339		2990
BIRTHS	3403		-
OUTPUT (c/fwd.)			19108
	7464		59493
COSTS			
Foods & Grazing			
Roots & Greenfodder		3440	
Cake & Corn		516	
Hay		245	
Grazing - Ewes & Rams		3432	
- Lambs		935	8568
Labour			
Manual		2588	
Horse		43	
Tractor		164	2795
Miscellaneous			
Overheads		977	
Equipment Depreciation		74	
Sundries		492	1543
MARGIN			16810
			29716

	No.	£	£
SALES			
Rams	14	112	
Ewes	533	3720	
Lambs	1544	13672	17504
CLOSING VALUATION			
Rams	67	1026	
Ewes	3275	28644	
Lambs	1852	12319	41989
DEATHS			
Rams	9		-
Ewes	163		-
Lambs	7		-
	7464		59493
OUTPUT (c/fwd.)			19108
WOOL SALES			10608
			29716

Table 2. SHEEP BREEDING AND REARING - 33 FLOCKS

OUTPUT, COSTS AND MARGINS PER EWE PUT TO RAM
1953 - 1954

No. of Ewes Put to Ram	3166					
	Per Ewe Put to Ram					
OUTPUT	D.W.	VALUE			%	
	lb.	£	s	d		
Lambs	55·5	8	4	0	71·0	
Wool (Ewes, Rams & Lambs)	-	3	7	0	29·0	
TOTAL OUTPUT	-	11	11	0	100·0	
COSTS	Quant.					
Foods - Roots & Greenfodder (cwt.)	22·00	1	1	9	17·4	
Cake & Corn (lb.)	15·70		3	3	2·6	
Hay (lb.)	26·90		1	6	1·2	
Grazing	-	1	7	7	22·1	
Total Foods	-	2	14	1	43·3	
	Hours					
Labour - Manual	5·75		16	4	13·1	
Horse	·21			3	·2	
Tractor	·23		1	1	·8	
Total Labour	-		17	8	14·1	
Miscellaneous - Overheads	-		6	2	4·9	
Flock Depreciation	-	2	3	6	34·8	
Equipment Depreciation	-			6	·4	
Sundries	-		3	1	2·5	
Total Miscellaneous	-	2	13	3	42·6	
TOTAL COSTS	-	6	5	0	100·0	
M A R G I N	+ £5 6 0					
SOME EFFICIENCY MEASURES						
No. Ewes Per Feed Acre	2·0					
Margin Per Feed Acre	+ £10 12 0					
No. Lambs Reared Per Ewe	1·1					

Table 3. SHEEP BREEDING AND REARING

OUTPUT, COSTS AND MARGINS PER EWE PUT TO RAM FOR THE FIVE FARMS WITH HIGHEST AND LOWEST LAMBING PERCENTAGES 1953 - 1954

	5 Farms with Highest %				5 Farms with Lowest %			
No. of Ewes Put to Ram	468				461			
	Per Ewe Put to Ram							
OUTPUT	D.W.	Value			D.W.	Value		
	lb.	£	s	d	lb.	£	s	d
Lambs	54.0	10	1	5	51.8	6	3	2
Wool (Ewes, Rams & Lambs)	-	3	6	5	-	3	5	8
TOTAL OUTPUT	-	13	7	10	-	9	8	10
COSTS	Quant.				Quant.			
Foods - Roots & Greenfodder (cwt.)	25.68	1	14	2	25.00	1	1	5
Cake & Corn (lb.)	25.13		5	9	21.87		4	0
Hay (lb.)	37.09		2	1	2.43			2
Grazing	-	1	4	4	-	1	12	1
Total Foods	-	3	6	4	-	2	17	8
	Hours				Hours			
Labour - Manual	5.34		15	7	6.45		18	10
Horse	-		-		-		-	
Tractor	.31		1	4	.61		2	9
Total Labour	-		16	11	-	1	1	7
Miscellaneous - Overheads	-		5	9	-		7	1
Flock Depreciation	-	2	19	5	-	2	9	8
Equipment Depreciation	-			7	-			5
Sundries	-		3	8	-		2	10
Total Miscellaneous	-	3	9	5	-	3	0	0
TOTAL COSTS	-	7	12	8	-	6	19	3
M A R G I N	+ £5 15 2				+ £2 9 7			
SOME EFFICIENCY MEASURES								
No. Ewes Per Feed Acre	1.8				1.9			
Margin Per Feed Acre	+ £10 3 10				+ £4 13 3			
No. Lambs Reared Per Ewe	1.30				0.88			

Table 4. COST OF REARING EWE REPLACEMENTS FROM BIRTH TO TUPPING

PER EWE HOGG
1953 - 1954

	Quantity	£ s d
1. BIRTH TO 6 MONTHS		
Cost of Maintaining Ewe for One Year		6 5 0
Less Wool Sold (Ewes, Rams & Lambs)		3 7 0
Net Cost Per Ewe		2 18 0
No. Lambs Reared Per Ewe		1·1
NET COST TO 6 MONTHS		2 12 9
2. 6 MONTHS TO 18 MONTHS		
Foods - Roots & Greenfodder (cwt.)	25·90	1 2 10
Cake and Corn (lb.)	1·74	2
Hay (lb.)	15·83	10
Grazing	-	18 2
Total Foods	-	2 2 0
	Hours	
Labour - Manual	3·58	10 5
Horse	-	-
Tractor	·13	7
Total Labour	-	11 0
Miscellaneous - Overheads	-	3 9
Equipment Depreciation	-	10
Sundries	-	2 2
Total Miscellaneous	-	6 9
TOTAL COSTS	-	2 19 9
Less Wool Sold	-	1 16 0
NET COST 6-18 MONTHS	-	1 3 9
TOTAL NET COST PER EWE HOGG	-	3 16 6

WINTER SHEEP FATTENING ON LOWLAND FARMS

As already stated, this aspect of the investigation was undertaken during the two-year period 1952-1954. In all, data were obtained for 70 fattening enterprises, embracing a total of 8,907 sheep. Nearly one-half of this number was purchased, and of these, over three-quarters had been brought on to the farms prior to the commencement of the fattening periods, the most frequent dates for which were November and early December. The remaining purchases were procured during subsequent months either to augment or replace the sheep originally on hand.

The average length of fattening period on the sample farms was 17¾ weeks, which included 3½ weeks grazing. During this time, each sheep consumed the produce of 0·10 feed acres, equivalent to 10 sheep for every feed acre devoted to the hogging enterprise, and achieved an estimated deadweight gain of 12½ lb., or nearly ¾ lb. per hogg feed week.

The overall output, or value added to the sheep during the feeding period averaged £2. 10s. 0d. per hogg, which included a receipt of 12s. 0d. from wool. At the commencement of feeding, the average value per hogg was calculated at £7. 3s. 6d. for an estimated carcase weight of 53½ lb. Per lb. deadweight, the value placed on the home-reared sheep was almost identical to that paid for the purchased hoggs. At the termination of the feeding period, 342 sheep were still on the farms, and these were assessed at an average value of £9. 0s. 0d. for an estimated deadweight of nearly 63 lb. per head. A total of 8,407 sheep was graded at an average price of £9. 5s. 3d. and at a carcase weight of 67 lb. per head. A further 49 sheep were sold as casualties at £5. 16s. 0d. and 60 lb. deadweight per head, whilst the remaining 109 hoggs died during the feeding period. The overall receipt value per hogg was £9. 2s. 3d. with an estimated deadweight of 66 lb.

The production costs incurred during the feeding period amounted to £1. 17s. 8d. per head. This represents a charge of 2s. 1d. per hogg feed week or 3s. 0d. per lb. deadweight gain, but a great variation existed in this respect, ranging from 7d. to 6s. 4d. per week and from 11d. to 7s. 6d. per lb. deadweight gain. The most important cost item was that of foods and grazing, which accounted for 74·3% of the total. Labour charges accounted for a further 17·3%, whilst 8·4% of the total was composed of miscellaneous costs such as overheads, equipment depreciation, haulage and other sundry items.

Roots and greenfodder accounted for over 85% of the total charges incurred on foods and grazing. In all, 683½ acres of forage were consumed, which is equivalent to one acre for every 12·5 sheep costed, or 0·08 feed acres per sheep. Here again, the most popular crops were mixed roots and turnips or swedes. Concentrate feeding in the form of

cake and corn, played a very minor role in the sheep diet, with an average of 6½ lb. fed per hogg. Hay was fed at the rate of 28 lb. per head, and together, these two items accounted for approximately 10% of the total food costs, and represented the produce of 0·01 feed acres.

Manual labour charges, which refer to the direct labour employed on shepherding, accounted for 16·6% of total costs for an average requirement of 2·1 hours. This represents the equivalent of approximately 12 hours per 100 hoggs per week. Under miscellaneous costs the most important item was that of general farm overheads, which were charged at 7s. 6d. per £1 of manual labour expended on shepherding.

The overall margin averaged 13s. 1d. per sheep, or £6. 10s. 10d. per feed acre, but ranged from a deficit of 43s. 0d. to a surplus margin of 76s. 0d. per head. In all, 23 of the costed flocks made deficit margins and 47 earned surplus margins.

This wide range in margins on the survey farms can be related to a large extent to certain variations in sheep management practices. The disposal of the hoggs in a shorn or unshorn condition and the weekly rate of deadweight gain are two of the most important considerations in this respect, while efficiency in the production of the various feed crops was found to be a third significant factor.

Of the total number of sheep graded, over 66% was sold unshorn directly off forage crops. Here, the average length of feeding was 13½ weeks, compared to 26½ weeks in the shorn group and where the latter 8½ weeks were spent on grass. During these periods, each feed acre devoted to the hogging enterprise maintained 12 sheep in the unshorn and 6·2 sheep in the shorn group. These two sets of figures, therefore, reflect almost identical intensities of feeding in both groups, namely, that 1 feed acre maintained 162 unshorn hoggs and 164 shorn hoggs for one week.

Based on a standard store value of 2s. 8d. per lb., the margin per hogg was nearly 26s. 0d. more for the shorn flocks, or £6. 16s. 0d. more per feed acre. This difference is mainly accounted for by the value of the wool clip, since not only were costs 10s. 0d. more per hogg, but the return per lb. carcase weight was also 2d. less on the shorn hoggs. The estimated deadweight of the sheep at the termination of feeding averaged 66 lb. in both groups.

The weight of wool obtained from the shorn hoggs averaged about 7½ lb. per head but this ranged from 4 lb. to just over 10 lb. per head according to the breed:-

AVERAGE WOOL CLIP BY BREED

Ewe	Ram	lb.
Long Wool	Long Wool	10
Long Wool	Down Type	8
Down Type	Down Type	4

The unshorn flocks were fed with more liberal rations of both forage and supplementary foods. For every week spent on forage crops, the unshorn hoggs received approximately ¼ cwt. more per head of these crops, over ½ lb. more cake and corn and nearly ¼ lb. more hay. This higher plane of nutrition was accompanied by a higher weekly rate of deadweight gain. On average, this was just over ¾ lb. per head in the unshorn, compared with ½ lb. in the shorn group, and in the case of the latter, an identical rate of gain was achieved during the 8½ weeks spent on grass.

The conventional accounting technique employed in this report clearly emphasises, therefore, the financial superiority of the shorn flocks. It must be remembered, however, that this more remunerative system does normally make demands on land and labour at a time of year when in all probability both could be productively employed in other ways. For example, the requirements of the flock may restrict and delay the spring cultivations; sowing dates may be retarded with consequent loss of yield and increased bills for purchased feedingstuffs. Under such circumstances, the loss so sustained is directly attributable to the hoggs and, therefore, should be borne by them.

As already stated, margins on the sample farms were also significantly influenced both by variations in costs and by the rate of deadweight gain attained. In order to illustrate the importance of these two factors, comparative data are presented in Table 8 for the ten unshorn flocks with the highest margin and the ten with the lowest margin.

With regard to costs, the most important item in the winter fattening of sheep is that of forage crops. Therefore, any economy which can be effected in the production of these foods will directly contribute to margins. For the ten high margin flocks, the costs incurred in the production of just over one ton of roots and greenfodder were 10s. 0d. less than on the low margin farms. Crop yields showed very little variation between the two groups, and hence this difference can only be due to more efficient production methods. In this respect, choice of crops appears to be one important factor. In the high margin group, kale, grown either pure or as a constituent of a mixture accounted for nearly 40% of the total forage consumed by the hoggs, compared with 20% in the low margin group. For sheep this crop is invariably grown unthinned with very little post-sowing demands in the way of hoeing, and hence a considerable saving in manual labour is possible by its cultivation. Indeed, the study data revealed that one acre of kale had an average manual labour requirement of only 21 hours, compared with 38 hours for mixed roots and 48 hours for swedes.

But, in addition to this advantage, the crop's relatively high nutritional value and its ability to produce a large bulk of succulent feed at the time when swedes become hard and frosted are further factors in its favour. In fact, these appear to be the main issues contributing

to the substantially higher rate of gain attained by the high margin flocks, since supplementary feeding in the way of cake, corn and hay was less important than for the low margin flocks.

In any event, it is clear that efficient crop production combined with a high rate of gain are important prerequisites of a high margin. But in order to assess more fully the significance of the latter factor, the sample of unshorn flocks has been divided in Table 9 into those where the hoggs gained at the weekly rate of $\frac{3}{4}$ lb. deadweight or under, and those where the rate of gain exceeded $\frac{3}{4}$ lb. To validate comparison between these two groups of farms, a standard store value per lb. has again been adopted.

In the low rate of gain group, where the hoggs averaged a weekly deadweight gain of $\frac{1}{2}$ lb. per head, a deficit margin of 6s. 8d. per hogg was incurred. In the other group, where the rate of gain averaged nearly 1 lb. per hogg, a surplus margin of 15s. 3d. was attained. In this particular comparison, the considerable difference in margins is almost entirely the result of the higher level of output, since total costs per hogg in the high rate of gain group were only 4s. 0d. lower than in the other group.

Unfortunately, however, the data presented in the table do not establish any salient factors which might be responsible for the higher rate of gain. It is true that nearly $\frac{1}{4}$ lb. more concentrates were fed per hogg feed week in this group, but less hay was consumed whilst the nature and volume of the forage fed were almost identical in both groups. Neither has it been possible to correlate a high rate of gain with particular breeds and crosses, or with the potential qualities of the sheep as expressed by the actual store values placed on them by the farmers. Even so, however, this does not obviate the usefulness of Table 9 in indicating that the rate of gain does exert a pronounced influence on the level of margin attained.

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Table 5. WINTER SHEEP FATTENING - 70 FLOCKS

REVENUE ACCOUNT
TWO-YEAR SUMMARY - 1952-1954

OPENING VALUATION	No.	£	£	SALES	No.	£	£
Home-Reared	4680	33385		Graded	8407	77900	
Purchased	3409	24634	58019	Casualties	49	284	78184
OTHER PURCHASES	818		6059	CLOSING VALUATION	342		3078
OUTPUT (c/fwd.)			17185	DEATHS	109		-
	8907		81263		8907		81262
COSTS				OUTPUT (b/fwd.)			17185
Foods and Grazing				WOOL SALES			5346
Roots & Greenfodder		10558					
Cake & Corn		527					
Hay		654					
Grazing		611	12350				
Labour							
Manual		2780					
Horse		93					
Tractor		31	2904				
Miscellaneous							
Overheads		1014					
Equipment Depreciation		178					
Haulage		179					
Sundries		89	1460				
MARGIN			5817				
			22531				22531

Table 6. WINTER SHEEP FATTENING - 70 FLOCKS

OUTPUT, COSTS AND MARGINS PER HOGG
TWO-YEAR AVERAGE 1952 - 1954

No. of Hoggs Fattened	8907		
	Per Hogg		
OUTPUT	D.W.	Value	%
	lb.	£ s d	
Meat	12.5	1 18 9	76.4
Wool	-	12 0	23.6
TOTAL OUTPUT	-	2 10 9	100.0
COSTS	Quant.		
Foods - Roots & Greenfodder (cwt.)	20.80	1 3 11	63.5
Cake and Corn (lb.)	6.60	1 2	3.1
Hay (lb.)	28.00	1 7	4.2
Grazing	-	1 4	3.5
Total Foods	-	1 8 0	74.3
	Hours		
Labour - Manual	2.10	6 3	16.6
Horse	.16	2	.5
Tractor	.04	1	.2
Total Labour	-	6 6	17.3
Miscellaneous - Overheads	-	2 2	5.7
Equipment Depreciation	-	5	1.1
Haulage	-	5	1.1
Sundries	-	2	.5
Total Miscellaneous	-	3 2	8.4
TOTAL COSTS	-	1 17 8	100.0
M A R G I N	+ £0 13 1		
SOME EFFICIENCY MEASURES			
No. Hoggs Per Feed Acre	10.0		
Margin Per Feed Acre	+ £6 10 10		
Feeding Period (Weeks)	17.7		
Costs Per Hogg Feed Week	2s. 1d.		
Estimated D.W. Gain Per Hogg Feed Week (lb.)	0.70		
Costs Per lb. D.W. Gain	3s. 0d.		

Table 7. WINTER SHEEP FATTENING

OUTPUT, COSTS AND MARGINS PER HOGG FOR
50 UNSHORN AND 20 SHORN FLOCKS
TWO-YEAR AVERAGE 1952 - 1954

No. of Hoggs Fattened	Unshorn 5879		Shorn 3028	
	Per Hogg			
OUTPUT	D.W.	Value	D.W.	Value
	lb.	£ s d	lb.	£ s d
Meat	10.5	1 18 0	14.5	1 19 3
Wool	-	-	-	1 14 10
TOTAL OUTPUT	-	1 18 0	-	3 14 1
COSTS	Quant.		Quant.	
Foods - Roots & Greenfodder (cwt.)	20.10	1 2 5	21.70	1 6 0
Cake & Corn (lb.)	8.50	1 7	2.10	5
Hay (lb.)	26.40	1 5	30.60	1 7
Grazing	-	5	-	3 2
Total Foods	-	1 5 10	-	1 11 2
	Hours		Hours	
Labour - Manual	1.80	5 2	2.90	8 3
Horse	-	-	.50	7
Tractor	-	-	-	-
Total Labour	-	5 2	-	8 10
Miscellaneous - Overheads	-	1 10	-	3 0
Equipment Depreciation	-	5	-	6
Haulage	-	5	-	5
Sundries	-	2	-	2
Total Miscellaneous	-	2 10	-	4 1
TOTAL COSTS	-	1 13 10	-	2 4 1
M A R G I N	+ £0 4 2		+ £1 10 0	
SOME EFFICIENCY MEASURES				
No. Hoggs Per Feed Acre	12.0		6.2	
Margin Per Feed Acre	+ £2 10 0		+ £9 6 0	
Feeding Period (Weeks)	13.5		26.5	
Costs Per Hogg Feed Week	2s. 6d.		1s. 8d.	
Estimated D.W. Gain Per Hogg Feed Week (lb.)	0.77		0.55	
Costs Per lb. D.W. Gain	3s. 3d.		3s. 0d.	

Table 8. WINTER SHEEP FATTENING

OUTPUT, COSTS AND MARGINS PER HOGG FOR THE TEN UNSHORN FLOCKS WITH THE HIGHEST AND LOWEST MARGINS
TWO-YEAR AVERAGE 1952 - 1954

	10 Flocks With Highest Margins		10 Flocks With Lowest Margins	
No. of Hoggs Fattened	1391		1364	
	Per Hogg			
OUTPUT	D.W.	Value	D.W.	Value
	lb.	£ s d	lb.	£ s d
Meat	13.7	2 18 8	7.1	1 7 10
Wool	-	-	-	-
TOTAL OUTPUT	13.7	2 18 8	7.1	1 7 10
COSTS	Quant.		Quant.	
Foods - Roots & Greenfodder (cwt.)	22.00	18 0	22.00	1 8 0
Cake & Corn (lb.)	7.84	1 2	12.32	2 5
Hay (lb.)	10.08	10	42.56	2 5
Grazing	-	5	-	-
Total Foods	-	1 0 5	-	1 12 10
	Hours		Hours	
Labour - Manual	1.89	5 5	1.91	5 8
Horse	-	-	-	-
Tractor	-	-	-	-
Total Labour	-	5 5	-	5 8
Miscellaneous - Overheads	-	2 0	-	2 0
Equipment Depreciation	-	5	-	5
Haulage	-	7	-	2
Sundries	-	-	-	5
Total Miscellaneous	-	3 0	-	3 0
TOTAL COSTS	-	1 8 10	-	2 1 6
MARGIN	+ £1 9 10		- £0 13 8	
SOME EFFICIENCY MEASURES				
No. Hoggs Per Feed Acre	13.8		11.1	
Margin Per Feed Acre	+£20 10 6		- £7 11 9	
Feeding Period (Weeks)	14.3		13.7	
Costs Per Hogg Feed Week	2s. 0d.		3s. 0d.	
Estimated D.W. Gain Per Hogg Feed Week (lb.)	0.96		0.52	
Costs Per lb. D.W. Gain	2s. 1d.		5s. 10d.	

Table 9. THE WINTER FATTENING ENTERPRISE

OUTPUT, COSTS AND MARGINS PER HOGG ACCORDING TO THE ESTIMATED WEEKLY RATE OF D.W. GAIN - 50 UNSHORN FLOCKS
TWO-YEAR AVERAGE 1952 - 1954

	Weekly Rate of D.W. Gain					
	¾ lb. and Under			Over ¾ lb.		
No. of Flocks	21			29		
No. of Hoggs Fattened	2745			3134		
	Per Hogg					
OUTPUT	D.W.	Value		D.W.	Value	
	lb.	£ s	d	lb.	£ s	d
Meat	7·4	1 9	2	13·4	2 7	2
Wool	-	-		-	-	
TOTAL OUTPUT	-	1 9	2	-	2 7	2
COSTS	Quant.			Quant.		
Foods - Roots & Greenfodder (cwt.)	21·00	1 4	7	19·40	19	11
Cake & Corn (lb.)	7·84	1	7	8·96	1	5
Hay (lb.)	30·24	1	7	22·40	1	2
Grazing	-		5	-		5
Total Foods	-	1 8	2	-	1 2	11
	Hours			Hours		
Labour - Manual	1·69	4	10	2·10	5	10
Horse	-	-		-	-	
Tractor	-	-		-	-	
Total Labour	-	4	10	-	5	10
Miscellaneous - Overheads	-	1	10	-	2	2
Equipment Depreciation	-		5	-		5
Haulage	-		5	-		5
Sundries	-		2	-		2
Total Miscellaneous	-	2	10	-	3	2
TOTAL COSTS	-	1 15	10	-	1 11	11
M A R G I N	- £0 6 8			+ £0 15 3		
SOME EFFICIENCY MEASURES						
No. Hoggs Per Feed Acre	11·1			12·5		
Margin Per Feed Acre	-£3 15 10			+ £9 10 8		
Feeding Period (Weeks)	14·2			12·1		
Costs Per Hogg Feed Week	2s. 6d.			2s. 7d.		
Estimated D.W. Gain Per Hogg Feed Week (lb.)	0·52			1·07		
Costs Per lb. D.W. Gain	4s. 10d.			2s. 5d.		

APPENDIX A.

METHOD OF COSTING

The accounting technique employed in determining the various cost items are as follows:-

FOODS

Purchased - charged at the actual cost to the farmer.

Homegrown - the costs of production of all forage crops fed to the sheep were determined on each farm surveyed. The other homegrown feeding-stuffs, such as hay and corn, were charged as follows:-

Food	Per Ton
	£
Hay	6
Dredge	16
Oats	20

Grazing - the actual costs incurred on grassland were determined for both pasture and hay/silage land. To determine the total cost of grazing, one-half the costs incurred on hay/silage land, excluding harvesting costs, was charged for the aftermath grazed by livestock and added to the pasture land costs. Of the total cost thus derived, one-third was charged to the winter period of November to April, and two-thirds to the summer period of May to October.

The total winter and summer grazing costs were apportioned according to the number of animal units of the different classes of livestock grazing the pastures. The conversion factors used in determining these animal units were as follows:-

		Animal Units
Cattle:	2 years and over	1
	1-2 years	½
	Under 1 year	¼
Sheep:	1 year and over	1/5th
	6-12 months	1/7th
	Under 6 months	1/10th
Horses:	Work	1
	Other	½
Pigs:	6 months and over	¼
	Under 6 months	1/8th
Poultry:	Hens	1/100th

LABOUR

Manual - charged at 2s. 10d. per hour.

This overall hourly rate was arrived at by adding to the National Minimum Wage Rate an allowance for perquisites, employer's share of N.H.I., overtime and also an allowance to cover the time lost through sickness, etc.

Horse - charged at 1s. 3d. per hour.

Tractor (Medium Power) - charged at 4s. 6d. per hour.

OTHER COSTS

Depreciation on Machinery - rates used were as follows:-

On Grassland - 5s. 0d. per acre
On Forage Crops - 20s. 0d. per acre

Depreciation on Sheep Equipment - the following annual rates were applied:-

	% of Cost
Wire	25
Hurdles	20
Wooden Stakes	50
Troughs	10
Clippers	5
Engine	5

General Farm Overheads - charged at 7s. 6d. per £1 of manual labour directly expended on the sheep.

Manures - Artificial manures were charged at Net Cost to the farmer. Farmyard Manure was entered at 15s. 0d. per ton.

Ley Establishment - the entire cost has been charged to the grassland in the first year.

MANURIAL AND CULTURAL RESIDUES

On Grassland - no manurial residues from preceding years were charged, and none carried forward to succeeding years.

On Forage Crops -

(a) brought forward from the previous crop and charged to the forage crops:-

$\frac{1}{3}$rd cost of Farmyard Manure and applying
$\frac{1}{3}$rd cost of all Artificials (excluding straight nitrogenous fertilisers).

(b) carried forward to the following crop:-

$\frac{1}{3}$rd cost of Farmyard Manure and applying
$\frac{1}{3}$rd cost of all Artificials (excluding straight nitrogenous fertilisers).

(c) Lime - the cost of lime and applying was spread over 5 years.

(d) One-half the costs of the cultural operations up to seeding on the forage crops were credited as a cultural residue in respect of cleaning, and carried forward to the following crop.

Sheep

(a) the residual manurial values of all forage crops folded were credited at £2 per acre. All other foods fed were credited according to the recommendation of the Scott Watson report.

(b) a credit of 10s. 0d. per acre was allowed as an arbitrary assessment of the treading value of the sheep in respect of all folded crops.

STORE WEIGHTS OF THE SHEEP - the initial deadweights of the store sheep, and the weights of those remaining on the farm at the conclusion of the investigation were estimated by the farmers.

FEED ACRE - this term includes an estimated conversion for purchased feeding-stuffs and, therefore, represents the entire acreage equivalent devoted annually to the sheep.

APPENDIX B.

PREVIOUS REPORTS ON SHEEP FARMING BY THIS DEPARTMENT

Report No.		Date of Publication
45	Changes in the Practice of Sheep Farming on the Red Loams of Mid-Devon.	July, 1935
80	Costs and Returns of Fattening Sheep on Roots in Devon.	July, 1954