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Sheep Cost of production

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PROFITS FROM ARABLE SHEEP FLOCKS.

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PROFITS FROM ARABLE SHEEP FLOCKS.

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An Investigation into the Costs and Returns from Sheep Flocks kept on Light Land Arable Farms in the East Midlands 1949-50 to 1951-52

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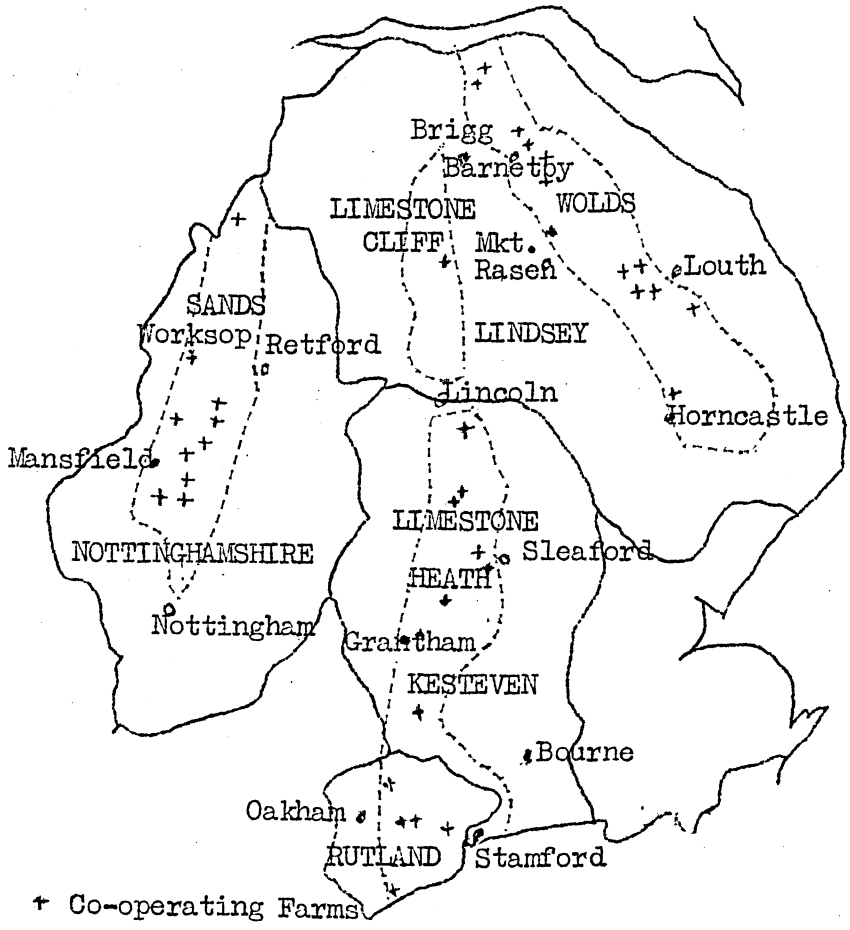
APRIL 1953.

SKETCH MAP OF SAND, WOLD AND LIMESTONE AREAS
SHOWING SHEEP FARMS IN INVESTIGATION 1949-52



PROFITS FROM ARABLE SHEEP FLOCKS.

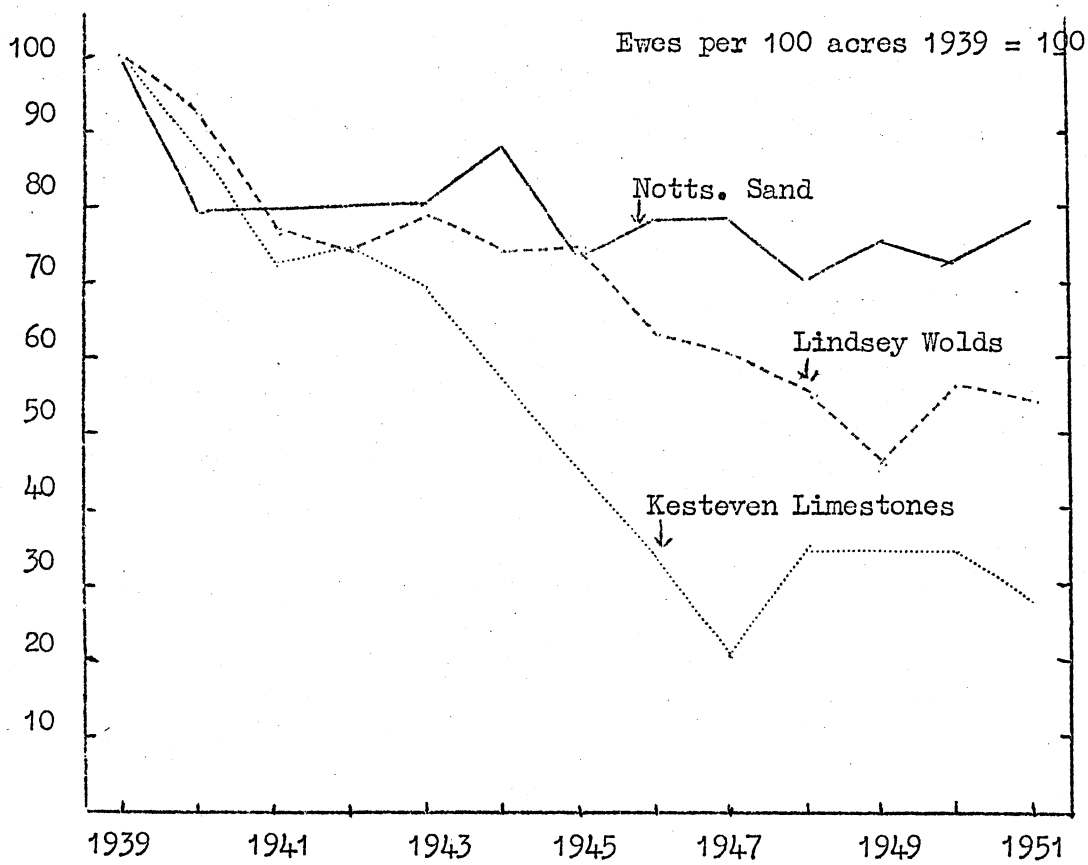
Introduction

During the years 1949-50 to 1951-52, an investigation was made into the economy of sheep flocks on the light land farms of Nottinghamshire, Lincolnshire and Rutland. This report examines the costs, returns and profits from 39 flocks and considers the importance of sheep to the light land arable farmer.

In the last 15 years, sheep flocks declined in the arable counties and upon light land arable farms. Whilst flocks are recovering from the depletion following the severe storms in February and March 1947, there is little indication of a return to the numbers kept in the late 1930's.

CHANGES IN EWE FLOCKS ON LIGHT LAND ARABLE FARMS IN THE EAST MIDLANDS 1939 TO 1951

Graph 1.



Based on data extracted from the Farm Management Survey.

Why keep sheep? The light land arable farmer devotes his main resources to the production of cash crops. To maintain high yields of these crops, he conserves soil fertility by resting the land periodically and building up the humus content and soil texture by means of leys. In his choice of a suitable use for these leys, the farmer will be guided by:

(a) its effectiveness in soil conservation.

(b) its adaptability to the labour demands of cash crops.

(c) the relative profit from alternative uses.

(d) his own personal preference.

Technically the sheep is considered an effective agent of soil conservation. It is probable that the decline in relative profit and the high cost of shepherding by pre-1939 methods made personal preference the main factor in the decision to keep sheep in the years 1940 to 1950.

The potentialities for profit from sheep have improved in the last few years. The extension of sugar beet growing on light land provides valuable feed at low labour cost and recent advances in pest and disease control have reduced shepherding time. Following recent reviews prices for fat sheep and wool have been increased to encourage greater production, particularly wool prices which have risen from 2s. 3d. per lb. for the 1950 clip to 6s. 0d. per lb. for the 1951 and 4s. 6d. for the 1952 clip.

A Note on Technique.

The first task is to decide the treatment of the value of sheep as an agent of soil conservation. It is difficult and costly to evolve an accurate method of estimating in £. s. d. the value of the improvement in soil fertility and texture which follows the consumption of crops and leys in situ by sheep. In comparing results between farms and groups of farms, arbitrary figures have little meaning and in this report no allowance has been made for manurial and cultural residues arising from sheep folding and grazing.

Secondly, beet tops are used extensively on these farms and the profits from sheep are influenced considerably by the value given to the tops. Beet tops have been treated in two ways giving two calculations of the profit or loss from sheep. To show the relative efficiency between flocks, the consumption of beet tops has been estimated and valued at 38s. 0d per ton for the 1949 crop and 40s. 0d. per ton for the 1950 and 1951 crops. On the other hand, to show the contribution of sheep to farm profits, no charge has been made for beet tops.

PROFITS, COSTS AND RETURNS FROM THE SHEEP ENTERPRISE.

On most of the farms from which information was collected, the sheep policy is to keep a ewe flock and to fatten the lambs, cull ewes and cull wethers during the winter. In some cases sheep are purchased for winter feeding to supplement the home bred lamb crop. This combination of breeding and winter fattening is a convenient unit to consume roots, beet tops and leys and, in larger flocks, provides regular employment for a shepherd during the greater part of the year.

During the two years 1949-50 to 1950-51, on average, sheep have been profitable on these farms, and they have shown a satisfactory return for the capital and land used. Thus, before charging beet tops, the average profit from the combined enterprise of breeding and feeding was £2.12s. per ewe in 1949-50 and £5.16s. per ewe in 1950-51. Investment in working capital and livestock has been estimated at £22 per ewe and the profit was a return on capital of 12 per cent and 26 per cent respectively. The profit per acre of land used was £3.15s. in 1949-50 and £8.18s. in 1950-51, which compares with an overall profit of £6.7 per acre from a number of similar light land farms for the harvest year 1950.

At the same time, sheep and sugar beet are associated on most of these farms and a proportion of the profit from sheep has been derived directly from the consumption of beet tops. This share of the profit has been estimated as the profit or loss on the feeding sheep plus the feeding value of tops fed to the breeding sheep and amounted to £5. 9s. per acre of beet tops folded in 1949-50 and £13. 8s. per acre in 1950-51, a substantial contribution to the economy of beet growing.

Breeding and Feeding Considered as Separate Enterprises.

In order to examine the sheep enterprise more closely it is convenient to separate the two processes of breeding and feeding. The arbitrary point of division has been taken on each farm as the day in September or October when it is customary to sort the sheep.

During the period of this investigation, prices of store sheep did not vary greatly and transfer values between the two related enterprises of breeding and feeding have been stabilised. This made it possible to distinguish between the costs and returns from the two enterprises with reasonable fairness to both.

Sheep breeding 1949-50 and 1950-51.

Before charging beet tops, the profits from breeding were £2.12s. per ewe in 1949-50 and £3.13s. in 1950-51. (Appendix Table 1).

The increase in profits was due mainly to the extra sales of wool, £1. 8s. per ewe in 1949-50 and £3. 4s. in 1950-51.

The differences in cost were slight, £5.14s. and £5.17s. per ewe in 1949-50 and 1950-51 respectively, but the net output of livestock declined from £6. 1s. per ewe in 1949-50 to £5. 8s. per ewe in 1950-51, due to an increase in the deficit on the breeding and rearing sheep. (Appendix Table 2).

Output from lambs showed little change, a smaller crop in 1950-51 being compensated by higher values.

The importance of output in successful breeding is shown in Tables 1 and 2 comparing the five flocks making the highest profits with the five making the lowest. Thus the high profit flocks disposed of more lambs per 100 ewes at a higher average value without decreasing the profit from the fattening of the lambs. The higher lamb crop is not directly related to breed and the obvious inference is that the general management of the flock has an important bearing on the output and financial results.

The pattern of flock replacement was not consistent from year to year and it does not appear to have any direct significance as between the high and low profit groups.

Wool sales per ewe were higher in the high profit flocks, due mainly to the wool from the extra rearing and other sheep in these flocks.

The low profit flocks fed more folded crops and supplementary feed at a higher cost than the successful flocks which rely upon grass at all seasons of the year to a much greater extent. Ewes can find a living from winter grass keep in comparatively mild winters such as those of 1949-50 and 1950-51 and produce more and healthier lambs than ewes receiving more concentrates, mangolds and folded crops.

Although the high profit flocks includedmore "rearing and other sheep", they used less labour per ewe than the low profit flocks.

To sum up, lower feeding costs, more efficient labour use and a higher output of lambs, sheep and wool point to better management in the high profit group as the most important factor contributing to the profitableness of the sheep enterprise.

Three Seasons Sheep Feeding 1949-50 to 1951-52.

In 1950-51 and 1951-52, both prices and food supplies for feeding sheep differed considerably from those in 1949-50 and profits from sheep feeding increased from 1s. 0d. per sheep fed in 1949-50 to £1.13s. per sheep fed in 1951-52. (Appendix Table 3).

In 1949-50 the price per lb. for fat lambs rose steadily from October to April and a fat lamb increased in value by about 1s. 0d. per week, apart from any increase in weight. Wool prices were low and food supplies were short as a result of the hot, dry summer of 1949.

The following season, the price per lb. for fat lambs was unchanged during October and November, but was increased as from 4th December, 1950 and, with ample feed supplies, the farmer was encouraged to hold his sheep much longer, about five weeks on average in the group under investigation. (See Table 3). Thus a first grade lamb, estimated dressed carcase weight 70 lbs. was worth £8. 0s. 5d. from the 8th to 14th January, 1951, whereas a sheep of the same weight in April was worth £9. 0s.10d. An expected rise in wool and fat sheep prices took place on 1st April following the February Price Review and a clipped sheep of 70 lbs. estimated dressed carcase weight plus 8 lbs. wool made about £11.15s. in April and May. In the following season 1951-52 this price structure was further modified by bringing forward to 18th February, the date at which an unshorn sheep would make more per lb. than a shorn sheep. This apparently did not encourage earlier marketing since feed supplies were good and these farmers preferred to continue feeding until April and May when the highest price for sheep was obtained.

There was little difference between incoming values in 1949 and 1950 but the increase in sheep and wool prices increased disposal values and the output of sheep and wool rose from £1.15s. per sheep in 1949-50 to £3. 7s. in 1950-51. Better sheep prospects tended to increase store values in 1951, but the increase in disposal prices was greater and the net output of sheep and wool rose to £3.19s. per sheep in 1951-52. The longer feeding period in the two seasons 1950-51 and 1951-52 resulted in higher costs of all items. Without making any credit for the residual value of folding and making no charge for beet tops, costs rose from £1.14s. in 1949-50 to over £2. in the two following seasons.

The importance of finishing sheep in order to make a profit on feeding is common to all seasons. Between the flocks making the five highest and five lowest profits, there is not a marked degree of variation in methods or in the amounts of farm resources used for sheep feeding. (Appendix Tables 5 and 6). The net output of sheep and wool is the most important consideration and the flock-masters making the highest profits are those who obtain the greatest margin between incoming and outgoing values by selling the highest proportion of fat sheep.

When feed supplies are short as in 1949-50, it pays to keep feeding sheep in good condition and to sell them fat before feed supplies run out. Thus many farmers sold sheep fat off beet tops in January 1950, rather than risk a loss in condition on poor crops of sheep feed. The least successful feeders took their sheep off the fold in February, March and April in store condition and either sold them as stores or kept them on leys until the autumn.

In the next two seasons, feed supplies were plentiful and the high profit group fed more folded crops per sheep week and reduced concentrate feed from 4 lbs. to 3 lbs. per sheep week. The sheep fattened at a slower rate but finished when the price per lb. was higher and were worth much more than in January. If they were kept into April and May, it was usual to clip them and the combined value of the fleece and carcase was generally higher than for the same sheep unshorn. Such late feeding has a disadvantage in that the late sowing of barley after the folded crops results in lower yields although it is customary to plough and sow right up to the fold to keep this loss to a minimum.

On the other hand, the low profit group was unable to fatten and market their sheep at the best time. Whilst supplies of food were maintained, conditions were unsuitable for fattening and the sheep were taken off the fold in store condition when folding was completed. The type of sheep is probably important and it is noticeable that more of the heavier and slow maturing long wool sheep are found in the low profit group whereas the successful flocks include more down and down cross hill sheep.

Thus to be successful in feeding both efficient management and a suitable type of sheep are required so that the fattening sheep can be kept in good condition, grow at the required rate and finish quickly to be ready for sale at the best time for marketing.

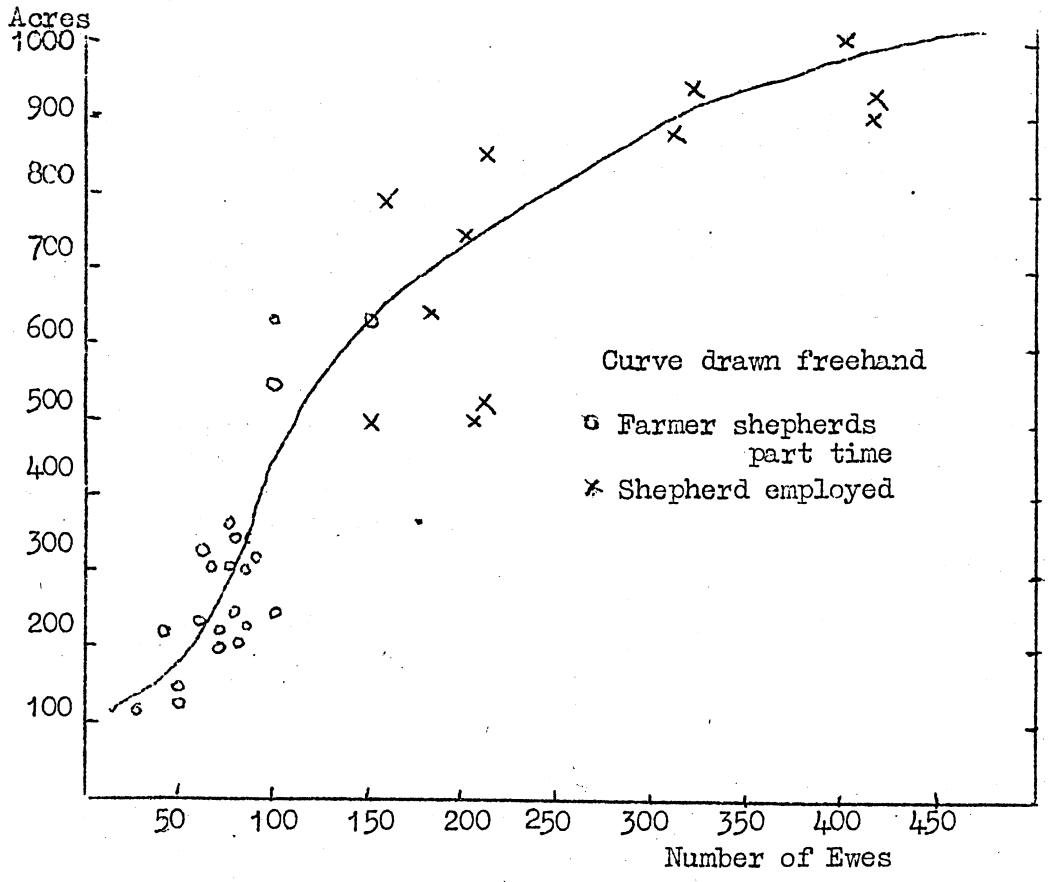
Size of Flock.

The breeding flocks can be divided into two groups. The smaller flocks of 25 to 110 ewes were found on farms up to 400 acres and were shepherded as a part time job by the farmer or farm manager. The larger flocks of 150 to 410 ewes were found on farms over 500 acres employing a shepherd who spends most of his time with the sheep during the winter months and a considerable proportion during the summer months, filling in with the supervision of cattle at grass and general farm work.

Corresponding with this division the feeding flocks have been divided into small flocks feeding up to 150 sheep in the season and large flocks feeding over 150 sheep.

SIZE DISTRIBUTION OF BREEDING FLOCKS IN RELATION TO SIZE OF FARM.

Graph 2.



It is possible that this division is significant. Thus the farmer or manager can only handle up to about 100 ewes and followers as well as carry out his other duties. For example, one farmer in 1950-51 was shepherding a flock of 150 ewes on 535 acres and found this was more than he could do without detriment to flock and farm. On the other hand it is probable that it is not worth while to employ a trained shepherd unless there is ample scope for his ability and 150 ewes and followers may be the minimum.

The large flocks were generally more profitable than the small owner shepherded flocks. (Appendix Tables 7 and 8). Thus, making no charge for beet tops and charging the farmer's own labour at standard rates, the large breeding flocks showed a slight advantage per ewe in 1949-50 and 11s. 0d. per ewe in 1950-51. Similarly, the larger feeding flocks showed an advantage over the small flocks of 12s. 0d. per sheep in 1949-50 and 18s. 0d. in 1950-51.

It is difficult to decide which was technically more efficient. Thus the small flocks had better breeding results and a higher output of sheep and wool. The number of lambs tailed per 100 ewes was higher and higher values on sale or on transfer to the feeding flock suggest that they were in better condition. In the feeding stage the small flocks lost some of this advantage. Although the average weight of fat lambs sold was higher than in the large flocks, the proportion sold fat was lower and on balance there was little difference in the net output of sheep from large and small feeding flocks.

The larger breeding flocks reared more and bought fewer replacements than the smaller flocks, probably because they have relatively more room to keep rearing sheep. In 1949-50, high prices for fat and store cull ewes reduced the cost of replacement in the small flocks, otherwise there was little difference over the two years in losses, replacement rate and replacement cost.

The costs and methods of feeding the large and small breeding flocks were similar but the small feeding flocks incurred higher feed costs by using more folded crops (including beet tops) and feeding less concentrates.

Labour costs were higher in the small flocks. According to the records, the farmer-shepherd spent more time per sheep and walked rather than rode. However, he was usually performing managerial duties at the same time and the actual cost in time may be much less. Allowing for this and for the fact that farmers' labour has been charged at standard rates, it is probable that there was not much difference between the profitableness of the large and small flocks, especially in their contribution to the overall farm profit.

SAND, WOLD AND LIMESTONE FLOCKS.

Whilst the flocks included in this study were all kept on light land farms, they were in three areas differing in soil climate, farm organisation and tradition.(1)

One group of flocks was on the Nottinghamshire Sand, an area extending northward from Nottingham to Bawtry. The soils are porous dry sands derived from the Bunter Sandstones. The area is inland at a height of 200 to 400 feet above sea level.

A second group was on the Lincolnshire Wolds, an area extending in a north westerly direction, parallel to the coast from Skegness to the Humber. The soils are light, vary in depth and overlie chalk. The area is a raised table land of undulating hills rising to 450 feet above sea level and exposed to keen sea breezes which delay crop growth and may be trying for sheep flocks.

The third group of flocks was on the Lincolnshire Limestone lying further inland than the Wolds. To the north of Lincoln it is a narrow ridge devoted mainly to cash cropping .

More sheep flocks are found to the south of Lincoln where light soils overlie the oolitic limestone at a height of 300 to 400 feet above sea level. The ridge widens south of Grantham and areas of heavy soil are interspersed with limestone. Many farms have both types of soil but the system of farming is based upon the limestone tradition.

The organisation of the farms included in the investigation differed in each area. On the Sand farms, about one third of the acreage was devoted to cash crops, mainly barley, wheat, potatoes and sugar beet, which together accounted for about one half of the farm output. The other two thirds of the acreage was used for cattle and sheep feeding, both of which contributed more to the farm output than on the Wold and Limestone farms. On the Wold farms over half the acreage was devoted to cash crops of which barley was the most important, occupying one quarter of the land. Cattle were relatively unimportant whilst sheep were nearly as important as on the Sand. On the Limestone farms, more wheat and less barley was grown than on the Wolds and the total acreage of cash crops and their output was more than half the total. Sheep were of lesser importance to the Limestone farmer than to those on the Sands and Wolds.

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(1)

Note: For a fuller description of farming in these areas the following publications can be consulted.

S.M. MAKINGS. The Economics of Poor Land Arable Farming. E. Arnold & Co., London, 1944.

E. MEJER. Sand Land Farming. University of Nottingham, Dept. of Agricultural Economics, St. Michael's House, Sutton Bonington, Loughborough. 1949.

J.H. SMITH & P.P. RICHARDSON. Farming in the Lincolnshire Limestone Areas. University of Nottingham, Dept. of Agricultural Economics, St. Michael's House, Sutton Bonington, Loughborough.

LAND USE AND FARM OUTPUT ON LIGHT LAND SHEEP FARMS.
(Mainly for harvest year 1949)

	Land use per 100 acres				Farm output per cent		
	Sands	Wolds	Lime-stone		Sands	Wolds	Lime-stone
No. of farms	10	10	9	No. of farms	8	10	5
Acreage per farm	294	582	535				
	acres	acres	acres		per cent	per cent	per cent
Sale grains	20	39	40	Sale grains	20	41	43
Sugar beet	5	10	8	Roots	24	29	32
Potatoes	6	6	4	Other crops	2	3	1
Other sale crops	2	1	1	Fodders	1		
Total sale crops	33	56	53	Total crops	47	73	76
Feed grains	14	6	5	Sheep and wool	18	15	8
Feed roots	8	3	5	Cattle	22	8	14
Leys mown	8	6	14	Pigs	7	2	1
Leys grazed	13	11	8	Poultry & eggs	6	2	1
Total arable	76	82	85	Total livestock	53	27	24
Permanent grass	23	17	14				
Other land	1	1	1				
TOTAL	100	100	100	TOTAL	100	100	100

Breeds of Sheep.

Considerable variation in sheep breeds is found in these areas and two or more breeds of ewes are often kept in the same flock. Five breeding policies have been observed.

1. Pure bred longwool flocks. The Lincoln and Leicester Longwool breeds still have their adherents and six flocks were using longwool rams either to maintain an all longwool flock or to keep a nucleus of longwool ewes for cross breeding.

2. Down cross longwool flocks. The general practice is to cross a proportion of longwool ewes with a down ram (Suffolk, Oxford or Hampshire) and to retain the ewe lambs for flock replacements. Two modifications of this practice are met:-

(a) to buy in gimmers bred in this way,

(b) to breed from the cross bred using rams of the same cross as the ewes.

3. Down crosses. By judicious use of rams and selection of ewes, a ewe intermediate in type between the Suffolk and Oxford is kept.

4. Pure bred downs. Pedigree Oxford and Suffolk flocks were established in these areas and they persist today mainly as non-pedigree flocks.

5. Hill breeds. Mashams, Scotch Half-breds and Suffolk x Half-breds are favoured by some farmers. These are usually replaced by the annual purchase of lambs or gimmers bred in their native districts since breeding locally has not proved successful.

The pure bred longwool and down flocks are not generally favoured and the down cross longwool and down crosses are more numerous. There is a preference for Suffolk rams for breeding both flock replacements and feeding sheep. The Oxford, producing a bigger lamb, is used in about 40 per cent of the flocks, but for quicker feeding the Hampshire is sometimes preferred.

The absence of a general breeding policy is most marked. There appears to be a movement towards a breed intermediate in type between the Suffolk Down and the Lincoln Longwool, but with the higher fertility and milking qualities of the Scotch Half-bred.

On the Sand, the main breeds of ewes were down cross and Scotch Half-bred. Thirty one per cent of the ewes in these flocks were replaced for the 1949-50 breeding season and 40 per cent for the 1950-51 season. Although more than half of these replacements were purchased hill bred stock, this practice does not appear to increase unduly the cost of maintaining the ewe flock and this group had the lowest average cost (Appendix Table 9), £1. 6s. per ewe in 1949-50.

On the Limestone, the Suffolk and Lincoln breeds were about equally divided, either pure or the first cross between them. Suffolk breeders in this area are dissatisfied with the Suffolk as a commercial sheep and are tending to replace them with hill bred ewes. About 30 per cent of the ewes in the Limestone flocks were replaced annually, slightly more than half of these being home reared.

On the Wold, the Lincoln Longwool, pure or the first cross with a Suffolk was dominant. The annual replacements were 30 per cent and about two thirds of these were home bred. The higher proportion of home bred replacements increased the numbers of "rearing and other sheep" kept.

Costs and Returns from Sand, Wold and Limestone Flocks.

On the sheep enterprise as a whole, the Sand flocks were most profitable, making a profit of £3. 7s. per ewe in 1949-50 and £7. 1s. in 1950-51 (beet tops free), whilst the Wold flocks were least profitable, £1.16s. per ewe in 1949-50 and £5. 4s. in 1950-51. (Appendix Table 9).

PROFITS FROM THE SHEEP ENTERPRISE SAND, WOLD AND LIMESTONE FLOCKS. 1949-50 AND 1950-51

	Per ewe		
	Sand flocks	Wold flocks	Limestone flocks
	£. s.	£. s.	£. s.
Profits - beet tops charged			
1949-50	2. 8.	loss 5.	1. 8.
1950-51	5. 5.	2.15.	4. 2.
Profits - beet tops free			
1949-50	3. 7.	1.16.	3. 6.
1950-51	7. 1.	5. 4.	6. 3.

The Sand flocks were smaller than those in the other areas but they fed proportionately more sheep, having reared more lambs and also purchased more. The higher profits were due to better all round management. It is probable that the Sand farmers placed more importance upon prolificacy and milking qualities in the ewe. As a result the number of lambs tailed was over 130 per 100 ewes in both years, consistently better than both Wold and Limestone flocks. The lambs were worth more at weaning time and tended to finish at a higher average dressed carcase weight. At the same time feeding costs were lower, fuller use being made of grass and folded crops in order to save on concentrates.

On the Limestone, sheep tended to finish fattening earlier and at a greater weight, probably the result of a much higher level of concentrates feeding. Thus in 1950-51 the Limestone farmers maintained the same level of sheep feeding as in 1949-50 and used the increased supplies of folded crops to feed more cattle and sheep. A high lamb crop in 1949-50 provided extra sheep for feeding, but purchases were increased as well. In contrast, the Wold and Sand farmers lengthened the feeding period and the sheep ate over 50 per cent more folded crops per sheep.

On the Limestone, higher labour and transport costs can be attributed to scattered farms, sheep at a distance from the farmhouse and the general attitude of large scale farmers to transport. On the smaller Sand farms, the shepherding is done either on foot or en route, whilst the larger farms on the Sand and Wold appear to be more compact and save undue travelling.

On the Wold farms, flocks were larger. Here the longwool tradition is strongest and has influenced the results from the sheep enterprise. The number of lambs tailed averaged only 112 lambs per 100 ewes over the two years compared with 130 on the Limestones and 132 on the Sands. In the autumn, these lambs were valued lower than those on the Sands and Limestones and in both years the value of the net output of lambs from the breeding flock was much the lowest of the three districts. When these lambs were fed they proved the least profitable and comparison with the other districts showed that:-

(i) they were fed longer for a lower increase in value.

(ii) the proportion sold fat was only 38 per cent of the total feeding flock in 1949-50 and 29 per cent in 1950-51 compared with over 70 per cent on the Limestone.

(iii) the fat sheep were a few pounds lighter and the average price received was the lowest.

(iv) more food was used per fattening sheep.

The Wold farmer places the returns from wool high in the economy of the sheep enterprise, but it is significant that in the year of the highest prices for wool, 1950-51, the higher sales of wool per ewe from the Wold group were insufficient to raise the output of the whole sheep enterprise to yield a profit as high as the other two groups.

INTENSITY OF PRODUCTION.

In a diverse farming system such as light land arable farming with cattle and sheep, the farmer will tend to give more attention to those enterprises in which he is particularly interested and which he believes contribute mainly to his profit. The conditions during this study encouraged primary interest in the production of cash crops and the farmers did not attempt to maximise the output of sheep. This is shown in the management of leys, folded crops and sheep.

Low intensity of crop production and use.

The main crop used for soil conservation on light land arable farms is the ley. On the Wolds and Limestones and to a lesser extent on the Sands, a special one year ley is used solely for sheep grazing. A comparatively cheap seeds mixture is sown and little attempt is made to increase the yield by the direct application of fertilisers e.g. only six farmers out of 20 top-dressed their one year grazing leys in 1950. The longer ley tends to receive more fertiliser, but there is no attempt to graze intensively. In many cases, the ewe flock will have the exclusive use of one field or of two fields alternatively from late April until the flock is made up again in the Autumn. This contrasts with the strip grazing or rotational grazing adopted by dairy farmers or with the moving sheep fold used on light land farms in some areas.

Similarly the two types of permanent grassland used, low to medium quality summer grazing and the lambing field, are not encouraged to give higher yields, the former receives very little treatment and the latter is considered to have played its part each year in keeping the ewe flock during the lambing season.

During the winter months when grass is in least supply, crop residues, chiefly beet tops,, and specially grown crops of kale, swedes and turnips are the main sources of feed for the sheep flocks. These crops are produced at a relatively low cost per acre (Appendix Table 10). The light land farmer concentrates upon the sale crops, placing sheep feed crops last in allocating labour, time and fertilisers to their cultivations. This contrasts with the milk producer who produces more roots at a higher cost per acre in order to maximise milk production. Thus it is clear that in the growing of crops to be fed to sheep, the main concern is soil conservation rather than maximum feed for sheep.

Whilst grass and folded crops are the main crops used for sheep, other crops are available. Thus the light land farmer prefers to plough out leys after the hay crop has been taken and grow a catch crop such as rape and mustard. Also there are by-products such as weed growth on stubbles, autumn growth of new leys, aftermaths, beet tops and other residues.

Incidentally the new leys are valuable both for flushing ewes at tupping time or keeping stores in forward condition before folding. The sheep is a convenient instrument for consuming these products and at the same time applying the equivalent of a light dressing of dung. Whilst there is some conflict of evidence upon the after effects, on the whole it is agreed that yields of subsequent crops are higher. Yet, there are indications that intensive use is not made of the feed available . Thus an estimate of the proportion of beet tops consumed out of the total yield shows that in only a few cases was a high recovery rate of beet tops achieved.(1)

DISTRIBUTION OF THE RECOVERY RATES OF BEET TOPS BY SHEEP FOLDING.

Recovery rate %	Number of farms	
	1949-50	1950-51
Under 15	3	3
15 - 25	3	3
26 - 35	2	3
36 - 45	9	5
46 - 55	4	4
56 - 65	2	4
Over 65	3	1
Total	26	23

Low Intensity of Sheep Management.

The management of the sheep flock also shows its secondary position in the farm enterprise. It is not suggested that the skill and art of shepherding these flocks was poor; indeed it would be regarded by fellow farmers as quite good.

Yet the results from breeding indicate that the flock owner is not putting his utmost into the enterprise. The rather haphazard breeding methods suggest a lack of attention to the pursuit of a breed with high fertility and an ability to keep fat whilst on the fold.

(1) Farm Management Notes No.6. Autumn, 1951. University of Nottingham Department of Agricultural Economics, St. Michael's House, Sutton Bonington, Loughborough. In this note the recovery rate is defined as "the estimated consumption of tops calculated as a percentage of the yield of clean beet."

The total number of lambs born, 144 per 100 ewes in 1950 and 134 in 1951, was not high. Sales of fat ewes indicate that from five to ten per cent of ewes prove barren and some losses occur through premature births. With a low start, the losses of lambs emphasise the failure to apply managerial care to the avoidance of waste. In 1949-50 and 1950-51, 23 lambs per 100 ewes were lost from various causes before the lambs were ready for disposal to the feeding flocks or as stores for sale at the autumn fairs. From 15 to 20 ewe lambs per 100 ewes are needed annually to make good the natural wastage of ewe flocks, leaving about one lamb per ewe for sale.

SHEEP LOSSES IN FEEDING AND BREEDING FLOCKS.
1949-50 and 1950-51.

	Per 100 ewes	
	1949-50	1950-51
Lambs: Total born or potential crop	144	134
Total tailed	129	116
Lambs: Born dead	6	5
Lost before tailing	9	13
Lost between lambing and disposal	8	5
Total casualties and deaths	23	23
Ewes casualties and deaths during year	10	9
Feeding sheep lost during feeding period	3	3

In addition ewe losses were 10 per cent of the total flock in 1949-50, nine per cent in 1950-51 and nearly three per cent of the feeding flock died within the six month feeding period. By comparison a dairy farmer with most of his farm resources devoted to milk production would be seriously perturbed at an annual death rate amongst his cattle of three cows, four calves and two young beasts from a herd of 30 cattle plus followers.

The low intensity continues into the feeding process - instead of relating the number of sheep fed to the total supply of feed, the tendency is to let the sheep already available consume the feed by staying on the farm several weeks longer. Thus capital investment is not increased by the purchase of sheep in the autumn when there is a shortage of liquid capital. At the same time labour and supplementary feed tend to be used at the same rate per sheep whether there is ample or little food so that in the long run the expenditure per sheep on labour and concentrated feed is higher. The extra labour is probably a slight diversion of labour within

the sheep enterprise and occurs at a time when it does not unduly conflict with the demands of arable crops whilst the extra feed cost, a few more pounds of purchased cake and meals, is covered by the increased returns from mutton and wool. There is no extra cost involved in the home grown feed since the cost of running the farm is unchanged whether yields are high or low and the essential cultivation, the consumption of crops and crop residues upon the land, is carried out without increasing the input of land, labour and capital.

All this points to the possibilities of increasing farm output and profit from the resources available to the sheep enterprise. An additional yield of lambs would increase the output of the breeding flock and provide more lambs for winter folding without increasing the capital investment. In turn the extra lambs would increase output from feeding without increasing labour and home grown feed costs.

In the circumstances of the years 1949 to 1952, many flock owners may not have made this effort to increase sheep profits because the additional income after deduction of income tax was not sufficient incentive to increase the existing farm profits.

NOTES ON METHOD.

Period:

Breeding Year - on each farm, the breeding year starts on the day upon which the breeding flock is made up.

Feeding Season - on each farm, the season starts on the day upon which the feeding flock is made up and ends either when the last batch of fat sheep are sold or when the flock comes off fold to be kept or sold as stores.

Size of Flock:

Ewes - the number put to the ram.

Feeding Sheep - the total number brought in to feed.

Sheep Weeks - the number of weeks each sheep was upon the farm. Records were kept of the weeks upon each crop, ley or grazing.

Fat Sheep Weights - estimated dressed carcase weight is the graders' estimate at the fatstock collection centres.

Folded Crops - costed on each farm and charged at cost of production. No charge is made for overhead costs of folded crops and no credits for the residual benefits of folding. If costs were not available, the average cost was used. (See note on 1951-52).

Beet tops are valued at feeding value £1.18s. per ton in 1949-50 and £2. 0s. per ton in 1950-51 and 1951-52.

The quantity of folded crops consumed has been calculated from the difference between the estimated requirements of starch equivalent by breeding or feeding sheep and the amount of starch equivalent supplied by hand fed foods. (purchased feed, cereals, hay etc.).

Supplementary Home Grown Foods - oats, hay and mangolds have been valued at average costs for the East Midlands, and others at feeding value. Thus:-

	Average cost per ton	
	1949-50	1950-51 & 1951-52
	£. s.	£. s.
Oats	12. 5.	11. 3.
Seeds hay	4.16.	5. 0.
Mangolds	2. 3.	2. 5.

Grazing - fields used wholly or mainly for sheep were costed and an allowance made for other stock grazing the same field. No charge is made for overheads and no credit for the residual benefits of sheep grazing.

All other grazing at 6d. per sheep week.

Labour - full time shepherds at actual cost less allowance for other work. All other labour at the following rates per hour:-

	Per hour	
	1949-50	1950-51 & 1951-52
	s. d.	s. d.
Man including farmer	2. 3.	2. 6.
Horse	1. 2.	1. 4.
Wheeled tractors, lorries, jeeps	4. 0.	4. 0.
Cars and vans	3. 0.	3. 0.

Equipment:

Crop Costs - 2s. 6d. per tractor hour equivalent.

Sheep Costs - wear and tear at standard taxation rates plus actual expenditure on repairs.

Overheads - in 1949-50 one sixth and in 1950-51 one quarter of the manual labour cost on sheep plus folded crops.

1951-52 Feeding Sheep - folded crops were not costed for the 1951-52 season, the cost for the 1950-51 season being used. Records of sheep, feeding and labour were kept as in previous seasons but miscellaneous and overhead expenses were added at fixed rates based upon previous years.

Rearing and Other Sheep - these consist of gimmers and rams kept for flock replacements together with store sheep left over from winter feeding. The costs and returns from these sheep have been included with those of the breeding flock.

APPENDIX TABLES

SHEEP BREEDING, ALL FLOCKS, FIVE FLOCKS MAKING HIGHEST PROFITS AND FIVE FLOCKS MAKING LOWEST PROFITS. 1949-50 AND 1950-51 COSTS AND RETURNS.

TABLE 1 — Per ewe

	1949-50			1950-51		
	All	High	Low	All	High	Low
No. of flocks	30	5	5	30	5	5
Average number of ewes	146	154	183	152	139	117
OUTPUT LIVESTOCK AND WOOL	£. s.	£. s.	£. s.	£. s.	£. s.	£. s.
Lambs	6.18.	7.12.	5. 5.	6.19.	7.15.	5.18.
Rearing and other sheep	17.	2.15.	10.	6.	1. 0.	9.
	7.15.	10. 7.	5.15.	7. 5.	8.15.	6. 7.
Deficit on ewes and rams	- 1.14.	- 1.16.	- 2. 8.	- 1.17.	- 2.13.	- 2. 4.
Net output of livestock	6. 1.	8.11.	3. 7.	5. 8.	6. 2.	4. 3.
Sales of wool	1. 8.	1.16.	1. 6.	3. 4.	3. 2.	2.15.
Net output livestock and wool	7. 9.	10. 7.	4.13.	8.12.	9. 4.	6.18.
COSTS						
Feeding. Beet tops	17.	1. 5.	1. 7.	17.	1. 5.	5.
Folded crops	8.	10.	5.	11.	2.	19.
Grazing	1.14.	1. 8.	1. 5.	1.11.	1. 8.	1.12.
Other foods	1. 8.	16.	1. 8.	1. 4.	11.	1. 6.
Total foods	4. 7.	3.19.	4. 5.	4. 3.	3. 6.	4. 2.
Labour	19.	1. 1.	19.	1. 2.	14.	1.10.
Sundries and overheads	8.	7.	8.	11.	7.	15.
Total costs	5.14.	5. 7.	5.12.	5.16.	4. 7.	6. 7.
Profit (+) or loss (-)	+ 1.15.	+ 5. 0.	- 19.	+ 2.16.	+ 4.17.	+ 11.
Profit - beet tops free	+ 2.12.	+ 6. 5.	+ 8.	+ 3.13.	+ 6. 2.	+ 16.
SOME AVERAGE VALUES						
Ewes from previous year	7. 3.	7.18.	7.12.	7. 1.	6. 0.	7. 0.
Home-reared gimmers	9.16	10. 9.	10. 9.	9.14.	8.10.	10. 4.
Purchased ewes and gimmers	8.14.	9.10.	9.15.	9.15.	10.11.	10. 9.
Total incoming flock	7.15.	8.10.	8.13.	7.17.	7.16.	8. 3.
Total flock disposal	6. 2.	6.16.	6. 6.	6. 4.	5. 5.	6. 0.
Lambs - average value in stock at end of year.	5.13.	5.14.	4.18.	6. 4.	7. 0.	5.14.

SHEEP BREEDING. ALL FLOCKS, FIVE FLOCKS MAKING HIGHEST PROFITS AND FIVE FLOCKS MAKING LOWEST PROFITS. TWO YEARS 1949-50 AND 1950-51 FLOCK STRUCTURE AND QUANTITIES OF FEED AND LABOUR USED.

TABLE 2

	1949-50			1950-51		
	All	High	Low	All	High	Low
FLOCK REPLACEMENT	Per cent of total flock			Per cent of total flock		
Incoming						
Ewes from previous year	73	75	59	69	59	65
Home reared gimmers	15	23	21	19	5	27
Purchased ewes and gimmers	12	2	20	12	36	8
Total incoming	100	100	100	100	100	100
Disposal of ewes						
Sales - fat and store	5	6	6	13	8	13
Casualties and deaths	10	9	12	9	11	10
Culled at end of year	12	19	8	11	5	7
Carried forward to breed	73	66	74	67	76	70
Total disposals	100	100	100	100	100	100
LAMBS	Per 100 ewes			Per 100 ewes		
Fat	3	-	-	11	50	-
Store	5	-	3	15	11	34
Casualties and deaths	8	8	13	5	2	3
In stock at end of year	113	134	104	85	53	67
Total tailed	129	142	120	116	116	104
Deaths before tailing	9	7	10	13	17	13
Born dead	6	8	7	5	5	4
Total born	144	157	137	134	138	121
REARING AND OTHER SHEEP	Per 100 ewes			Per 100 ewes		
Total incoming	38	86	34	54	61	41
To breeding flock	19	35	20	21	13	18
			Per ewe			
FEED TO EWES AND RAMS	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.
Purchased cakes and meals	0.46	0.28	0.49	0.40	0.15	0.25
Home grown grains	0.45	0.17	0.59	0.33	0.20	0.26
Hay and chaff	0.16	0.10	0.18	0.13	0.13	0.15
Mangolds and swedes	5.66	2.16	3.72	4.42	1.89	10.95
Folded crops and beet tops	14.23	14.69	18.68	8.66	16.03	25.76
	Sheep weeks			Sheep weeks		
Leys	30.2	43.1	26.3	29.9	27.2	32.7
Permanent grass	10.7	8.8	19.2	9.3	7.0	6.6
LABOUR ON ALL SHEEP PER EWE	Hours	Hours	Hours	Hours	Hours	Hours
Man	7.3	6.8	7.8	8.1	5.2	11.1
Horse	0.4	0.7	0.2	0.4	0.1	0.1
Tractor, lorry, etc.	0.3	0.8	0.2	0.4	0.3	0.5

(1) Includes one large flock on swedes November - March part folded and part drawn out = average 6.84 cwts. to all sheep.

SHEEP FEEDING. ALL FLOCKS. THREE SEASONS 1949-50 TO 1951-52.
COSTS AND RETURNS.

TABLE 3

	Per sheep fed		
	1949-50	1950-51	1951-52
Number of flocks	31	27	19
Average number of sheep fed	225	232	200
Length of season per flock	weeks 22	weeks 29	weeks 28
Length of season per sheep	18	24	25
COST AND RETURNS PER SHEEP	£. s.	£. s.	£. s.
Average value on disposal	7.15.	8. 7.	9.16.
Average value incoming	6. 0.	5.15.	6.11.
Net increase in value	1.15.	2.12.	3. 5.
Sales of wool	-	15.	14.
Net output sheep and wool	1.15.	3. 7.	3.19.
Feeding. Beet tops	13.	17.	14.
Folded crops	15.	16.	18.
Grazing	1.	1.	2.
Other foods	12.	13.	14.
Total foods	2. 1.	2. 7.	2. 8.
Labour	4.	7.	8.
Sundries and overheads	2.	4.	4.
Total costs	2. 7.	2.18.	3. 0.
Profit (+) or loss (-)	- 12.	+ 9.	+ 19.
Profit - beet tops free	+ 1.	+ 1. 6.	+ 1.13.
AVERAGE VALUES			
Lambs at start	5.18.	5.13.	6. 7.
purchased	6. 1.	6. 6.	6.16.
All lambs into flock	5.18.	5. 2.	6. 8.
All wethers into flock	7.19.	8. 2.	8. 7.
All ewes into flock	6. 0.	5.16.	4.14.
Fat lambs	8. 6.	8.12.	10. 4.
Fat wethers	9. 9.	10.12.	11. 8.
Fat ewes	5.19.	6. 2.	8. 0.
AVERAGE ESTIMATED DRESSED CARCASE WEIGHT	lbs.	lbs.	lbs.
Fat lambs	68	69	75
Fat wethers	85	83	87
Fat ewes	93	86	101

SHEEP FEEDING. ALL FLOCKS. THREE SEASONS 1949-50 TO 1951-52
FLOCK STRUCTURE, FOOD AND LABOUR USED.

TABLE 4

	1949-50	1950-51	1951-52
STRUCTURE OF THE FLOCK	Per cent of total flock		
Incoming			
Lambs. At start	74	71	71
Purchased	8	14	6
Total	82	85	77
Wethers	10	6	15
Ewes	8	9	8
Disposals			
Lambs. Fat	52	51	57
Store	8	6	4
Losses	3	3	2
Unfinished	19	25	14
Total	82	85	77
Wethersfat	8	5	14
Ewes fat	6	7	6
QUANTITIES OF FOODS AND LABOUR	Per sheep fed		
Foods	cwts.	cwts.	cwts.
Folded crops	18.47	28.21	26.75
Purchased cakes and meals	0.36	0.43	0.41
Home grown grains	0.31	0.43	0.32
Hay and chaff	0.22	0.13	0.09
Labour	Hours	Hours	Hours
Man	1.59	2.56	2.98
Horse	0.15	0.28	0.12
Tractor, lorry, etc.	0.11	0.09	0.16

SHEEP FEEDING. FIVE FLOCKS MAKING HIGHEST PROFITS AND FIVE FLOCKS MAKING LOWEST PROFITS. THREE SEASONS 1949-50 TO 1951-52.

AVERAGE COSTS AND RETURNS.

TABLE 5

Per sheep

	1949-50		1950-51		1951-52	
	High	Low	High	Low	High	Low
Number of flocks	5	5	5	5	5	5
Average number of sheep fed	186	224	190	255	178	214
Length of season per flock	20 weeks	25 weeks	34 weeks	24 weeks	30 weeks	24 weeks
Length of season per sheep	16	19	25	21	25	26
COSTS AND RETURNS PER SHEEP	£. s.	£. s.	£. s.	£. s.	£. s.	£. s.
Average value on disposal	8. 9.	7. 6.	9. 2.	7. 4.	10.11.	9. 8.
Average value incoming	5. 6.	6. 8.	5.14.	5. 8.	6. 3.	7. 4.
Net increase in value	3. 3.	18.	3. 8.	1.16.	4. 8.	2. 4.
Sales of wool	-	-	1. 5.	-	11.	1. 2.
Net output sheep and wool	3. 3.	18.	4.13.	1.16.	4.19.	3. 6.
Total foods	1.14.	2.10.	2. 2.	2.12.	2. 6.	2.17.
Labour	5.	4.	7.	5.	8.	7.
Sundries and overheads	3.	2.	4.	3.	-	-
Total costs	2. 2.	2.16.	2.13.	3. 0.	2.14.	3. 4.
Profit (+) or loss (-)	+ 1. 1.	- 1.18.	+ 2. 0.	- 1. 4.	+ 2. 5.	+ 2.
Profit or loss - beet tops free	+ 1.13.	- 1.17.	+ 2.18.	+ 11.	+ 2.16.	+ 1. 4.
AVERAGE ESTIMATED DRESSED CARCASE WEIGHT	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Fat lambs	71	67	74	67	78	77
Fat wethers	74	91	90	76	86	86
Fat ewes	105	97	85	98	102	110

SHEEP FEEDING. FIVE FLOCKS MAKING HIGHEST PROFITS AND FIVE FLOCKS MAKING LOWEST PROFITS. THREE SEASONS 1949-50 TO 1951-52.

FLOCK STRUCTURE, FOOD AND LABOUR USED.

TABLE 6

	1949-50		1950-51		1951-52	
	High	Low	High	Low	High	Low
STRUCTURE OF THE FLOCK	Per cent of total flock					
Incoming						
Lambs. At start	79	67	77	79	64	63
Purchased	6	3	18	8	7	12
Total	85	70	95	87	71	75
Wethers	7	20	1	+	19	16
Ewes	8	10	4	13	10	9
Disposals						
Lambs. Fat	72	28	67	45	62	46
Store	5	14	1	21	-	6
Losses	2	3	1	3	1	3
Unfinished	6	25	25	18	8	20
Total	85	70	94	87	71	75
Wethers fat	6	13	1	+	19	15
Ewes fat	7	4	3	12	10	6
QUANTITIES OF FOODS AND LABOUR	Per sheep fed		Per sheep fed		Per sheep fed	
Foods	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.
Folded crops	17.73	22.88	28.19	21.16	33.66	30.68
Purchased cakes and meals	0.24	0.45	0.19	0.43	0.28	0.65
Home grown grains	0.35	0.24	0.45	0.32	0.40	0.21
Hay and chaff	0.08	0.07	0.35	0.11	0.27	0.07
Labour	Hours	Hours	Hours	Hours	Hours	Hours
Man	1.82	1.49	2.26	1.96	2.84	2.94
Horse	0.25	0.09	0.27	0.20	-	0.02
Tractor, lorry, etc.	0.19	0.01	0.23	-	0.02	0.01

SHEEP BREEDING. LARGE AND SMALL FLOCKS. 1949-50 AND 1950-51.
AVERAGE COSTS AND RETURNS.

TABLE 7 — Per ewe

	1949-50		1950-51	
	Large	Small	Large	Small
Number of flocks	10	19	12	18
Average number of ewes	280	76	256	75
OUTPUT LIVESTOCK & WOOL	£. s.	£. s.	£. s.	£. s.
Net output of livestock	5.13.	6.10.	5. 1.	6. 0.
Sales of wool	1. 7.	1. 8.	3. 6.	2.19.
Net output livestock and wool	7. 0.	7.18.	8. 7.	8.19.
COSTS				
Total foods	4. 7.	4. 7.	3.19.	4.10.
Labour	17.	1. 3.	1. 1.	1. 4.
Sundries and overheads	6.	9.	10.	13.
Total costs	5.10.	5.19.	5.10.	6. 7.
Profit (+) or loss (-)	+ 1.10.	+ 1.19.	+ 2.17.	+ 2.12.
Profit or Loss - beet tops free	+ 2.10.	+ 2. 9.	+ 3.17.	+ 3. 6.
LAMBS	Per 100 ewes		Per 100 ewes	
Fat	2	4	16	1
Stores	-	15	11	14
Casualties and deaths	9	5	5	6
In stock at end of year	116	103	79	101
Total tailed	127	127	111	122
Deaths before tailing	8	12	12	17
Born dead	5	8	3	6
Total born	140	147	126	145

SHEEP FEEDING. LARGE AND SMALL FLOCKS. TWO SEASONS 1949-50 TO 1950-51
AVERAGE COSTS AND RETURNS.

TABLE 8

Per sheep fed

	1949-50		1950-51	
	Large	Small	Large	Small
Number of flocks	11	19	9	18
Average number of sheep fed	301	89	303	90
Length of season per flock	22 weeks	22 weeks	30 weeks	28 weeks
Length of season per sheep	18	19	24	24
COSTS AND RETURNS PER SHEEP	£. s.	£. s.	£. s.	£. s.
Net increase in value	1.14.	1.16.	2.10.	2.13.
Sales of wool	-	-	17.	10.
Net output sheep and wool	1.14.	1.16.	3. 7.	3. 3.
Total foods	1.18.	2. 8.	2. 7.	2.13.
Labour	4.	6.	6.	10.
Sundries and overheads	2.	2.	4.	6.
Total costs	2. 4.	2.16.	2.17.	3. 9.
Profit (+) or loss (-)	- 10.	- 1. 0.	+ 10.	- 6.
Profit or Loss - beet tops free	+ 3.	- 9.	+ 1. 7.	+ 9.
AVERAGE ESTIMATED DRESSED CARCASE WEIGHT	lbs.	lbs.	lbs.	lbs.
Fat lambs	67	71	67	76
Fat wethers	86	74	82	76
Fat ewes	94	96	87	84

SAND, WOLD AND LIMESTONE FLOCKS 1949-50 AND 1950-51.

TABLE 9

	Sands		Wolds		Limestones	
	1949-50	1950-51	1949-50	1950-51	1949-50	1950-51
SHEEP BREEDING						
Number of flocks	8	7	10	12	12	11
Average number of ewes	73	75	194	192	155	157
	£. s.	£. s.	£. s.	£. s.	£. s.	£. s.
Output of lambs	8. 1.	8. 0.	6. 2.	6.10.	7. 6.	7. 5.
Sales of wool	1. 0.	2.10.	1.11.	3.18.	1. 2.	2.10.
Deficit on ewes or rams	1. 6.	1.18.	1.16.	1.16.	1.14.	1.16.
Feed costs	4. 1.	4.13.	4. 7.	4. 4.	4. 7.	4. 0.
Labour costs	18.	1. 1.	16.	1. 0.	1. 4.	1. 6.
Composition of flock			Per 100 ewes			
Ewes retained	69	60	77	66	67	74
Home reared gimmers	17	14	14	24	17	15
Purchased ewes and gimmers	14	26	9	10	16	11
	100	100	100	100	100	100
SHEEP FEEDING						
Number of flocks	9	8	11	11	11	8
Average number of sheep	183	187	285	280	200	210
Length of season per sheep (weeks)	15	23	19	24	18	19
			Per sheep fed			
	£. s.	£. s.	£. s.	£. s.	£. s.	£. s.
Output of live-stock	1.12.	2. 4.	1. 9.	2. 8.	2. 6.	3. 2.
Sales of wool	-	1.12.	-	8.	-	14.
Feed costs	1.12.	2. 1.	1.19.	2.15.	2.10.	2. 0.
Labour costs	3.	7.	4.	7.	5.	6.
Average estimated dressed carcase of lambs (lbs)	65	71	66	65	70	69
Percentage of sheep sold fat	72	82	54	45	80	81

COSTS OF PRODUCTION PER ACRE OF SHEEP FEED CROPS 1949 AND 1950

TABLE 10

Per acre

	1949 crops				1950 crops			
	Mixed crops	Kale	Turnips	Swedes	Mixed crops	Kale	Turnips	Swedes
Number of crops costed	10	4	9	11	10	9	4	11
	£. s.	£. s.	£. s.	£. s.	£. s.	£. s.	£. s.	£. s.
Total labour	4.13.	3. 8.	4. 1.	7. 3.	4.16.	5. 9.	7. 6.	9. 9.
Seeds	9.	8.	5.	6.	8.	11.	12.	6.
Manures (less manurial residues)	2.17.	4. 9.	2. 0.	6.16.	4.10.	5. 7.	2. 6.	4.19.
Rent	1. 0.	1. 1.	1. 1.	1. 0.	19.	1. 1.	1. 5.	19.
Implements maintenance	1.10.	1. 1.	1. 2.	1.14.	1. 8.	1. 3.	2. 0.	2.10.
Net costs	10. 9	10. 7.	8. 9.	16.19.	12. 1.	13.11.	13. 9.	18. 3.
Yield (tons)	7	11	9	8	12	17	16	21