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LOWLAND SHEEP

AN ECONOMIC ANALYSIS OF LAMB PRODUCTION 1970

Lowland Sheep Study Group
Editor: W.J.K.Thomas

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THE LOWLAND SHEEP STUDY GROUP

Agricultural Economics Unit
University of Exeter (co-ordinating Department)

Agricultural Economics Research Unit
University of Bristol

Farm Management Section
University of Nottingham

School of Rural Economics and Related Studies
Wye College (University of London)

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An Economic Analysis of Lamb Production 1970

A preliminary statement of the financial
and physical results of lamb production
in 147 lowland sheep flocks in England in 1970

Lowland Sheep Study Group
Editor: W. J. K. Thomas

December 1971

ACKNOWLEDGMENTS

The staff of the University departments, listed below, concerned with this study are very grateful for the help given by the sheep farmers who took part in it. It is hoped that they will benefit from the consideration of their own results and the comparison with those achieved by other producers.

The information was collected during the period Autumn 1969 to Spring 1971 by the field staff of each department using a standard survey book. This ensured that the data for each flock was presented in a uniform and verified manner to the computer staff at Nottingham University. The survey data was then transferred to magnetic tape and this was used for the various analyses. The work on the computer was under the direction and supervision of R. O. Wood and R. A. S. Williams.

This report has been written by W. J. K. Thomas (Exeter) in consultation with R. C. Broughton (Bristol), J. D. Sykes (Wye College), and R. O. Wood (Nottingham).

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FOREWORD

Lowland sheep farmers will soon be preparing themselves to face the opportunities and problems that membership of the Common Market will create. It is even more difficult to predict the future for sheep in the E.E.C. than for some other commodities as there is, as yet, no common market organisation for lamb and mutton. The only certainty is that those lowland sheep farmers whose flocks are already efficiently and profitably managed can face the future with greater confidence and equanimity than those who fall behind.

The Lowland Sheep Study Group was formed in 1968 at a time of depression in the sheep industry. The Group saw as one of its main objectives a need to pinpoint the principal structural and managerial strengths and weaknesses in sheep production as currently practised.

The report "Lowland Sheep: Production Policies and Practices" was the first stage in this exercise. It examined the structure of the industry as determined from a postal survey of over 800 flocks.

This report is the second step. In it are analysed the preliminary results of field studies of sheep production in the four main lowland sheep regions in England.

The chief significance of the present publication, perhaps, lies in the light it throws on the wide range of profitability of sheep production under different systems, on different types of farming and between regions. These matters will be examined in greater depth in a subsequent report. For the present they show that 1 in 7 of the producers in 1970 obtained a margin from sheep production which compared favourably with that from barley growing. This evidence together with the greater air of optimism existing in the industry at present certainly suggest that confidence would appear to be justified taking a medium term view.

AN ECONOMIC ANALYSIS OF LAMB PRODUCTION 1970

Introduction

In a recent study[(i)] of the lowland sheep industry it was shown that 51 per cent of the sheep farmers specialised in the production of fat lambs and that 54 per cent of the 1968 lamb-crop sold as fat lambs. This was the position in the four areas of England studied, namely the East Midlands, South East and South West England and a Western area covering the counties of Somerset, Warwickshire, Wiltshire and some on the English-Welsh border. These areas contained the majority of lowland ewes in England so that the results for them could be taken as fairly representative of the lowland sheep industry in the rest of the country.

Because of the importance of fat lamb production in these areas, and thus also nationally, the Lowland Sheep Study Group next decided to carry out a detailed survey into the economics of this type of production. For this purpose a sample of the sheep farmers who had been identified as Fat lamb producers in the postal enquiry were invited to take part in a field survey. The sample was chosen to give a reasonable spread of flock sizes and 147 sheep producers co-operated in the survey. It covered the period mainly from Autumn 1969 (tupping time) through to Spring 1971 when the last of the 1970 lambs had been disposed of. The flocks were distributed regionally as shown in Table 1.

Table 1 Number of flocks in 1970 field survey

No. of ewes per flock	East Midland	South East(i)	Western	South West	All flocks
Under 200	22	4	22	32	80
Over 200	20	19	18	10	67
Totals	42	23	40	42	147

(i) A sample of 23 Store lamb producing flocks was studied over the sample period in the South East.

An analysis of the sales of the 1970 lamb crop by type, i.e. fat lambs, stores or breeders, showed that the percentage of lambs sold fat in each

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(i) 'LOWLAND SHEEP - Production Policies and Practices' published by the University of Exeter. October 1970 (price 50p).

flock had changed, in some very markedly, since 1968 when the pattern of sales was analysed for the same flocks in the course of the postal survey. These changes are noted in Table 2.

Table 2 A comparison of the numbers of flocks by % sales of fat lambs in 1968 and 1970

% fat lambs sold	East Midland		South East		Western		South West		All flocks	
	1968	1970	1968	1970	1968	1970	1968	1970	1968	1970
	Nos. of flocks									
Under 50	-	4	11	13	-	3	-	2	11	22
50 - 65	-	3	4	-	-	2	1	3	5	8
65 - 80	-	5	3	8	7	6	6	3	16	22
Over 80	42	30	5	2	33	29	35	34	115	95
Totals	42	42	23	23	40	40	42	42	147	147

While, therefore, the study began as one mainly of specialist fat lamb flocks, that is of flocks from which at least 50 per cent of the lambs were sold fat, in the event it did not end up as such, for in some flocks in each region, and particularly in the South East, fat lamb sales formed only a small proportion of total lamb sales. In the earlier study it was shown that in South East England fat lamb production was not such a predominant sheep enterprise as in the other areas studied. A survey was, therefore, undertaken simultaneously in this area of a sample of flocks which were exclusively concerned with producing store lambs for sale, along with a few such flocks in the Western region. These flocks will be studied in the subsequent report. The present report is based on the information from the 147 flocks whose common characteristic was that they were all concerned in 1970 with the production of fat lambs to a greater or lesser extent.

General comments on the results

In this statement of the results the purpose is to comment only on the principal findings of the survey. A subsequent report will consider the results in greater depth. Thus average Output per ewe, see Table 3, calculated for the whole sample of some 42,000 ewes, was £9·7. This comprised the Output of lambs (predominantly fat) of £9·2 and wool £1·6, offset by the cost of flock replacement of £1·1 per ewe. Regionally Output per ewe

Table 3 Lamb production 1970 - Financial results by Regions

	East Midland	South East	Western	South West	All flocks
No. of flocks	42	23	40	42	147
No. of ewes per flock	205	677	269	166	285
	£ per ewe				
Output:-					
Lambs	11·5	7·2	10·3	9·1	9·2
Wool	1·2	2·0	1·2	2·0	1·6
Less flock replacement	- 1·3	- 0·9	- 1·1	- 1·2	- 1·1
Total output	11·4	8·3	10·4	9·9	9·7
Variable costs:-					
Feed(i)	2·6	1·6	2·2	2·4	2·1
Other	0·6	0·7	0·8	0·6	0·7
Total variable costs	3·2	2·3	3·0	3·0	2·8
Gross margin	8·2	6·0	7·4	6·9	6·9
Gross margin per forage acre £	20·1	13·3	20·2	18·1	17·0

(i) In all tables the 'Feed' includes the variable costs of forage.

varied considerably, being over £3 per ewe greater in the East Midlands, the region with the highest figure of £11·4 per ewe, than in South East England where Output per ewe was lower in the very large flocks from which also proportionally more lambs were sold as stores. Output per ewe in the flocks in the two areas of the west of England worked out at about £10. With Variable costs per ewe of £2-£3 the Gross Margin per ewe over the whole

sample was nearly £7, but £1 per ewe more than this in the East Midlands and £1 per ewe less in the South East. The Gross margin per ewe in the Western and South West flocks was similar to the whole sample average.

In a grazing livestock enterprise it is of much interest and importance to consider the use of land by the stock and some indication of this is given by the Gross margin per forage acre. It should be noted that in calculating the Gross margins presented in this report the Variable costs always include the Variable costs of forage (i.e. the fertilisers, seed etc.). In allocating the land to sheep on farms with different types of livestock some estimation has been necessary because the accurate recording of this allocation is virtually impossible except under experimental conditions. With this proviso, Table 3 shows that the average Gross margin obtained per forage acre over the whole sample was £17 but this figure again varied considerably from area to area. Better than average figures were obtained in the East Midlands, Western and South West areas but a poorer result in the South East for reasons already mentioned.

Table 4 presents a brief summary of the financial data for the flocks which obtained the greatest Gross margins per forage acre. These flocks

Table 4 Lamb production 1970

Gross margins per forage acre in the Best flocks

	Best 10 flocks(i) in:-				Best 40 flocks(ii) in sample
	East Midland	South East	Western	South West	
No. of ewes per flock	236	685	348	151	248
	£ per acre				
Output	39·4	29·2	37·9	41·0	36·4
Variable costs	10·1	8·6	8·1	10·9	8·9
Gross margin	29·3	20·6	29·8	30·1	27·5

(i) The 10 flocks in each region with the highest Gross margin per forage acre.

(ii) The 40 flocks in the whole sample with the highest Gross margin per forage acre.

by combining good outputs per ewe and high stocking rates produced very good levels of output per acre, e.g. over £40 in the South West. With variable

costs at normal levels the Gross margins per forage acre were about £30 in the East Midlands, Western and South West areas, very creditable performances which compare favourably with the results of barley growing on many farms.

Physical factors in fat lamb production

Output per ewe is largely dependent on the number of lambs reared by each ewe, i.e. the rearing performance which is calculated from the count of lambs excluding those which died at birth or soon afterwards. Table 5 shows that the overall rearing performance was 124 lambs reared per 100 ewes, or about 1¼ lambs per ewe but the results varied a great deal regionally.

Table 5 — Lamb production 1970

Some physical results by Regions

	East Midland	South East	Western	South West	All flocks
No. of flocks	42	23	40	42	147
No. of ewes per flock	205	677	269	166	285
Lambs					
Nos. reared per 100 ewes	147	110	134	115	124
Mortality per 100 lambs reared	3·3	2·3	1·3	1·3	2·1
D.c.w. of fat lambs lb	42·5	37·8	41·3	42·4	41·1
Price per fat lamb £	8·21	7·19	7·84	8·14	7·87
Ewes					
% Barren	5·3	4·1	7·8	10·9	6·3
% Mortality	5·5	5·5	4·8	5·5	5·3
Concentrates per ewe cwt	1·27	0·58	0·74	0·52	0·75
Forage and grassland:-					
Ewes per acre	2·46	2·23	2·69	2·63	2·45
Acres per ewe	0·41	0·45	0·37	0·38	0·41
No. of man hours per ewe	3·6	3·7	4·1	3·9	3·8
Wool per ewe lb	5·9	10·2	5·7	10·8	8·0

The East Midland flocks achieved an excellent result followed by an above average performance in the Western flocks. The lambing performances in the South East and South West were modest and leave room for improvement, especially in the South West where size of flock was not a factor affecting

the lambing percentage. For as is shown in Table 6, the size of flock analysis, the largest flocks had the poorest rearing performances and many of these were in the South East.

Average results, especially in agricultural production, conceal surprisingly wide ranges of achievement and the average rearing figure was no exception to this. A frequency distribution (Table 10, page 14) shows the rather disturbing feature that in 1 in 12 of the flocks (8·2 per cent) the ewes did not rear a lamb apiece, a lambing performance of less than 100 per cent. This was one extreme, at the other, and rather more hopefully for the sheep enterprise, more than 1 in 5 flocks (22 per cent) achieved a rearing performance of more than 150 per cent. This figure and even higher ones are commonly suggested as the requisite levels for profitable production but it is very clear from the evidence of this survey that the most usual result was well below this.(i)

Turning to the other physical factors presented in Table 5, the mortality of lambs refers to the loss of strong lambs, i.e. after weaning. The average mortality of 2 lambs in every 100 meant a reduction in sales of about £16. This represents virtually a straight loss of income since most costs will have to be met by this time.

The percentage barren ewe figures are increased by the inclusion of ewe lambs in the calculation. While a number of these would not have lambed there would have also been a few which were not even tupped, this would partly explain the higher figures in the Western and South West flocks. An average of about 5 per cent barren ewes is about usual. Ewe mortality was at a surprisingly uniform figure of 5 per cent in the four areas.

The average weights of wool per ewe summarise in one figure a great deal of information on sheep farming in the different regions. The heavy fleece weights in the South East and South West signify the predominant position still held by the traditional breeds, the Kent or Romney Marsh and Devon Longwool respectively.(ii) Whereas in the East Midlands and the Western flocks wool contributed 10-12 per cent of output in the two Southern areas

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(i) Similar results have been reported in a recent Meat and Livestock Commission survey of 30 fat lamb (grass) flocks, which showed an average of 127 lambs reared per 100 ewes, ranging from under 100 to 165.

(ii) The breed structure of the ewe flock in each area was considered in Chapter 3 of the Study Group's first report.

the proportion was 20-24 per cent. The much greater wool sales partly offset the lower lamb sales in these areas, but whether the sheep farmers here should aim for more lambs at the expense of wool and the use of traditional breeds raises other issues.

Concentrates fed per ewe show a regional pattern in line with lambing performances; heavy feeding in the East Midlands, medium in the Western flocks and light 'cake' rations for the flocks in the two Southern areas. This would appear to be a significant relationship deserving further consideration.

The stocking rates are presented in alternative forms to satisfy the exponents of both. With the exception of the South East where the much larger flocks were stocked at a significantly lower density, stocking rates in the other areas varied minimally above and below $2\frac{1}{2}$ ewes to the acre. This is substantially less than the stocking rates of 4-5 ewes per acre occasionally reported or suggested as necessary for profitable production.

The estimated annual numbers of man hours per ewe were very similar in each area, i.e. in modern terms equivalent to one-half a standard man-day per ewe per annum.

Analysis by size of flock

Table 6 presents the financial and physical information on a size of flock basis, irrespective of area. As the data are presented in the form of weighted averages, those for the largest sized-groups are inevitably greatly influenced by the South East flocks. Bearing in mind the earlier comments on these flocks it is not surprising that Gross margins per ewe on average declined as flock size increased, but Outputs and Variable costs did not follow this trend precisely. Outputs per ewe in the medium size flocks (200-400 ewes) were quite comparable with those obtained in the smaller flocks, but then fell away sharply in the largest flocks due in part to lambing results. The causes of the variations in output have largely been dealt with in the section on lambing performance.

There was a slight increase in the Density of stocking as flocks got larger up to the medium-sized flock level. This is indicated in Table 6 by the two sets of information 'ewes per acre grassland and forage' and also 'acres per ewe'. Ewes in the medium flocks required 0·38 acres per head, or

Table 6 Lamb production in 1970

Financial and physical results by Size of flock

	No. of ewes per flock				All flocks
	50-99	100-199	200-399	400 & over	
No. of flocks	19	61	39	28	147
No. of ewes per flock	78	143	261	769	285
Financial data	£ per ewe				
Output:					
Lambs	10·2	10·0	10·4	8·2	9·2
Wool	1·5	1·5	1·3	1·8	1·6
Total lambs and wool	11·7	11·5	10·7	10·0	10·8
Less flock replacement	- 1·1	- 1·1	- 1·2	- 0·9	- 1·1
Total output	10·6	10·4	10·5	9·1	9·7
Variable costs:					
Feed	2·4	2·2	2·6	1·8	2·1
Other	0·7	0·7	0·7	0·7	0·7
Total variable costs	3·1	3·9	3·3	2·5	2·8
Gross margin	7·6	7·5	7·2	6·6	6·9
Gross margin per forage acre £	18·6	18·6	19·0	15·5	17·0
Physical data					
Lambs					
Nos. reared per 100 ewes	128	128	136	118	124
Mortality per 100 lambs reared	0·8	2·0	3·7	1·4	2·1
D.c.w. of fat lambs lb	42·9	41·8	41·6	40·2	41·1
Price per fat lamb £	8·07	8·05	7·88	7·53	7·87
Ewes					
% Barren	7·2	7·8	6·5	5·6	6·3
% Mortality	4·6	5·9	5·2	5·2	5·3
Concentrates per ewe cwt	0·59	0·81	1·05	0·59	0·75
Forage and grassland:					
Ewes per acre	2·44	2·50	2·64	2·35	2·45
Acres per ewe	0·41	0·40	0·38	0·43	0·41
No. of man hours per ewe	4·9	4·1	3·6	3·7	3·8
Wool per ewe lb	8·4	8·1	6·8	9·0	8·0

alternatively the stocking rate was 2·64 ewes per acre. The stocking rate fell to 2·35 ewes per acre for the largest flocks, another average weighted by the South East sample. Considering this sheep to land ratio in a more practical way, each 100 ewes in the largest flocks required 5 more acres (grassland and forage) than those in the medium flocks. These 5 acres used for another enterprise e.g. cash-cropping would have added a useful contribution to farm output.

Analysis by Density of stocking with sheep

Table 7 presents some results from fat lamb production according to the density of stocking with sheep. This is expressed as so many 'Sheep units

Table 7 Lamb production 1970

Financial and physical results by Density of stocking

	No. of Sheep units per acre grazed				All flocks
	Under 2·00	2·00–2·99	3·00–3·99	4·00–4·99	
No. of flocks	11	58	46	32	147(i)
No. of ewes per flock	183	270	264	376	285
Output	£ per ewe				
Lambs	9·6	9·0	9·7	8·8	9·2
Wool	1·9	1·5	1·7	1·7	1·6
Less flock replacement	- 1·9	- 1·0	- 1·1	- 1·0	- 1·1
Total Output	9·6	9·5	10·3	9·5	9·7
Variable costs					
Feed	1·8	1·9	2·2	2·3	2·1
Total Variable costs	2·6	2·5	2·9	3·0	2·8
Gross margin	7·0	7·0	7·4	6·5	6·9
G.M. per forage acre £	8·2	14·9	21·0	20·8	17·0
Physical data					
Lambs					
Nos. reared per 100 ewes	135	121	129	123	124
D.c.w. fat lambs lb	42·9	40·8	42·1	40·1	41·1
Price per fat lamb £	7·99	7·84	8·06	7·66	7·87
Ewes					
Concs per ewe cwt	0·75	0·65	0·83	0·80	0·75
No. per acre forage and grassland	1·12	2·14	2·83	3·23	2·45

(i) Includes 1 flock stocked at over 5 Sheep units per acre.

per acre' which as explained in the Definitions of Terms are not the same as 'ewes per acre' because Sheep units take into account the lambs and any other sheep using the land.

This analysis confirms a feature already observed, i.e. the correlation between density of stocking and size of flock except for the largest flocks. On this analysis the most densely stocked flocks were also the biggest in size. There was minimal variability in many of the factors when the flocks were grouped in this way. Output per ewe was very stable but the Gross margin per ewe was marginally lower in the larger, more densely stocked flocks. Gross margin per forage acre was, therefore, virtually determined by the stocking rate, the Gross margin per acre at 3 Sheep units per acre was virtually three times greater than that at the average level of 1·1 Sheep units per acre, i.e. the stocking rate at the lower end of the scale. It is almost unnecessary to state that stocking rate is one of the more important determinants of overall profitability in fat lamb production.

Analysis of results by rearing (lambing) performance

Successful performance in any enterprise depends on several factors. In a grazing livestock enterprise a prime requirement is productivity per acre, in lamb production this means stocking rate of ewes per acre which has been discussed and productivity per ewe measured in this instance by the rearing or lambing performance. Some of the results are presented on this basis in Table 8.

This analysis brings together several features already noted. The larger flocks had lower lambing performances. This was in fact a compound influence of the larger flocks in South West England due to primarily the lower prolifacy of the Romney Marsh ewes. The range in the financial output of lambs was very wide, from under £7 rising to over £12 per ewe as lambing performances improved. Output per ewe in the low lambing flocks was improved by the greater returns from wool, again an effect contributed by the Romney ewes.

More concentrates were naturally used in the more productive flocks, and their cost made up most of the £1·1 difference in Total variable costs per ewe. Despite the offsetting effects of wool and feed the Gross margin per ewe increased considerably as the lambing performance improved, the difference at the extremes being of the order of 75 per cent.

A contributory cause of low lambing performance is the extent of barreness in ewes, and the percentage of barren ewes dropped from nearly 12 to about 4 at the two extremes. The position is further complicated by the existence in the flock of greater or lesser proportion of ewe lambs. Greater numbers are more usual in larger flocks with more home-reared replacements, fewer in smaller flocks which relied mainly on purchased replacements.

Table 8 Lamb production 1970

Financial and physical results by Lambing performance

	Lambs reared per 100 ewes				All flocks
	Under 110	110-129	130-149	150 & over	
No. of flocks	27	48	40	32	147
No. of ewes per flock	373	285	291	203	285
Output	£ per ewe				
Lambs	6·6	8·3	10·6	12·5	9·2
Wool	1·9	1·8	1·5	1·2	1·6
Less flock replacement	- 1·1	- 0·9	- 1·1	- 1·1	- 1·1
Total Output	7·4	9·2	11·0	12·6	9·7
Variable costs					
Feed	1·6	2·1	2·4	2·5	2·1
Total Variable costs	2·1	2·9	3·1	3·2	2·8
Gross margin	5·3	6·3	7·9	9·4	6·9
G.M. per forage acre £	14·0	14·4	20·7	20·9	17·0
Physical data					
Lambs					
Nos. reared per 100 ewes	94	118	140	159	124
D.c.w. fat lambs lb	38·0	40·7	41·8	42·8	41·1
Price per fat lamb £	7·31	7·73	7·92	8·24	7·87
Ewes					
Wool per ewe lb	9·9	8·8	7·5	6·1	8·0
% Barren	11·9	7·4	5·5	3·8	6·3
Concs per ewe cwt	0·43	0·67	0·96	1·05	0·75
No. per acre forage and grassland	2·65	2·30	2·62	2·23	2·45

Analysis of results by type of farming

Information was collected about the farms surveyed to make it possible to consider the place of the sheep enterprise in the whole farm situation. This aspect will be examined in detail in a subsequent report. For the present report the farms have been classified by type of farming and some results of lamb production have been analysed on this basis and are shown in Table 9.

Table 9 Lamb production 1970

Financial and physical results by Type of farming

	Type of farming				All flocks
	Dairy	Live-stock	Cropp-ing	Mixed	
No. of flocks	18	72	24	32	147(i)
No. of ewes per flock	159	326	312	247	285
Output	£ per ewe				
Lambs	10·2	8·4	10·4	10·0	9·2
Wool	1·5	1·8	1·4	1·5	1·6
Less flock replacement	- 1·1	- 1·0	- 1·3	- 1·1	- 1·1
Total output	10·6	9·2	10·5	10·4	9·7
Variable costs					
Feed	2·5	1·8	2·6	2·6	2·1
Total Variable costs	3·1	2·4	3·3	3·4	2·8
Gross margin	7·5	6·8	7·2	7·0	6·9
G.M. per forage acre £	21·9	15·7	17·9	19·6	17·0
Physical data					
Lambs					
Nos. reared per 100 ewes	134	119	137	130	124
D.c.w. fat lambs lb	42·1	40·3	43·0	41·0	41·1
Price per fat lamb £	8·98	7·71	8·26	7·84	7·87
Ewes					
Concs per ewe cwt	0·65	0·62	0·94	1·01	0·75
No. per acre forage and grassland	2·93	2·29	2·49	2·80	2·45

(i) Includes one flock on a specialist Pig and poultry farm.

The results of lamb production by type of farming are the logical consequence of the system of farming. Thus on Dairy farms sheep were necessarily

a secondary enterprise and the flocks were snaller than average. It has been shown that the smaller flocks produced some of the best performances and so it follows that the Dairy farm flocks,on average had the best results. Their Gross margins per ewe were highest, the ewes were stocked at the highest intensity, at nearly 3 ewes per acre forage and grassland, and the combination of these results produced the best Gross margin per forage acre, of £22.

In contrast on the Livestock farms (i.e. Livestock rearing and fattening) sheep were a major enterprise and on average the flocks were the largest, many being in South East England. There is no need to repeat the detailed characteristics of the larger flocks, they had poorer results in terms of Gross margins per ewe and per acre. It is, however, important to note that Gross margins do not convey the whole financial picture, they must be related to the level of fixed costs obtaining on each farm. This is another subject which will be considered in the next report. It may well be found that the levels of Fixed costs on the larger Livestock farms, and on the Cropping farms, were such that their lower Gross margins from sheep made as commensurate a contribution to their overall financial position as on other types of farms. This is not to suggest, however, that in these flocks nothing should be done to try and improve the Gross margin results.

The variation in the results of lamb production

The variation in the lamb rearing performance (Table 10) has already been mentioned but there were also great differences in other factors affecting the result of lamb production and some data are presented in Tables 11-14.

The percentage mortality of lambs reared (Table 11) refers, as mentioned earlier, to the loss of strong lambs after weaning. Apart from accidents such losses should be minimal and in 45 per cent of the flocks less than 1 lamb in 100 was lost and in many flocks none were lost at all. The overall average of 2 per cent lamb mortality reared hides the disastrous situation in those few flocks in which upwards of 10 lambs in every 100 died.

Table 10 Nos. of lambs reared per 100 ewes

Nos. of lambs per 100 ewes	% of flocks
Under 100	8·2
100 - 109	10·2
110 - 119	16·3
120 - 129	16·3
130 - 139	15·0
140 - 149	12·2
150 - 159	14·2
160 & over	7·6
Total	100·0
Average %	124

Table 11 Mortality Per 100 lambs reared

Per cent mortality	% of flocks
Under 1·0	44·9
1·0 - 1·9	24·5
2·0 - 3·9	14·3
4·0 - 5·9	8·8
6·0 - 7·9	2·7
8·0 - 9·9	2·1
10·0 - 11·9	1·4
12·0 & over	1·3
Total	100·0
Average %	2·1

Another factor for which data is presented (Table 12) is ewe mortality which is calculated as the number of ewe deaths per 100 ewes put to the ram. The overall sample average was 5, but in some flocks ewe mortality was as much as three times greater than this. Replacing such a large proportion of ewes is a costly business and would have substantially reduced the Flock Output which, by definition, is net of flock replacement.

Table 12 Ewes: Per cent mortality

% ewe mortality	% of flocks
Under 0·1	0·7
0·1 - 3·9	34·0
4·0 - 7·9	47·6
8·0 - 11 9	13·6
12 0 - 15·9	3·4
16·0 - 19·9	0·7
20·0 & over	-
Total	100·0
Average %	5·3

Table 13 Ewes: Per cent barren

% barren ewes	% of flocks
Under 0·1	3·4
0·1 - 3·9	35·4
4·0 - 7·9	24·5
8·0 - 11·9	19·0
12·0 - 15·9	8·8
16·0 - 19·9	8·2
20·0 & over	0·7
Total	100·0
Average %	6·9

The calculation of the percentage barren ewes (Table 13) took into account the ewe lambs in the flock. The lambing percentage of ewe lambs tupped is normally much lower than for mature ewes so that the statistics in Table 12 do not show the true position for the latter. The fact that in about two-thirds of the flock the percentage of barren ewes is less than 8 suggests that the average figure for mature ewes is of the order of 5 per cent.

The variability in the figures discussed so far affects the Output side of the enterprise but there was also great variation on the cost side, one aspect of this is shown by the figures of concentrates fed per ewe in Table 14. While on average each ewe received $\frac{3}{4}$ cwt. concentrates per year, in 1 in 8 flocks less than $\frac{1}{4}$ cwt. was fed per ewe while in a few flocks 2 cwts. per ewe were fed. However these figures, while of interest, do not tell a complete story on their own. There is, for example, no virtue in feeding double the average weight of concentrates per ewe if the ensuing production is not sufficient to pay for the extra feed. Cost items must be related to production before any conclusion can be drawn; these aspects will be examined in greater detail in the next report.

The density of stocking also varied considerably between flocks, see Table 15, from under 150 to over 500 ewes per 100 acres of grassland and

Table 14 Ewes Concentrates per head (cwt)

Concs fed per ewe cwt	% of flocks
Under $\frac{1}{4}$	12·3
$\frac{1}{4}$ to under $\frac{1}{2}$	17·0
$\frac{1}{2}$ " " $\frac{3}{4}$	23·8
$\frac{3}{4}$ " " 1	12·9
1 " " $1\frac{1}{4}$	16·3
$1\frac{1}{4}$ " " $1\frac{1}{2}$	5·5
$1\frac{1}{2}$ " " $1\frac{3}{4}$	6·1
$1\frac{3}{4}$ & over	6·1
Total	100·0
Av. per ewe cwt.	$\frac{3}{4}$

Table 15 No. of ewes per 100 acres Forage and grassland

No. of ewes per 100 acres	% of flocks
Under 150	4·8
150 - 199	13·6
200 - 249	19·7
250 - 299	28·6
300 - 349	18·4
350 - 399	9·5
400 - 499	3·4
500 & over	2·0
Total	100·0
Av. no. of ewes per 100 acres	245

forage. This again is only one factor affecting the outcome of lamb production and in isolation it cannot be assumed that the highest stocking rate will produce the greatest margin of profit, With ewes very tightly stocked disease and worms may become bigger problems leading to greater ewe mortality. The fattening of lambs may also suffer so that while the figures in Table 14 are of interest, further investigation of the inter-relationships between stocking rates and other factors is required before any firm conclusions can be drawn.

Conclusions

Some initial conclusions to be drawn from the data presented are that lamb production is a profitable enterprise on a good number of farms and very profitable indeed on a small number. Like so many other forms of agricultural production, however, there is a great disparity between the worst and best producer. The principal object of the work of the Lowland Sheep Study is to pinpoint the factors of greatest economic importance in sheep production. On the one side the aim is to highlight those practices which make the greatest contribution to output and on the other side those that lead to the greatest saving in costs.

The present interim statement of results has been designed to provide some reference points from which to judge the overall economic viability of sheep enterprises. It also provides a point of departure for the more intensive examination of the complex relationships in lamb production and which will comprise the subject of the Study Group's next report.

Appendix 1

Regional information

Areas of study

Flocks in the following counties were included in the survey.

East Midlands (Nottingham University) - the counties of Leicester, Northampton and Rutland.

South East (Wye College, London University) - the counties of Kent, Surrey and Sussex.

Western (Bristol University) - the counties of Gloucester, Hereford, Somerset Warwick, Wiltshire and Worcester.

South West (Exeter University) - the counties of Cornwall and Devon.

List of Tables

The tables for each province are denoted as follows:-

(a) East Midlands
(b) South East
(c) Western
(d) South West

Table 13(a) Lamb production in East Midlands flocks 1970

Financial and physical results by Size of flock

	No. of ewes per flock				All flocks
	50-99	100-199	200-399	400 & over	
No. of flocks	6	16	17	3	42
Av. no. of ewes per flock	73	132	255	569	205
Financial data	£ per ewe				
Output:					
Lambs	12·0	11·1	11·4	12·0	11·5
Wool	1·2	1·0	1·1	1·3	1·2
Total lambs and wool	13·2	12·1	12·5	13·3	12·7
Less flock replacement	- 0·8	- 1·2	- 1·1	- 1·7	- 1·3
Total output	12·4	10·9	11·4	11·6	11·4
Variable costs:					
Feed	2·8	2·2	2·8	2·6	2·6
Other	0·6	0·5	0·7	0·5	0·6
Total variable costs	3·4	2·7	3·5	3·1	3·2
Gross margin	9·0	8·2	7·9	8·5	8·2
Gross margin per forage acre £	17·0	19·8	20·6	20·1	20·1
Physical data					
Lambs					
Nos. reared per 100 ewes	151	143	148	150	147
Mortality per 100 lambs reared	0·6	2·1	5·2	0·4	3·3
D.c.w. of fat lambs lb	43·5	42·6	42·1	42·9	42·5
Price per fat lamb £	8·16	8·09	8·33	8·14	8·21
Ewes					
% Barren	3·6	5·4	4·8	4·5	5·3
% Mortality	3·9	7·0	5·0	5·7	5·5
Concentrates per ewe cwt	1·01	1·04	1·43	1·21	1·27
Forage and grassland:					
Ewes per acre	1·92	2·38	2·63	2·38	2·44
Acres per ewe	0·52	0·42	0·38	0·42	0·41
No. of man hours per ewe	4·0	4·1	3·4	3·2	3·6
Wool per ewe lb	6·1	5·7	6·4	6·5	5·9

Table 14(a) Lamb production in East Midlands flocks 1970

Financial and physical results by Density of stocking

	No. of sheep units per acre grazed				All flocks
	Under 2·00	2·00–2·99	3·00–3·99	4·00 & over	
No. of flocks	4	17	15	5	42
Av. no. of ewes per flock	143	270	363	371	205
Financial data	£ per ewe				
Output:					
Lambs	12·9	11·2	11·3	12·0	11·5
Wool	1·1	1·1	1·2	1·1	1·2
Total lambs and wool	14·0	12·3	12·5	13·1	12·7
Less flock replacement	- 1·5	- 1·1	- 1·4	- 1·2	- 1·3
Total output	12·5	11·2	11·1	11·9	11·4
Variable costs:					
Feed	3·3	2·4	2·5	3·0	2·6
Other	0·5	0·6	0·6	0·6	0·6
Total variable costs	3·8	3·0	3·1	3·6	3·2
Gross margin	8·7	8·2	8·0	8·3	8·2
Gross margin per forage acre £	13·1	17·1	22·5	27·5	20·1
Physical data					
Lambs					
Nos. reared per 100 ewes	157	144	148	152	147
Mortality per 100 lambs reared	0·4	3·1	4·5	1·6	3·3
D.c.w. of fat lambs lb	44·0	42·2	43·0	41·5	42·5
Price per fat lamb £	8·47	8·16	8·24	8·16	8·21
Ewes					
% Barren	4·4	5·4	4·3	3·3	5·3
% Mortality	4·9	6·7	5·2	3·6	5·5
Concentrates per ewe cwt	1·22	1·14	1·26	1·60	1·27
Forage and grassland:					
Ewes per acre	1·49	2·08	2·78	3·33	2·44
Acres per ewe	0·67	0·48	0·36	0·30	0·41
No. of man hours per ewe	4·2	3·5	3·4	3·3	3·6
Wool per ewe lb	6·3	5·6	6·1	5·8	5·9

Table 15(a) Lamb production in East Midlands flocks 1970

Financial and physical results by Lambing performance

	Lambs reared per 100 ewes				All flocks
	Under 110	110-129	130-149	150 & over	
No. of flocks	1	7	12	22	42
Av. no. of ewes per flock	-	192	240	194	205
Financial data	£ per ewe				
Output:					
Lambs		9·0	11·2	12·6	11·5
Wool		1·0	1·2	1·1	1·2
Total lambs and wool		10·0	12·4	13·7	12·7
Less flock replacement		- 1·2	- 1·5	- 1·1	- 1·3
Total output		8·8	10·9	12·6	11·4
Variable costs:					
Feed		2·5	2·7	2·6	2·6
Other		0·5	0·5	0·7	0·6
Total variable costs		3·0	3·2	3·3	3·2
Gross margin		5·8	7·7	9·3	8·2
Gross margin per forage acre £		15·5	20·1	21·6	20·1
Physical data					
Lambs					
Nos. reared per 100 ewes		122	144	159	147
Mortality per 100 lambs reared		5·1	3·7	2·6	3·3
D.c.w. of fat lambs lb		41·3	42·8	42·6	42·5
Price per fat lamb £		7·96	8·19	8·29	8·21
Ewes					
% Barren		4·5	5·3	4·2	5·3
% Mortality		7·8	5·5	4·5	5·5
Concentrates per ewe cwt		1·30	1·35	1·22	1·27
Forage and grassland:					
Ewes per acre		2·70	2·63	2·33	2·44
Acres per ewe		0·37	0·38	0·43	0·41
No. of man hours per ewe		3·5	3·7	3·4	3·6
Wool per ewe lb		5·2	6·1	6·0	5·9

Table 16(a) Lamb production in East Midlands flocks 1970

Financial and physical data by Type of farming

	Type of farming				All flocks
	Dairy	Live-stock	Cropp-ing	Mixed	
No. of flocks	5	18	10	9	42
Av. no. of ewes per flock	183	304	364	293	205
Financial data	£ per ewe				
Output:					
Lambs	12·4	11·6	11·2	11·0	11·5
Wool	1·1	1·2	1·2	1·2	1·2
Total lambs and wool	13·5	12·8	12·4	12·2	12·7
Less flock replacement	- 0·8	- 1·5	- 1·1	- 1·2	- 1·3
Total output	12·7	11·3	11·3	11·0	11·4
Variable costs:					
Feed	2·9	2·1	2·6	3·5	2·6
Other	0·6	0·5	0·6	0·7	0·6
Total variable costs	3·5	2·6	3·2	4·2	3·2
Gross margin	9·2	8·7	8·1	6·8	8·2
Gross margin per forage acre £	24·4	21·2	19·3	17·5	20·1
Physical data					
Lambs					
Nos. reared per 100 ewes	155	148	155	140	147
Mortality per 100 lambs reared	2·0	3·7	4·1	1·7	3·3
D.c.w. of fat lambs lb	44·3	43·1	42·5	40·8	42·5
Price per fat lamb £	8·46	8·23	8·15	8·13	8·21
Ewes					
% Barren	6·6	4·6	4·1	5·5	5·3
% Mortality	3·7	5·2	5·5	6·3	5·5
Concentrates per ewe cwt	1·22	1·09	1·29	1·61	1·27
Forage and grassland:					
Ewes per acre	2·63	2·44	2·38	2·56	2·44
Acres per ewe	0·38	0·41	0·42	0·39	0·41
No. of man hours per ewe	4·9	3·4	3·4	3·7	3·6
Wool per ewe lb	5·6	5·9	6·2	5·8	5·9

Table 13(b) Lamb production in South East flocks 1970

Financial and physical results by Size of flock

	No. of ewes per flock				All flocks
	100-399	400-749	750-999	1000 & over	
No. of flocks	6	8	5	4	23
Av. no. of ewes per flock	211	578	836	1373	677
Financial data	£ per ewe				
Output:					
Lambs	8·6	8·7	6·9	5·7	7·2
Wool	1·8	2·2	2·4	1·7	2·0
Total lambs and wool	10·4	10·9	9·3	7·4	9·2
Less flock replacement	- 1·2	- 0·7	- 1·0	- 0·8	- 0·9
Total output	9·2	10·2	8·3	6·6	8·3
Variable costs:					
Feed	2·7	2·1	1·7	0·9	1·6
Other	0·8	0·8	0·9	0·5	0·7
Total variable costs	3·5	2·9	2·6	1·4	2·3
Gross margin	5·7	7·3	5·7	5·2	6·0
Gross margin per forage acre £	12·1	17·0	11·5	12·2	13·3
Physical data					
Lambs					
Nos. reared per 100 ewes	125	127	108	93	110
Mortality per 100 lambs reared	8·6	1·7	2·6	0·8	2·3
D.c.w. of fat lambs lb	38·9	38·5	36·1	38·1	37·8
Price per fat lamb £	7·88	7·89	6·66	6·62	7·19
Ewes					
% Barren	3·7	4·6	3·8	4·1	4·1
% Mortality	5·3	4·3	4·1	7·9	5·5
Concentrates per ewe cwt	0·91	0·81	0·61	0·27	0·58
Forage and grassland:					
Ewes per acre	2·13	2·33	2·04	2·33	2·22
Acres per ewe	0·47	0·43	0·49	0·43	0·45
No. of man hours per ewe	4·6	4·3	4·7	2·2	3·7
Wool per ewe lb	9·9	10·8	11·8	8·6	10·2

Table 14(b) Lamb production in South East flocks 1970

Financial and physical results by Density of stocking

	No. of sheep units per acre grazed				All flocks
	2·00–2·99	3·00–3·99	4·00–4·99	5·00 & over	
No. of flocks	6	5	6	5	23(i)
Av. no. of ewes per flock	850	601	370	881	677
Financial data	£ per ewe				
Output:					
Lambs	6·3	7·6	8·0	7·6	7·2
Wool	1·9	2·5	1·7	1·9	2·0
Total lambs and wool	8·2	10·1	9·7	9·5	9·2
Less flock replacement	- 0·8	- 0·7	- 1·2	- 0·6	- 0·9
Total output	7·4	9·4	8·5	8·9	8·3
Variable costs:					
Feed	1·0	1·6	2·7	2·0	1·6
Other	0·5	1·0	0·7	0·7	0·7
Total variable costs	1·5	2·6	3·4	2·7	2·3
Gross margin	5·9	6·8	5·1	6·2	6·0
Gross margin per forage acre £	11·9	18·6	14·7	17·9	13·3
Physical data					
Lambs					
Nos. reared per 100 ewes	101	113	121	112	110
Mortality per 100 lambs reared	1·6	2·6	5·3	0·9	2·3
D.c.w. of fat lambs lb	35·9	38·0	39·2	39·4	37·8
Price per fat lamb £	6·74	7·16	7·55	7·60	7·19
Ewes					
% Barren	3·9	4·3	6·6	3·3	4·1
% Mortality	7·8	3·7	5·9	3·9	5·5
Concentrates per ewe cwt	0·37	0·57	1·17	0·54	0·58
Forage and grassland:					
Ewes per acre	2·00	2·70	2·86	2·94	2·22
Acres per ewe	0·50	0·37	0·35	0·34	0·45
No. of man hours per ewe	2·8	4·2	3·8	3·9	3·7
Wool per ewe lb	9·5	12·2	8·9	9·8	10·2

(i) Includes 1 flock with a stocking rate of under 2 sheep units per acre.

Table 15(b) Lamb production in South East flocks 1970

Financial and physical results by Lambing performance

	Lambs reared per 100 ewes				All flocks
	Under 110	110–129	130–149	150 & over	
No. of flocks	5	13	5	0	23
Av. no. of ewes per flock	1151	557	513	-	677
Financial data	£ per ewe				
Output:					
Lambs	5·7	7·4	9·6		7·2
Wool	2·0	2·1	2·2		2·0
Total lambs and wool	7·7	9·5	11·8		9·2
Less flock replacement	- 1·1	- 0·8	- 0·7		- 0·9
Total output	6·6	8·7	11·1		8·3
Variable costs:					
Feed	1·1	2·0	1·8		1·6
Other	0·5	0·8	0·8		0·7
Total variable costs	1·6	2·8	2·6		2·3
Gross margin	5·0	5·9	8·5		6·0
Gross margin per forage acre £	12·8	12·5	16·4		13·3
Physical data					
Lambs					
Nos. reared per 100 ewes	90	116	136		110
Mortality per 100 lambs reared	0·9	3·0	2·6		2·3
D.c.w. of fat lambs lb	35·0	39·0	40·7		37·8
Price per fat lamb £	6·69	7·24	8·01		7·19
Ewes					
% Barren	5·0	3·7	3·4		4·1
% Mortality	7·5	4·2	4·4		5·5
Concentrates per ewe cwt	0·39	0·65	0·79		0·58
Forage and grassland:					
Ewes per acre	2·56	2·13	1·92		2·22
Acres per ewe	0·39	0·47	0·52		0·45
No. of man hours per ewe	2·4	4·7	3·6		3·7
Wool per ewe lb	9·8	10·2	11·2		10·2

Table 16(b) Lamb production in South East flocks 1970

Financial and physical results by Type of farming

	Type of farming			All flocks
	Live-stock	Cropp-ing	Mixed	
No. of flocks	15	6	2	23
Av. no. of ewes per flock	794	362	-	677
Financial data	£ per ewe			
Output:				
Lambs	6·9	8·0		7·2
Wool	2·1	1·8		2·0
Total lambs and wool	9·0	9·8		9·2
Less flock replacement	- 0·8	- 1·6		- 0·9
Total output	8·2	8·2		8·3
Variable costs:				
Feed	1·3	2·7		1·6
Other	0·6	0·9		0·7
Total variable costs	1·9	3·6		2·3
Gross margin	6·3	4·6		6·0
Gross margin per forage acre £	12·8	14·7		13·3
Physical data				
Lambs				
Nos. reared per 100 ewes	107	119		110
Mortality per 100 lambs reared	2·0	4·3		2·3
D.c.w. of fat lambs lb	36·8	40·3		37·8
Price per fat lamb £	6·95	8·06		7·19
Ewes				
% Barren	4·3	4·6		4·1
% Mortality	5·6	4·6		5·5
Concentrates per ewe cwt	0·42	1·00		0·58
Forage and grassland:				
Ewes per acre	2·04	3·13		2·22
Acres per ewe	0·49	0·32		0·45
No. of man hours per ewe	3·5	4·2		3·7
Wool per ewe lb	10·6	8·7		10·2

Table 13(c) Lamb production in Western flocks 1970

Financial and physical results by Size of flock

	No. of ewes per flock				All flocks
	50-99	100-199	200-399	400 & over	
No. of flocks	3	19	11	7	40
Av. no. of ewes per flock	78	142	261	709	269
Financial data	£ per ewe				
Output:					
Lambs	10·4	10·1	10·6	10·2	10·3
Wool	0·9	1·1	1·1	1·3	1·2
Total lambs and wool	11·3	11·2	11·7	11·5	11·5
Less flock replacement	- 1·1	- 1·1	- 1·2	- 1·0	- 1·1
Total output	10·2	10·1	10·5	10·5	10·4
Variable costs:					
Feed	1·4	2·2	2·2	2·3	2·2
Other	0·9	0·9	0·7	0·7	0·8
Total variable costs	2·3	3·1	2·9	3·0	3·0
Gross margin	7·9	7·0	7·6	7·5	7·4
Gross margin per forage acre £	19·3	17·6	22·0	20·7	20·2
Physical data					
Lambs					
Nos. reared per 100 ewes	123	132	138	134	135
Mortality per 100 lambs reared	1·4	1·7	1·2	1·2	1·3
D.c.w. of fat lambs lb	43·0	40·4	41·0	41·8	41·3
Price per fat lamb £	8·44	7·92	7·91	7·75	7·85
Ewes					
% Barren	7·3	7·1	6·1	9·2	7·8
% Mortality	4·7	5·9	4·7	4·4	4·8
Concentrates per ewe cwt	0·45	0·95	0·89	0·55	0·74
Forage and grassland:					
Ewes per acre	2·44	2·50	2·89	2·78	2·70
Acres per ewe	0·41	0·40	0·35	0·36	0·37
No. of man hours per ewe	3·5	4·1	4·1	4·1	4·1
Wool per ewe lb	5·7	5·4	5·1	6·1	5·7

Table 14(c) Lamb production in Western flocks 1970

Financial and physical results by Density of Stocking

	No. of sheep units per acre grazed				All flocks
	1·00–1·99	2·00–2·99	3·00–3·99	4·00–4·99	
No. of flocks	5	16	13	6	40
Av. no. of ewes per flock	135	230	279	464	269
Financial data	£ per ewe				
Output:					
Lambs	11·8	11·0	10·0	9·2	10·3
Wool	1·3	1·1	1·1	1·3	1·2
Total lambs and wool	13·1	12·1	11·1	10·5	11·5
Less flock replacement	- 1·1	- 1·0	- 1·0	- 1·1	- 1·1
Total output	12·0	11·1	10·1	9·4	10·4
Variable costs:					
Feed	2·3	2·3	2·2	2·0	2·2
Other	0·9	0·9	0·6	0·7	0·8
Total variable costs	3·2	3·2	2·8	2·7	3·0
Gross margin	8·8	7·9	7·3	6·7	7·4
Gross margin per forage acre £	17·2	17·6	20·5	27·2	20·2
Physical data					
Lambs					
Nos. reared per 100 ewes	158	141	129	128	135
Mortality per 100 lambs reared	1·0	1·4	1·6	1·1	1·3
D.c.w. of fat lambs lb	43·6	41·3	42·1	39·6	41·3
Price per fat lamb £	7·90	8·07	7·99	7·32	7·85
Ewes					
% Barren	1·5	6·9	8·8	10·3	7·8
% Mortality	4·6	4·6	4·7	5·5	4·8
Concentrates per ewe cwt	0·92	0·81	0·70	0·64	0·74
Forage and grassland:					
Ewes per acre	1·92	2·27	2·77	4·00	2·70
Acres per ewe	0·52	0·44	0·36	0·25	0·37
No. of man hours per ewe	4·4	3·8	4·2	3·9	4·1
Wool per ewe lb	6·3	5·5	5·3	6·2	5·7

Table 15(c) Lamb production in Western flocks 1970

Financial and physical results by Lambing performance

	Lambs reared per 100 ewes				All flocks
	Under 110	110–129	130–149	150 & over	
No. of flocks	5	12	15	8	40
Av. no. of ewes per flock	232	224	326	253	269
Financial data	£ per ewe				
Output:					
Lambs	6·7	9·2	10·8	12·6	10·3
Wool	1·0	1·2	1·2	1·1	1·2
Total lambs and wool	7·7	10·4	12·0	13·7	11·5
Less flock replacement	- 1·3	- 0·9	- 1·1	- 1·2	- 1·1
Total output	6·4	9·5	10·9	12·5	10·4
Variable costs:					
Feed	1·9	2·2	2·3	2·1	2·2
Other	0·7	0·8	0·8	0·8	0·8
Total variable costs	2·6	3·0	3·1	2·9	3·0
Gross margin	3·8	6·5	7·8	9·6	7·4
Gross margin per forage acre £	15·4	16·5	24·0	19·3	20·2
Physical data					
Lambs					
Nos. reared per 100 ewes	98	122	140	159	134
Mortality per 100 lambs reared	1·1	2·8	0·9	0·8	1·3
D.c.w. of fat lambs lb	37·2	40·5	41·4	43·1	41·3
Price per fat lamb £	7·00	7·79	7·83	8·18	7·84
Ewes					
% Barren	11·8	11·9	6·7	2·6	7·8
% Mortality	7·5	4·8	4·4	4·4	4·8
Concentrates per ewe cwt	0·61	0·53	0·89	0·73	0·74
Forage and grassland:					
Ewes per acre	4·00	2·50	3·03	2·04	2·70
Acres per ewe	0·25	0·40	0·33	0·49	0·37
No. of man hours per ewe	2·7	3·8	4·5	4·1	4·1
Wool per ewe lb	5·0	5·8	5·7	5·8	5·7

Table 16(c) Lamb production in Western flocks 1970

Financial and physical results by Type of farming

	Type of farming			All flocks
	Live-stock	Cropp-ing	Mixed	
No. of flocks	20	8	9	40(i)
Av. no. of ewes per flock	208	333	346	269
Financial data	£ per ewe			
Output:				
Lambs	9·5	11·7	10·4	10·3
Wool	1·1	1·1	1·3	1·2
Total lambs and wool	10·6	12·8	11·7	11·5
Less flock replacement	- 1·0	- 1·2	- 1·1	- 1·1
Total output	9·6	11·6	10·6	10·4
Variable costs:				
Feed	2·2	2·3	2·3	2·2
Other	0·8	0·7	0·7	0·8
Total variable costs	3·0	3·0	3·0	3·0
Gross margin	7·6	8·6	7·6	7·4
Gross margin per forage acre £	18·3	18·6	24·2	20·2
Physical data				
Lambs				
Nos. reared per 100 ewes	129	142	139	134
Mortality per 100 lambs reared	1·7	1·4	0·8	1·3
D.c.w. of fat lambs lb	39·5	44·2	40·7	41·3
Price per fat lamb £	7·64	8·35	7·61	7·84
Ewes				
% Barren	7·4	4·6	8·1	7·8
% Mortality	5·4	3·7	5·5	4·8
Concentrates per ewe cwt	0·84	0·58	0·77	0·74
Forage and grassland:				
Ewes per acre	2·78	2·17	3·13	2·70
Acres per ewe	0·36	0·46	0·32	0·37
No. of man hours per ewe	3·6	4·0	4·4	4·1
Wool per ewe lb	5·2	5·8	6·3	5·7

(i) Includes 2 flocks on Dairy farms and 1 on a Pig and poultry holding.

Table 13(d) Lamb production in South West flocks 1970

Financial and physical results by Size of flock

	No. of ewes per flock				All flocks
	50-99	100-199	200-399	400 & over	
No. of flocks	10	22	9	1	42
Av. no. of ewes per flock	81	146	263	-	166
Financial data	£ per ewe				
Output					
Lambs	9·2	9·4	9·0		9·1
Wool	2·1	2·1	1·8		2·0
Total lambs and wool	11·3	11·5	10·8		11·1
Less flock replacement	- 1·3	- 1·2	- 1·4		- 1·2
Total output	10·0	10·3	9·4		9·9
Variable costs:					
Feed	2·3	2·4	2·6		2·4
Other	0·8	0·6	0·5		0·6
Total variable costs	3·1	3·0	3·1		3·0
Gross margin	6·9	7·3	6·3		6·9
Gross margin per forage acre £	18·1	19·9	15·9		18·1
Physical data					
Lambs					
Nos. reared per 100 ewes	118	115	116		115
Mortality per 100 lambs reared	0·9	1·3	1·5		1·3
D.c.w. of fat lambs lb	42·6	43·4	41·1		42·4
Price per fat lamb £	7·91	8·29	8·09		8·14
Ewes					
% Barren	9·1	10·8	11·3		10·9
% Mortality	5·1	5·2	6·4		5·5
Concentrates per ewe cwt	0·40	0·57	0·57		0·52
Forage and grassland:					
Ewes per acre	2·81	2·70	2·52		2·63
Acres per ewe	0·35	0·37	0·40		0·38
No. of man hours per ewe	5·8	4·1	3·2		3·9
Wool per ewe lb	12·4	11·6	10·0		11·0

Table 14(d) Lamb production in South West flocks 1970

Financial and physical results by Density of stocking

	No. of sheep units per acre grazed				All flocks
	Under 1·99	2·00–2·99	3·00–3·99	4·00–4·99	
No. of flocks	1	19	13	9	42
Av. no. of ewes per flock	-	195	141	140	166
Financial data	£ per ewe				
Output:					
Lambs		8·5	9·5	10·4	9·1
Wool		1·9	2·2	2·0	2·0
Total lambs and wool		10·4	11·7	12·4	11·1
Less flock replacement		- 1·3	- 1·0	- 1·3	- 1·2
Total output		9·1	10·7	11·1	9·9
Variable costs:					
Feed		2·3	2·6	2·7	2·4
Other		0·5	0·5	0·8	0·6
Total variable costs		2·8	3·1	3·5	3·0
Gross margin		6·3	7·6	7·6	6·9
Gross margin per forage acre £		14·7	23·3	26·6	18·1
Physical data					
Lambs					
Nos. reared per 100 ewes		108	117	132	115
Mortality per 100 lambs reared		1·3	0·9	1·9	1·3
D.c.w. of fat lambs lb		42·4	43·2	41·2	42·4
Price per fat lamb £		8·04	8·45	7·97	8·14
Ewes					
% Barren		11·0	11·9	8·6	10·9
% Mortality		6·3	5·1	4·1	5·5
Concentrates per ewe cwt		0·46	0·62	0·57	0·52
Forage and grassland:					
Ewes per acre		2·33	3·12	3·57	2·63
Acres per ewe		0·43	0·32	0·28	0·38
No. of man hours per ewe		3·6	4·5	4·0	3·9
Wool per ewe lb		10·4	12·0	10·8	11·0

Table 15(d) Lamb production in South West flocks 1970

Financial and physical results by Lambing performance

	Lambs reared per 100 ewes				All flocks
	Under 110	110–129	130–149	150 & over	
No. of flocks	16	16	8	2	42
Av. no. of ewes per flock	189	151	161	-	166
Financial data	£ per ewe				
Output:					
Lambs	8·2	9·5	10·4		9·1
Wool	2·1	1·9	1·8		2·0
Total lambs and wool	10·3	11·4	11·2		11·1
Less flock replacement	- 1·0	- 1·3	- 1·4		- 1·2
Total output	9·3	10·1	10·8		9·9
Variable costs:					
Feed	2·4	2·3	2·9		2·4
Other	0·5	0·6	0·6		0·6
Total variable costs	2·9	2·9	3·5		3·0
Gross margin	6·4	7·2	7·3		6·9
Gross margin per forage acre £	16·2	18·0	23·1		18·1
Physical data					
Lambs					
Nos. reared per 100 ewes	101	118	136		115
Mortality per 100 lambs reared	1·0	1·4	1·7		1·3
D.c.w. of fat lambs lb	42·1	42·8	42·0		42·4
Price per fat lamb £	8·17	8·18	8·07		8·14
Ewes					
% Barren	13·5	10·1	7·5		10·9
% Mortality	5·0	6·2	5·7		5·5
Concentrates per ewe cwt	0·43	0·54	0·68		0·52
Forage and grassland:					
Ewes per acre	2·50	2·50	3·23		2·63
Acres per ewe	0·40	0·40	0·31		0·38
No. of man hours per ewe	3·5	4·2	4·1		3·9
Wool per ewe lb	12·2	9·9	9·7		10·8

Table 16(d) Lamb production in South West flocks 1970

Financial and physical results by Type of farming

	Type of farming			All flocks
	Dairy	Live-stock	Mixed	
No. of flocks	11	19	12	42
Av. no. of ewes per flock	145	197	136	166
Financial data	£ per ewe			
Output:				
Lambs	9·3	9·2	8·9	9·1
Wool	1·8	2·1	1·9	2·0
Total lambs and wool	11·1	11·3	10·8	11·1
Less flock replacement	- 1·3	- 1·2	- 1·2	- 1·2
Total output	9·8	10·1	9·6	9·9
Variable costs:				
Feed	2·6	2·4	2·5	2·4
Other	0·7	0·5	0·6	0·6
Total variable costs	3·3	2·9	3·1	3·0
Gross margin	6·5	7·2	6·5	6·9
Gross margin per forage acre £	19·3	18·8	15·6	18·1
Physical data				
Lambs				
Nos. reared per 100 ewes	125	114	107	115
Mortality per 100 lambs reared	1·9	1·2	0·9	1·3
D.c.w. of fat lambs lb	41·9	42·4	42·8	42·4
Price per fat lamb £	7·92	8·17	8·30	8·14
Ewes				
% Barren	7·6	12·2	11·1	10·9
% Mortality	7·2	4·8	5·4	5·5
Concentrates per ewe cwt	0·43	0·54	0·57	0·52
Forage and grassland:				
Ewes per acre	2·94	2·63	2·39	2·63
Acres per ewe	0·34	0·38	0·42	0·38
No. of man hours per ewe	4·2	3·7	4·0	3·9
Wool per ewe lb	9·7	11·3	11·0	11·0

Appendix 2

Definitions of Terms

Lamb production in the context of this report means in the main "fat lamb production", as this was the predominant type of output in 85 per cent of the flocks.

No. of ewes includes 2-tooth ewes and ewe lambs put to the ram to lamb mainly in Spring 1970 although a few ewes lambed late in 1969.

Output of lambs and wool includes the value (with subsidy) of all lambs sold and the value of lambs carried forward for feeding (hoggets) or breeding (ewe lambs). Marketing charges are deducted from prices. Sales of wool include both ewe and lamb wool.

Flock replacement is calculated as the Opening Valuation of the flock (ewes and rams for breeding in 1969) plus purchases and transfers in of ewes and ewe lambs for breeding in 1969 less sales of ewes and rams (fat, cull or casualty) and less the Closing Valuation of the flock.

Total output is Output of lambs and wool less the cost of Flock replacement.

Variable costs Feed - includes (i) the cost of purchased concentrates e.g. ewe cobs, ewe nuts, cereals etc., (ii) the value of homegrown cereals fed to the sheep, (iii) the variable costs (fertilisers, seed, sprays) of forage crops and grassland used by sheep, (iv) cost of any bought fodders. Other Variable costs includes veterinary charges, drenches, dips, haulage on sheep, repairs to shearing equipment, sheep fencing, the cost of sheep dogs.

Variable costs are those costs which can be directly allocated to the enterprise, i.e. to the sheep, and which usually vary with the size of the enterprise. An obvious example is that 'vet and med' costs usually increase as the flock gets larger.

Total Variable costs is Feed plus Other Variable costs.

Gross margin is Output less Total Variable costs. The Gross margin is a useful figure to enable comparisons of the sheep enterprise to be made

between farms but it must not be regarded as a profit from the sheep. The Gross margin represents the contribution the sheep make to meeting the so-called Fixed costs on the farm. The Fixed costs such as rent (or mortgage payments) machinery costs and labour cannot be readily allocated to the separate enterprises, cattle, corn, sheep, pigs etc. and will be different on each farm. If the Fixed costs are particularly high on a farm, then of course, bigger Gross margins must be made in order to cover them and leave a satisfactory farm income.

Forage acres represents the acres of grassland (including hay) and forage crops allocated to sheep. As the recording of the use of grassland by different stock is virtually impossible except under experimental conditions this allocation has been estimated.

Gross margin per forage acre is the Total Gross margin for the flock divided by the forage acres (as defined above).

No. of lambs reared is the count of lambs sold fat, store or for breeding, plus lambs kept for feeding or breeding plus the deaths of strong lambs which were alive at the end of the main breeding period. The count excludes the deaths of lambs at lambing or soon after lambing. Thus Mortality per 100 lambs reared represents the number of strong (weaned) lambs which eventually died.

Percentage barren ewes is the percentage of the ewe flock (including ewe lambs) put to the ram which did not produce a lamb (dead or alive).

Percentage ewe mortality is the fraction of the ewes put to the ram which died over the year (from one tupping to the next).

No. of man hours per ewe is an estimated figure based on the monthly programme of work with sheep.

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