Agricultural Enterprise Studies
in England and Wales

Economic Report No. 87

UNIVERSITY OF EXETER
Agricultural Economics Unit

LOWLAND SHEEP

Aspects of lamb production in England and Wales 1981-82

W. J. K. Thomas

October 1983
Price £2.50

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The 'Acknowledgements' in this publication regrettably omitted reference to the Department of Agricultural Economics and Management of the University of Reading. I should like to place on record my appreciation of the very helpful co-operation of its staff in all aspects of the survey work on which this report is based.

University of Exeter
Agricultural Economics Unit

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ASPECTS OF LAMB PRODUCTION IN ENGLAND AND WALES

1981-82

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AGRICULTURAL ENTERPRISE STUDIES IN ENGLAND AND WALES

University departments of Agricultural Economics in England and Wales have for many years undertaken economic studies of crop and livestock enterprises, receiving financial and technical support from the Ministry of Agriculture, Fisheries and Food.

The departments in different regions of the country conduct joint studies of those enterprises in which they have a particular interest. This community of interest is recognised by issuing enterprise studies reports prepared and published by individual departments in a common series entitled "Agricultural Enterprise Studies in England and Wales".

Titles of recent publications in this series and the addresses of the University departments are given at the end of the report.

ACKNOWLEDGEMENTS

An interim report on this national survey has been published and I should like to repeat the acknowledgements made to my colleagues in the Ministry of Agriculture (London), in the Universities of Manchester, Newcastle, Nottingham, London (Wye College), Wales (Aberystwyth), the Askham Bryan College of Agriculture in Yorkshire, and those concerned here in this Unit. Without their interested collaboration the survey would not have been carried out and I express my thanks to them for undertaking and completing the unsuspected volume of work which the survey created.

Neither, of course, would the survey have been possible without the excellent cooperation of the sheep farmers who were asked to take part in the work. For their interest and hospitality we are all very grateful and it is to be hoped that they will also gain from the detailed study of their flocks.

I am indebted to my colleagues, Mr E T Davies and Miss E Burnside for their helpful comments on the report, but as the sole author I am responsible for all its 'omissions and commissions'. I trust that these will be few and that the report will add to our knowledge of the lowland sheep industry. Finally my thanks to Mrs M Pinn for her excellent typing, especially of the unending tabular material.

October 1983 W J K Thomas

Contents

Chapter 1

Introduction

An interim report[1] on this survey of lowland sheep production in England and Wales has already been published so that, while this report repeats some of the financial results from the survey, it is mainly concerned with more detailed information on various aspects of husbandry in the flocks studied.

Usually the enterprise studies[2] carried out in England and Wales span a period of twelve months which is normally long enough to cover the full cycle of 'events' from sowing to harvest. For some livestock enterprises, however, this period is too short to encompass the whole cycle and the field work in this particular survey was spread over about twenty months from the earliest date the rams were turned in with the ewes in the summer of 1980 to the final sale of hoggets from the 1981 lamb-crop in March-April 1982. Describing the survey in arable terms, it was concerned with the "sowing of the seed" in 1980 to the last disposal of the product in 1982.

The survey was confined to the lowland areas of England and Wales with the exception of East Anglia which is relatively sheepless. In EEC terminology, these are the 'favoured areas' of the country in contrast to the 'less-favoured areas' which are the uplands and mountain regions in receipt of special financial support.

The survey sample was selected from agricultural holdings with 50 or more breeding ewes as recorded at the June 1979 Census. The sample was a random one with the sampling fractions varying according to flock size. The final number of flocks[3] from which information was available for analysis is shown in Tables 1 and 2.

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(1) Lowland Sheep - Interim results of a survey of the 1981 lamb crop in England and Wales, University of Exeter, Agricultural Economics Unit, October 1982.

(2) See Appendix J for list of the most recent of these studies.

(3) The word 'flock' is synonymous with, and the short way to refer to, an agricultural holding with a flock of breeding ewes.

Table 1 Sample flocks by region[(i)] and flock size-group

Region[(i)]	No of ewes per flock: 50-199	200-499	500 & over	All flocks
	No of flocks			
England:				
North	5	9	8	22
North East	11	11	2	24
North West	9	7	1	17
East Midland	6	13	1	20
South Central	10	23	17	50
South East	3	8	14	25
South West	12	24	7	43
Wales	12	13	6	31
Totals	68	108	56	232

Table 2 Sample flocks by type of farming and flock size group

Type of farming	No of ewes per flock: 50-199	200-499	500 & over	All flocks
	No of flocks			
Full-time:				
Specialist dairy	6	2	-	8
Mainly dairy	9	10	1	20
Livestock rearing -				
Mainly cattle	4	4	1	9
Mainly sheep	-	13	15	28
Cattle and sheep	17	42	23	82
Pigs and poultry	2	6	2	10
Cropping:				
Mostly cereals	1	6	1	8
General	5	11	2	18
General horticulture	1	1	1	3
Mixed	6	10	10	26
Part-time holding[(ii)]	17	3	-	20
Totals	68	108	56	232

(i) See Appendix B for composition of regions by counties

(ii) An agricultural holding on which the work on the crops and livestock is estimated to require less than 250 standard man-days.

The total sample represents about one per cent of the agricultural holdings in England and Wales with 50 or more breeding ewes and some two per cent of the total number of ewes in the country. The higher coverage of ewes is the result of stratifying the sample by flock size-group and selecting proportionally more larger flocks.

By selecting the sample holdings on the basis of their stocking with sheep it would be expected to include a predominance of holdings with livestock rearing enterprises, i.e. combinations of sheep and cattle; while this is so Table 2 also demonstrates that flocks of sheep are fitted into most types of farming. For example, on 12 per cent of the survey farms dairying is the major enterprise and, no doubt, on some of these the sheep flock is used to 'clean-up' the pastures after a first grazing by the dairy herd. These farmers have solved the problem of the pressure on grazing during the spring months. Then the sheep population is at its greatest after lambing, cattle are being turned out after in-wintering and the shutting up of fields for hay or silage is becoming imminent. The survey does not provide sufficient detail to reveal how this husbandry problem is overcome. On a further 12.5 per cent of the farms the main emphasis is on cropping, either cereals, general cropping or horticulture. On most of these farms sheep are the only livestock and, as the only source of organic matter, they play an important role in maintaining soil fertility. They do so by utilising a grass break, or folding off arable by-products (e.g. sugar beet tops) or specially grown forage crops. The rather hackneyed term 'golden hoof' is still very much applicable today.

Apart from the lambing period a flock of ewes makes no protracted heavy demand for labour which is one aspect of the flexible nature of this enterprise. Another factor formerly advanced to commend the introduction of a sheep flock was that it did not create a significant capital requirement. This, however, is no longer such a strong justification when flock replacements are costing upwards of £50 per head and when increasing numbers of lowland farmers are putting up or converting buildings to house their sheep during the winter.

With the EEC support system offering greater returns for lowland sheep farmers, this enterprise is no longer the 'Cinderella' or poor relation in farming and, on economic grounds, it can hold its place in many lowland farming systems.

Chapter 2

Some flock characteristics

A farmer intent on going into sheep production for the first time has to make several decisions before acquiring his first animals. Given that he can obtain some expertise with sheep and has fully considered the capital and marketing aspects he has to decide whether to run a breeding flock as against the purchase of store lambs for finishing. This report as already stated, concerns farmers with breeding ewes for it was on this basis that the sample was chosen. Having opted to run a breeding flock there are still many points for the sheep farmer to consider and this chapter examines the results of some of these decisions made by 232 farmers. For them the actual choice to be a sheep farmer was made many years ago for, as Table 3 shows, the majority of farmers in the survey have had many years experience with sheep. However, this is not to say that they have not varied their husbandry practices over these years but rather that they have progressively adjusted these to meet the current requirements for their products. A good example of this lies in the choice of the ewe and ram breeds, the subject of the next section.

Table 3 Survey farmers' years of experience in sheep production

Region	Years in sheep production					
	Under 5	5-10	10-19	20-39	40 & over	Totals
England:	% of farmers					
North	5	5	23	54	13	100
North East	-	4	33	59	4	100
North West	-	-	29	71	-	100
East Midland	5	-	30	50	15	100
South Central	2	8	22	58	10	100
South East	8	4	12	64	12	100
South West	12	9	16	35	28	100
Wales	3	10	16	58	13	100
Whole sample(i)	5	6	22	54	13	100

(i) These figures should not be taken to be representative of England and Wales, to obtain such figures a larger sample is required and the results statistically weighted.

Breeds of sheep

For the sake of analysis of breeds, not for reasons of comparison, the survey flocks are grouped into three areas, Northern England, East and

Central Southern England, Southern England (East and West) and Wales. A fuller sub-division of breeds and crosses is made in Appendix C, only the predominant breeds are noted in this section.

The North of England

Table 4 Main breeds of ewe in the North of England

Breeds of ewe	North	North East	North West
	% of ewes		
Mules	36.1	27.7	35.4
Masham	7.0	19.5	8.0
Greyface	12.4	-	-
B.Leicester Xs	13.2	-	1.7
Suffolk X SHB(i)	5.2	33.1	2.6
Clun Forest	-	-	34.3
Other	26.1	19.7	18.0
Totals	100.0	100.0	100.0
'000 ewes	9.2	5.7	3.2

(i) Scotch Halfbred

The multiplicity of breeds and crosses kept on farms in this country is sometimes the target of criticism of the sheep industry in that it makes it difficult to standardise lamb carcasses for example. While there are many breeds and crosses in Northern England, see Appendix C, it is noteworthy that a large proportion of ewes in the region are of few breeds (Table 4). Crossbred Mules (Border Leicester or Blue-faced Leicester X Swaledale) are widely kept while only one pure breed, the Clun Forest, is prominent.

Table 5 Main breeds of ram in the North of England

Breed of ram	North	North East	North West
	% of rams		
Suffolk	79.4	87.8	82.8
Clun	-	-	7.5
Dorset Down	4.0	3.4	-
Texel	4.0	1.4	-
Other	12.6	7.4	9.7
Totals	100.0	100.0	100.0

Turning to the breeds of ram used, the Suffolk is overwhelmingly the predominant breed, with about half of the flocks relying entirely on rams of this breed.

East Midlands and South Central England

While Mule ewes predominate again in these areas, there is rather less dependence on a few breeds and crosses than was the case in the northern

Table 6 Main breeds of ewe

Breed of ewe	East Midland	South Central England
	% of ewes	
Mules	37.7	37.6
Greyface	25.3	9.0
Masham	8.6	1.8
Clun	-	10.0
Suffolk X SHB(i)	6.0	4.8
Other	22.4	36.8
Totals	100.0	100.0
'000 ewes	5.1	19.0

(i) Scotch Halfbred

areas. This is particularly so in the South Central region but, here again, the Clun Forest is the only pure breed kept in significant numbers.

As for the 'other half of the flock', as the rams are sometimes referred to, the Suffolk breed is again the most popular by a long way,

Table 7 Main breeds of ram

Breed of ram	East Midland	South Central England
	% of ram	
Suffolk	86.8	67.8
Dorset Down	-	15.1
Hampshire Down	10.7	5.5
Clun Forest	-	4.1
Other	2.5	7.5
Totals	100.0	100.0

especially in the East Midlands where it accounts for nearly 9 out of every 10 rams used. As in the northern areas, over half the flocks use only Suffolk rams.

South of England and Wales

Table 8 Main Breeds of ewe

Breed of ewe	South East	South West	Wales
	% of ewes		
Romney Marsh	67.1	-	-
Romney Marsh Xs	4.2	-	-
Greyface	10.6	-	-
Mules	-	17.4	-
Suffolk Xs	-	11.9	27.9
Border Leicester Xs	-	9.1	-
Suffolk X SHB	2.7	7.6	-
Devon & Cornwall Longwool	-	6.7	-
Beulah Speckleface	-	-	15.7
Welsh Halfbred	-	-	14.4
Welsh Mountain	-	-	12.9
Other	15.4	47.3	29.1
Totals	100.0	100.0	100.0
'000 ewes	13.3	12.7	8.2

The South East of England is the only region where the survey shows one pure breed of ewe to be predominant and this is, of course, the Kent or Romney Marsh, which accounts for just over two-thirds of the region's ewes. The most variable regional flock from a breed point of view is in the South West. Here no one breed is particularly popular and crossbred ewes - Mules, Suffolk and Border Leicester crosses - appear to be taking over from the local breeds as the farmers attempt to increase the profitability of their flocks. On the lowland sheep farms in Wales various crosses of ewes with Suffolk rams are popular as are the local pure breeds - the Beulahs and Welsh Mountain. The latter are put to Border Leicester tups to produce Welsh Halfbreds which are also popular.

In the two southern areas of England, Suffolk rams are less widely used than in the rest of England, being replaced by Dorset Down rams as terminal sires. In the South East, a significant proportion of Romney Marsh ewes are kept for breeding flock replacements, therefore requiring Romney rams, while in Wales, Suffolk rams are predominant in the survey flocks.

Table 9 Main breeds of ram

Breed of ram	South East	South West	Wales
	% of rams		
Suffolk	23.0	36.8	69.3
Romney Marsh	34.1	-	-
Dorset Down	26.3	21.0	-
Hampshire Down	4.7	15.9	-
Blue faced Leicester	-	-	5.5
Other	11.9	26.3	25.2
Totals	100.0	100.0	100.0

Flock replacements

The choice of breeds of ewes and rams will, to some extent, determine the method of obtaining flock replacements. The widespread use of cross-bred ewes for carcass (fat) lamb production usually precludes the breeding of replacements and the method by which these are procured in the survey flocks is shown in Table 10.

Table 10 Methods of obtaining flock replacements

Region	By purchase	Home bred	Partly both	Totals
		% of flocks		
England:				
North	68	5	27	100
North East	63	12	25	100
North West	29	41	30	100
East Midlands	80	5	15	100
South Central	60	34	6	100
South East	36	20	44	100
South West	33	30	37	100
Wales	19	29	52	100
Whole sample(i)	47	24	29	100

(i) See footnote to Table 3, page 4.

The contrast here lies between the East Midlands in which 80 per cent of the flocks are entirely dependent on purchased replacements and Wales where only 19 per cent of the flocks were so reliant; although for the latter the picture is indistinct to the extent that more than half the flocks obtain replacements from both sources.

The breeding season

Following the sheep farmer through the events of the sheep cycle, he now has to make some decisions concerning the breeding season. Satisfactory lambing results are partly dependent on the condition of the ewes when the rams are turned in with them. The ewes need to be in a fit but not fat condition at this time (about 3 on the MLC scale) and, in order to achieve this, some farmers will use a method of 'flushing' the ewes which, in the main, consists of raising the plane of nutrition of the flock for a few weeks before breeding starts. Usually (see Table 11) this consists of putting the ewes on to some better pasture for a period but, where the ewes are down in condition, some supplementary feeds may be given.

Table 11 Flushing of ewes prior to tupping

Region	Flushing on: Fresh grass	Forage crop	Concentrates	Other feeds	No flushing	Totals
	% of flocks					
England						
North	68	-	5	-	27	100
North East	67	-	4	4	25	100
North West	76	-	-	-	24	100
East Midlands	95	-	5	-	-	100
South Central	80	10	-	6	4	100
South East	84	8	4	-	4	100
South West	79	2	-	-	19	100
Wales	92	-	4	-	4	100
Whole sample(i)	81	3	2	2	12	100

(i) See footnote to Table 3, page 4.

The next table indicates the farmers' opinions of the condition of their ewes prior to tupping, and it can be seen that the ewes in the majority of flocks were in good or very good condition prior to breeding. It must be assumed that the flushing process will have played a part in bringing the ewes up to these levels of fitness.

A fundamental decision to be made by sheep farmers is the date on which breeding will start or, more practically, the date the rams will be turned in with the ewes. This will determine the 'crunch' period in the shepherd's life - lambing - and this, in turn, will partly determine the sale pattern of the lambs. Apart from ewes of the Dorset Horn breed which

Table 12 Condition of ewes when rams turned in

Region	Condition of ewes in 1980			
	Very good	Good	Average	Totals
England:	% of flocks			
North	23	64	13	100
North East	34	58	8	100
North West	24	59	17	100
East Midlands	30	50	20	100
South Central	28	58	14	100
South East	44	52	4	100
South West	44	47	9	100
Wales	42	52	6	100
Whole sample(i)	35	54	11	100

(i) See footnote to Table 3, page 4.

will come into season at different times of the year, breeding takes place in the latter part of the year although as is shown in Table 13 there is still much variation in the choice of this important date.

Table 13 Dates on which rams turned in with ewes in 1980

Region	July or earlier	August		September		October		November		Totals
		E*	L*	E	L	E	L	E	L	
England:	% of flocks									
North	-	-	-	5	13	5	41	36	-	100
North East	-	4	8	13	8	17	25	25	-	100
North West	-	6	-	24	12	29	23	6	-	100
East Midlands	-	5	-	5	10	40	40	-	-	100
South Central	-	-	-	8	12	28	30	18	4	100
South East	-	-	4	4	4	12	24	48	4	100
South West	18	7	5	12	26	18	9	5	-	100
Wales	7(i)	7	10	13	22	35	3	3	-	100
Whole sample(ii)	5	3	3	10	15	23	23	17	1	100

*E - Early (1st - 15th of month), L - Late (16th to end of month)

(i) In these flocks the rams were not taken out
(ii) See footnote to Table 3, page 4.

As would be expected tupping, and thus lambing, is later in the northern and eastern flocks. An interesting contrast is between this aspect of sheep farming in South East England and in the South West. In the former the harsh winter environment of the Romney Marsh dictates that lambs should not be born until well into April when the weather would

normally be improving, tupping is thus also later. The much kinder climate in the South West allows lambing to take place at least a month earlier than in the South East and much earlier still in some flocks; accordingly in 68 per cent of the flocks the rams were put with the ewes before the end of September.

A subject on which there is still debate among sheep farmers is whether ewe lambs should be bred from in their first year or should breeding be delayed until the second year to allow the animals to grow fully. Although the lambing rate for ewe lambs is lower than that of more mature ewes, breeding from them is one way to improve the production from the whole flock. This question is of more concern in the flocks in which flock replacements are home-bred, for it can be avoided in other flocks by the purchase of 2-tooth or older ewes as replacements. Table 14 analyses this situation in the survey flocks.

Table 14 Breeding from ewe lambs

Region	Flocks with ewe lambs as replacements (a)	% of flocks in (a) in which ewe lambs are put to the ram
	% of flocks	
England:		
North	59	77
North East	33	75
North West	59	80
East Midlands	35	71
South Central	56	75
South East	56	29
South West	77	88
Wales	81	92
Whole sample (i)	59	77

(i) See footnote to Table 3, page 4

This survey shows that ewe lambs are kept and bred from in the majority of flocks only in South West England and Wales. The high percentage figures in the second column, except for the South East, mean that when ewe lambs are kept as flock replacements they will also be bred from in their first year or, perhaps, more accurately an attempt will be made to do so.

In the South East most ewe lambs are held back a year before breeding to enable them to grow fully, for the later lambing in the region does not give time for this. Generally the tupping dates for ewe lambs are upwards of a month later than those of the more mature ewes.

Winter feeding of ewes

As was noted earlier (Table 12) many of the farmers in the survey reported that their ewe flocks were in good/very good condition at the time of breeding, the aim should then be to keep them in this condition during pregnancy, lambing and during the suckling period. For most flocks these events take place through late autumn to late winter (October-March) when the grass has ceased to grow and the pastures are at the point of lowest productivuty. Even if the ewes have the run of all the grassland on each farm they will require supplementary feeding to meet the nutritional demands made upon them when carrying lambs and later when suckling. These demands are met by offering the ewes a variety of feeds as is shown in Table 15.

Table 15 Winter feeding of ewes

Region	Conc's only	Concentrates with: Hay	Hay FC	Hay FB	Hay FC FB	Silage	Hay silage	Other	Totals
		% of flocks							
England:									
North	5	24	38	-	19	-	-	14	100
North East	-	18	37	9	27	-	-	9	100
North West	6	41	12	29	-	6	-	6	100
East Midland	-	25	40	-	15	10	-	10	100
South Central	-	24	20	20	12	-	8	16	100
South East	-	56	20	12	-	4	-	8	100
South West	2	5	33	21	26	-	-	13	100
Wales	3	26	6	16	13	-	6	30	100
Whole sample(i)	2	25	25	15	15	2	3	13	100

FC = forage crops FB = feed blocks

(i) See footnote to Table 3, page 4.

Generally a concentrate feed, either a purchased compound or cereal (home-grown or bought) is given, as also is hay for the majority of flocks. Forage crops, feed blocks and occasionally silage are used in some of the several combinations of feeds offered to the ewe flock during the winter months. Average figures of concentrates per ewe, for example, while given later, are not too meaningful for they do not take into account the consumption of other feeds (see Table 16). The only satisfactory measure

of feed usage per head is the financial one which takes in all sources of nutrients including grassland.

Table 16 Proportions of flocks receiving the main winter feeds

Region	Concentrates	Hay	Forage crops	Feed blocks
England:		% of flocks receiving		
North	100	95	64	36
North East	96	96	63	33
North West	100	82	18	29
East Midland	100	90	52	25
South Central	96	100	46	42
South East	96	92	28	16
South West	93	93	70	58
Wales	87	87	29	29
Whole sample(i)	95	93	48	37

(i) See footnote to Table 3, page 4

The policies adopted and work done by the sheep farmer in the first months of the sheep year are paralleled by the arable farmer's preparation of the land and the sowing of the seed. Both then must wait for the harvest which, for the sheep farmer, results from the successful lambing and consequent rearing of the largest number of the live lambs born, the subjects of the next chapter.

Chapter 3

Lambing

From Table 13, showing the widespread of dates on which the rams are put with the ewes, it follows that there is a corresponding range of periods when lambing takes place. In three-quarters of the flocks surveyed the main dates of breeding are in the two months from mid-September through to mid-November, giving a modal (most frequent) time about mid-October and thus it could be expected the most typical lambing period would centre around 15th March (i.e. about 21 weeks from the date of tupping). Biologically this would seem to be the wrong time for with the ewes under the burden of pregnancy they also have to face the rigours of the winter months and, partly to avoid this, the housing of lowland ewes at this time of the year is becoming increasingly popular (see Chapter 4).

The primary purpose of a flock of ewes is to produce lambs and in order to do so the ewe must conceive and then be kept fit through the winter until lambing time. Despite the sheep farmer's work in supervising the flock at tupping time and then feeding the ewes, as was noted in the previous chapter, it is unlikely that the whole flock will lamb down successfully.

For a variety of causes, some not explicable by the farmer and most not investigated by post-mortem examination, some ewes die in the period up to lambing. Ewe deaths at this time represent losses to the farmer in three ways, (i) the animal itself, (ii) its expected lamb(s) and (iii) the costs of keeping the ewe from the previous weaning time. Table 17 shows the extent of these deaths in the regional flocks.

Table 17 Deaths of ewes prior to lambing

	% ewe deaths							
Region	None	0.1-0.9	1-1.9	2-2.9	3-3.9	4-4.9	5.0 & over	Totals
England:								
North	13.6	22.8	13.6	22.8	4.5	13.6	9.1	100.0
North East	8.7	21.7	26.1	17.4	13.1	8.7	4.3	100.0
North West	35.3	11.8	29.4	17.6	5.9	-	-	100.0
East Midlands	15.0	35.0	20.0	20.0	-	5.0	5.0	100.0
South Central	14.3	34.7	36.7	2.0	8.2	-	4.1	100.0
South East	16.0	68.0	8.0	8.0	-	-	-	100.0
South West	13.9	30.2	27.9	16.3	4.7	4.7	2.3	100.0
Wales	16.1	16.1	29.1	16.1	3.2	9.7	9.7	100.0
Whole sample(i)	15.6	30.9	25.6	13.5	5.2	4.8	4.4	100.0

(i) See footnote to Table 3, page 4

As is noted in many surveys of agricultural production there is a wide rnage in the results and the distribution of the percentages of ewes dying before lambing is no exception as the table shows. On average, however, less than $1\frac{1}{2}$ ewes per 100 put to the ram die in this period. Even so, totalling the losses categorised earlier these deaths cost the average sheep farmer about £130 per 100 ewes[1] and reduce the residual net margin by about the same amount.

For a variety of reasons, better known to the veterinary profession than to economists, a proportion of ewes in most flocks fail to conceive at tupping time or fail to carry their lamb(s) through to a successful parturition; in short, they are empty or barren. This again is a source of lost income to the sheep farmer, but the loss is not so great as when a ewe dies for the barren ewe is, at least, still alive and can be kept for a further breeding attempt or sold as a cull. If the latter occurs before the due time for replacement then the difference between the cost of its replacement and the cull value can be regarded as a further loss. Table 18 shows the distribution of barren ewes in the regional flocks in the survey.

Table 18 Percentage distribution of barren ewes

Region	% barren ewes: None	0.1-1.9	2-3.9	4-5.9	6-7.9	8 & over	Totals
England:	% of flocks						
North	4.6	40.9	27.2	9.1	4.6	13.6	100.0
North East	13.1	26.1	8.7	26.1	4.3	21.7	100.0
North West	11.8	11.8	11.8	23.5	11.8	29.3	100.0
East Midlands	-	20.0	25.0	40.0	10.0	5.0	100.0
South Central	2.1	12.2	34.7	20.4	4.1	26.5	100.0
South East	-	8.0	52.0	24.0	8.0	8.0	100.0
South West	2.3	13.9	13.9	25.7	13.9	30.3	100.0
Wales	-	22.6	29.0	16.1	9.7	22.6	100.0
Whole sample[i]	3.5	18.3	26.1	22.5	8.3	21.3	100.0

(i) See footnote to Table 3, page 4

Although it is not very meaningful, given the spread of the figures in Table 18, the average figure for barren ewes over the sample was 5.2 per cent and, in terms of lambs lost, this represents a greater reduction of

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(1) 1.3 ewes x £40 = £52, 2 lambs x £35 = £70, 50% of the variable costs per ewe 1.3 x £7.25 = £9.4, a total of £131.4.

lambs than the loss due to ewe mortality. Ewes in this analysis include ewe lambs put to the ram and, for the latter, the proportion of unproductive animals is higher than for mature ewes. The figures in Table 18, therefore, exaggerate the loss of production from this cause in older ewes. Table 19 shows the extent to which the proportion of barren ewes is associated with the percentage of ewe lambs in the flock.

Table 19 Relationship between ewe lambs in flock and barreners

	% ewe lambs in flock				All
% barren	None	0.1-7.9	8-15.9	16 & over	flocks
			% of flocks		
Under 4	59.7	44.8	31.0	29.2	47.8
4 - 7.9	26.6	41.3	51.7	22.9	30.9
8 - 11.9	8.9	10.4	13.8	27.1	13.5
12 and over	4.8	3.5	3.5	20.8	7.8
Totals	100.0	100.0	100.0	100.0	100.0

The contrast here is between the flocks with no ewe lambs, 60 per cent of which had less than 4 per cent barren ewes, and the flocks with at least 16 per cent ewe lambs. Of the latter, just under half (47.9 per cent) had more than 8 per cent barren ewes/ewe lambs. For mature ewes the proportion barren is about 4 per cent which means the loss of 5-6 lambs per 100 ewes put to ram and a reduction in production of about £200. Nearly all of this would also be lost income for there would be little saving in the annual costs per ewe except for the supplementary feeding of the empty ewes when they should have been suckling lambs.

The proportion of the ewes tupped which eventually lamb down in any flock is obviously dependent on the two factors which have been examined in this chapter, i.e. ewe mortality prior to lambing and the proportion barren. An average figure for the survey flocks is about 93.5 per cent allowing 1.3 per cent for ewe deaths and 5.2 per cent for barren ewes, but as usual, there is much variation in this factor and this is seen in Table 20.

It should be remembered that any ewe lambs put to the ram are included with the ewes in this calculation and because of their lower reproductive rates the flocks with proportionally more ewe-lambs would tend to be at the lower end of the distribution in Table 20.

Table 20 Percentages of ewes lambing

Region	% of ewes put-to-ram which lambed							
	Under 90	90-91.9	92-93.9	94-95.9	96-97.9	98-99.9	100	Totals
England:	% of flocks							
North	13.6	13.6	9.1	18.3	22.7	22.7	-	100.0
North East	17.4	8.7	17.4	17.4	26.1	13.0	-	100.0
North West	23.5	11.8	23.5	5.9	17.6	5.9	11.8	100.0
East Midlands	-	15.0	25.0	40.0	15.0	5.0	-	100.0
South Central	24.5	6.1	14.3	22.4	18.4	14.3	-	100.0
South East	4.0	8.0	20.0	16.0	52.0	-	-	100.0
South West	25.6	13.9	16.3	23.2	16.3	4.7	-	100.0
Wales	19.4	12.9	25.8	19.4	16.1	6.4	-	100.0
Whole sample(i)	17.8	10.9	18.3	20.9	22.1	9.1	0.9	100.0

(i) See footnote to Table 3, page 4.

In this study, the lambing rate or lambing percentage is calculated on the basis of the number of lambs reared per 100 ewes put to ram so that, while the number of ewes actually lambing is an important factor in this, it is not the only one. Another is the frequency of multiple births, twins and triplets, from the ewes lambing but there is no information on this point. A third factor affecting the lambing rate is the mortality of the lambs born alive and an attempt was made to distinguish between the deaths of lambs at or soon after lambing and later losses. Information on all losses of lambs is very often a 'guesstimate' for few farmers keep accurate records on this matter which, one would think, would be useful data in the diagnosis of certain management problems. Given the proviso just made, Table 21 indicates the orders of magnitude of the losses of lambs in the schedule just noted and Table 22 shows the distribution of post-natal lamb deaths.

There is, as usual, much variation in the proportionate losses of lambs within and between the regional flocks but an overall loss of six lambs out of every 100 born alive would not seem excessive when two-thirds of these occur at or near lambing. The final column of Table 20 shows what are termed 'natal deaths', these include still-born and lambs dying at lambing or before the shepherd has had an opportunity to assist them in any way. It is suggested that these deaths should not be put down to any inefficiency of management for some of them are avoidable only with continuous supervision at lambing which is hardly physically possible nor is it likely to be economically justifiable.

Table 21 Deaths of lambs

Region	% of live lambs dying: at or soon after birth	% of live lambs dying: later	% of live lambs dying: Totals	Natal deaths[(i)] as a % of live lambs born
England:				
North	2.0	2.6	4.6	3.8
North East	4.1	3.3	7.4	3.6
North West	5.7	1.5	7.2	n a[(ii)]
East Midlands	3.9	3.8	7.7	n a[(ii)]
South Central	5.4	2.6	8.0	3.7
South East	1.4	1.5	2.9	3.6
South West	4.7	1.2	5.9	3.7
Wales	3.7	1.8	5.5	3.2
Averages	3.9	2.2	6.1	3.6

(i) Lambs born dead or live lambs which died before being seen by shepherd
(ii) Not available

Table 22 Percentage distribution of post-natal[(i)] deaths

Region	Post-natal deaths as % of live lambs born: Under 2	2-3.9	4-5.9	6-7.9	8-9.9	10 & over	Totals
England:	% of flocks						
North	18.2	31.8	18.2	18.2	9.1	4.5	100.0
North East	17.4	8.7	26.1	13.0	8.7	26.1	100.0
North West	-	23.5	5.9	23.5	11.8	35.3	100.0
East Midlands	-	21.0	31.6	26.3	5.3	15.8	100.0
South Central	4.2	12.5	29.1	18.8	12.5	22.9	100.0
South East	32.0	48.0	16.0	4.0	-	-	100.0
South West	2.4	33.3	16.7	21.4	11.9	14.3	100.0
Wales	16.1	29.0	16.1	6.5	6.5	25.8	100.0
Whole sample[(ii)]	10.6	25.5	20.7	16.3	8.8	18.1	100.0

(i) As distinct from 'natal deaths' as in footnote (i) above.
(ii) See footnote to Table 3, page 4.

Lambing rates

Whatever form the final product, finished lambs, stores or breeders, the sheep farmer cannot substantially alter the total production in financial terms unless the flock has produced the lambs in the first place. Having got the lambs the farmer has some flexibility in the way he then disposes of them to obtain the best financial return. Table 23 indicates the degree of success, or otherwise, the survey flocks had in producing the

Table 23 Percentage distribution of lambing rates

Region	Lambs reared per 100 ewes put to ram: Under 100	100-119.9	120-139.9	140-159.9	160-179.9	180 & over	Totals	Average
England:	% of flocks							
North	9.1	4.5	27.3	18.2	36.4	4.5	100.0	148.0
North East	-	4.3	26.1	47.8	8.7	13.1	100.0	147.6
North West	-	17.6	11.8	35.3	35.3	-	100.0	146.4
East Midlands	-	5.0	30.0	30.0	35.0	-	100.0	150.2
South Central	4.1	20.4	24.5	28.6	20.4	2.0	100.0	139.7
South East	12.0	16.0	56.0	12.0	4.0	-	100.0	122.2
South West	9.3	34.9	30.2	23.3	2.3	-	100.0	125.7
Wales	22.6	25.8	25.8	19.4	6.4	-	100.0	119.4
Whole sample (i)	7.8	18.7	29.1	26.1	16.1	2.2	100.0	134.4

(i) See footnote to Table 3, page 4

raw material for later purposes. It shows the usual widespread of results with a few flocks not managing to rear one lamb per ewe while, at the other extreme, each ewe, on average, in a few flocks reared upwards of 1.8 lambs. If it is accepted that the target lambing percentage for lowland sheep flocks should be 150 then, in 1981, this was achieved by many of the flocks in the northern parts of England and the East Midlands, whereas in much of southern England and Wales the target would seem to be too ambitious for most flocks.

Several factors contribute to the variation in lambing rates, among them are the breeds of ewe kept, the condition of the ewes and rams, the proportion of ewe lambs bred from, but it is difficult to be specific about the relative importance of each of the various factors. It is, therefore, suggested that each farmer should set his own target in relation to his own circumstances, both physical and financial, and then plan how to meet

it. A very high lambing rate is not necessarily the 'be-all and end-all' of sheep production for the costs involved, particularly of shepherding, may not justify it; nevertheless it does remain one of the more important factors making for the success of this enterprise.

Chapter 4

Further flock characteristics

Labour

A flock of sheep is not regarded as a 'labour intensive' enterprise and this is the case apart from a few occasions during the year, particularly the lambing period and less so at shearing, dipping and winter feeding. Even so, the cost of labour is second only to that of feed in the cost structure of lowland sheep flocks. In the absence of time sheets, which the survey farmers were not asked to keep, the input of labour was estimated by the summation of the time spent on daily shepherding and the hours needed for the occasional jobs required by the flock, such as those mentioned above and the hours spent on medical attention, e.g. drenching, vaccination and feet treatment.

Over the whole sample the average (unweighted) direct[1] labour requirement per ewe was 3.7 hours per year but there is much variation in this from one extreme of less than two hours per ewe to the other of over six hours. The facts suggest that the ewes in the smaller flocks get more attention than those in the larger flocks, for Table 24 shows that in 86.7 per cent of the flocks of 50-199 ewes the labour requirement was 4 or more

Table 24 Labour usage per ewe by flock size group

Hours per ewe per year	Ewes per flock			All flocks
	50-199	200-499	500 & over	
	% of flocks			
Under 2	4.4	3.7	8.9	5.2
2 - 3.9	8.9	54.7	66.1	43.9
4 - 5.9	57.3	37.0	23.2	39.7
6 and over	29.4	4.6	1.8	11.2
Totals	100.0	100.0	100.0	100.0

(1) This is the labour directly and recognisably employed on the flock and does not include such work as applying fertilisers to the pasture grazed by sheep nor the hours involved in growing any forage crops for the flock, this 'indirect' labour is taken account of in the grassland and crop costings.

hours per ewe but that was the position in only 25 per cent of the largest flocks. Here, however, economies of scale seem to come into play. For example, a 'journey' across the farm to see the sheep does not necessarily take longer whether the flock is small or large, so that on a per ewe basis the 'journey' is shorter and less costly for the larger flock. Accumulated over the year the savings in the 'travel' part of shepherding could account for at least part of the differences in labour costs between small and large flocks. These do not imply that the ewes in a small flock get more attention per head in the field than those in larger flocks.

Much of the direct work on sheep flocks was done by the farmer himself or by other family workers and the cost per hour of £2.60 is estimated to allow for overtime work, particularly at lambing, for holidays and insurances. The labour cost per ewe was thus slightly under £10 and for the average sized flock in the sample about £3,500. The farmer/shepherd will not pay this sum of money to himself but it is as well to be aware of the magnitude of the labour cost when considering the economic efficiency of sheep flocks. In farm management analysis labour is treated as a fixed cost and, as such, is not included in the calculation of gross margins: its exclusion, therefore, diminishes the value of gross margins as an indicatio indication of the overall poofitability of the sheep enterprise.

Housing

Given that lambing is the most laborious and troublesome period in the sheep year, farmers are adopting various techniques to make life easier at this time. In order to reduce the duration of lambing some methods are designed to encourage speedier mating by, for example, the use of teaser rams or hormone sponges to bring ewes into season simultaneously. For the same reason, in some flocks the rams are left with the ewes for a restricted period which achieves the objective of reducing the lambing period but, possibly, at the expense of more barren ewes. Other farmers are dividing their flocks for tupping, not only to be able to sell some lambs in different markets but also to have more manageable lambing periods than one long dragged-out one. Yet more and more farmers are turning to housing their sheep at lambing time to make shepherding more comfortable and, hopefully, to reduce the losses of lambs in the cold, wet weather which can often accompany lambing.

The survey distinguished two different approaches to the housing of sheep. In the first, the ewes were completely housed for varying lengths of time prior to lambing, they lambed indoors and were then turned out with their lambs after a day or so dependent on the weather. While the ease of supervising the flock in the pre-lambing and lambing periods is an important factor in a farmer's decision to house his sheep, also of significance is the resting of the pastures in the winter months to avoid poaching and to encourage an early spring bite. The second approach was to house ewes just for lambing or to bring them into buildings or yards overnight during the lambing period. No distinction was made between the latter, but rather different, systems.

Table 25 shows the number of flocks in each region and in flock size groups which were housed under one or other of the systems just mentioned.

Table 25 Housing of sheep in winter 1980-81

(A) By region

Region	No of flocks in survey	No of flocks housed: Completely	No of flocks housed: At lambing(i)
England:			
North	22	5	6
North East	24	3	21
North West	17	-	13
East Midlands	20	-	11
South Central	50	10	29
South East	25	4	14
South West	43	5	31
Wales	31	4	19
Totals	232	31	144
%		13.4	71.6(ii)

(B) By flock size group

	No of ewes per flock: 50-199	200-499	500 & over	All flocks
Nos in sample	68	108	56	232
No of flocks housed:				
Completely	1	13	17	31
%	1.5	12.0	30.4	13.4
At lambing(1)	51	69	24	144
%	76.1	72.6	61.5	71.6(ii)

(i) Housed at lambing or brought in at night at lambing.
(ii) The percentage of the flocks not completely housed, e.g. 144 ÷ 201 x 100 = 71.6 per cent.

About one in eight (13.4 per cent) of the flocks surveyed were housed completely for varying lengths of time during the winter of 1980-81 while seven out of ten of the remaining flocks were brought in just for lambing or overnight during the lambing period. This means that the ewes in only one-quarter of the survey flocks were outdoors for the whole year, which is a surprisingly low proportion when, perhaps, not too many years ago housing would have been considered unhealthy for sheep, irrespective of the benefit to the shepherd.

On a regional basis there is insufficient coverage of flocks to make any valid comparisons, but the analysis by flock size groups shows some differences. Only one flock in the 50-199 ewe size group was housed completely, i.e. 1.5 per cent of the group compared with 30.4 per cent of the flocks in the 500 ewe and over group. Of the remaining flocks, 76 per cent of the smallest size flocks were housed for lambing or brought in at night at this time compared with 62 per cent of the 500 ewe group. Fairly obviously, lambing is more manageable outdoors during day-time when dealing with up to 200 ewes and there is less incentive to put up or adapt a building to house this number. It is a different story for the shepherd when he is lambing upwards of 500 ewes so that complete housing is more common and also the spreading of the capital cost of a building over many more ewes makes housing a more economic proposition.

A final table on housing (Table 26) indicates the variety and ages of buildings which are used to house sheep. It can be seen that very few of

Table 26 Description and age of buildings used to house sheep

Description of building	England							Wales	Totals
	North	N East	N West	East Mid.	South Cent.	S East	S West		
	No of buildings								
Sheephouse	-	2	-	-	-	1	6	3	12
Dutch barn	-	5	5	3	6	1	4	-	24
Pole barn	2	-	1	1	16	3	-	1	24
Barn	-	2	1	-	9	-	-	4	16
Cattle yard	6	4	1	-	2	5	1	3	22
Covered yard	-	2	-	1	13	-	4	-	20
Lean-to	1	4	5	-	3	3	-	3	19
Gen.purpose	2	1	-	3	9	7	11	-	33
Conversions	2	1	2	-	5	17	3	5	35
Other	4	9	5	4	9	1	9	10	51
Totals	17	30	20	12	72	38	38	29	256
Age of building									
Under 5 yrs	8	4	2	1	11	8	13	5	52
5-10 "	-	3	3	3	9	3	7	1	29
10-20 "	6	8	6	3	21	6	4	9	63
20 and over	3	15	9	5	31	21	14	14	112
Totals	17	30	20	12	72	38	38	29	256

the buildings were put up for the main purpose of housing sheep, most are general purpose barns of various descriptions or adaptations of other livestock accommodation. The essence of this table is to illustrate that ewes do not require purpose built 'palaces' but, given that good ventilation is possible, many existing structures can be adapted to house flocks for this relatively short but vital period in the sheep-year.

Density of stocking with sheep at grass

Although the end product of most lowland sheep systems is the same, i.e. lambs for the meat trade or carcass lambs(1), it is a truism to say that there are many different ways of achieving that result. In earlier sections of the report several of the differences in lowland sheep enterprises have been examined, e.g. flocks are fitted into various farming systems, there are manifold breeds and crosses of ewe kept, the timing of the sheep-year differs, so does the method of flock replacement and the methods of winter feeding to mention some of the differences. There is, however, a common element in all sheep-keeping systems in this country, namely that each flock spends all or the greater part of the year at grass and grazed grass contributes the largest part of a ewe's annual intake of feed. But, even in this respect, there is much variation in the intensity of stocking sheep on grass; it would, however, require a much more detailed investigation than the present survey to determine the reasons for this variation.

In order to assess the stocking rate of ewes at grass, the concept of Livestock Unit Grazing Weeks was employed to allocate the grassland to its different uses. Unless grazing records are kept over the year it is inevitable that an arbitrary system such as this should be used (see Appendix D for an example) but, given that all farms (and flocks) are treated alike, the system does allow comparison between flocks to be made if required.

Table 27 illustrates one such comparison, i.e. between the density of stocking with ewes and various types of farming. The overall distribution (the 'All flocks' column) has a 'normal' appearance with relatively few

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(1) In using this terminology the author is avoiding the use of the term 'fat lamb' which seems desirable as fat is the last thing the meat trade currently requires.

flocks at the extremes and a clustering of flocks with stocking rates of 8 to 12 ewes per hectare (3.2 - 4.9 ewes per acre). The samples of flocks on pig and poultry farms and on part-time farms are small and should be discounted but it is of interest to note that on cropping farms 52 per cent

Table 27 Stocking density with ewes and types of farming

Ewes per ha of grassland	Type of farming (full-time)					Part time holdings	All farms
	Dairy	L'stock rearing	Pigs & poultry	Cropping	Mixed		
	% of flocks						
Under 6	10.7	4.2	-	6.9	4.0	5.0	5.2
6 - 7.9	14.3	18.3	20.0	6.9	20.0	40.0	18.5
8 - 9.9	28.6	25.0	-	17.2	16.0	15.0	21.6
10 - 11.9	32.2	24.2	30.0	17.2	32.0	30.0	25.8
12 - 13.9	7.1	17.5	30.0	38.0	12.0	5.0	17.7
14 and over	7.1	10.8	20.0	13.8	16.0	5.0	11.2
Totals	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No of flocks	28	120	10	29	25	20	232

of the flocks were stocked at over 12 ewes per hectare compared with 29 per cent at this level for the sample as a whole. One explanation could be that on such farms the sheep must be really competitive with the cropping enterprises and it is only at the higher stocking rates that the sheep hold their own financially. On such farms the 'golden hoof' benefit of sheep has already been mentioned although it is difficult to put a monetary value on their contribution to soil fertility. On the livestock rearing farms, which comprise the major part of the sample, the sheep will have a greater or, at least, equal right to the best pastures, but this would not be so on dairy farms on which the sheep would, for example, utilise off-lying grassland away from the farmstead or be used as 'scavengers' to clean up after the milking herd had the first pick of the available pastures. If these are the uses for sheep on dairying farms their stocking rates would be lower than on the livestock-rearing farms and the figures in Table 27 tend to confirm this.

The study of stocking rates alone is not very meaningful, for what really matters is the financial margin per unit of land devoted to different enterprises and, for sheep, this means taking account of the margin per ewe and the associated stocking rate, to which references are made later in the report.

Chapter 5

Carcass lamb flocks

In the preceding chapters the 232 flocks in the survey were analysed on a regional basis and, for convenience, according to flock size-groups for they all share one common characteristic in that they are kept on lowland farms in England and Wales. While the main ultimate purpose for keeping ewes is to produce animals for the meat trade these are not the immediate products from all the survey flocks. The output from the flocks was, therefore, sub-divided and the flocks classified as follows:

Carcass lambs - usually called 'fat-lambs' but see the footnote on page 25; these are lambs born in 1981 and sold for killing in the same year. Flocks with 50 per cent of their lambs in this category were classified as carcass lamb flocks.(1)

Hoggets - these are lambs born in 1981 but not sold until the early months of 1982 having had feeding supplementary to grazed grass, usually a forage crop but sometimes trough feed as well. Hogget flocks are, consequently, those in which 50 per cent or more of the lambs were kept on for these sales.

Store lambs - lambs sold in an 'unfinished' condition for further feeding on other farms before they go for slaughter. Lambs sold with their dams as 'couples' are included as stores, and the flocks were so-called if 50 per cent or more of the lambs were disposed as stores.

Lambs for breeding - these are mainly ewe lambs and kept for flock replacements while in a few flocks some are sold for this purpose; an occasional ram lamb is included. There were no flocks in the survey in which breeding lambs formed 50 per cent of total disposals so that no flock is classified as such. However, in some of the larger flocks the significant proportion of breeding lambs determined the precise classification of the flock by their effect on the overall composition of disposals. A final group of flocks was differentiated because no category of the lamb

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(1) Including flocks in which the ewes lambed down in late 1980 and the lambs sold in the Spring of 1981.

disposals just described contributed more than half of the total, these are, therefore, described as 'mixed output' flocks. The classification of the flocks by type of production and (a) by flock size group and (b) by region are shown in Tables 28 and 29.

Table 28 Type of flock and flock size group

Type of flock	Ewes per flock: 50-199	200-499	500 & over	All flocks
	No of flocks			
Carcass lamb	52	82	33	167
Hogget	5	7	8	20
Store lamb	7	10	8	25
Mixed output	4	9	6	19
Totals	68	108	55(i)	231(i)

(i) Excludes one 'flying flock' in which all the ewes are replaced each year.

Table 29 Type of flock and region

Region	Type of flock: Carcass lamb	Hogget	Store lamb	Mixed output	All flocks
England:			No of flock		
North	12	6	2	2	22
North East	13	7	1	3	24
North West	14	1	-	2	17
East Midland	18	-	1	1	20
South Central	34	4	8	3	49
South East	12	2	7	4	25
South West	37	-	4	2	43(i)
Wales	27	-	2	2	31
Totals	167	20	25	19	231(i)

(i) See Table 28

In each region and in each size group the production of lambs for immediate sale to the meat trade (carcass lambs) is the prime objective of most of the flocks but, if the regional samples are rather too small to generalise from, there is trend in production when the flocks are classified by size of flock. Over three-quarters of the flocks in the smaller size groups, i.e. with less than 500 ewes, were classified as carcass lamb but the proportion falls to 60 per cent for the largest flocks. This suggests that the farmers with the latter flocks are more flexible in the disposal

of their lambs when there are several hundred available whereas the farmers with the smaller flocks aim to sell the majority of their lambs in the most remunerative carcass (fat) lamb market.

The remainder of this chapter is concerned with the carcass lamb flocks while in chapter 6 some analyses are given of the minority type flocks. Table 30 shows the average disposal of the lambs from the carcass lamb flocks and Table 31 the monthly distribution of the sales of carcass lambs from the same group of flocks. Even within the specialist carcass lamb flocks the trend, already mentioned, is discernible in Table 30 in that the proportion of lambs finished off grass falls as the flocks increase in size, from 85 per cent of total lamb disposals in the smallest flocks down to 77 per cent in the 500 ewe (and over) group. Complementary to this are some reverse trends as the proportions of hoggets and store lambs increase as the flocks get larger, with a total of 16 per cent in these categories in flock size group 3 as against under 7 per cent in size group one. Other features to note in this table are the facts that

Table 30 The disposal of lambs in carcass lamb flocks

	No of ewes per flock			All flocks
	50-199	200-499	500 & over	
Sales:	% of lambs			
Carcass lambs	85.1	82.6	77.2	80.5
Hoggets	4.9	6.4	6.8	6.4
Store lambs	2.9	3.8	9.0	6.0
Breeding lambs	0.6	0.8	0.6	0.7
Casualties	0.3	0.1	-	0.1
Total sales	93.8	93.7	93.6	93.7
Lambs kept:				
For breeding	5.4	4.9	5.5	5.2
For feeding	0.8	1.4	0.9	1.1
Total disposals	100.0	100.0	100.0	100.0
No of lambs '000	8.6	34.7	34.1	77.4

sales as percentages of total disposals are virtually the same in each size group as are the proportions of lambs kept back as flock replacements, which varied minimally around 5 per cent.

The monthly distribution of carcass lamb sales, Table 31, also indicates some trends associated with size of flock. Following the

insignificant numbers sold up to the end of March there was a proportionally more rapid build-up of sales from the smaller flocks in the April-June quarter compared with the larger flocks, the percentage figures being 27, 24 and 19 respectively. The pattern is reversed in the final quarter of the year, with 21 per cent of sales in flock size-groups 1 and 2 and 27 per cent from the biggest flocks. Adding the sales of hoggets to the lamb sales

Table 31 Monthly distribution of sales of carcass lambs

Month of sale (1981)	No of ewes per flock			All flocks
	50-199	200-499	500 & over	
	% of lambs			
February	-	0.1	-	*
March	1.4	0.4	0.4	0.5
April	3.0	2.5	1.2	2.0
May	8.5	6.9	4.2	6.0
June	15.5	14.6	13.6	14.3
July	14.7	21.2	19.4	19.7
August	16.2	18.5	16.0	17.1
September	19.4	14.7	17.9	16.6
October	11.1	9.8	14.1	11.8
November	6.8	6.8	8.6	7.6
December	3.4	4.5	4.6	4.4
Totals	100.0	100.0	100.0	100.0
No of lambs	7.4	28.6	26.3	62.3

*less than 0.1

in the last quarter means that a third of disposals from the largest flocks took place later than September compared with one-quarter from the smaller flocks. If these figures, on a quarterly basis rather than on the more fluctuating monthly sales, are typical over a run of years they do give some guidance to forecasting the trend of sales of the annual lamb crop, though this will always be partly dependent on the weather in the post-lambing period.

Financial aspects[1]

In addition to its main trading activity of selling lambs and wool there is, for every permanent flock, the integral matter of maintaining

(1) As the carcass lamb flocks represent 72 per cent of the whole sample in the survey and, therefore, contribute largely to the tabulated results in the earlier chapters, it is not intended to repeat these analyses for the flocks when grouped by type of production.

the flock. This includes making decisions on the culling of ewes and rams at the end of their productive lives and then arranging for their replacement. For rams this is usually done by purchase, for ewes there is the choice between rearing and purchase or partly both (see Chapter 2). These decisions will, obviously, have their effect on the eventual financial success of the flocks. The longer term effect will show up in the breeding performance of the flock but this cannot be assessed from a 'one-off' survey. The immediate financial effects of these decisions are reflected in the financial valuations and the cost of maintaining the flock over the course of the survey year. Information on these items are given in Table 32.

Table 32 Valuation, purchases and sales of breeding sheep in the average flocks

	No of ewes per flock					
	50-199		200-499		500 & over	
	Nos	£ per head	Nos	£ per head	Nos	£ per head
Opening valuation:						
Ewes	107	34.20	283	35.24	676	33.66
Ewe lambs	9	31.43	33	33.36	104	30.67
Rams	3	60.29	8	68.63	18	75.62
Incoming sheep (1981)						
Ewes	11	44.20	30	46.58	60	49.85
Ewe lambs: bought	5	42.77	21	48.21	38	39.02
reared	9	36.77	20	36.76	57	32.18
Rams	1	76.43	1	133.23	4	143.39
Total	145		396		957	
Closing valuation:						
Ewes	102	38.12	284	39.68	688	37.79
Ewe lambs	13	40.55	36	40.55	99	34.67
Rams	3	63.10	8	76.63	18	85.77
Outgoing sheep (1981)						
Sales:						
Ewes - killing	16	22.89	37	22.49	104	22.67
breeding	5	32.92	17	45.25	12	24.01
casualties	1	7.00	1	7.48	1	7.52
Rams	1	35.81	1	49.89	3	27.28
Deaths: ewes	4	-	12	-	31	-
rams	*	-	*	-	1	-
Total	145		396		957	
Flock adjustment £ per flock	- 49		+ 16		- 436	
Flock replacement rate	22.4%		22.0%		19.0%	

*less than 1 per flock

It is not intended to comment on all the figures in this table. Briefly they show that in each size group the average costs of incoming sheep in 1981 (i.e. the price of purchased sheep or the estimated market value of home-reared animals) were higher than the opening valuation of the same categories. The average closing valuation of all classes of sheep were greater than the opening valuations because the values of animals carried forward from 1980 to 1981 were raised in line with the market prices of breeders and because of the higher values of the incoming animals just mentioned. In the calculation of the flock adjustment(1) the higher closing valuations were often offset by the return from cull ewes, the average price of ewes sold for killing was £10-11 less than their opening value. For the smallest and largest flocks the average adjustment was a relatively small negative figure (depreciation) and will have had little effect on the final net margin. Likewise the small appreciation (+ £16 per flock) in the 200-499 ewe group will alter the net margin only minimally. For an individual flock, however, heavy culling of ewes or many ewe deaths would result in a substantial flock depreciation and lower profitability.

The flock replacement rate (last figures in the table) is calculated by relating the total ewe disposals (all sales plus deaths) to the ewe numbers in the opening valuation. The figures of 19 to 22.4 per cent, averaging about 20 per cent indicate a flock life for lowland ewes of five years but, as with all the survey results, there is much variation in this figure as seen in Table 33.

Table 33 Flock replacement rates in 1981

% flock replacements	No of ewes per flock			All flocks
	50-199	200-499	500 & over	
	% of flocks			
Under 10.0	16.3	13.4	21.2	15.9
10 - 14.9	22.5	21.9	12.1	20.1
15 - 19.9	26.5	18.3	21.2	21.3
20 - 24.9	8.2	24.4	21.2	18.9
25 - 29.9	12.2	9.8	6.1	9.8
30 & over	14.3	12.2	18.2	14.0
Totals	100.0	100.0	100.0	100.0

(1) Flock adjustment = opening valuation + purchases of breeding stock less closing valuation + sales.

Some replacement rates, in excess of 40 and 50 per cent, were caused by large sales of breeders which may be an indication of a change of breeds. While the survey noted the numbers of incoming ewes it did not, unfortunately, record their breeds, and evidence on the switching of breeds, if any, is not available.

The average financial results and some physical data for each flock size group are presented in Tables 34 and 35 and they set the scene for a further examination of the information to provide some standards or targets at which lowland sheep farmers can aim. While to know that the average gross margin per ewe in the smallest flocks in 1981-82 was £38.6 may be of use, say, in budgeting, it is not possible to describe this result as good, bad or indifferent unless it can be compared with some standard or other. The average data in these tables can stand without much comment; however, it can be noted that the output per ewe decreased by some 10 per cent between the smallest and largest flocks, which is nearly all accountable for by the greater price per head for all lamb disposals and the slightly higher lambing rate (Table 35).

While shearing, more especially of a large flock, is a significant event in the shepherd's calendar it can be seen that wool contributes a fairly small fraction of the output of the average flock. At about £3.00 per ewe, wool contributes some 6 per cent of output although this will vary widely and in South West and South East England fleece weights are often greater than average. The time is, however, long gone when the sheep farmers in the South West could regard the fleece as equivalent in value to about one-quarter of a (fat) lamb and consequently could be satisfied with a relatively lower lambing rate from their long-woolled breeds.

Of the variable costs of production, only the costs of grazing and of fodder crops are much higher in the largest flocks and these, together with the output difference, account for most of the 15 per cent difference in the average gross margins of flocks in size-groups 1 and 3.

Turning to the fixed costs, only one item varies substantially between flock size groups; in the smallest flocks the average labour input was 5.4 hours per ewe against less than 4 hours in the other groups. This is responsible for the cost of labour in money terms, being 55 per cent higher on the smallest compared with the largest flocks. The net effects of the

Table 34 Financial results from carcass lamb flocks

	No of ewes per flock		
	50-199	200-499	500 & over
No of flocks	52	82	33
No of ewes put to ram	114	309	746
Output:		£ per 100 ewes	
Lambs	4837	4646	4458
Wool	299	311	284
Sub-total	5136	4957	4742
Ewe premium	138	138	135
Flock adjustment(i)	-43	+5	-58
Total output	5332(ii)	5100	4819
Variable costs:			
Feed:			
Concentrates	530	526	503
Hay	52	41	51
Silage	5	5	28
Grazing, fodder crops	500	500	592
Total feed	1087	1072	1174
Vet and medicines	171	156	192
Other variables	210	162	169
Total variable costs	1468	1390	1535
Gross margin(iii)	3864	3710	3284
Fixed costs:			
Labour	1374	964	889
Grazing, hay, fodder crops	997	954	985
Vehicles, equipment, buildings	286	235	278
Share of farm overheads	484	453	443
Total fixed costs	3141	2606	2595
Net margin(iv)	723	1104	689

(i) Flock appreciation +, flock depreciation -
(ii) Includes compensation for one flock savaged by dogs which is not included in any other of the output items
(iii) Output less Total Variable Costs
(iv) Gross margin less Total Fixed Costs

differences in output and costs between the flocks in size groups 1 and 3 were to produce very similar net margins which varied minimally around £7 per ewe. For the flocks of 200-499 ewes, the greater average output than in the size group 3 flocks and the lower level of costs, particularly of fixed costs, than in the flocks in size group 1, combined to give them a considerably higher average net margin of £11 per ewe.

Of the physical results given in Table 35 the only major difference between the flocks in the three size groups is that of the labour input and thus labour costs which have already been mentioned.

Table 35 Some physical results

		Ewes per flock		
		50-199	200-499	500 & over
Lambs reared per 100 ewes ptr		136.7	134.1	135.7
% ewe lambs in flock		6.2	8.2	9.3
Lambs for killing:				
Deadweight	kg	18.0	18.1	17.5
Price	£	34.87	34.51	33.34
Price per kg dw(i)	p	194	191	191
Concentrates per ewe	kg	42.6	42.1	40.2
Labour hours per ewe		5.4	3.7	3.5
Ewes per hectare:				
Grazing		8.9	9.8	9.7
All land		7.9	8.6	8.4
Ewe to ram ratio		38	41	41

(i) Including variable premiums

Of more interest than the overall averages in isolation is a comparison of these with the results of the most profitable flocks as measured by the net margins per ewe. Several such comparisons are given in Table 36. The most substantial factor leading to the greater net margins of the 'top' flocks is their relative output; lines a and g indicate the magnitude of the output increment from these flocks over the average ones, i.e. 20 per cent and over. This in turn is largely due to the higher lambing rates (line f) since, for example, in the first flock size group the 29.4 extra lambs reared per 100 ewes was worth about £1050 of the total output difference of £1239 between the average and top 25 per cent flocks (line g). The residue of the difference was due to a combination of a lower depreciation of the flocks, a slightly better price for each lamb and marginally greater wool sales. Thus, in the profitability stakes, the top flocks in this size group start with an output advantage 23 per cent more than average.

In line b the relative levels of variable costs in the first and second size groups are shown to be considerably lower than the average,

18 and 16 per cent less respectively. For the same flocks, line j indicates that the variable feed costs (concentrates, hay, grazing) were lower than average; for example in size group 1, 'premium' flocks, the feed costs of £860 per 100 ewes were nearly 21 per cent less than in the average flock

Table 36 Some results for average flocks and most profitable flocks

	50-199		200-499		500 & over	
	Average	Top 25%	Average	Top 25%	Average	Top 25%
No of flocks	52	13	82	20	33	8
Ewes per flock	114	105	309	289	746	660
	Top 25% flocks' results with average results =100					
a Output		123		120		126
b Variable costs		82		84		107
c Gross margin		139		134		135
d Fixed costs		88		91		88
e Net margin		260		135		211
f Lambs reared per 100 ewes	136.7	166.1	134.1	149.9	135.7	147.3
	£ per 100 ewes					
g Output	5332	6571	5100	6126	4819	6070
h Net margin	723	2605	1104	2598	689	2149
j Feed (variable)	1087	860	1072	857	1174	1340
k Labour (fixed)	1374	1137	964	867	889	820

and were largely responsible for the lower variable costs in total. With these and greater relative outputs it is inevitable that the gross margins in the premium flocks in size groups 1 and 2 would be much higher than the average for the whole sub-samples and line c shows the percentage increases of 39 and 34 in the gross margins respectively. In contrast, in the largest flocks of 500 ewes and over, the total variable costs (including feed) were greater in the top 25 per cent flocks (line b) and for them it was only the much greater output which produced the higher gross margin, 35 per cent above the average for the group (line c).

Considering the fixed costs of lowland sheep production (see Table 34 and also the Definition of terms in Appendix A) it can be seen from Table 36 that the top 25 per cent flocks had the benefits of much lower expenditures on these items, some 9 to 12 per cent lower than average.

In the premium flocks in size groups 1 and 2 economies in the use of labour were particularly important and were responsible for 63 and 39 per cent respectively of the differences in the totals of fixed costs compared with the average. In the largest most profitable flocks there was a significant saving in the fixed costs of grazing, hay and fodder crops which was equivalent to 59 per cent of the decrement in total fixed costs as compared with the average flock in this size group.

The variation in output, variable and fixed costs combine to determine the levels of net margins earned by the flocks which has been used to measure profitability of sheep production in this survey so far.(1) Table 36, line e gives these figures which indicate significantly higher net margins in the premium flocks. In flock size group 1, for example, the increase from the average of £723 per 100 ewes to £2605 in the top flocks is, in percentage terms, a change of plus 260 per cent. For the largest flocks this percentage was 211, while for the premium 200-499 ewe flocks the advantage was 135 per cent. This relatively smaller increase reflects the fact that it was calculated from a much higher base figure of £1104 per 100 ewes earned by the average flock; the group's actual financial margin of £2598 per 100 ewes is virtually the same as that of the premium flocks in the smallest size group (£2605).

While a very obvious conclusion from this examination of the financial results of the premium flocks is that, for greater profitability, output must be kept up and costs down, a more significant observation is the extent of the difference in the margins earned. The fact that a group of farmers with average flocks of 105 ewes produced a return of £26 per ewe, after meeting all the costs detailed, should be an incentive to sheep farmers lower down the scale to re-consider all aspects of their sheep production with a view to remedying the more substantial deficiencies.

Stocking rate

Writing recently about his flock performance a sheep farmer (Dr Henry Swann in the Sheep Supplement of the Farmers Weekly, 5th August 1983)

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(1) The author is aware that this measure does not itself reflect the earning capacity of the land devoted to sheep which some may consider to be a more important factor in this enterprise; margins per hectare are considered later in the report.

claimed that "profit from sheep is all about stocking density" and, no doubt, this view is held by others. It is, therefore, of interest to examine the survey results in order to determine whether such a sweeping generalisation could be supported. Stocking density of itself is, of course, no measure of profitability. The farmer implied, no doubt, that it was stocking density allied with the returns per ewe that is the prime determinant of profit in this enterprise. The association of these two factors produces the net margin per hectare of land used for sheep and Table 37 illustrates some relevant points.

Table 37 A relationship between net margins per hectare and per ewe and stocking density

	Top 25% flocks by:	No of column (a) flocks in top quartiles by:	
Ewes per flock	Net margins per hectare (a)	Net margins per ewe (b)	Stocking density (c)
50 - 199	13	11	5
200 - 499	20	14	6
500 & over	8	6	3

Column (a) simply indicates the number of flocks in the top quartile (25 per cent) when the flocks are distributed according to net margins per hectare. Column (b) states the number of column (a) flocks which would appear in the top 25 per cent of flocks when they are listed in descending order according to net margins per ewe. Similarly column (c) shows the number of column (a) flocks which would be in the top quartiles when the flocks are arranged by reference to density of stocking (ewes per hectare).

Two points stand out in this table. First, that most of the column (b) flocks are also included in the column (a) groups showing that there is a close relationship between margins per hectare and margins per ewe. Second, that, as few of column (c) flocks are among the column (a) samples, it means that there is no, or at least a very weak, relationship between density of stocking and margins per hectare in this particular sample of flocks. The first of these relationships is also clearly seen in the scatter diagram in Figure 1 and implies that profitability per ewe was far more important than stocking density in determining the level of profitability per unit of land used by sheep. Table 38 gives some appropriate figures for the flocks in the 50-199 ewe size group, similar figures for the other size groups are given in Appendix E.

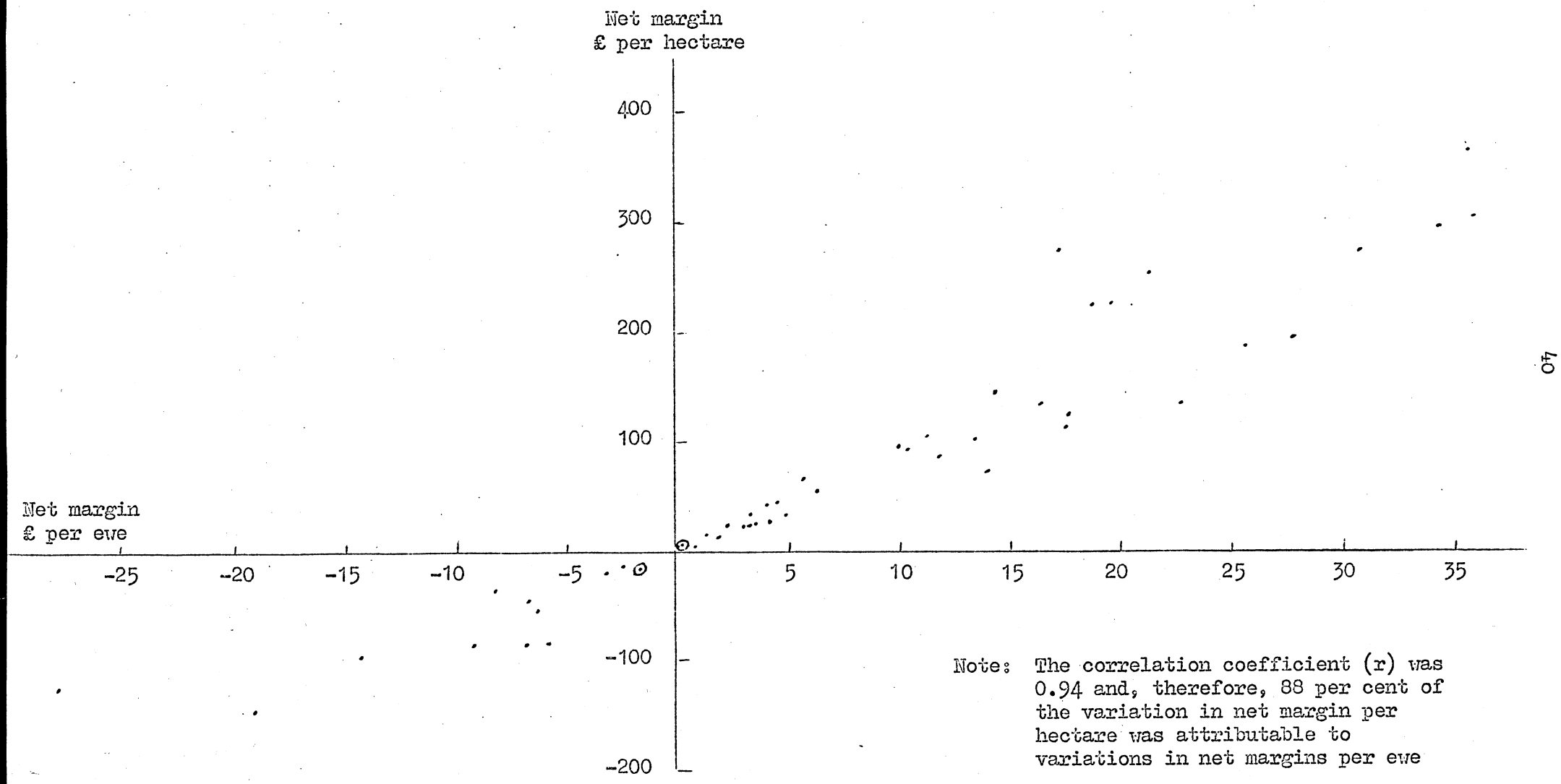
Table 38 Net margins per hectare for the top flocks based on different criteria (50 - 199 ewe size group)

		Top 25% flocks based on:		
		Net margins per hectare	Net margins per ewe	Stocking density
		£ per hectare		
(a)	Output	579	561	581
(b)	Variable costs	113	102	166
(c)	Gross margin	466	459	415
(d)	Fixed costs	243	236	334
(e)	Net margin	223	223	81
(f)	Ewes per hectare	9.0	8.5	11.2
(g)	Lambs reared per 100 ewes	160.3	166.1	132.5
		£ per ewe		
(h)	Output	64.4	65.7	51.8
(j)	Net margin	24.9	26.0	7.2

The figures in the first two columns are very similar, the contrast is between them and the figures for the more densely stocked flocks in the third column. The output per hectare in the latter is much the same as for the other flocks but its composition is quite different being the product of a lower output per ewe (some 20 per cent less than in top per hectare flocks) and a higher stocking rate, 24 per cent above that in the first group. Much more expenditure, both on variable and fixed costs, was needed to achieve the result in the third group so that, even with the same output per unit of land, the residual margin was significantly lower, an average of £81 per hectare compared with £223 for the top quartile flocks according to margins per hectare. If it is difficult to envisage these results related to land, lines (h) and (j) in the table give two performance figures on a 'per ewe' basis, and a difference in the net margin of £17.7 per ewe (line (j), column 1 - column 3) is easily appreciated.

While not denying the effect of stocking density on the economics of sheep production the author would suggest that proclaiming profit is all due to this factor is not supportable from the evidence of this wide-spread survey. Rather he would say that for each sheep farm with its varying area and quality of grassland, the competition for land between its different enterprises and, finally, the skill in managing a flock, there is an appropriate combination of ewe productivity and land utilisation to produce the most satisfactory return from sheep on that

Figure 1 Net margins per hectare and net margins per ewe in flocks of 50-199 ewes



Note: The correlation coefficient (r) was 0.94 and, therefore, 88 per cent of the variation in net margin per hectare was attributable to variations in net margins per ewe

farm. The most that these surveys can do is to pinpoint the factors that shepherds should consider in determining that combination.

Return on capital

A question that is sometimes asked in relation to enterprise costings is what is the return on capital? While this is an easy question to put it is a difficult one to answer for there are various problems. One lies in the determination of the capital sum against which the financial return is to be related and, having decided that, another problem is what financial return should be employed in the calculation. In order to be able to give some information from the survey flocks a fairly simple approach to these matters has been adopted. The return on capital is assumed to be the net margin per flock as derived in the earlier part of this chapter, i.e. output less the total costs of production, but bearing in mind that the costs do not include any interest payments which could be significant if the flock was being financed on borrowed capital.

For the amount of capital investment, a sum representing what could be called tenant-type (or operating) capital is derived. For a whole farm this is a meaningful concept for, besides livestock, it includes machinery, crops in store, work in progress, cash and other assets (except land and buildings) needed to run the business. For a single enterprise it has less meaning for it is not possible to allocate the capital values of many of these assets between the different enterprises. For the survey flocks it was decided to include in tenant's capital the following:

(i) the opening valuation of the flock

(ii) purchases of breeding sheep less sales

(iii) a proportion of the total costs of production, variable and fixed, which were discussed earlier in the chapter; in practice 75 per cent of total costs were included which takes into account the fact that this amount of expenditure would have been made before the build up of income from lamb sales some nine months (in round terms) through the sheep year. After this point in time the amount of operating capital required is steadily offset by receipts so that in this exercise the return is being related to the peak capital requirements.

For one of the survey flocks of 143 ewes earning a total net margin of £2294 (£16.0 per ewe) the return on tenant's capital was calculated as follows:

	£	£ per ewe
Opening valuation of flock	5114	35.8
Purchases less sales (£1890 - 581)	1309	9.2
Total costs of production (£5673) x 75%	4255	29.7
Tenant's capital	10678	74.7

$$\text{Return on capital (\%)} = \frac{\text{Net margin x 100}}{\text{Tenant's capital}}$$

$$= \frac{2294 \times 100}{10678}$$

$$= \underline{21.5 \text{ per cent}}$$

On this particular farm the flock would appear to be earning a good dividend, but should the farmer wish to compare this with alternative uses of the capital he should bear in mind the simplistic approach applied to this complicated concept.

Figures calculated on the same basis for the carcass lamb flocks in the three size groups are given in the following tables:

Table 39 Average tenant's capital per ewe and % return

	No of ewes per flock			Whole sample
	50-199	200-499	500 & over	
	£ per ewe			
Opening valuation	35.7	37.6	36.6	37.0
Purchases less sales of breeding sheep	5.0	5.7	5.4	5.5
Total costs of production x 75%	33.9	29.9	31.0	30.8
Tenant's capital	74.6	73.2	73.0	73.3
Net margin £ per ewe	7.2	11.0	6.9	8.8
% return on capital	9.7	15.1	9.7	12.0

Table 40 Distribution of % returns on tenant's capital

	% return on tenant's capital	No of ewes per flock			Whole sample
		50-199	200-499	500 & over	
		% of flocks			
Negative returns	10 and over	9.8	6.1	12.1	8.4
	Under 10	15.7	7.3	12.1	10.8
Positive returns	Under 10	31.4	35.6	18.2	25.9
	10 - 19.9	11.8	18.3	27.2	18.1
	20 - 29.9	13.7	15.9	15.2	15.1
	30 and over	17.6	26.8	15.2	21.7
	Totals	100.0	100.0	100.0	100.0

Referring to Table 39 it can be seen that the requirements of tenant's capital per ewe do not vary greatly with the size of flock. There is very little variation between the average valuations and in the net costs of the incoming breeders, the latter averaging £5.5 per ewe. In the first size group the slightly higher opening valuation is offset by a higher requirement for working capital as indicated by greater costs of production; for the other groups the reverse is the case, the lower capital from costs offsetting the marginally higher valuations. A farmer in 1981 who was thinking of introducing sheep into his farming programme would have had to consider an operating capital requirement of about £73 per ewe. According to the method used this would have earned a return of 12 per cent, but Table 40 indicates a wide range in the percentage returns on capital. This is a reflection of variations in margins and costs over the survey flocks; due to these, in a significant proportion of flocks (19.2 per cent) there was a negative return on the capital employed. At the other extreme, in a slightly greater proportion of flocks (21.7 per cent) the returns exceeded £30 for every £100 of capital. In these instances, the sheep enterprise appears to be a worthwhile investment, but whether it is a more rewarding one than, say cereal production on lowland farms, in terms of the capital employed obviously cannot be judged from this survey. It is doubtful whether such a comparison would be meaningful under any circumstances because of the difficulty of allocating capital assets between enterprises which was mentioned earlier.

Capital investment in sheep housing

It was noted in Chapter 4 that lowland sheep farmers are turning to the in-wintering of their flocks for one or more of the reasons given. This will have involved either the adaptation of an existing building or the construction of a new one; both require capital investment and an attempt must be made to check whether it will produce an acceptable return on the capital outlay. Again this is not easy for some of the benefits emanating from winter housing are not measurable in money terms, e.g. how does one evaluate the more comfortable shepherding environment or can one value the avoidance of poaching pastures during a wet period in the winter? This survey, covering the broad span of sheep production, did not also investigate the economics of specialised aspects of the sheep enterprise such as housing. It is also suggested that any generalised result on this matter would be of limited value to farmers considering this question as the circumstances on individual farms vary so much. The survey has, however, shown that lowland sheep farmers have put a variety of buildings to this use and that there will be a wide range in the amounts of capital expended and the returns derived. Financial arithmetic on its own will not give the complete answer to winter housing of sheep, but the fact that it is becoming more popular on lowland farms suggests that it is a development worthy of consideration by those farmers who have not so far undertaken it.

The variability of results

The earlier parts of this chapter have been concerned with the average results for the three groups of carcass lamb flocks and with the results of the most profitable flocks; these have been presented so that other sheep farmers can compare their own figures (assuming they have the appropriate records) and then decide whether they need to improve their own performance or otherwise bask in the knowledge that their own flock is well up to the standards of the best in the survey. The author sees little point in examining the results of the least profitable flocks for there is little to be gained from these. What may, however, be of interest is to see the whole range of achievements in the survey flocks. These will indicate, for example, to management advisers that there is still much work to be done to raise the overall standard of lowland sheep production. Two factors are tabulated for this purpose - lambing percentages and net margins per ewe.

Table 41 Percentage distribution of lambing rates

Lambing %	No of ewes per flock			All flocks
	50-199	200-499	500 & over	
	% of flocks			
Under 110	19.6	14.6	21.2	17.5
110 - 119.9	3.9	9.8	12.1	8.4
120 - 129.9	9.8	18.3	9.1	13.9
130 - 139.9	21.5	8.5	12.1	13.3
140 - 149.9	17.7	15.9	15.2	16.3
150 - 159.9	3.9	15.9	12.1	11.4
160 - 169.9	11.8	8.5	9.1	9.6
170 and over	11.8	8.5	9.1	9.6
Totals	100.0	100.0	100.0	100.0
Average number of lambs reared per 100 ewes	136.7	134.1	135.7	135.1

Such widespread results are not confined to the sheep enterprise; they will be found in all forms of agricultural production, for example in milk yields, crop yields and pigs reared per sow, etc. They reveal, among other things, the inadequacy of considering just the average results of performance. With upwards of one-third of the flocks achieving lambing rates of 130 per cent or below it would seem that a target of 150 lambs reared per 100 ewes, not too ambitious perhaps for lowland sheep, is in fact too high for many flocks. The results of surveys by the Meat and Livestock Commission[1] confirm this but also indicate steady progress to 150 per cent lambing over the years 1979 to 1982, except for early lambing flocks for which this percentage is stuck around 133. With the developments taking place in the lowland sheep enterprise - more prolific cross-bred ewes, more winter housing, the support of the EEC regime, etc. - it is possible that the rearing of $1\frac{1}{2}$ lambs per lowland ewe will become the norm in the near future.

Also, as was mentioned earlier, the variations in output and in the costs of production combine to produce much variation in the levels of net margins, the final measure of profitability in this survey. A comparison of the results for the average flock and those of the top 25 per cent flocks showed a significant gap in net margins but even more striking

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(1) Results from recorded commercial flocks selling lambs from grass - summer and autumn 1982. Data sheet 83/1, May 1983, Meat and Livestock Commission.

differences are revealed in Table 42, the last table in the chapter, which shows the whole range of net margins for the carcass lamb flocks in the three size groups.

Table 42 Percentage distributions of net margins per ewe

	Net margins £ per ewe	No of ewes per flock			All flocks
		50-199	200-499	500 & over	
		% of flocks			
Deficits	10 and over	7.8	4.9	9.1	6.6
	5 - 9.9	11.8	4.9	6.1	7.2
	Under 5	7.8	3.6	12.1	6.6
Surpluses	Under 5	27.4	17.1	3.0	17.5
	5 - 9.9	5.9	12.2	24.3	12.7
	10 - 14.9	11.8	17.1	21.2	16.3
	15 - 19.9	11.8	19.5	12.1	15.7
	20 - 24.9	3.9	7.3	3.0	5.4
	25 and over	11.8	13.4	9.1	12.0
	Totals	100.0	100.0	100.0	100.0
	Average £	7.2	11.0	6.9	8.8

The figures in the table really speak for themselves; it is fairly obvious that, when 12 per cent of the survey farmers made £25 per ewe or more, there was something wrong in the production systems in the fairly numerous flocks which made negative net margins in 1981-82. It means that the best use of the resources involved - land, labour and capital - was not being made in these flocks and, from a national economic point of view, this is a waste. A contrary view, perhaps held by the Community exchequer, is that the lower production leading to fewer lambs coming forward eases the marketing situation, keeping prices up and the level of support down. However worthy, this should not be the individual sheep farmer's outlook. Possibly, as a result of this and other economic surveys, the below average sheep farmers will be able to see more clearly where things can be improved and so provide another justification for this type of work.

Chapter 6

Other types of lowland sheep production

While the majority of flocks in the survey were primarily concerned with the production of lambs directly for the meat trade there were numbers of flocks in each size group in which this was not so, see Table 28, and analyses of their output are given in Table 43.

Table 43 Analysis of output in other types of sheep production

Ewes per flock	Main output	Type of production: Hoggets	Store lambs	Mixed output (i)
		% of 1981 lamb crop		
50 - 199	Carcass lambs	31.0	21.8	29.0
	Hoggets	63.6	-	22.9
	Store lambs	1.1	71.7	23.2
	Other	4.3	6.5	24.9
	Totals	100.0	100.0	100.0
200 - 499	Carcass lambs	31.6	16.6	33.8
	Hoggets	61.0	-	25.4
	Store lambs	6.2	79.4	11.6
	Other	1.2	4.0	29.2
	Totals	100.0	100.0	100.0
500 & over	Carcass lambs	26.0	20.1	34.7
	Hoggets	69.6	2.6	13.2
	Store lambs	1.7	73.4	22.1
	Other	2.7	3.9	30.0
	Totals	100.0	100.0	100.0

(i) A more detailed breakdown is given in Appendix E.

A proportion of the 1981 crop was sold as carcass lambs from most of the flocks in these sub-samples and they were, in fact, the most important single item of production in the Mixed output flocks, although only accounting for a maximum of one-third of all lamb disposals. Both the hogget and store lamb flocks (on average) finished a proportion of their lambs off grass but then sold the majority of the 1981 lambs in different markets; in the former to the meat trade in 1982 and the latter to the store markets in late summer and autumn of 1981.

The question arises as to whether the financial results of these other systems of production were comparable with those of the carcass lamb flocks? A few factors relevant to this comparison are shown in Table 44.

Table 44 Some financial factors by type of production

Ewes per flock	Factor	Type of production: Carcass lambs	Hoggets	Store lambs	Mixed output
50 - 199	No of ewes	114	124	112	165
	Lambing %	136.7	162.4	128.4	129.5
	Ewes per ha	7.9	5.5	5.8	9.3
			£ per 100 ewes		
	Output	5332	6828	4405	4771
	Net margin	723	777	257	- 12
			£ per hectare		
	Output	423	374	255	340
	Net margin	57	43	15	- 1
200 - 499	No of ewes	309	308	346	348
	Lambing %	134.1	144.9	129.7	136.9
	Ewes per ha	8.6	7.3	8.9	7.8
			£ per 100 ewes		
	Output	5100	5597	4217	4845
	Net margin	1104	1309	- 292	790
			£ per hectare		
	Output	439	410	377	380
	Net margin	95	96	- 26	62
500 & over	No of ewes	746	834	801	630
	Lambing %	135.7	143.1	129.0	125.9
	Ewes per ha	8.4	7.7	10.0	8.6
			£ per 100 ewes		
	Output	4819	5902	4110	4535
	Net margin	689	1407	450	1347
			£ per hectare		
	Output	403	447	409	389
	Net margin	58	107	45	116

Except for the flocks in the 50-199 ewe size group, net margins per ewe and per hectare were higher in the hogget flocks than in the carcass lamb ones. In the small samples of hogget flocks ewe productivity, as shown by the lambing percentage, was greater than in carcass lambs flocks and this together with better returns per animal sold for killing (see

Table 41) gave much higher outputs per ewe. These were sufficiently greater to offset lower stocking densities and yielded better outputs and margins per hectare.

The store lamb flocks in the survey produced consistently lower margins in each of the three flock size groups than the carcass lamb ones, the small sample in the 200-499 ewe group failing (on average) to make a positive margin. Of the flocks which did not specialise in producing one type of lamb, only those in the largest size group were more profitable than the equivalent sized carcass lamb flocks, this was entirely due to lower costs, in particular to lower variable costs which averaged £10.6 per ewe as against £15.4 in the latter group.

Table 45 Returns per animal sold for killing

			Type of flock	
Ewes per flock	Factor		Carcass lamb	Hogget
50 - 199	Price per head(i)	£	34.87	39.07(ii)
	Deadweight	kg	18.0	21.1
200 - 499	Price per head(i)	£	34.51	39.03(ii)
	Deadweight	kg	18.1	20.2
500 & over	Price per head(i)	£	33.34	36.60(ii)
	Deadweight	kg	17.5	19.1

(i) Includes variable premiums
(ii) Average price of carcass lambs and hoggets

While these comparisons are valid in the statistical sense this does not imply that all sheep farmers should change to producing animals directly for the meat trade, either as carcass lambs or hoggets. There are, or at least should be, particular husbandry or other reasons why farmers decide to produce what they do and the straight comparison of economic results, taking no account of the circumstances on each farm, is too simple to judge the viability of one type of production as against another. All it can do is to show what better results are obtainable in other systems and it is then up to the individual to consider all the 'pro's and con's' of making a change.

Chapter 7

Commentary

This survey of lowland sheep production in 1981-82 is a continuation of the work which started in the late 1960's under the direction of the Lowland Sheep Study Group. The group was set up to carry out investigations into the lowland sheep sector of farming which at that time was in the doldrums; the production of sheep-meat in the United Kingdom was falling and being replaced by increasing quantities of imports. This was a matter of concern to a Parliamentary Select Committee on Agriculture which was deliberating at that time. Over the 70's the trend in total sheep numbers in England and Wales has been upward but not so smoothly as indicated in Table 46, for there were occasional year to year decreases. Encouraged by

Table 46 Numbers of breeding ewes in England and Wales

	England	Wales	Total
		'000	
1970	5327	3067	8394
1974	6132	3401	9533
1978	6217	3690	9907
1982	6964	4094	11058
1983 prov.	7181		

the higher support prices under the EEC sheep regime which was eventually introduced in 1980[1] the positive movement speeded and the provisional figure for England at the June 1983 census of 7.2 million breeding ewes (including two-tooths) is 35 per cent greater than the 1970 total. Also the Ministry of Agriculture Press Notice[2] giving the provisional results for the June 1983 census stated that the total of all sheep in the United Kingdom stood at a record of 34 million.

If the movement in total ewe numbers was erratic over the last decade, the same cannot be said of the number of sheep farmers as represented by the number of agricultural holdings with breeding sheep, for there was a continuous decline in this number in the '70's as evidenced by the

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(1) Lowland Sheep - Economics of lamb production in England in 1976, Economic Report No 57, University of Exeter, December 1977.

(2) Ministry of Agriculture, Fisheries and Food - Press Notice No 236, August 25, 1983.

statistics in Table 47 for the United Kingdom, but this has been halted in the most recent years, again probably due to high EEC prices encouraging entry (or re-entry) into sheep farming. Within the overall trend there have been variations by size of flock. The number of small flocks with less than 100 ewes has fallen regularly whereas the number of flocks with 500 ewes or over has increased steadily so that while the latter in 1982 represented only 9 per cent of sheep holdings they accounted for 42.7 per cent of total ewes. For the medium-sized flocks there have been some year by year fluctuations in numbers although the longer term trend is for an increase. The 9 per cent decrease in the total number of flocks coupled with a growing population means that the average size of flock in the United Kingdom is steadily increasing, the change from 138 to 188 represents a 36 per cent increase between 1970 and 1982. A flock of the latter size may be large by European standards but it is minimal by Antipodean ones.(1)

Table 47 The number of agricultural holdings with breeding sheep in the United Kingdom

	Nos of ewes per holding				Average size of flock
Year	Under 100	100-499	500 & over	Total	
1970	54.6	28.7	4.5	87.8	138
1974	46.1	30.6	5.5	82.2	162
1978	43.2	29.5	6.1	78.8	173
1982 (prov)	42.0	31.0	7.2	80.2	188

Source: Annual Review White Papers

It is extremely difficult, if not impossible, to explain what causes changes in livestock populations or cropping areas because the total change is the net effect of many thousands of decisions made by individual farmers. Each will decide what is best for his own farm in the light of his own personal inclinations and skills, the farm conditions, the prevailing economic circumstances and future expectations. It is relatively easy to adjust the size of flock for no additional equipment is required if a modest change is made while it is not necessary to own a great deal of

(1) For example, a regular survey carried out by the New Zealand Meat and Wool Board's Economic Service excludes flocks of less than 750 sheep (or the equivalent stock units in sheep and cattle) which although numerous are responsible for only 6 per cent of the country's sheep population.

specialised equipment if a farmer wishes to introduce a flock to his farm (shearing and dipping, for example, can be contracted out). Given that he has some livestock skills and experience, then economic considerations must play an important part in forming a farmer's decision to 'grow' sheep in preference to some other product. The following figures give some guidance to the relative return from various enterprises which may be possible on land which would also be suitable for sheep. In giving these figures the author would warn against using them without adjustment for the different conditions prevailing on each farm.

Table 48 Gross margins per hectare for sheep and other enterprises (1981)

Enterprise	Gross margin[(i)] £ per hectare	Notes
Dairying	507	Friesian breed, average performance yield 5000 litres per cow, low stocking rate 1.45 cows per forage hectare
Dairy followers	194	Friesian breed, GM per heifer £165, 1.2 heifers per forage hectare
Beef[(ii)]	187	Single-suckling system, average of spring/autumn calving, 1.6 cows per forage hectare
Sheep	298	Carcass (fat) lamb production, lambing rate 135%, 8.4 ewes per forage hectare, GM per ewe £35.4
Spring wheat	315	Feed wheat, yield 4.0 tonnes per hectare, £112 per tonne
Spring barley	323	Feed barley, yield 4.1 tonnes per hectare, £107.5 per tonne

(i) Figures from John Nix's Farm Management Pocketbook (11th edition) except for those for sheep which are the survey results.

(ii) There are, of course, several other beef systems but the gross margins would also be below those for sheep.

Simply on the basis of gross margins per hectare, sheep, so long the so-called "Cinderella" of farming, can hold its own with most enterprises other than dairying. But the main conclusion from this comparison is that, if a farmer is contemplating a change in his farming pattern, then the production of carcass (fat) lambs should not be excluded from his deliberations on economic grounds, although there may be husbandry reasons which preclude bringing in a flock of sheep; the lack of good hedges was once a reason but developments in fencing (e.g. flexinet) have overcome this.

The figures in Table 48 are now part of agricultural history and what is of more relevance to farmers who are thinking about their farm plans is what is going to happen to costs and prices in the future. Before commenting briefly on this it may be of interest to consider a few results from the previous surveys carried out for the Lowland Sheep Group. These are presented in Table 49 along with the levels of the Retail Price Index for the same years.

Table 49 Some results from the 1970, 1976 and 1981 surveys

					1970 = 100	
		1970	1976	1981	1976	1981
Lambs reared per 100 ewes		124	143	135	-	-
			£ per ewe			
Output		9.7	31.7	50.0		
Gross margin		6.9	21.2	35.4	307	513
			per hectare			
Gross margin	£	42.0	189	298	450	710
Ewes	nos	6.1	8.9	8.4	-	-
			per carcass (fat) lamb			
Price	£	7.87	19.10	34.05	243	437
Deadweight	kg	18.6	18.5	17.5	-	-
Price per kg dw	p	42	103	191	245	454
Retail price index					214.9	403.6

It is not pretended that these figures are representative of the lowland sheep industry as a whole and neither do they refer to the same samples of flocks, even so they can be used as an indication of the 'fortunes' of lowland flocks. Not a great deal need be said about the lambing percentages except to repeat a remark made earlier in the report that there is some way to go before an average of 150 per cent lambing is reached. The average stocking rate of less than 9 ewes per hectare (under 4 per acre) is also lower than should be achieved on lowland farms.

It is the financial figures which should be related to the Retail Price Index and here it can be seen that the returns per lamb (i.e. market price plus support payments) have kept up with the general price movements while the gross margin per ewe and per hectare have moved ahead of the RPI level. Given that the fixed costs of production, which are not

insubstantial as is shown in this report, have been kept under control then the net margins should also have kept up with inflation.

But what of the future for sheep production? This will partly depend on the current review of the EEC Common Agricultural Policy and it is a coincidence that a similar conclusion was reached in the final paragraph of the previous report.(1) Then it was intimated that the introduction of the sheep-meat regime was due in the Spring 1978 but it was not finally implemented until $2\frac{1}{2}$ years later (October 1980) and now, after 3 years of operation, it is being re-examined in the more wholesale review of the CAP. For the UK farmer the support policy of variable premiums plus the annual ewe premium has been a success and led to the largest sheep population as recorded at the 1983 June Census.

For the consumer, lamb still does not have the appeal of other meats and total home consumption of sheep-meat over the past few years has fallen. This was not encouraged by the price of lamb in the shop which does not fall as one might expect given the low farm-gate price and the high level of support at certain times of the year (see Appendix G for 1981-82 figures).

Table 50 Indices of retail prices 1980 = 100

	All items(i)	Food items	Meat and bacon	Lamb
1981	111.9	106.8	109.2	104.3
1982	121.5	115.2	119.5	122.7
1983(ii)	125.6	117.2	119.7	118.9

(i) All items included in the retail price index
(ii) January-July

In 1982 the index of retail prices of lamb moved up in line with the general RPI but faster than the price indices for 'All food' and 'Meat and bacon'. In 1983, however, there has been a downward movement in lamb prices compared with upward trends in the other three indices quoted and this was accompanied by an increase in the consumption of lamb and mutton in the first quarter of 1983. Even so, it may interest farmers to know that the average quantity of sheepmeat bought in that quarter was only $3\frac{3}{4}$ ounces

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(1) Lowland Sheep - the economics of lamb production in England 1976, University of Exeter, 1977

per head per week. This cost consumers 24 pence which represented just 10 per cent of their expenditure on all meat and bacon and only 0.40 per cent of their total weekly spending. There would, therefore, appear to be scope for increasing this minute share.

Lower prices may continue to stimulate demand as may a few other developments in the industry. A most important one is that farmers are having to pay more attention to the finish of their lambs in order to avoid the penalty of non-certification for overfatness under the more strict grading standards. Excess fat has been in fact one of the deficiencies of lamb mentioned by consumers. The introduction of 'lamburgers' and the advertising of lamb chops, for example, as a convenience food may also be mentioned while the MLC is 'campaigning' to advise and persuade butchers to bone and roll certain cuts of lamb in order to make them more attractive to housewives, in particular to younger housewives.

However, none of these developments will lead to immediately substantial increases in the home demand for sheep-meat and push up the market price for lamb; the CAP reviewers will be aware of the low prices and the large variable premiums payable to sheep farmers in the UK. While, in terms of the total CAP expenditure, that on sheep-meat is minimal, it is, of course adding to the EEC budgeting problems and will be under the present scrutiny. It seems unlikely that sheep farmers will be faced with the draconian measures which may confront dairy farmers as a result of the review of the CAP but it is also too optimistic to expect no changes in the sheep-meat scheme and that support will be maintained at the present high levels. Sheep farmers and the meat trade must continue their efforts to reverse the decline in home consumption in order to derive more of the farmers' returns from the market and less from outside subsidy. The 'authorities' on their part must also help by taking measures (e.g. on the 'clawback' of variable premiums) to facilitate and encourage exports even though it may seem somewhat perplexing to the layman to think of the UK as an exporter of sheep-meat when it is only some two-thirds self-sufficient in the product. On the production side, there is scope for greater efficiency which could help to offset any adverse rearrangements on the pricing side. The future prospect for sheep farmers, therefore, is cloudy and may not be so good as in the recent past.

Appendix A

Definitions of terms

Information is given for three groups of flocks as follows:

Size group 1 - flocks with 50-199 ewes and ewe lambs put to the ram in 1980

Size group 2 - flocks with 200-499 ewes (as in 1)

Size group 3 - flocks with 500 and more ewes (as in 1)

Number of ewes - includes mature ewes, 2 tooth ewes and ewe lambs put to the ram in order to lamb down from about January 1981 onwards, but including some Dorset Horn flocks lambing in the autumn 1980 in the south of England.

Output items

Lambs - this item includes the return from all lambs sold either for killing, breeding or feeding plus the value of lambs carried forward for breeding or for feeding. Prices are net of marketing charges except haulage where this is separately charged, it is then included as a variable cost. The cost of store lambs bought for finishing is deducted from the lamb return. Variable premiums are included in the return for certified lambs.

Wool - is the return from the sale of ewe, ram and lamb wool.

Ewe premium - is the annual headage payment under the EEC sheep regime and is included at the provisional rate for 1981-82 of £1.40 per ewe and ewe lamb put to ram.

Flock adjustment - is either a flock appreciation (+) or depreciation (-) and is calculated as the opening valuation of the flock (ewes and rams) plus purchases less sales of ewes and rams, casualties and the closing valuation. Breeding sheep carried forward in the opening and closing valuations were valued at the market prices prevailing at the time; these tended to rise over the survey year.

Variable costs

Concentrates - include ewe cobs, ewe nuts, homegrown cereals, feed blocks and minerals fed to ewes and lambs. Homegrown cereals were valued at the market prices prevailing when they were fed.

Hay and silage - the costs of these fodders fed in the winter 1980-81 include the variable costs of growing the grass (fertilisers, seeds) for conservation and the small variable costs (e.g. baler cord, additives) of conservation. Standard costs, based on other surveys were used for these items.

Grazing, fodder crops - include the costs of fertilisers, seeds, sprays and any other variable costs incurred in their production.

Vet and medicines - include veterinary fees and all the drenches, vaccines and medical products which sheep appear to require. The material but not the labour for dipping is also included.

Other variable costs include contract work on sheep, haulage and various miscellaneous expenditures on sheep, e.g. crayons, rubber rings, tags, wool cord, sheep dog(s), etc.

Gross margin - is output less total variable costs. The gross margin is a useful figure to enable some financial comparisons of the sheep enterprise to be made but it must not be regarded as the profit from sheep, for this see under net margin.

Fixed costs

Labour - is the cost of the labour directly employed on the sheep flock, i.e. for daily shepherding, drenching, docking, dipping, shearing, etc. except when some of these jobs are done on contract. The work done on pastures, hay/silage and any fodder crops grown for sheep is included in the fixed costs of these items. The work on the sheep is usually done by the farmer himself and is charged at £2.60 per hour, which allows for overtime, but the payment to full-time shepherds is charged then this is known.

Grazing, hay and fodder crops - include the costs of the labour and machinery, equipment used in the production of these items and also the rent of the land.

Vehicles, equipment and buildings - include the running costs of tractors and other farm vehicles used in shepherding and feeding sheep, the depreciation on equipment such as handling systems, fencing, dips and the depreciation on buildings. Buildings over 20 years old (and there were many) were considered to be written off; for the rest, an updated cost was depreciated over 20 years.

Farm overheads - the share of the general farm overheads which includes occupiers' repairs, hedging, ditching, rates, electricity, water, telephone, etc., have been allocated to the sheep enterprise on a standard basis. The standards were derived from the Universities' Farm Management Surveys. They varied from £3.00 - £3.50 per ewe, depending on the type of farm, to which was added an overhead labour cost equal to 15 per cent of the direct labour cost on sheep. The allowance for overheads was made in order to make it possible to compare the financial position of sheep with other farm enterprises which had been similarly treated.

Net margin - is the gross margin less total fixed costs, or output less the total of variable and fixed costs. The net margin is about the nearest one can get to measuring the profitability of the sheep enterprise but remembering that allowances have not been made in the costs for the managerial work of the farmer nor for interest on capital.

Appendix B

Regional composition by counties

England

North	Cumbria Durham Northumberland Tyne and Wear
North West	Cheshire Greater Manchester Lancashire Merseyside Shropshire Staffordshire
South Central	Avon Berkshire Buckinghamshire Greater London (SE) Gloucestershire Hampshire Hereford and Worcester Isle of Wight Oxfordshire Warwickshire West Midlands Wiltshire
North East	Cleveland Humberside North Yorkshire South Yorkshire West Yorkshire
East Midlands	Derbyshire Leicestershire Lincolnshire Northamptonshire Nottinghamshire
South East	Kent Surrey Sussex
South West	Cornwall Devon Dorset Somerset

Wales

Clwyd, Dyfed, Glamorgan, Gwent, Gwynedd, Powys

Appendix C

Detailed analysis of ewe breeds

Breed of ewe	England		
	North	North East	North West
	% of ewes		
Border Leicester Xs	13.2	-	1.7
Cambridge	-	1.4	-
Clun Forest	-	-	34.3
Greyface	12.4	-	-
Masham	7.0	19.5	8.0
Mules	36.1	27.7	35.4
North Country Cheviot	2.0	-	-
Sc Blackface Xs	-	1.5	-
Scotch Halfbred	7.1	-	-
South Country Cheviot	2.2	-	-
Suffolk	2.9	1.3	-
Suffolk X Clun	-	-	13.9
Suffolk X SHB(i)	5.2	33.1	2.6
Suffolk Xs(ii)	0.8	8.7	1.9
Swaledale	1.2	4.8	-
Welsh Mountain	5.7	-	-
Welsh Mountain Xs	1.9	-	-
Other(iii)	2.3	2.0	2.2
	100.0	100.0	100.0

(i) Scotch Halfbred
(ii) Crossbreds not fully identified
(iii) Minor breeds or flocks of very mixed breeds

Appendix C (continued)

Detailed analysis of ewe breeds

Breed of ewe	England	
	East Midlands	South Central
	% of ewes	
Bluefaced Leicester Xs	-	1.2
Border Leicester Xs	3.4	-
Clun Forest	-	10.0
Clun Xs	-	3.7
Colbred	-	2.0
Dorset Horn Xs	-	0.9
Greyface	25.3	9.0
Kerry Hill	-	2.0
Masham	8.6	1.8
Mules	37.7	37.6
Scotch Halfbred	-	4.5
Suffolk	4.7	1.1
Suffolk X Border Leicester	6.1	-
Suffolk X Clun	-	4.4
Suffolk X SHB(i)	6.0	4.8
Suffolk Xs(ii)	5.6	4.0
Swaledale	-	1.3
Welsh Halfbred	-	3.2
Welsh Mountain Xs	-	1.6
Other(iii)	2.6	6.9
	100.0	100.0

(i) Scotch Halfbred
(ii) Crossbreds not fully identified
(iii) Minor breeds or flocks of very mixed breeds

Appendix C (continued)

Detailed analysis of ewe breeds

Breed of ewe	England		Wales
	South East	South West	
	% of ewes		
Beulah Speckledface	-	-	15.7
Border Leicester Xs	-	9.1	1.2
Clun Forest	-	4.5	-
Devon Closewool	-	1.8	-
D & C Longwool(i)	-	6.7	-
Dorset Horn	-	3.1	1.3
Dorset Horn Xs	-	7.1	-
Finn	-	0.9	-
Greyface	10.6	-	-
Greyface Dartmoor	-	0.8	-
Kent (Romney Marsh)	67.1	-	-
KentXs	4.2	-	-
Llanwennog	-	-	2.7
Masham	1.6	1.7	-
Mules	0.7	17.4	2.3
Oldenburgh	6.6	-	-
Poll Dorset	-	2.4	-
Scotch Halfbred	-	4.5	1.2
Suffolk	1.4	1.7	4.0
Suffolk X Border Leicester	-	4.6	-
Suffolk X Clun	1.5	1.2	1.2
Suffolk X Dorset Horn	-	1.5	-
Suffolk X D & C Longwool(i)	-	2.6	-
Suffolk X SHB(ii)	2.7	7.6	-
Suffolk X WHB(iii)	-	-	2.5
Suffolk Xs(iv)	1.4	11.9	27.9
Welsh Halfbred	-	-	14.4
Welsh Mountain	-	-	12.9
Welsh Mountain Xs	-	-	-
Whiteface Dartmoor	-	1.6	-
Other(v)	2.2	7.3	4.0
	100.0	100.0	100.0

(i) Devon and Cornwall Longwool
(ii) Scotch Halfbred
(iii) Welsh Halfbred
(iv) Crossbred ewes not fully identified
(v) Minority breeds or flocks of very mixed breeds

Appendix D

Grassland allocation and costings

The following procedure, inevitably somewhat arbitrary, was used in the sheep survey to allocate the area of grassland and its costs to the sheep flock and to calculate the density of stocking which is expressed as the number of ewes per hectare.

The example given later shows the calculations required to allocate the area and costs of grassland on a farm where the grassland is grazed by a dairy herd including followers and by sheep while an area is also cut for hay.

1 The total grassland area on the farm is recorded and also the different uses of the grassland. Grassland reserved for the dairy herd for example and never grazed by sheep can be ignored alongwith its associated costs. Also grassland grazed only by sheep presents no difficulty in costings, the costs on these areas are wholly attributable to the sheep flock. The difficulties of allocating areas and costs arise, of course, only when the same areas of grassland are used for different purposes at different times of the year.

2 Determination of livestock grazing weeks - starting from the beginning of the sheep year the numbers of all types of grazing livestock on the farm are recorded for each month for a period of one year. When any livestock grazing grass are receiving supplementary feeds (concentrates, hay, forage crops) the monthly number is adjusted downwards to allow for the reduced value of the grazing. Thus, if the ewes six weeks before lambing are being fed hay and a small concentrate ration ($\frac{1}{4}$lb per head) their number will be reduced by say 40 per cent. As lambing approaches and a larger daily ration is fed the adjustment will be increased. When ewes are completely housed in the winter the adjustment is 100 per cent. (Let these numbers be A).

By multiplying A by 4 or 5 (short or long months) and totalling for the twelve months the number of livestock grazing weeks (B) is obtained for each type of grazing livestock.

3 Livestock unit grazing weeks (LUGW's) are then calculated by multiplying (B) by the appropriate livestock unit factors from the table overleaf. The annual total of LUGW's (C) is then obtained, this represents the grazing use of the grassland to which must be added the conservation use. Appropriate factors have been derived to convert tonnages of conserved grass into LUGW's as follows:

1 tonne of:	LUGW's	1 tonne of:	LUGW's
Hay	12.9	Barn dried hay	11.6
Silage	3.3	Haylage	5.1
Dried grass	10.6		

These factors are applied to the farm's annual production of conserved grass and the total LUGW's from this source (E) is added to (C) to give the grand annual grassland usage (F) for all purposes.

4 The proportions (%'s) of (F), representing the shares to grazing and conservation, are applied to total area of grassland and to the costs (variable and fixed) to give the respective shares of these items to grazing (G) and conservation (H).

5 The sheep flock's share of the grazing area and costs are obtained by applying (D) to (G), as will be made clear in the example.

6 The allocation of a 'land allowance' for hay (or other conserved grass) fed to sheep is calculated as:

$$\frac{\text{Hay fed to sheep (tonnes)}}{\text{Total tonnage made}} \times \text{hectares for hay (H)}$$

Example

(Flock of 200 ewes, 30 dairy cows and followers, total grassland 75 hectares, 140 tonnes hay made)

(i) Calculation of livestock unit grazing weeks

Sheep	Grazing weeks(B)	LU factor	LU grazing weeks		%
Ewes	5114	0.14	716		
Ewe lambs	1698	0.11	187		
Rams	96	0.11	11		
Lambs	7258	0.11	789	1703	37.5(D)
Cows	1035	1.0	1035		
1-2 yr old	1557	0.74	1152		
Under 1 yr	1548	0.42	650	2837	62.5
				4540(C)	100.0

(ii) Use of grassland

	LUGW's	%	Hectares	Variable costs £	Fixed costs £
Grazing	4540(C)	71.5	53.6(G)	1597(G)	6944(G)
Own hay - 140t x 12.9	1806(E)	28.5	21.4(H)	1033(H)	2763(H)
Grass silage	-	-	-	-	-
Other conservation	-	-	-	-	-
Totals	6346(F)	100.0	75.0	3630	9707

(iii) Allocation of grazing and costs to sheep

Proportion to sheep (D) = 37.5%

		All grazing(G)	Sheep (37.5%)
Hectares		53.6	20.1
Variable costs	£	1597	974
Fixed costs	£	6944	2604

(iv) Stocking density at grass

$$\frac{\text{No of ewes put to ram}}{\text{Hectares grazed}} = \frac{200}{20.1} = 10 \text{ ewes per hectare}$$

(v) If, say, 7 tonnes of hay had been fed to the ewes the 'land allowance' for this would be:

$$\frac{\text{Hay fed to sheep}}{\text{Total tonnes made}} \times \text{Hay hectares} = \frac{7}{140} \times 21.4 = 1.07 \text{ hectares}$$

(vi) Stocking density on all land - to the hectares of grazing is added the 'land allowance' for conserved grass and the areas, if any, of forage crops. In the example the figures are:

	Hectares
Grazing	20.1
Hay	1.07
Forage crops	-
	21.17

Stocking density = 200 - 21.17

= 9.4 ewes per hectare

Factors for converting numbers of animals into grazing livestock units

	Grazing livestock unit
CATTLE	
Dairy cow - Friesian	1.00
Channel Island	0.92
Dairy bull	0.80
Beef cow (excluding suckling calf)	0.69
Beef bull	0.80
Other cattle - breeding	
0 - 12 months	0.42
12 - 24 months	0.69
Over 24 months	0.92
Other cattle - fattening	
0 - 12 months	0.42
12 - 24 months	0.78
Over 24 months	1.00
SHEEP	
Ewe or ewe replacement (excluding suckling lambs)	
light weight - hill	0.11
medium weight - lowland	0.14
heavy weight - lowland	0.17
Ram/hogget	0.11
Lamb	
birth to store (30kg)	0.08
birth to fat (41kg)	0.11
purchased store	0.08

Appendix E

Output, costs and net marginsper hectare for the top flocks based on different criteria (see Table 3)

Flock size-group:- 200 - 499 ewes

	Top 25% flocks based on:		
	Net margins per hectare	Net margins per ewe	Stocking density
	£ per hectare		
Output	580	504	572
Variable costs	118	96	162
Gross margin	462	408	410
Fixed costs	222	194	301
Net margin	240	214	109
Ewes per hectare	9.9	8.2	12.5
Lambs reared per 100 ewes	146.9	149.9	123.7
	£ per ewe		
Output	58.7	61.3	45.9
Net margin	24.3	26.0	8.7

Flock size-group:- 500 ewes and over

Output	570	521	550
Variable costs	154	141	200
Gross margin	416	380	350
Fixed costs	213	195	301
Net margin	203	185	49
Ewes per hectare	9.8	8.6	12.2
Lambs reared per 100 ewes	143.8	147.3	129.6
	£ per ewe		
Output	57.9	60.7	45.1
Net margin	20.6	21.5	4.0

Appendix F

Analysis of output in other types of sheep production

No of ewes per flock	Factor	Type of production: Hoggets	Store lambs	Mixed output
50 - 199	Nos of flock	5	7	4
	Ewes per flock	124	112	165
	Sales:	% of 1981 lamb-crop		
	Carcass lambs	31.0	21.8	29.0
	Hoggets	63.6	-	22.9
	Store lambs	1.1	71.7	23.2
	Breeding lambs	1.9	2.3	1.2
	Casualties	0.5	-	0.2
	Carried forward:			
	For breeding	1.9	4.2	22.9
	For feeding	-	-	0.6
	Totals	100.0	100.0	100.0
200 - 499	Nos of flocks	7	10	9
	Ewes per flock	308	346	348
	Sales:	% of 1981 lamb-crop		
	Carcass lambs	31.6	16.6	33.8
	Hoggets	61.0	-	25.4
	Store lambs	6.2	79.4	11.6
	Breeding lambs	-	0.6	10.9
	Casualties	-	-	0.1
	Carried forward:			
	For breeding	1.2	3.4	10.9
	For feeding	-	-	7.3
	Totals	100.0	100.0	100.0
500 & over	Nos of flocks	8	8	6
	Ewes per flock	834	801	630
	Sales:	% of 1981 lamb-crop		
	Carcass lambs	26.0	20.1	34.7
	Hoggets	69.6	2.6	13.2
	Store lambs	1.7	73.4	22.1
	Breeding lambs	0.8	2.7	1.5
	Casualties	-	-	-
	Carried forward:			
	For breeding	1.3	1.2	21.8
	For feeding	0.6	-	6.7
	Totals	100.0	100.0	100.0

Appendix G

Guide prices and market prices for certified sheep and variable premiums 1981-82

	Guide price	Market price	Variable premium
1981		pence per kg dwt	
March	197.35	175.40	21.82
April	213.93	178.08	35.34
May	211.78	189.69	22.10
June	206.14	172.16	33.58
July	199.45	132.05	67.34
August	190.32	121.95	68.38
September	179.90	145.20	34.26
October	176.00	155.43	20.59
November	176.75	166.23	10.50
December	183.78	188.98	-
1982			
January	193.25	194.98	0.89(i)
February	198.90	200.11	0.39(i)
March	206.43	211.37	-

(i) Small premiums in one week in month

Source: Meat and Livestock Commission

Appendix H

Other titles of publications on sheep in the series "Agricultural Enterprise Studies in England and Wales"

Lowland Sheep - production, policies and practices
W J K Thomas
Economic Report No 1 October 1970 50p

Lowland Sheep - An economic analysis of lamb production 1970
W J K Thomas
Economic Report No 8 December 1971 30p

Veterinary and medicine costs and practices in lowland sheep
D D Pout and W J K Thomas
Economic Report No 23 September 1973 60p

Ewe flocks in England - Breeds, lamb production and other aspects of husbandry 1973-74
W J K Thomas
Economic Report No 46 November 1976 £1.00

Lowland Sheep - Economics of lamb production in England 1976
W J K Thomas
Economic Report 57 December 1977 £1.00

Lowland Sheep - Interim results of a survey of the 1981 lamb-crop in England and Wales
W J K Thomas
Economic Report 84 October 1982 £1.25

Appendix J

Latest publications in this series

Report number		
75	Pig Production in South West England 1979-80 W J K Thomas University of Exeter February 1981	£1.50
76	Pig Management Scheme Results for 1980 R F Ridgeon University of Cambridge December 1980	£1.50
77	English Strawberries - An Economic Study on the Production and Marketing of Strawberries W L Hinton University of Cambridge February 1981	£2.50
78	A National Beef Survey J A L Dench and R L Vaughan University of Reading December 1981	£1.00
80	Pig Management Scheme - Results for 1981 R F Ridgeon University of Cambridge January 1982	£1.75
81	Pig Production in South West England 1980-81 W J K Thomas, E Burnside, A Sheppard University of Exeter February 1982	£2.00
83	Cereals 1979-80 - A Study of Cereal Production and Marketing in the United Kingdom	£3.00
84	Lowland Sheep - Interim results of a survey of the 1981 lamb-crop in England and Wales W J K Thomas University of Exeter October 1982	£1.25
85	Pig Production in South West England 1981-82 E Burnside and A Sheppard University of Exeter February 1983	£2.00
86	Pig Management Scheme Results for 1982 R F Ridgeon University of Cambridge December 1982	£1.75

A complete list of reports and their sources is available from Economics Division 1, Ministry of Agriculture, Fisheries and Food, Whitehall Place, (West), London SW1A 2HH.

Appendix K

Addresses of University departments publishing in this series

Cambridge	Agricultural Economics Unit Department of Land Economy University of Cambridge Silver Street Cambridge CB3 9EL
Exeter	Agricultural Economics Unit University of Exeter Lafrowda House St German's Road Exeter EX4 6TL
London	School of Rural Economics and Related Studies Wye College (University of London) Nr Ashford Kent TN25 5AH
Manchester	Department of Agricultural Economics Faculty of Economic and Social Studies University of Manchester Manchester M13 9PL
Newcastle	Department of Agricultural Economics The University Newcastle Upon Tyne NE1 7RU
Nottingham	Department of Agriculture and Horticulture The University of Nottingham School of Agriculture Sutton Bonington Loughborough Leics LE12 5RD
Reading	Department of Agricultural Economics and Management University of Reading 4 Earley Gate Whiteknights Road Reading RG6 2AR
Wales	Department of Agricultural Economics The University College of Wales School of Agricultural Sciences Penglais Aberystwyth Dyfed SY23 3DD