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LOWLAND SHEEP PRODUCTION 1988:

AN ECONOMIC PERSPECTIVE

M.M. Turner

with

M.W. Fogerty

University of Exeter
Agricultural Economics Unit
Lafrowda House
St German's Road
EXETER EX4 6TL

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SPECIAL STUDIES IN AGRICULTURAL ECONOMICS

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. Since April 1978 this work has been supported in Wales by the Welsh Office following the transfer of responsibilities for agriculture to the Secretary of State for Wales.

The departments in different regions conduct joint studies of those enterprises in which they have a particular interest. The reports of these studies are published in a common series entitled "Special Studies in Agricultural Economics". Titles of recent publications in this series and the addresses of the University departments are given in Appendix IV and V.

PREFACE

Sheep production is perhaps second only to dairying as a backbone of much farm business activity. In many regions, particularly the hills, it lies at the centre of what are relatively limited farming options. In lowland areas the production of fat lamb frequently fits conveniently with the rest of the farm enterprise mix as the best way to utilise grassland. There is rather less tendency for sheep producers to go in and out of the sector (as compared to pig production, for example), and the steadiness of sheep farming at times seems totally at variance with the well-known characteristics of the animal itself. Even the market for sheep has seemed tolerably attractive in recent years with the prospects of growth under a reasonably favourable support scheme, and untroubled by such administrative complications as quotas or the public concerns over surpluses and environmental side effects experienced elsewhere in agriculture.

Thus, at first glance sheep production appeared to be a good line to be in during the 1980s. Compared to some other sectors this was undoubtedly true - and sufficient farmers recognised this to cause a marked rising trend in sheep numbers throughout the decade. It was only in the last year that there were clear signs the bubble might be about to burst, with the weakness in sheep prices that emerged in 1989 seeming likely to gather pace in 1990.

The survey results reported in the following pages make clear, however, that in strict economic terms sheep production has not really justified the rosy impression it may have gained. If all the resources used are costed at something like the price they would earn in the rest of the economy, it transpires that the incomes earned by sheep farmers (measured as net margin per ewe) were already distinctly negative by the time of the 1988 lamb crop. Because farmers don't do their accounting according to these specific procedures, of course, the situation was not experienced in quite such bleak terms. Nevertheless, an uncomfortable feeling was probably already growing in the minds of many producers that the going would be much tougher in the future.

The sheep sector has now evidently fallen into line with what seems to be the general situation facing agriculture as a whole. A difficult period of adjustment to new market arrangements and demand levels has arrived, there is a continuing incentive - indeed necessity - to achieve higher standards of technical and management performance to stay in business, and a clear tendency for the larger units to have the greater advantages and the better prospects is evident. The results presented and discussed in the following pages set out the details that lie behind this scenario.

The study on which this report is based would not have been possible without the help and collaboration of many people. We are grateful for the assistance of investigational colleagues and local coordinators at other university centres and members of the Economics (Farm Business) Division of MAFF. The sudden death of Mike Pick in November 1989, just as the study was being finalised, was a sad blow to everyone; as Ministry representative and chairman of the Planning Group he had a major influence on the work undertaken, and the value of his contribution, to this as to other Special Studies, is recognised by all who worked with him. We acknowledge, too, the help given by the Social

Studies Data Processing Unit at Exeter and record our special thanks to Gill Skinner, who came out of retirement (again!) to provide the programming skills necessary for data analysis. Typing and presentation of the report has been undertaken by Daniela Goff, to her usual high standards.

Above all, however, the report is founded on the interest, support and cooperation of those farmers who gave both information and time to make this study possible. Their help is acknowledged gratefully.

Professor John McInerney
Director

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SUMMARY

1. This report presents the results of a survey carried out between 1987 and 1989 and is the latest in a series of enterprise studies in England and Wales. The survey data are raised sample averages derived from a stratified random sample of 247 lowland ewe flocks producing mainly finished (rather than store) lambs.
2. The survey was carried out after a decade of expansion in the national sheep flock and a consequent increase (by nearly 50 per cent) in British sheepmeat production. This took place against the background of sheep support arrangements, which were included under the Common Agricultural Policy from October 1980. For British producers there are likely to be both advantages and disadvantages in the reformed sheepmeat regime which will take effect over a transitional period of up to three years from 1989/90.
3. Comparison with previous studies indicates that since 1970 there have been improvements in lambing percentage and stocking rate, with increases in concentrate usage and labour input. Both ewe and lamb mortality have declined and there has been a small reduction in carcase weights. Analysis by flock size shows that in terms of overall productivity largest flocks performed best, averaging 142.2 lambs reared per ewe tupped compared with the overall national figure of 139.5.
4. A regional analysis of physical performance using the four Economic Planning Regions reflected certain differences of system. The grass-oriented systems in Wales resulted in the highest proportion of lambs taken through to finishing combined with the lowest concentrate use. Grassland productivity in Wales was reflected in the highest stocking rates and lowest nitrogen use. However, in contrast the East region, with the highest nitrogen and second-highest concentrate use, achieved a stocking rate close to the overall national average even without regional advantages in grass production.
5. Four out of ten of the ewes in survey flocks were Mules or of Mule-type, and the breed was found in six out of ten flocks indicating its increased prominence nationally. The next most important breeds were Suffolk-based crosses, and Suffolk rams were found in nearly nine out of ten flocks. Thirty per cent of flocks had at least one Texel.
6. Several measures of income were calculated in order to illuminate the financial position of the sheep enterprise. The first and most rigorous assessment, **net margin**, is calculated after charging for all inputs used in the production process and resulted in a negative £10.78 per ewe. On this basis, and from a purely economic standpoint, the enterprise appears not viable in the long term. However **family income**, representing the return to the farm family for their labour and tenant-type investment, was £6.39 per ewe whilst **occupier's income**, closer to an operating profit before interest, was £8.47 per ewe. It is the latter measure of income, in particular, which reflects the farmer's perception of enterprise profitability.

7. An analysis of the survey data by flock size showed fairly minor differences on average between small and large flocks at gross margin level, but in the area of fixed costs major differences emerged showing the marked superiority of larger flocks. Small flocks recorded much higher direct labour costs and, in addition, all other items of overhead costs were higher too. Consequently, net margins were -£19.11 per ewe for flocks below 200 ewes and -£3.91 per ewe for flocks over 500 ewes. Family income, however, ranged from £11.95 per ewe or £1451 per flock (below 200 ewes) to £6.45 per ewe or £5156 per flock (over 500 ewes).
8. Differences in technical performance are linked directly with the financial returns achieved. The more successful flocks, in terms of net margin per hectare, produced more lambs with a higher proportion sold as finished, yet with a lower concentrate use. This suggests that although certain important factors come outside the farmer's control, there are many flocks where significant improvements in technical performance are both achievable and worthwhile.
9. The key factor influencing flock expansion on the survey flocks was given as 'good prospects for the sheep enterprise' followed by 'personal interest' and then 'poor prospects for other enterprises'. The major constraint on expansion was shortage of land, followed by management factors and labour shortage. Perceived prospects, both for sheep and for other enterprises, are crucial in assessing likely future changes in the national flock.

I INTRODUCTION

The UK sheep industry

The United Kingdom has long been a leading producer and consumer of sheepmeat. Relative to its human population the number of breeding ewes (at more than 16 million in 1989) is higher than in any other European country, whilst consumption (at 145 ounces per capita in 1988) is the highest in Europe. The role of sheep farming in Britain has changed over the centuries, and wool is now but a by-product rather than principal output as was once the case. However, in hill and upland areas breeding sheep flocks continue to occupy a key position in economic terms and the sheep enterprise remains an important element of mixed and livestock farming systems on the lowlands.

The stratified structure of UK sheep production is unique within the European Community (EC) and has evolved over centuries with the hill areas, the uplands and the lowlands each having different, but complementary, roles in the year round production of sheepmeat. The harsher hill regions support flocks of hardy (hill) breeds producing draft ewes for breeding flocks on upland farms and wether lambs for finishing on more favoured (lower) land. The upland flocks, in turn, cross hill ewes with lowland rams to produce lambs for meat, and with longwool rams to produce crossbred (and mule) ewes for subsequent lowland breeding. Most lambs move to the lowlands for finishing although an increasing number are retained and finished on the uplands. Finally, the lowland component of the sheep industry comprises the finishing of store lambs from hills and uplands and the direct production of meat lambs, mainly from upland-born crossbred and mule ewes. Approximately, 60 per cent of the national breeding flock is in the hills and uplands while more than 60 per cent of finished lambs come off lowland farms.

This report is concerned with the lowland segment of the England and Wales flock, and specifically with finished lamb production. The remainder of this chapter reviews sheep production both in the EC and in the UK.

A European Community perspective

Within the EC the UK flock is of major importance, representing as it does some 30 per cent of the overall total (Table 1). In this respect, at least, the sheep sector is unique because in no other major

Table 1 Sheep numbers and self-sufficiency in sheepmeat in the European Community and the United Kingdom 1987

	European Community (12)	United Kingdom	UK as % of EC12
Total numbers (million head)	90.9	27.8	30.6
Breeding sheep numbers (million head)	67.4	20.0	29.7
(% change 1987 to 1988)	(+5.1)	(+4.5)	-
Sheepmeat production ('000 tonnes)	1043	343	32.9
Self-sufficiency in sheepmeat (%)	81	84	-

Source: Various, see Appendix II Tables 2.1, 2.7, 2.8, 2.9 and 2.10

agricultural commodity does the UK so dominate the 'common market'. Not only will policy changes under the Common Agricultural Policy (CAP) influence British sheep production, but also the reverse is true and longterm changes in the UK flock, particularly in production policies, can be expected to be of major significance in the Community. The 1980s have seen a sustained increase in total sheep numbers and between 1987 and 1988, for example, the UK breeding flock increased 4.5 per cent (EC12 up by 5.1 per cent). Self-sufficiency, though lower in sheepmeat than in other major products, is increasing and in 1987 stood at 84 per cent for the UK against 81 per cent for the EC; the latter is forecast to rise to about 87 per cent by 1990 (Appendix Table 2.11). The shortfall in supplies is filled by imports under a series of Voluntary Restraint Agreements (VRAs), with New Zealand by far the largest supplier (at 245,500 tonnes) followed by Argentina and Australia. Relatively small numbers of live sheep are imported from (mainly) East European countries (Appendix Table 2.10). In a world context the EC is the major sheepmeat producer ahead of the USSR, China, Australia and New Zealand (Appendix Table 2.12).

In recent years the UK sheepmeat situation has changed in a complex series of trends. First, sheepmeat production in the UK increased by nearly 50 per cent during the 1980s whilst imports steadily, though erratically, declined. Increasingly, New Zealand has not taken full advantage of its VRA quota. Meanwhile, sheepmeat exports have grown, particularly within the EC to France (which accounts for about three quarters of UK sheepmeat exports), more than doubling between 1979 and 1988 (Appendix Table 2.1 and 2.3). The net effect of all these changes has been a marked increase in self-supply, with home production (as a proportion of total new supply) growing from 60 per cent in 1979 to 94 per cent in 1988. However, the overall self-sufficiency ratio is influenced not only by production, but also by consumption. Over the past 25 years in Great Britain sheepmeat consumption has declined by about half, and has also been losing market share of total meat purchases for home consumption. The Meat and Livestock Commission (MLC) have identified several important reasons for this, chief among which are a trend away from consumption of the traditional roast joint to more convenient meat products and, crucially, changing preferences for carcass quality with regard to fat content. In both these respects sheepmeat has lagged behind other meats: extensive MLC-funded development work is showing some success in the former (including new ways of cutting, boning and presenting sheepmeat) but carcass quality remains an area where producers must show greater readiness to respond to market signals¹.

The breeding flock in England and Wales

The increase in British sheepmeat production was the result of a very considerable increase in the national flock. Details of the growth in sheep numbers for England and Wales are given in Appendix Tables 2.13, 2.14 and 2.15 and are summarised in Table 2. They indicate that over the eight years from 1980 total sheep numbers rose 31 per cent to almost 30 million, and breeding ewes (including ewe lambs for breeding) by more than 29 per cent. Much of this increase, of course, was the result of flock expansion on farms with an existing breeding flock; there was, nevertheless, noticeable growth over the eight years in the number of

¹See, for example, Sheep Yearbook 1989 (Meat and Livestock Commission).

Table 2 Total sheep, breeding ewes and flocks in England and Wales

	'000 in June each year			% change 1980-1988
	1980	1984	1988	
Total sheep numbers	22501.2	25040.2	29517.5	+31.2
Breeding ewes	10411.0	11616.7	13467.4	+29.4
Breeding ewe flocks	56.441	58.691	63.979	+13.4
Average flock size (ewes)	184.5	197.9	210.5	+14.1

Source: MAFF annual census, see Appendix Tables

breeding ewe flocks, which rose by more than one eighth to almost 64 thousand. Average flock size rose 14 per cent to about 210 ewes.

The regional pattern of increase, given in Table 3, shows interesting variations from the overall national picture. First, there was a greater increase in breeding ewe numbers in all three English regions than in Wales, with numbers in the West region increasing by a third over the eight years to 1988. A similar pattern is evident in the

Table 3 Changes in the England and Wales flock by EC region

	England			Wales
	North	East	West	
Breeding ewes ('000) - 1980	2772.4	1381.3	2391.1	3866.2
- 1988	3606.8	1819.1	3185.7	4855.9
% change 1980-1988	+30.1	+31.7	+33.2	+25.6
Breeding ewe flocks ('000) - 1980	14.871	8.797	17.023	15.750
- 1988	16.639	10.986	19.354	17.000
% change 1980-1988	+11.9	+24.9	+13.7	+7.9
Average flock size - 1980	186.4	157.0	140.5	245.5
- 1988	216.8	165.6	164.6	285.6
% change 1980-1988	+16.3	+5.5	+17.2	+16.3

Source: MAFF annual census, see Appendix Tables

number of breeding ewe flocks (with the Welsh flock increasing at a below average 7.9 per cent) but here the largest growth occurred in the East region where flock numbers rose by a quarter. Consequently, average flock size increased far less in the East region than elsewhere; both Wales and the North have larger average flocks because of the influence of hill flocks in these regions.

The EC sheep support system

Sheepmeat was not included among the original CAP support commodities, partly because of its relatively minor importance in the initial six Community countries. However, sheep support arrangements were finally introduced in October 1980 when sheepmeat and goatmeat were included under the CAP. The basic aim was and remains, to guarantee producer's average returns on lamb to the level of a Basic Price for sheepmeat. This has been achieved through the payments of an annual premium on breeding ewes (based on the number of ewes on the farm in January each

year) and, in Great Britain only, through a variable premium on lambs sold for slaughter. This variable premium is essentially the same as the national Fat Sheep Guarantee Scheme that preceded the EC arrangements. It is paid in any week when average market prices (measured as the price of clean animals less than one year old certified at livestock auction markets) falls below the seasonal guide price for that week. The rate of premium is equal to the difference between these two prices and is published by the EC Commission some three weeks in arrears (see Appendix Table 2.5). A charge (or 'clawback') equivalent to the rate of premium in the week of export is levied on exports of sheep from Great Britain to other Community countries to prevent any undermining of markets, thus creating pressure for activating intervention buying. External trade is regulated through Voluntary Restraint Agreements (VRAs) agreed with the EC's major third country suppliers.

In September 1989 the Council of Agriculture Ministers adopted a regulation giving effect to reformed sheepmeat arrangements from January 1989, with further changes to be phased in over a transitional period of up to three years. The variable premium is to be phased out but with corresponding increases in the ewe annual premium. From 1990 this is now subject to headage limits, which will put a ceiling on the number of animals which are eligible for the full rate of annual premium. Producers will be able to claim the full rate on up to 500 animals in the lowlands and up to 1000 ewes in the Less Favoured Areas. Beyond these thresholds all producers will be able to claim 50 per cent of the full rate without any upper limit on the number of animals eligible. There are, in addition, further changes of detail which it is not appropriate to discuss here. There are both advantages and disadvantages for British sheep producers from the new arrangements. Although there may be an overall reduction in support it is expected that there will be benefits in not having a separately calculated stabiliser and in improved access to other Community countries for sheep exports.

II THE SURVEY SAMPLE

The survey

This report presents and discusses the national results of the 1987/88 Lowland Sheep Study in England and Wales. This survey on lowland lamb production is the latest in a series of periodic national studies of the sheep sector funded by the Ministry of Agriculture, Fisheries and Food, currently under the Special Studies in Agricultural Economics research programme. Details of previous reports on sheep production published within this series are given in Appendix IV. The study covered the period from September 1987 to March 1989, running from the main tugging date until final disposal of the 1988 lamb crop for each flock. During the course of the study more than 250 lowland flocks throughout England and Wales were involved in a detailed analysis and recording of the costs of lamb production.

The present study, although the fifth (since 1968) on aspects of lowland sheep flocks, is the first full investigation of the economics of lamb production since 1981. During this period significant changes in the size, structure and systems of the lowland sheep sector have taken place and consequently these results are of major importance. Of course, it is always necessary to interpret farm survey data with care, especially in the case of a single year's results from a periodic survey. Fortunately, during the period of this survey there were no exceptional events, climatic or otherwise, which might justify the appending of any serious qualification to the results. The survey is well-placed, therefore, to serve as a benchmark against which the likely effects of anticipated changes in the EC's sheep support policy can be judged. Moreover, since the survey was based on a stratified random sample, the use of raising factors has enabled the calculation of representative results for the national flock. This report is based on the raised sample.

Survey objectives

In seeking to concentrate on the issues of prime interest within the sheep sector the objectives of the survey, defined at the outset, were agreed as follows:

- (a) To measure the profitability of the 1988 lowland lamb crop in terms of gross margin, net margin and occupier's margin before interest;
- (b) To obtain information on the reasons for the increase in size of the national flock during the 1980's;
- (c) To obtain information on the likely limits to the expansion of the national flock;
- (d) If, due to policy changes, further expansion is assumed, to obtain information on the types of farm, areas of the country and flock size groups where this may occur;
- (e) To identify current and likely future changes in marketing patterns for finished lamb.

These objectives were to be met by means of a detailed examination of both costs and returns of the 1988 lamb crop, following through to finished lamb marketed as late as March 1989, together with a supplementary questionnaire probing cooperators' recent past and anticipated future sheep production policies.

Sampling procedure

In order to obtain a statistically optimum target sample of 250 flocks, a random sample of 1250 lowland flocks¹ in England and Wales with 50 or more breeding ewes, stratified according to flock size², was selected on the basis of the June 1986 Census returns. This sample was designed to reflect also the regional distribution of flocks and was subdivided into five samples, a main sample of 250 flocks and four reserve samples of 250 flocks each. These reserve samples were required in order to ensure the adequate availability of replacements (of specific flock size and region) where initial contacts proved unsuccessful.

Where the main sample failed to provide a viable cooperator, the sampling procedure involved the straightforward substitution of a replacement flock - drawn from the appropriate (flock size x region) cell - from the first reserve sample. If this replacement failed to participate a further replacement was taken from the corresponding cell in the second reserve sample, and so on so the structure of the sample was maintained. The sampling fractions were designed to minimise the expected sampling error of gross costs per ewe. The overall response pattern obtained in recruiting the sample is shown in Table 4.

Table 4 Response pattern in recruiting

	Numbers	% of total sample
Main sample	107	41.5
Reserve sample		
- First	58	22.5
- Second	60	23.3
- Third	13	5.0
- Fourth	20	7.7
	<hr/>	<hr/>
Total sample	258	100.0
	<hr/>	<hr/>

Reasons for non-cooperation

During the initial stages of the survey some 555 farmers throughout England and Wales were contacted. Of these, 30 no longer had a breeding flock on the farm and 16 were intending to give up the enterprise in the near future. With a further 6 recorded as recruitment list deficiencies

¹Defined as those not receiving any Hill Livestock Compensatory Allowances and, also, run independently of a hill or upland flock.

²Three flock size groups were used: 50 to 199 ewes, 200 to 499 ewes and 500 ewes and over.

there were, therefore, 52 (or nearly one in ten) who were ineligible for inclusion in the survey. Of the 503 potentially suitable contacts a total sample of 258 agreed to take part giving a response rate of just over 46 per cent. The analysis is based on a final sample of 247 flocks, some being excluded because of changes in system. By far the major reason for not cooperating was listed as 'too busy' or 'not interested'; these are not, in fact, identical reasons but it is not possible to break down this item further to identify which (if either) was the predominant factor. Details of the other reasons given for not taking part are shown in Table 5.

Table 5 Reasons for non-cooperation

	Numbers	% of total contacts	% of non-cooperators
<u>Non-eligibles</u>			
No sheep enterprise on farm	30	5.4	10.1
Soon to cease sheep production	16	2.9	5.4
Recruitment list deficiency	6	1.1	2.0
Total non-eligibles (A)	52	9.4	17.5
<u>Non-participants</u>			
'Too busy' or 'not interested'	132	23.8	44.4
Not contacted (pre-selection)	39	7.0	13.2
No reason given	6	1.1	2.0
Other reasons	68	12.2	22.9
Total non-participants (B)	245	44.1	82.5
Total non-cooperators (A+B)	297	53.5	100.0
Total sample	258	46.5	
Total number of contacts	555	100.0	

As in previous surveys the level of cooperation given over the course of the investigation was, in general, very good. It has to be recognized that there is always the possibility of sample bias towards, for example, those farms with better recording systems - although this does not necessarily imply higher (or lower) technical efficiency or financial performance. With this in mind the survey methodology and supporting recording forms, were designed to allow the collection of data even from flocks where such information would not normally be recorded. The hypothesis that response in such surveys is proportional to farm (or flock) size was tested, with rather inconclusive results. The analysis indicated that the poorest response was among the smallest flocks, but that the best response occurred in the middle sized group, those with between 200 and 500 ewes. However, the between-group differences were not great (with effective response ranging between 40 and 50 per cent); there are firm reasons, therefore, for regarding the sample as a representative cross-section of lowland breeding flocks.

Raising procedure

In view of the known disproportionate stratification (by flock size) of the sample, final estimates of the performance of the lowland sheep sector have been obtained by raising the sample results in order to represent the population accurately. The raising factors for each flock size group and on a regional basis, were derived by calculating the ratio of the number of flocks in the population (i.e. non-LFA flocks at the June 1988 Census) to the number of flocks in the sample. The individual flock results have been multiplied by the appropriate factor and summed to provide national estimates. Accordingly, the average results presented in this report are derived from the estimated totals for all flocks rather than being simple averages of individual flock figures.

Table 6 Derivation of raising factors

EC Region	Flock size group (ewes per flock)			
	50.0-199.9	200.0-499.9	500.0 & over	
<u>England</u>				
North	a	3216	1096	252
	b	22	20	16
	c	146.18	54.80	15.75
East	a	3282	1859	783
	b	15	21	27
	c	218.80	88.52	29.00
West	a	6110	3015	768
	b	23	43	20
	c	265.65	70.12	38.40
<u>Wales</u>				
	a	1271	536	140
	b	11	16	13
	c	115.55	33.50	10.77

a = number of flocks in population

b = number of flocks in sample

c = raising factor

III TECHNICAL ASPECTS OF PRODUCTION

Changes in resource use

Changes in the technical efficiency of agriculture follow improvements both in technology and in management techniques, as the combined effect of formal advice and informal observation influence aspects of husbandry. Although in many ways sheep production has been less affected by significant technology-led changes than most of the other major agricultural enterprises, nevertheless it has not remained immune to change. A notable development over the past twenty years has been the widespread acceptance of housing the ewe flock, for at least part of the winter, often practised in conjunction with an early (Christmas) lambing period. Breed evolution has seen the continuing adoption of mule and mule-type crosses and considerable activity in importing new breeds, particularly for use as terminal sires. Modern sheep breeding now involves techniques such as artificial insemination and embryo transfer, though these have yet to achieve wide influence within the national flock.

Undoubtedly the sheep sector has felt the effects of increasing pressure for standardisation; despite the apparent plethora of breeds which continue to flourish, many have strong similarities or common genetic backgrounds, and one breed, the Suffolk, is by far the predominant sire for finished lambs. Market demands for a medium-sized, lightly-boned carcass of good length and with little fat cover, increasingly evident over the past decade, imply that not only breeding (including the genetic characteristics of breeds throughout the stratified industry, not merely the terminal size) but also feeding practices and other aspects of management need to be reviewed - and changed where necessary - if the industry is to produce what the market requires.

Against this background of market change it is appropriate to review technical aspects of finished lamb production and an indication of changes in efficiency is given in Table 7 overleaf. It is emphasized that the results for 1970, 1976 and 1981, which are drawn from previous studies in this series, are straight sample averages. Furthermore, there was a degree of sample concentration in these studies by which in 1970, for example, the survey flocks were drawn from only four provinces¹. However, all samples were selected at random by MAFF from census records and good levels of cooperation were obtained, thus the results are of value in suggesting where changes have occurred.

The figures suggest that over the eighteen years to 1988 there have been improvements in lambing percentage (up 14 percentage points) and stocking rate (up 4.9 ewes per hectare), together with increases in concentrate usage (up 21 kg per ewe) and labour input. Mortality, in both ewes and lambs, is slightly lower, perhaps as a result of improved husbandry practices. The average wool clip has decreased, perhaps reflecting breed changes within the national flock over the period. There is some indication of a small reduction in carcass weights, whilst the percentage of lambs sold finished, down 20 points in 1988 compared with either of the two previous surveys, tracks the trend to

¹See Appendix V for details of University provinces

overwintering of store lambs as hoggets which has become a feature of sheep production in the 1980s. Since the survey period ended in March 1989, a greater proportion of lambs than previously had not been marketed by this date.

Table 7 Changes in physical resource use and productivity 1970 to 1988

	1970 ¹	1976 ¹	1981 ¹	1988 ²
Number of flocks in samples	147	103	232	247 ³
Average flock size (no. ewes)	285	291	362	227 ³
Lambs				
Numbers reared per 100 ewes	124	143	135	138
Post-weaning mortality (%)	2.1	n.a.	n.a.	1.2
Sold finished (%)	n.a.	79.0	82.4	62.3
Dressed carcass weight (kg)	18.6	18.5	17.5	17.7
Ewes				
Barren (%)	6.3	n.a.	5.2	5.8
Mortality (%)	5.3	n.a.	n.a.	4.7
Concentrates (kg per ewe)	38	33	41	59
Stocking rate (ewes per forage ha.)	6.1	8.9	8.4	11.0
Labour (hours per ewe)	3.8	3.6	3.7	4.8
Wool (kg per ewe)	3.6	3.4	3.1	3.0
Ewe lambs in flock (%)	n.a.	n.a.	8.3	11.9

¹Survey averages

²Raised results

³Survey average = 410

n.a. = not available

As with other indications of technical progress, these findings are consistent with the view that the sheep sector as a whole is steadily improving its technical efficiency as husbandry and management changes together take effect. However, within the overall averages there are considerable variations in performance, and the following sections in this chapter explore both the basis and the extent of this variety.

Basic characteristics of the sample flocks

The results are presented and discussed in terms of flock size using three size groups coinciding with the initial sampling frame. Details of these flock groups are given in Table 8. Average flock size within the groups ranged from 121 to 799 ewes, with a weighted average of 227 ewes for all flocks. There was no consistent pattern in the evident

Table 8 Flock characteristics by flock size, 1988

	Under 200	200-499	500 & over	All flocks
Average flock size (ewes to tup)	121	315	799	277
Ratio of ewes to rams	32	37	37	36
Ewe lambs in flock (%)	10	12	14	12
Flock maintenance rate (%)	25	22	25	24

variation of either the ewe to ram ratio (although the smaller flocks had a lower ratio possibly through maintaining genetic distinctions) or flock maintenance rate, where medium-sized flocks had a lower maintenance rate than either small or large flocks. The percentage of ewe lambs in the flock did increase with flock size, however, which corroborates previous studies.

Physical performance in relation to flock size

A review of certain indicators of physical efficiency (Table 9) suggests a clear link between flock size and nitrogen use, with larger flocks using more nitrogen; the resulting increase in grassland and forage production permits higher stocking rates. In line with prior expectations the average stocking rate of 11.0 ewes per hectare is lower

Table 9 Physical efficiency factors by flock size, 1988

	Under 200	200-499	500 & over	All flocks
Finished lambs sold (%)	66.3	60.3	60.9	62.3
Concentrates fed (kg/ewe)	59.6	57.2	59.7	58.7
Grassland stocking rate (ewes/ha)	11.2	11.5	12.0	11.6
Overall stocking rate (ewes/ha)	10.9	10.9	11.2	11.0
Nitrogen use (kg/ha)	80.0	90.2	110.6	89.6

than that seen in the Meat and Livestock Commission's "Flockplan Scheme", which in 1988 was 12.8 ewes per hectare for spring lambing flocks and 15.8 ewes per hectare for Christmas lambing flocks. Given the much higher average flock size (at 606 ewes) the Flockplan results may be regarded as broadly consistent with the present study. The other notable difference (shown in Table 9) is the higher proportion of lambs finished in the smaller flocks, although concentrate use was also slightly higher. Overall, 62.3 per cent of lambs were sold finished, with concentrate use averaging 58.7 kg per ewe.

Turning to flock performance the results (see Table 10) suggest that both smallest and largest flocks outperformed mid-sized flocks in

Table 10 Flock performance by flock size, 1988

	Under 200	200-499	500 & over	All flocks
	% of ewes tupped			
Productive ewes	91.0	89.7	91.8	90.7
Barren ewes	6.0	6.4	5.0	5.8
Lambs born alive	147.8	142.7	146.6	145.4
Lambs reared	140.4	136.6	142.2	139.5
	% of lambs reared			
Breeding lambs (sold/retained)	8.2	7.3	7.5	7.6
Retained as store lambs	9.8	7.8	10.7	9.3
Finished by end July	27.2	24.1	24.7	25.3

terms both of a higher percentage of productive ewes (ewes actually lambing) and of a lower percentage of barren ewes, with more lambs born and reared in addition. Although the differences between flock size groups appear small the cumulative effect of such performance differences, when translated into financial terms, can be important in determining profitability. Reasons for these differences are less clear: whilst small flocks' performance was superior to that of medium-sized flocks, mortality (discussed below) was also higher. Certainly, in relation to these productivity factors, the largest flocks performed best averaging 142.2 lambs reared per ewe tupped compared with the overall national figure of 139.5. At 27.2 per cent there was a slightly higher proportion of lambs finished (and sold) by the end of July in the case of small flocks.

The possibility of qualitative differences in shepherding between the flock size groups may be further considered from Table 11, which shows clear and consistent reductions in mortality with increasing flock size. In particular, the largest flocks recorded below average mortality of both ewes and lambs (at all stages), again a corroboration of earlier studies. Overall, as a percentage of all ewes tupped, ewe

Table 11 Ewe and lamb mortality by flock size, 1988

	Under 200	200-499	500 & over	All flocks
		% of ewes tupped		
Ewe deaths	4.9	4.7	4.6	4.7
Lamb deaths				
- Natal	8.5	7.3	5.3	7.0
- Pre-weaning	7.4	6.1	4.4	5.9
- Post-weaning	1.7	2.1	1.2	1.7
Mortality per 100 lambs born	6.2	5.7	3.8	5.2

mortality was 4.7 per cent and lamb mortality 14.6 per cent - but of this 7.6 per cent represented lambs born alive and subsequently lost. Expressed as a percentage of lambs born, lamb deaths subsequent to birth averaged 5.2 per cent.

Regional differences in physical performance

The regional distinctions adopted by the European Community represent combinations of Economic Planning Regions, and thus originate outside agriculture. In agricultural terms these regional boundaries are of limited significance: Wales forms a distinct region, clearly dominated by extensive (Less Favoured) hill areas, whilst within England the North and West regions are wetter and contain most of the country's Less Favoured Areas and the East is drier with a greater proportion of arable farming systems. These regions do have a wider political, economic and social significance, however, and to facilitate such interdisciplinary study the results have been grouped by EC region¹.

¹Details of the county groupings for EC regions are given in Appendix III

Notwithstanding the non-agricultural basis of the regional divisions, the physical efficiency factors presented in Table 12 do suggest certain differences in system. Wales has by far the highest proportion of lambs taken through to finishing (74.6 per cent) and this

Table 12 Physical efficiency factors by region, 1988

	England			Wales
	North	East	West	
Finished lambs sold (%)	64.8	63.5	57.9	74.6
Concentrates fed (kg/ewe)	74.3	69.9	47.9	37.5
Grassland stocking rate (ewes/ha)	11.4	11.6	11.4	12.6
Overall stocking rate (ewes/ha)	10.5	11.1	10.9	12.2
Nitrogen use (kg/ha)	94.9	97.8	90.0	56.5

Table 13 Flock performance and mortality by region, 1988

	England			Wales
	North	East	West	
	% of ewes tupped			
Productive ewes	87.9	92.0	90.8	91.6
Barren ewes	8.0	5.0	5.7	5.5
Ewe deaths	5.6	4.4	4.7	4.3
Lambs born alive	142.9	152.2	144.8	128.2
Lambs reared ¹	139.9	145.3	138.8	120.9
Lamb deaths ¹	12.1	16.2	15.9	8.2
	% of lambs reared			
Breeding lambs (sold/retained)	7.3	5.5	9.1	9.8
Retained as store lambs	10.0	5.3	12.2	9.7
Finished by end July	17.5	27.5	25.7	32.3

¹Including natal, pre-weaning and post-weaning deaths

is combined with the lowest concentrate use. In fact, three quarters of the finished lambs in Wales were sold by the end of September; this is consistent with the country's relative superiority (with much of the western part of England) in grass production, which is also evident in the highest stocking rates and lowest nitrogen usage. Whilst similar results might be expected for the South West and parts of the West and North of England this particular regional analysis is too broad to highlight these features. In addition, there is the strong possibility of a breed effect influencing these Welsh results, namely the smallness of the Welsh Mountain and its crosses, both of which predominate on lowland sheep farms in Wales. However the East region, with the highest nitrogen and second-highest concentrate use, achieved a stocking rate close to the overall national average, even without advantages in grass production. The West region had the lowest proportion of lambs finished, with more retained for breeding and (especially) as store lambs.

An analysis of regional differences in flock performance (see Table 13) shows the highest proportion of productive ewes in the East region and the highest lambing percentage at 152, with some 145 lambs reared per 100 ewes tupped. In contrast, with a similar proportion of productive ewes Wales had a much lower lambing percentage (128) and reared only 121 lambs per 100 ewes tupped. It is likely that a significant part of this differences is breed-related, since the Welsh flock is dominated by the less prolific hill crosses and the East has far more of the productive mule-type ewes. The severity of northern winters does not favour systems based on very early lamb production and a much later lambing date, rather than management factors, explains the much lower proportion of lambs sold finished by the end of July. The highest proportion of lambs destined for breeding was found in the West, both Wales and the West region recording above average figures.

Stocking rate and nitrogen use

The contribution of stocking rate to financial performance is considered in the following chapter; it is appropriate here to examine the influence of nitrogen use on stocking rate. In this study two measures of stocking rate have been used: the first, grassland stocking rate, expresses sheep numbers in relation to grassland area (including conserved products) while the second, overall stocking rate, includes the contribution of other fodder crops and bulk fodder. The relatively extensive nature of sheep production is confirmed by the average nitrogen use of 90 kg per grassland hectare, less than half found in a recent study of dairying (190 kg per grassland hectare)¹. Analysis of the survey results indicated a statistically significant relationship between nitrogen use and grassland stocking rate.

Flock maintenance policies

The sustained numerical growth of the national sheep flock throughout the 1980s has already been referred to. The data in Table 14 presents survey evidence of changes in flock size between 1987 and 1988. There were evident differences over the flock size range, with both small and large flocks recording small decreases compared with an increase in the medium sized category; the overall national figures indicated an increase of 0.2 per cent. However there were differences also in flock maintenance rate (calculating flock disposals as a percentage of opening

Table 14 Flock maintenance patterns, 1987/88

Flock size group	Opening numbers	Closing numbers	Change in flock size	Maintenance rate	Adjusted maintenance rate
Less than 200 ewes	121.4	120.1	-1.1	24.6	23.5
200 to 499 ewes	315.1	318.0	+0.9	21.9	22.8
500 ewes and over	799.4	798.3	-0.1	25.5	25.4
All flocks	226.7	227.2	+0.2	23.8	24.0

¹Milk Production Before and After Quotas, Ministry of Agriculture, Fisheries and Food. London: HMSO, 1988.

numbers) ranging from 21.9 per cent (medium flocks) to 25.5 per cent per cent. Given that the survey indicates some 12 per cent of the (large flocks); the national average was 23.8 per cent. Adjusting this flock maintenance rate for changes in flock size suggests less variation in the true replacement rate, with an overall national average of 24.0 opening flock numbers were ewe lambs, this implies that perhaps a half of replacements were homebred with a half purchased.

Flock size and breed characteristics of the sample

The distribution of the sample flocks by flock size group is given in Table 15, showing that about a fifth of the sample (50 flocks) were in the modal size group of 200 to 300 ewes with 71 smaller flocks and 126 larger flocks. Sixteen flocks (6.5 per cent of the sample) had more than 1000 ewes.

Table 15 Distribution of sample flocks by broad flock category

(a) By flock size

	Number of flocks	% of total
Less than 100 ewes	25	10.1
100-200 ewes	46	18.6
200-300 ewes	50	20.3
300-400 ewes	27	10.9
400-500 ewes	22	8.9
500-600 ewes	24	9.7
600-700 ewes	20	8.1
700-1000 ewes	17	6.9
1000 ewes and over	16	6.5
	<hr/> 247	<hr/> 100.0

(b) By breed group

	Number of flocks	% of total
Hill	20	8.1
Longwool	5	2.0
Down	77	31.2
Mule and mule-type	126	51.0
Other/mixed	19	7.7
	<hr/> 247	<hr/> 100.0

Two factors make useful classification of flocks on a breed basis difficult. First, the multiplicity of breeds make (possibly arbitrary) groupings of several individual breeds necessary; secondly, the majority of flocks exhibit considerable heterogeneity in breed terms. In an attempt to summarise the sample flocks an initial breed grouping was carried out and the results are shown in Table 15. Four distinct main types were identified (hill, longwool, down and mule-type), flocks so classified containing at least half of the breed of these broad types. Flocks which could not be classified on this basis formed a fifth

Table 16 Distribution of sheep breeds

Breed	Ewes		Rams
	Proportion of total ewe numbers	Proportion of flocks	Proportion of flocks
	%	%	%
Beulah Speckled Face	2.7	6.1	-
Bluefaced Leicester Xs	1.2	2.4	-
Clun	1.6	2.8	3.6
Clun Xs	1.0	2.0	..
Devon Longwool Xs	1.2
Dorset Downs Xs	0.5	2.0	1.2
Dorset Horn	0.9	1.6	2.4
Dorset Horn Xs	0.8	2.0	..
Greyface	0.7	1.2	-
Masham	2.4	8.9	-
Mule	41.2	58.7	..
Poll Dorset	0.7	2.0	2.8
Romney Marsh	4.3	4.9	3.2
Scotch Halfbred	5.1	10.1	..
Suffolk	3.0	16.6	85.8
Suffolk Xs	12.0	40.5	10.1
Texel	1.6	8.1	29.6
Welsh Halfbred	6.6	13.4	-
Welsh Mountain	1.8	4.9	1.6
Welsh Mountain Xs	1.6	5.7 ¹	-
Minor breeds ¹	4.8	30.8 ²	57.5 ³
Other and mixed	4.3	9.7 ²	3.6
Total	100.0		

¹Specified breeds less than 0.5% of total ewe numbers

²Includes mixed/uncertain breeds

³Includes 8.1% Bluefaced Leicester, 7.3% Charollais, 7.7% Dorset Down and 4.9% Hampshire Down.

.. = less than 1 per cent

(other) category. The increasing significance of Mule and mule-type crossbreds is apparent, with this group forming over half of the sample flocks.

A more detailed description of the breed distribution is given in Table 16. It is not surprising, given the results of the broad grouping, that mules formed 41 per cent of the total ewe numbers and were found in nearly six out of ten flocks. The next most important breeds were Suffolk based crosses, which accounted for an eighth of the sample and were widely distributed. In total 54 distinct breeds were recorded in the sample flocks. With regard to rams, some 86 per cent of flocks had at least one Suffolk and 30 per cent a Texel. All other breeds were found on no more than 10 per cent of farms, the most important being the Suffolk crosses, Bluefaced Leicester, Dorset Down, Charollais, Hampshire Down, Clun Forest and Romney Marsh.

IV ECONOMIC ASPECTS OF PRODUCTION

Methodological background

The present survey follows previous practice in being based on a full cost approach and includes, along with directly incurred (and eminently recordable) expenditures, imputed costs for resources which do not incur an actual cash outlay and for items which cannot be readily attributed to a particular enterprise. The former include the value of unpaid labour (including that of farmer and spouse), an estimated rental value (or rent equivalent) on owner-occupied land, and a depreciation charge for buildings and machinery owned by the farm business. Secondly, certain overhead costs are difficult, if not impossible, to allocate with accuracy or consistency; between enterprises on a mixed farm they include general costs (electricity, office expenses, accountancy charges and general sundries) and the overhead element of machinery and labour costs. The latter have recently been the subject of a specific study, which suggested that on many farms 'overhead' labour - that is, labour costs which cannot be attributed to direct activity on any enterprise - may be far greater than previously realised¹. Overhead costs derived from an analysis of Farm Business Survey data have been imputed to each of the sample flocks. Further information regarding survey methodology and the definitions of terms used in the report is contained in Appendix III.

Among the advantages of this approach, whereby all resources used in the production process attract an appropriate charge, is that valid inter-farm and inter-commodity comparisons can be made. Irrespective of variations in the specific circumstances of farms (which may be related to personal or family circumstances) comparisons of financial performance measures, margins and productivity are available for research. However, it should be equally clear that such margins are not necessarily identical with the actual cash flow position of the business for two main reasons: first, the presence of non-cash imputed items and, secondly, the absence of interest charges on borrowed capital. The margins thus calculated reflect correctly the actual return on all resources used in the lowland sheep enterprise, but cannot be regarded as definitive statements of the overall financial viability of the farms concerned. Despite a poor (or even negative) net margin it may be that the sheep enterprise generates sufficient cash to provide a living or, as is frequently the case, to supplement other major enterprises.

Consequently, two other measures of income have been calculated for certain tables in addition to net margin. The first, **family income**, represents the return to the farm family (including farmer, spouse and other unpaid family members) for their manual and managerial work and for their investment in tenant-type assets. The second is termed **occupier's income** and comprises family income less unpaid labour (except that of farmer and spouse) plus the rental value of owner-occupied land. To the extent that it is gross of two major imputed cost items it is thus much closer than net margin to an operating profit, albeit before the deduction of interest. The estimation of interest charges attributable to a single enterprise on a multi-enterprise farm cannot be undertaken within acceptable bounds of accuracy; occupier's income differs in this one aspect, therefore, from occupier's net income which

¹Work undertaken by the Special Studies Methodology Working Party.

Figure 1 Schematic outline of margin and income measures

ENTERPRISE OUTPUT
Less Variable costs
 = GROSS MARGIN
Less Fixed costs (excl. general overheads)
 = MARGIN BEFORE OVERHEADS
Less General overheads
 = NET MARGIN
Plus Unpaid labour (incl. farmer and spouse)
 = FAMILY INCOME
Less Unpaid labour (excl. farmer and spouse)
Plus Rent paid
 = OCCUPIER'S INCOME

is calculated on whole farm business data. The relationship between the main margin and income measures used in this report is shown schematically in Figure 1.

Output, costs and margins

The overall financial results for the study are presented in Table 17 and Figure 2. Total enterprise output was £59.55 per ewe, of which £55.68 (93.5 per cent) was derived from lambs. Flock replacement cost averaged £5.14 per ewe; the basis for this calculation is discussed later in this chapter. Variable costs were £20.29 per ewe of which concentrates formed the largest single item. At £39.26 per ewe gross margin was approximately two thirds of total output, but almost half of this figure was accounted for by recorded direct and forage labour

Figure 2 Lowland lamb production costs 1987/88 (£/ewe)

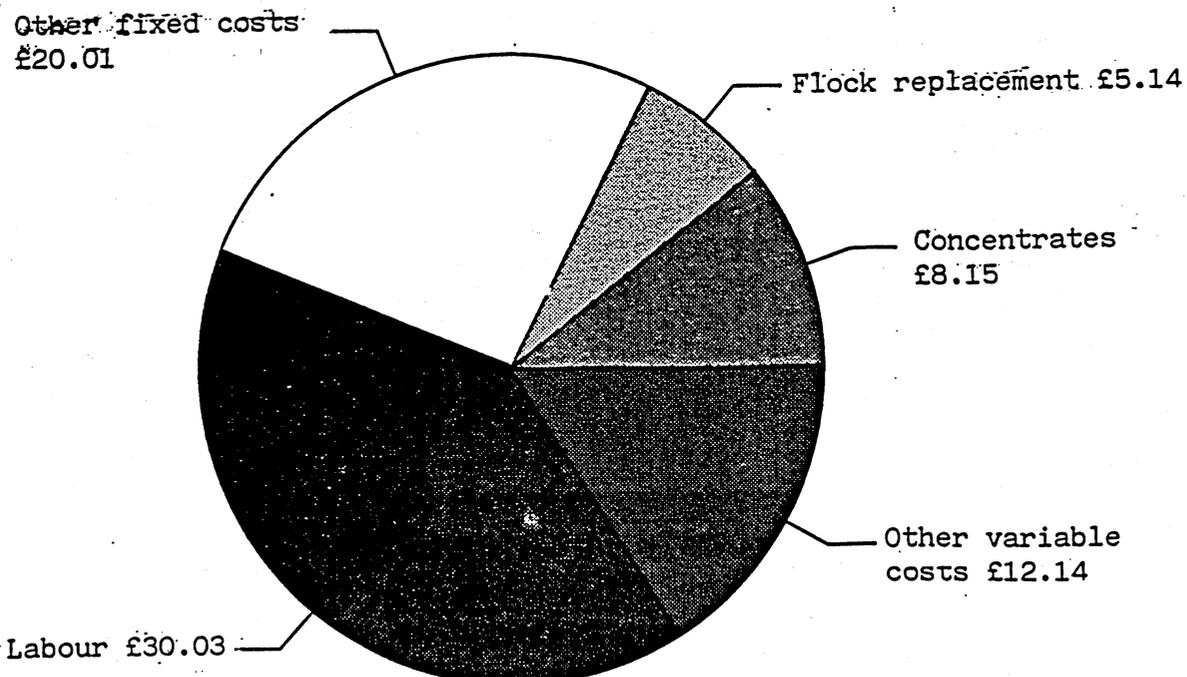


Table 17 Output, costs and margins for lowland lamb production in England and Wales, 1988

	£ per ewe	£ per flock
Output		
Lambs	55.68	12620
Wool	3.12	707
Ewe premium	5.89	1335
Less flock replacement	-5.14	-1164
Total	59.55	13498
Variable costs		
Concentrates	8.15	1847
Purchased fodder	0.77	175
Forage variables	5.11	1158
Other livestock costs	1.91	433
Veterinary and medicines	3.11	705
Miscellaneous costs	1.24	281
Total	20.29	4599
Gross margin	39.26	8899
Fixed costs (excl. overheads)		
Labour - sheep	17.99	4078
- forage	0.93	211
Rent/rental value	8.26	1872
Machinery - sheep	2.45	555
- forage	2.15	487
Total	31.78	7203
Margin before overheads	7.48	1696
Overheads		
Labour	11.11	2518
Machinery	1.78	403
General	5.37	1218
Total	18.26	4139
Net margin	-10.78	-2443
Family income	6.39	1448
Occupier's income (before interest)	8.47	1919
£ per adjusted forage hectare		
Gross margin	431	
Margin before overheads	82	
Net margin	-119	
Family income	70	
Occupier's income	93	

costs. Of total output, one eighth remained as a margin before overheads (£7.48 per ewe). The imputed overhead costs, at £18.26 per ewe, in total comprised some 30 per cent of output and resulted in a negative net margin of - £10.78 per ewe. It is important to understand the significance of this figure. It implies that in 1988 lowland breeding flocks did not obtain an income sufficient to provide a proper return on all resources used in the enterprise, net margin being the enterprise equivalent of management and investment income for the whole farm business. As indicated above, this is not the only valid measure of farm enterprise profitability but it is, perhaps, the most rigorous indication of overall returns. If the charge for the manual labour of the farm family is excluded as a cost (it does not take the form of a cash outlay), the resulting family income was £6.39 per ewe, or £1448 per average flock. Even this does not reflect the financial position of the enterprise as perceived by the farmer, however; occupier's income, a 'before interest' measure, stood at £8.47 per ewe (£1919 per flock).

When these results are set in the context of previous studies there are clear indications of the pressures to intensify which the sheep sector, in common with the rest of British agriculture, has experienced over the last two decades. In addition to results from the current study Table 18 shows output and gross margins in real terms from studies conducted in 1970, 1976 and 1981. These figures should be regarded as indicative only, because earlier studies were not based on full national samples; however, they suggest that both output and gross margin (per ewe) have fallen since 1976 when calculated at constant prices and appear now to be broadly comparable with the situation in 1970. Against this, increased intensity of stocking has largely compensated for the falling margins per ewe so that the 1981 and 1988 studies record almost identical figures for gross margin per hectare at about £430.

Table 18 Output and gross margins in real terms¹, 1970 to 1988

	1970	1976	1981	1988
Output: £ per ewe	56.0	85.1	71.5	59.6
Gross margin: £ per ewe	39.8	56.9	50.6	39.3
Gross margin: £ per forage ha	242	507	426	431

¹Reflated using retail price index, 1988 base

Table 19 Proportional significance of certain costs, 1976, 1981 and 1988¹

Cost item	In relation to	1975/76	1980/81	1987/88
		%	%	%
Concentrate feed costs	Total variable costs	27.8	35.4	40.2
Forage variable costs	Total variable costs	58.7	41.1	29.0
Forage variable costs	Total feed costs	67.8	53.7	58.1
Total feed costs	Total variable costs	86.5	76.5	69.1
Total feed costs	Total costs	44.7	27.0	19.9
Labour costs	Total costs	25.3	27.0	42.7
Total variable costs	Total costs	48.5	35.3	28.8
Total fixed costs	Total costs	51.5	64.7	71.2

¹These comparisons should be regarded only as a broad guide because of changes in methodology between surveys.

Since the 1970s, however, the cost structure of lamb production has altered significantly and Table 19 contains a summary of the changes which have occurred in the relative importance of the major inputs over recent years. Notably, concentrate costs have risen as a proportion of variable costs with a corresponding decrease in the importance of forage variables; these changes are consistent with the overall increase in stocking rate, itself a reflection of increased grassland productivity. Within the total cost structure total feed costs are less important but fixed costs account for well over two thirds of the total. These findings are analysed at greater length later in this chapter.

Lamb disposals

Details of lamb disposals, the major component of output, are given in Table 20. Of the finished lambs sold some two thirds were sold on a liveweight basis and were slightly heavier, realising £42.06 per lamb

Table 20 Lamb disposals, 1988

	Per 100 ewes		Net returns £/head	D.C.W. kg/lamb
	Number	Value (£)		
Liveweight sales	60.37	25.39	42.06	18.86 (Est.)
Deadweight sales	31.64	12.24	38.69	17.51 (Actual)
Other sales	29.14	10.32	35.40	-
Retained on farm	21.88	8.71	39.80	-
(Purchased)	(6.25)	(1.75)	(27.98)	-

compared with £38.69 per lamb for deadweight sales. Other lamb sales, which were principally store lambs, averaged £35.40 with retentions (approximately one third breeding, two thirds stores) valued at an average of £39.80 each. There were a small number of (mainly store) lambs purchased which could not be separately identified within the lamb flock or disposals. A quarter of lambs had been sold finished before the end of July (Table 21) but the timing of finished lamb sales shows a

Table 21 Timing of finished lamb sales 1988/89

	% of available lambs
May 1988 or before	7.74
June	8.82
July	8.69
August	9.33
September	8.07
October	7.70
November	3.07
December through March 1989	9.01
Total finished lambs	62.31

fairly even monthly distribution from the end of May to October. Thereafter, finished lamb sales fell back, averaging less than 3 per cent monthly through the winter.

Regional variation in output, costs and margins

Using the broad (EC) regional groupings the results are summarised in Table 22. Full details are contained in Appendix Table 1.2. The three English regions show very similar levels of output but Wales is somewhat lower, the financial result particularly of the much lower lambing rate which, it will be recalled, the earlier analysis of flock performance

Table 22 Output, costs and margins by region, 1988

Region	Total output	Variable costs	Gross margin	Fixed costs	Net margin	Net margin
	£ per 100 ewes				£ per forage ha	
England - North	6131	2372	3759	5399	-1640	-172
- East	6112	2344	3768	5259	-1491	-166
- West	5945	1781	4164	4691	-527	-57
Wales	5097	1365	3732	4759	-1027	-126
England & Wales	5955	2029	3926	5004	-1078	-119

identified among Welsh flocks. Variable costs were lower in the West and in Wales, reflection in part of the evident benefits of better grass production. These regional differences are maintained through to net margin level, with the North doing least well. After taking stocking rate into account, the net margins per forage hectare show a clear superiority in the western areas, particularly in the West region of England. However, all regions recorded a negative net margin.

Analysis by flock size

The previous discussion has largely concentrated on the overall results and Table 23 presents an analysis of the financial results according to flock size, with full details given in Appendix Table 1.1. Although variation between flock size groups to gross margin level was not great

Table 23 Output, costs and margins by flock size, 1988

Flock size	Total output	Variable costs	Gross margin	Fixed costs	Net margin	Net margin
	£ per 100 ewes				£ per forage ha	
Under 200	6120	2017	4103	6014	-1911	-208
200-499	5782	1985	3797	4816	-1019	-111
500 & over	6024	2096	3928	4319	-391	-44
All flocks	5955	2029	3926	5004	-1078	-119

the financial implications of the slightly better technical performance achieved in both small and large flocks can be seen, with gross margins for the mid-sized group rather below average. However, it is in the area of fixed costs that the major differences emerge, with a marked superiority for larger flocks. In fact, both medium and large flocks had below average fixed costs, the smallest flocks recording markedly higher direct labour costs. Since the (imputed) overhead labour charge is based on recorded direct labour, this further increased the

disparity. However, it was not solely the labour element but in all items of overhead costs that small flocks were found to be at a disadvantage compared to larger flocks. Consequently, and compared with the national average net margin of -£10.78 per ewe, small flocks had a net margin of -£19.11 per ewe; large flocks achieved a much better (though still negative) net margin of -£3.91 per ewe.

Family income by flock size

Following the earlier discussion of the limitations of using a single income measure Table 24 details, on a per flock basis, the appropriate family income according to flock size. The concept of family income is particularly relevant in any consideration of the ability of small units

Table 24 Family income by flock size, 1988

Flock size	Net margin	Unpaid labour	Family income	Family income
		(incl. farmer and spouse)		
		£ per flock		£ per 100 ewes
Under 200	-2320	3771	1451	1195
200-500	-3211	6705	3494	1109
500 & over	-3126	8282	5156	645
All flocks	-2443	3891	1448	639

to survive difficult economic conditions. This analysis highlights the reasons for their survival and continuance, since even the smallest flock size group achieved a family income of £1451; it also emphasises the disparity between large and small flocks in the use made of hired labour. With no charge made for family labour it is the small flock which is achieving the highest returns at £11.95 per ewe, almost double that of the largest flocks; the reason is, of course, that in small flocks a far greater proportion of the manual labour is performed by family members.

In terms of flock survivability several points need to be made. First, there is a paradox in that greater reliance on family labour, as in small flocks, increases the short-term likelihood of survival since it confers greater opportunity and incentives for 'tightening the belt', however, such dependence may decrease the long term likelihood of continuation in that even family members need sufficient reward for their labour or they will ultimately seek alternative employment. Secondly, however, the smaller breeding flocks are normally adjuncts to the main farm business, additional enterprises which fit into the farm for a variety of sound management reasons, the utilization of land unsuitable, or less suited, for other enterprises; the justification for retaining additional labour required primarily for another (main) enterprise, perhaps at peak periods of the year; the dovetailing of a sheep enterprise with other enterprises in a mixed farming system; and the provision of an enterprise for a son, perhaps, to team the elements of business management in practice. For all these reasons, and more, for many flocks negative net margins may be a theoretical accounting problem but a practical irrelevance. Consequently, the family income figures may be regarded as a more frequently consulted indication of sheep profitability than the strictly correct - but dismal - net margins.

Factors affecting profitability

The overall averages conceal considerable variation in financial performance and Table 25 summarises the results of top quartile flocks, selected in terms of both gross margin per hectare and net margin per hectare. Full details of these analyses will be found in Appendix

Table 25 Comparison between average and top quartile flocks

	All flocks average	Top 25% of farms	
		Selected according to GM/ha	Selected according to NM/ha
£ per 100 ewes			
Enterprise output	5955	6607	6629
Variable costs	2029	1737	1584
Gross margin	3926	4870	5045
Fixed costs	5004	4269	3313
Net margin	-1078	601	1732
Gross margin per adj. forage ha (£)	436	827	680
Net margin per adj. forage ha (£)	-119	102	233
Overall stocking rate (ewes/ha)	11.00	16.98	13.47
Concentrates (kg/ewe)	58.7	48.5	44.4
Ewe lambs in flock (%)	11.9	14.3	16.6
Flock maintenance rate (%)	23.8	27.1	28.7
Lambs weaned (%)	139.5	145.9	147.8
Finished lambs sold (%)	62.3	74.5	65.3

Tables 1.4 and 1.8. Both groups achieved an output per ewe more than 10 per cent above average (of which some four fifths was due to higher lamb output) and this was combined with considerably lower variable costs (with significant savings in concentrate feed costs). At the gross margin level, therefore, these flocks had an advantage of at least 25 per cent over the average. In the area of fixed costs the two groups diverge. Those with the highest gross margins per hectare managed a 15 per cent saving in fixed costs, distributed over all items, whilst the flocks with highest net margin per hectare achieved substantial savings particularly on direct labour (and hence overhead labour) with total fixed costs a third below average. The results in net margin per hectare terms are striking: both groups produced respectable positive net margins, of £6.01 and £17.32 per ewe, equivalent to £102 and £233 per hectare respectively.

Differences in technical performance are also summarised in the table, of which perhaps the most important is overall stocking rate. The more successful flocks had a higher proportion of ewe lambs and a higher flock maintenance rate, implying a higher turnover of ewes possibly as a result of stricter culling policies. They produced more lambs and sold a higher proportion of these as finished lambs, yet with a lower concentrate use. Many factors will have contributed to these differences in performance, some of which (such as land quality, farm aspect and local climatic factors) will be outside the farmer's control. Nevertheless, the figures suggest that on many flocks worthwhile improvements in technical performance are achievable, and that these can be expected to produce distinct financial benefits.

A review of fixed costs

Fixed costs merit a closer look not only because of their increasing importance within the cost structure of lamb production but also because some of them are frequently the 'forgotten' costs in farm management terms. To some extent this is not without justification: on a day to day basis it may be better to concentrate attention on those costs which can be identified most readily and which have a clear and direct influence on production. However, every business must give consideration to the less obviously controllable (fixed) costs and the survey data presented in Table 26 are analysed again by top quartile group, selecting flocks on gross and net margin per hectare criteria.

Table 26 Analysis of fixed costs by average and top quartile flocks

	All flocks average	Top 25% of farms	
		Selected according to GM/ha	Selected according to NM/ha
£ per 100 ewes			
Labour - sheep	1799	1720	1141
- forage	93	71	56
- overhead	1111	985	559
Rent/rental value	826	553	688
Machinery - sheep	245	194	148
- forage	215	181	138
- overhead	178	188	147
General overheads	537	377	436
Total	5004	4269	3313

The single largest element of fixed costs is labour and this is shown under three categories - direct sheep, direct forage and overhead. As explained earlier, the imputed charge for overhead labour is related to the actual direct labour input, and so it is on direct labour that attention must be focussed. As the table shows, a quarter of the survey flocks recorded a direct labour charge 37 per cent lower than average and this, combined with overhead labour, accounted for three quarters of the difference in net margin per ewe. It is not possible to get behind the reasons for this lower labour input, but apart from a minor effect from stocking intensity (see discussion below) it would appear that the top quartile flocks made more efficient use of labour. Certainly, there is no evidence of any adverse effect on technical efficiency as a result of the lower labour component. Differences in the majority of the other cost items stem, directly or indirectly, from the higher stocking rates associated with the top quartile groups. Thus the charge for land (as rent or rental value), forage and overhead machinery costs and general overheads are all linked to land use. Arguably, some even of the direct machinery charge to sheep may be associated with stocking density, in that feeding and tending operations for a given flock size might involve fewer miles (and fewer man hours) for a more tightly stocked, compact flock. It would appear from this analysis that two factors are of great influence on fixed costs in sheep production - the first being the efficiency of labour use and the second the overall stocking rate, thus confirming two aspects of conventional management advice on improving profitability.

Flock replacement cost

Flock replacement cost was calculated for the whole breeding flock, including rams used for breeding. The method adopted utilizes the difference between (a) the sum of the opening valuation, the cost of purchased replacement ewes, ewe lambs and rams and the estimated market value of home-bred ewe lambs and rams transferred into the flock and (b) the sum of the closing valuation, the net returns from ewes and rams

Table 27 Flock replacement cost, 1987/88

	Number of ewes or ewe lambs	Value £ per head	Total valuation £ per flock	
Opening numbers	226.66	@ 52.89	11988	
Purchases and transfers in	54.01	@ 56.42	3047	
	<u>280.67</u>		<u>15035</u>	15035
Sales and transfers out	44.33	@ 40.77	1807	
Casualties and deaths	9.12	@ 2.57	23	
Closing numbers	227.22	@ 53.73	12209	
	<u>280.67</u>		<u>14039</u>	<u>14039</u>
Difference on ewe flock				996
Difference on rams for breeding details (not shown)				169
Balance being flock replacement cost				<u>1165</u>
Average flock size = 226.66 ewes				
Flock replacement cost per ewe £5.14				

sold and the estimated market value of ewes transferred out of the flock. The closing valuation includes the remaining original members of the flock valued at their opening unit values plus replacements valued at either their purchase price or transferred in value, as appropriate. In effect, this method calculates the difference between the opening valuation of those animals sold or which died during the survey year and their realised sale value; Table 27 summarises the results of the exercise. Obviously, the charge for flock replacement will be influenced by relative values and market prices, as well as by culling and replacement policies. It is worth noting that the effect of qualitative changes within the national flock cannot be estimated, as this would require information on changes in the age (and quality) structure of the survey flocks over the study period.

V FURTHER DISCUSSION AND CONCLUSIONS

Introduction

In addition to collecting financial and physical information the survey included a range of supplementary questions, designed to identify the reasons for the underlying increase in flock size over the past decade and to explore the likelihood of further changes over a foreseeable period of two or three years. Other questions dealt with attitudes to marketing and individual marketing practices. The first part of this chapter deals with major aspects of this section of the survey so that final discussion of the results is set in the context of this background information.

In the process of identifying those flocks which had been established during the 1980s the (sometimes approximate) year in which each flock started was obtained, and it became clear that there was a very wide distribution within the sample (Table 28). Forty of the flocks (16.2 per cent) were post-1980 but a similar number had been started more than 40 years before with not less than 31 in every decade

Table 28 Year of initial flock establishment

	No	%		No	%
1940 and before	41	16.6	1961 to 1970	33	13.4
1941 to 1950	31	12.5	1971 to 1980	56	22.7
1951 to 1960	46	18.6	1981 and later	40	16.2

since. Two decades were noticeably less well represented. The lower numbers in the 1940s may reflect either wartime food and agricultural controls or on the length of time involved (or both), while the 1960s represented the post-war nadir of the UK sheep industry and this probably accounts for the low numbers from that decade. The increased numbers in the 1970s mirrors the steady national increase, with a further sustained growth in the 1980s.

Recent changes in flock size

Quite apart from the 40 flocks which had been established since 1981 there had been other considerable size changes on six out of ten of the sample farms over the six years to 1987 as shown in Table 29. Although a quarter reported no change in flock size, half had expanded during this period, coinciding with the existence of sheep marketing arrangements under the CAP. Of the original (pre-1980) 207 flocks, more than one in four had increased by at least 30 per cent. Decreases in flock size were less numerous and less dramatic.

The major reasons for both the establishment of new flocks and the increase in existing flocks are given in Table 30. It is worth noting that the modal year of establishment was 1982 which suggests that the introduction of sheep support under the CAP (in autumn 1980) and the resulting increase in confidence provided a spur to potential flock-owners. To take the question of establishment first, the list of main reasons - that is, those ranked 'most important' - was topped by the acquisition (though not necessarily the purchase) of additional land

Table 29 Changes in flock size since 1981

	Number of flocks	% of total	Of which:-		
			No	% change	
Decrease	24	9.7	}	3	10% or less
				5	10-20%
				9	20-50%
				7	Over 50%
No change	60	24.3			
Increase	123	49.8	}	10	10% or less
				17	10-20%
				39	20-50%
				34	50-100%
				23	Over 100%
Established since 1981	40	16.2			
Total	247	100.0			

suited to sheep production, closely followed by a declared personal interest in the enterprise. General management or husbandry factors, and perceived favourable prospects for sheep were also important. When subsidiary reasons are taken into account, the overall ranking runs: personal interest, relative prospects for sheep and then other enterprises, followed by additional land, management aspects, other

Table 30 Reasons for flock establishment and expansion

	Establishment since 1981		Increase since 1981		Likely future expansion	
	Main reason	Overall ¹ ranking	Main reason	Overall ¹ ranking	Main reason	Overall ¹ ranking
	%		%		%	
Good prospects for sheep enterprise	12.5	2	36.0	1	35.5	1
Poor prospects for other enterprises	10.0	3	11.6	3	15.8	2
Management/ husbandry factors	17.5	5	9.5	4	10.5	5
Milk quotas	2.5	7	4.1	7	4.0	7
Personal interest	20.0	1	10.9	2	6.6	3
Acquisition of suitable land	22.5	4	14.3	6	6.6	6
Other reasons	15.0	6	13.6	5	21.0	4
(Number of flocks)	(40)		(123)		(74)	

¹Weighted ranking of main and subsidiary reasons

reasons, and milk quotas. Since the sample was drawn from the 1986 census returns the low ranking of the latter may not reflect the final influence on the sheep sector of this particular policy instrument. A wide variety of other reasons included, importantly, cessation of dairying (pre-quotas) and various family factors, including the assimilation of a son into the farm business.

The relative importance of the main reasons given for an increase in flock size during the 1980s was somewhat different to that for flock establishment, but the overall ranking was remarkably similar. By far the most important reason for expansion was 'good prospects for sheep' which accounted for 36 per cent of the main reasons. The acquisition of land suited to sheep production was again an important factor, however. The variety of other reasons encompassed substitution effects within the business ('out of dairying', 'still building up flock', 'farm reorganization'), family reasons (particularly son joining the business) and, rationally, financial aspects ('profitability of sheep', 'good return on capital', 'part of FHDS plan' and, explicitly, 'EC sheep support').

Prospective changes in flock size

Cooperators were asked of any firm intentions to expand the breeding flock over the next two to three years and 74 (30 per cent) were planning such expansion. There was no relationship between the year of original flock establishment and intention to expand - the evidence does not support any suggestion of a close link between new flocks and prospective expansion. Table 30 shows 'good prospects for sheep' again as the predominant main reason for these expansion plans followed by 'other reasons' (important among which was increased farming intensity releasing surplus land) and pessimism over prospects for alternative enterprises. Again, the overall ranking followed closely the pattern of reasons given for initial establishment and recent expansion. Averaging these overall rankings produces a combined ranking as follows (Table 31).

Table 31 Key factors influencing expansion of national flock

1	Good prospects for sheep enterprise
2	Personal interest in sheep
3	Poor prospects for other enterprises
4	Management/husbandry factors
5	Other (miscellaneous) reasons
6	Acquisition of suitable land
7	Milk quotas

Notwithstanding these expressed intentions to expand, the survey tried to establish factors which were seen as constraints on expansion of the breeding flock. Of the main reasons shortage of land was cited most often (34.8 per cent of all main reasons) with management/husbandry factors second and labour shortages third (Table 32). All other reasons were relatively infrequently mentioned as likely constraints. In the overall ranking of main and subsidiary reasons shortage of capital was listed fourth most important; there was some evidence that among the owners of older flocks this was seen as a rather more important limit on expansion.

Table 32 Constraints on expansion of breeding flock

	Main reason (%)	Overall ranking
Resource shortage - land	34.8	1
- labour	19.2	3
- capital	6.0	4
Management/husbandry factors	24.8	2
Other reasons	12.0	5
No major constraint foreseen	3.2	6

The survey attempted to identify the likely limits to expansion of the national flock with inconclusive results. Given good prospects for the sheep enterprise and poor prospects for other (feasible) enterprises it was evident that many farmers would continue to expand their flocks, subject only to the constraints listed above. It is not surprising, perhaps, that this rational response to combined economic pressures and market or policy signals did not differ significantly either by farm type or size or regionally. Rather, it appears that a positive response to economic stimuli for sheep production could be expected to depend on personal and farm specific characteristics in conjunction with the general factors outlined above.

Policies for marketing finished lambs

The final aspect of lamb production examined was that of marketing policies - in particular, the choice of market outlet and the reasons which influence this choice. There was little evidence of any significant pattern of changes in marketing outlet over the period 1981 to 1987. Table 33 indicates that the traditional auction market remains the single most important system of sale for finished lamb, although

Table 33 Major marketing outlet for lambs

	Year flock established					
	Prior to 1981		1981 or later		All flocks	
	No	%	No	%	No	%
Auction	150	69.2	29	67.5	179	68.8
Direct to abattoir	41	18.9	12	27.9	53	20.4
Direct to butcher	8	3.7	1	2.3	9	3.5
Marketing group	9	4.1	-	-	9	3.5
Other	9	4.1	1	2.3	10	3.8
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Number of outlets	217	100.0	43	100.0	260	100.0
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Number of farms	207		40		247	

direct selling to an abattoir account for one in five of all outlets recorded. Other market outlets, including marketing groups, were far less common. When the responses were analysed by year of flock establishment a significantly higher use of 'direct to abattoir' deadweight selling was evident among those flocks established since 1981. Furthermore, the survey showed an increased likelihood to use

this (deadweight) system of marketing amongst larger flocks and almost four out of ten finished lambs were sold this way.

It is revealing that 'convenience' was the predominant reason given for choice of marketing outlet (34.0 per cent) although better returns was the second most important (26.9 per cent). The reasons are listed in Table 34. It was admitted that tradition remains an important factor influencing choice. Again, there were differences between new (post 1981) and older flocks: new flockmasters rated convenience much higher and (not surprisingly) tradition far lower, but with a remarkably similar importance given to 'better returns'.

Table 34 Reasons for choice of marketing outlet

	Year flock established					
	Prior to 1981		1981 or later		All flocks	
	No	%	No	%	No	%
Convenience	100	32.1	25	44.7	125	34.0
Tradition	55	17.6	5	8.9	60	16.3
Better returns	84	26.9	15	26.8	99	26.9
Lower costs	14	4.5	-	-	14	3.8
Other	59	18.9	11	19.6	70	19.0
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Number of reasons	312	100.0	56	100.0	368	100.0
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Number of farms	207		40		247	

Conclusions

Studies of agricultural production processes, for whatever commodity, tend to produce evidence of considerable variation in levels of production efficiency and economic performance. These variations reflect not only wide differences in the resources, both physical and financial, available to individual producers but also are the result of the farmer's own management abilities, motivations and aspirations. Anyone familiar with the agricultural industry will know that the assumption of profit maximisation as the sole, or even main, motivating factor rarely applies. This is not to suggest, of course, that the profitability of individual enterprises (however this is measured) is unimportant: clearly there is a minimum level of income which a farmer will consider acceptable, which will be related to long run stability for the farm business. Evaluating such thresholds on an enterprise basis is a complex task on a multi-enterprise farm because of the interplay between complementarity and substitution effects at work in the context of a specific set of resources and objectives.

For lowland sheep production, especially, the simple statement of estimated net margins cannot be regarded as a sufficient indicator of enterprise profitability at the farm level. Although, to the economist, efficient production implies the effective use of the available resources so that financial returns to the farm business are maximised, there are other major factors influencing the continuation and even expansion of the sheep enterprise. This study has shown that in 1987/88 the average net margin was negative but that two alternative measures of

income, family income and occupiers' margin (before interest), both provided a positive return. The study also indicated that although good (financial) prospects for the sheep enterprise was the major influence on expansion of the national flock many other factors were also involved including, importantly, land and family considerations. Furthermore, evidence from the more successful flocks indicated that very acceptable net margins were being achieved within the sample, and that this superiority was linked to technical aspects well within managerial influence and control. In this, the study merely restates the findings of innumerable other farm studies over the past half century or more.

Against this background of the study results, what are the current prospects for the sheep enterprise? It is clear that producers' perceptions of the likely future profitability of both the sheep enterprise and alternative enterprises have underpinned the expansion in sheep production in the 1980s. Thus, once the effects of the new sheepmeat regulations are known - in terms of export prospects as well as financial returns - the current slowdown in the rate of expansion may turn out to be either a pause in the long term growth of the national flock or the peak which heralds a decline. This study cannot inform on other enterprises, but does provide a base against which future trends can be judged. It suggests that, given the possibility of export growth, many sheep producers will be well placed to exploit the opportunities available and are sufficiently interested in (and committed to) the sheep enterprise to do so effectively.

APPENDIX I

Supplementary analyses of financial and physical data

Table

1.1	Distribution by flock size group
1.2	Distribution by EC region
1.3	Distribution by gross margin per ewe
1.4	Distribution by gross margin per hectare
1.5	Distribution by margin before overheads per ewe
1.6	Distribution by margin before overheads per hectare
1.7	Distribution by net margin per ewe
1.8	Distribution by net margin per hectare
1.9	Distribution by overall stocking rate
1.10	Distribution by percentage of lambs sold finished
1.11	Summary results per average flock

Table 1.1 Flock output, costs and margins and physical data by flock size group

Flock size (number of ewes)	Under 200	200- 499	500 & over	All flocks
	£ per 100 ewes			
Output				
Lambs	5730	5420	5607	5568
Wool	296	314	324	312
Ewe premium	628	574	572	589
Less flock replacement	-534	-526	-479	-514
Total	6120	5782	6024	5955
Variable costs				
Concentrates	842	794	813	815
Purchased fodder	66	71	95	77
Forage variables	583	503	569	511
Other variables	526	617	619	626
Total	2017	1985	2096	2029
Gross margin	4103	3797	3928	3926
Fixed costs				
Labour - sheep	2367	1721	1380	1799
- forage	110	91	80	93
Rent/rental value	844	818	821	826
Machinery - sheep	291	197	264	245
- forage	234	210	205	215
Overheads	2168	1779	1569	1826
Total	6014	4816	4319	5004
Net margin	-1911	-1019	-391	-1078
Gross margin per adj forage ha £	446	415	440	436
Net margin per adj forage ha £	-208	-111	-44	-119
Flock size	121	315	799	227
Stocking) - grassland (ewes/ha)	11.15	11.54	12.01	11.57
rate) - overall (ewes/ha)	10.87	10.92	11.21	11.00
Nitrogen (kg/grass ha)	80	90	110	90
Concentrates (kg/ewe)	59.6	57.2	59.7	58.7
Labour use (hours/ewe)	6.2	4.6	3.7	4.8
Ewe lambs in flock (%)	9.7	12.1	13.8	11.9
Flock maintenance rate (%)	24.6	21.9	25.3	23.8
Ewe and ewe lamb mortality (%)	4.9	4.7	4.6	4.7
Ewe and ewe lamb performance		% of number put to ram		
Total lambs born	156.3	150.0	151.8	154.4
Lambs weaned	140.4	136.6	142.2	139.5
Productive ewes	91.0	89.7	91.8	90.7
Lamb disposal		% of available lambs		
Post-weaning mortality	1.2	1.5	0.9	1.2
Other lambs sold	16.7	24.4	21.8	21.3
Retained on farm	15.8	13.8	16.4	15.2
Total finished lambs	66.3	60.3	60.9	62.3

Table 1.2 Flock output, costs and margins and physical data by European Community region

EC region	England- North	England- East	England- West	Wales
£ per 100 ewes				
Output				
Lambs	5858	5727	5527	4620
Wool	293	352	306	231
Ewe premium	594	620	568	563
Less flock replacement	-614	-587	-456	-317
Total	6131	6112	5945	5097
Variable costs				
Concentrates	994	995	658	528
Purchased fodder	95	72	88	8
Forage variables	593	518	500	383
Other variables	690	759	535	446
Total	2372	2344	1781	1365
Gross margin	3759	3768	4164	3732
Fixed costs				
Labour - sheep	2064	1749	1673	2040
- forage	111	95	86	85
Rent/rental value	841	869	835	608
Machinery - sheep	152	289	245	267
- forage	223	242	199	182
Overheads	2008	2015	1653	1577
Total	5399	5259	4691	4759
Net margin	-1640	-1491	-527	-1027
Gross margin per adj forage ha £	395	419	453	456
Net margin per adj forage ha £	-172	-166	-57	-126
Flock size	170	286	269	125
Stocking) - grassland (ewes/ha)	11.41	11.55	11.44	12.63
rate) - overall (ewes/ha)	10.51	11.12	10.88	12.23
Nitrogen (kg/grass ha)	95	98	90	57
Concentrates (kg/ewe)	74.3	69.9	47.9	37.5
Labour use (hours/ewe)	5.1	4.8	4.5	5.5
Ewe lambs in flock (%)	15.3	8.8	12.6	13.4
Flock maintenance rate (%)	30.0	25.8	20.8	17.9
Ewe and ewe lamb mortality (%)	5.6	4.4	4.7	4.3
Ewe and ewe lamb performance		% of number put to ram		
Total lambs born	150.2	159.8	152.7	128.4
Lambs weaned	139.9	145.3	138.8	120.9
Productive ewes	87.9	92.0	90.8	91.6
Lamb disposal		% of available lambs		
Post-weaning mortality	1.3	1.2	1.4	0.6
Other lambs sold	20.1	25.1	21.7	5.6
Retained on farm	13.8	10.2	19.0	19.2
Total finished lambs	64.8	63.5	57.9	74.6

Table 1.3 Flock output, costs and margins and physical data by gross margin per ewe

Gross margin per ewe (£)	Under 31.30	31.31- 39.50	39.51- 46.50	46.51 & over
	£ per 100 ewes			
Output				
Lambs	4388	5237	5873	6783
Wool	276	330	310	333
Ewe premium	572	562	582	643
Less flock replacement	-640	-565	-464	-387
Total	4596	5564	6301	7372
Variable costs				
Concentrates	976	833	765	683
Purchased fodder	116	92	36	70
Forage variables	516	497	558	465
Other variables	629	628	612	640
Total	2237	2050	1971	1858
Gross margin	2359	3514	4330	5514
Fixed costs				
Labour - sheep	1748	1862	1796	1791
- forage	100	90	89	95
Rent/rental value	700	765	891	946
Machinery - sheep	218	284	260	215
- forage	237	227	211	186
Overheads	1806	1783	1861	1844
Total	4809	5011	5108	5077
Net margin	-2450	-1497	-778	437
Gross margin per adj forage ha £	287	384	482	548
Net margin per adj forage ha £	-298	-164	-87	43
Flock size	220	227	248	212
Stocking) - grassland (ewes/ha)	12.80	11.65	11.81	10.23
rate) - overall (ewes/ha)	12.17	10.93	11.12	9.94
Nitrogen (kg/grass ha)	105	85	104	74
Concentrates (kg/ewe)	67.6	60.6	56.4	50.2
Labour use (hours/ewe)	4.5	5.0	4.8	4.8
Ewe lambs in flock (%)	15.2	11.6	12.9	7.7
Flock maintenance rate (%)	28.7	22.9	22.5	20.9
Ewe and ewe lamb mortality (%)	6.3	4.6	4.1	3.9
Ewe and ewe lamb performance		% of number put to ram		
Total lambs born	130.7	145.0	161.1	172.8
Lambs weaned	117.4	132.0	148.3	160.3
Productive ewes	87.3	91.1	92.5	92.0
Lamb disposal		% of available lambs		
Post-weaning mortality	1.4	1.5	1.3	0.9
Other lambs sold	28.4	22.3	25.8	10.4
Retained on farm	17.3	15.5	14.8	13.8
Total finished lambs	52.9	60.7	58.1	74.9

Table 1.4 Flock output, costs and margins and physical data by gross margin per forage hectare

Gross margin per forage ha (£)	Under 300	300- 499	500- 699	700 & over
	£ per 100 ewes			
Output				
Lambs	4471	5655	5876	6084
Wool	295	316	324	301
Ewe premium	598	585	571	617
Less flock replacement	-685	-521	-458	-395
Total	4679	6035	6313	6607
Variable costs				
Concentrates	915	807	844	669
Purchased fodder	127	82	56	43
Forage variables	538	559	470	434
Other variables	635	638	625	591
Total	2215	2086	1995	1737
Gross margin	2464	3949	4318	4870
Fixed costs				
Labour - sheep	1872	1818	1771	1720
- forage	90	112	82	71
Rent/rental value	958	961	708	553
Machinery - sheep	280	271	215	194
- forage	228	238	195	181
Overheads	2119	1947	1617	1550
Total	5547	5347	4588	4269
Net margin	-3083	-1398	-270	601
Gross margin per adj forage ha £	218	380	564	827
Net margin per adj forage ha £	-273	-135	-35	102
Flock size	228	223	237	220
Stocking) - grassland (ewes/ha)	9.28	10.25	13.59	17.50
rate) - overall (ewes/ha)	8.84	9.63	13.06	16.98
Nitrogen (kg/grass ha)	62	76	104	120
Concentrates (kg/ewe)	65.8	57.5	61.7	48.5
Labour use (hours/ewe)	5.0	4.8	4.7	4.8
Ewe lambs in flock (%)	14.7	9.7	11.8	14.3
Flock maintenance rate (%)	31.9	20.9	20.4	27.1
Ewe and ewe lamb mortality (%)	6.0	4.3	4.6	4.4
Ewe and ewe lamb performance		% of number put to ram		
Total lambs born	134.2	155.7	148.8	151.2
Lambs weaned	120.3	143.4	143.0	145.9
Productive ewes	87.6	91.5	91.3	91.7
Lamb disposal		% of available lambs		
Post-weaning mortality	1.3	1.2	1.2	1.3
Other lambs sold	34.9	20.1	21.6	10.8
Retained on farm	15.2	17.1	13.6	13.4
Total finished lambs	48.6	61.6	63.6	74.5

Table 1.5 Flock output, costs and margins and physical data by margin before overheads per ewe

Margin per ewe (£)	Under 0	0- 11.60	11.61- 19.50	19.51 & over
£ per 100 ewes				
Output				
Lambs	5218	5169	5793	6248
Wool	290	313	328	321
Ewe premium	575	591	570	620
Less flock replacement	-656	-525	-508	-342
Total	5427	5548	6185	6847
Variable costs				
Concentrates	1046	773	757	645
Purchased fodder	115	66	36	84
Forage variables	628	463	522	427
Other variables	728	599	587	575
Total	2517	1901	1902	1731
Gross margin	2910	3647	4283	5116
Fixed costs				
Labour - sheep	2539	1738	1505	1262
- forage	125	102	74	63
Rent/rental value	903	806	804	782
Machinery - sheep	393	192	226	146
- forage	297	232	165	144
Overheads	2438	1768	1610	1370
Total	6695	4838	4384	3767
Net margin	-3785	-1191	-101	1349
Gross margin per adj forage ha £	300	387	502	608
Net margin per adj forage ha £	-390	-126	-12	160
Flock size	219	236	212	239
Stocking) - grassland (ewes/ha)	11.09	11.06	12.36	12.24
rate) - overall (ewes/ha)	10.30	10.61	11.72	11.88
Nitrogen (kg/grass ha)	96	68	112	95
Concentrates (kg/ewe)	76.5	53.2	55.0	47.8
Labour use (hours/ewe)	6.7	4.5	4.1	3.4
Ewe lambs in flock (%)	11.5	13.4	10.8	11.9
Flock maintenance rate (%)	26.9	22.1	21.6	24.0
Ewe and ewe lamb mortality (%)	5.8	4.7	4.2	4.0
Ewe and ewe lamb performance				
		% of number put to ram		
Total lambs born	142.8	140.9	155.3	159.0
Lambs weaned	129.6	133.0	144.0	155.3
Productive ewes	89.2	91.1	91.3	91.7
Lamb disposal				
		% of available lambs		
Post-weaning mortality	1.5	1.1	1.4	1.0
Other lambs sold	22.6	24.5	20.5	17.1
Retained on farm	13.4	21.2	13.1	12.4
Total finished lambs	62.5	53.2	65.0	69.5

Table 1.6 Flock output, costs and margins and physical data by margin before overheads per forage hectare

Margin per forage ha (£)	Under 0	0- 199	200- 399	400 & over
	£ per 100 ewes			
Output				
Lambs	5239	5417	6107	5881
Wool	291	324	316	308
Ewe premium	581	587	579	657
Less flock replacement	-668	-508	-447	-210
Total	5443	5820	6555	6636
Variable costs				
Concentrates	1045	757	746	524
Purchased fodder	110	67	54	84
Forage variables	633	488	460	359
Other variables	730	598	586	547
Total	2518	1910	1846	1514
Gross margin	2925	3910	4709	5122
Fixed costs				
Labour - sheep	2555	1626	1449	1158
- forage	125	94	70	48
Rent/rental value	902	879	740	548
Machinery - sheep	403	196	196	103
- forage	298	214	162	95
Overheads	2454	1735	1490	1146
Total	6737	4744	4107	3098
Net margin	-3812	-834	602	2024
Gross margin per adj forage ha £	300	393	596	895
Net margin per adj forage ha £	-390	-84	76	354
Flock size	216	235	228	217
Stocking) - grassland (ewes/ha)	11.04	10.50	13.10	18.02
rate) - overall (ewes/ha)	10.24	10.04	12.66	17.47
Nitrogen (kg/grass ha)	96	72	110	106
Concentrates (kg/ewe)	76.2	53.3	55.0	38.0
Labour use (hours/ewe)	6.8	4.3	3.9	3.2
Ewe lambs in flock (%)	10.9	11.7	10.2	22.2
Flock maintenance rate (%)	26.6	21.9	19.6	36.3
Ewe and ewe lamb mortality (%)	5.9	4.5	4.0	4.2
Ewe and ewe lamb performance		% of number put to ram		
Total lambs born	135.9	145.8	153.2	152.5
Lambs weaned	130.0	139.2	148.1	149.3
Productive ewes	89.0	91.5	91.2	91.4
Lamb disposal		% of available lambs		
Post-weaning mortality	1.6	1.1	1.1	1.1
Other lambs sold	21.8	24.6	17.3	14.3
Retained on farm	13.1	17.4	13.4	16.2
Total finished lambs	63.5	56.9	68.2	68.4

Table 1.7 Flock output, costs and margins and physical data by net margin per ewe

Net margin per ewe (£)	Under -19.00	-18.99 -0	0- 8.00	8.01 & over
	£ per 100 ewes			
Output				
Lambs	5387	5360	5820	6058
Wool	301	306	333	322
Ewe premium	595	569	584	625
Less flock replacement	-628	-554	-448	-311
Total	5655	5681	6289	6694
Variable costs				
Concentrates	1051	775	712	614
Purchased fodder	106	63	44	91
Forage variables	630	470	550	374
Other variables	740	611	550	553
Total	2527	1919	1856	1632
Gross margin	3128	3762	4433	5062
Fixed costs				
Labour - sheep	2611	1678	1403	1135
- forage	123	93	85	56
Rent/rental value	927	806	800	734
Machinery - sheep	402	204	159	163
- forage	293	214	172	137
Overheads	2565	1720	1498	1177
Total	6921	4715	4117	3402
Net margin	-3793	-953	316	1660
Gross margin per adj forage ha £	313	406	525	641
Net margin per adj forage ha £	-380	-103	37	210
Flock size	226	225	218	240
Stocking) - grassland (ewes/ha)	10.80	11.21	12.55	12.96
rate) - overall (ewes/ha)	10.02	10.78	11.85	12.66
Nitrogen (kg/grass ha)	74	86	123	89
Concentrates (kg/ewe)	76.5	55.0	50.6	45.8
Labour use (hours/ewe)	6.9	4.4	3.8	3.1
Ewe lambs in flock (%)	10.5	12.0	9.5	16.1
Flock maintenance rate (%)	25.9	22.6	18.8	27.3
Ewe and ewe lamb mortality (%)	5.5	4.8	4.0	4.1
Ewe and ewe lamb performance		% of number put to ram		
Total lambs born	146.1	143.3	158.6	153.2
Lambs weaned	132.4	136.8	146.6	149.6
Productive ewes	89.4	91.2	92.1	90.7
Lamb disposal		% of available lambs		
Post-weaning mortality	1.4	1.2	1.3	1.1
Other lambs sold	20.0	26.4	15.2	18.6
Retained on farm	14.2	17.8	13.7	13.2
Total finished lambs	64.4	54.6	69.8	67.1

Table 1.8 Flock output, costs and margins and physical data by net margin per forage hectare

Net margin per forage ha (£)	Under -200	-200- 0	0- 99	100 & over
	£ per 100 ewes			
Output				
Lambs	5382	5410	5782	5982
Wool	294	316	327	317
Ewe premium	588	577	578	628
Less flock replacement	-669	-536	-428	-298
Total	5595	5767	6259	6629
Variable costs				
Concentrates	1087	756	697	609
Purchased fodder	118	52	65	76
Forage variables	603	505	521	354
Other variables	742	618	546	545
Total	2550	1931	1829	1584
Gross margin	3045	3836	4430	5045
Fixed costs				
Labour - sheep	2612	1671	1414	1141
- forage	119	94	85	56
Rent/rental value	858	848	858	688
Machinery - sheep	390	216	171	148
- forage	289	216	173	138
Overheads	2510	1765	1518	1142
Total	6778	4810	4219	3313
Net margin	-3733	-974	211	1732
Gross margin per adj forage ha £	334	390	490	680
Net margin per adj forage ha £	-409	-99	23	233
Flock size	219	226	228	240
Stocking) - grassland (ewes/ha)	11.85	10.60	11.55	13.85
rate) - overall (ewes/ha)	10.96	10.16	11.05	13.47
Nitrogen (kg/grass ha)	101	73	112	88
Concentrates (kg/ewe)	79.0	53.3	51.4	44.4
Labour use (hours/ewe)	6.9	4.4	3.8	3.1
Ewe lambs in flock (%)	11.1	11.2	10.5	16.6
Flock maintenance rate (%)	27.1	21.6	18.8	28.7
Ewe and ewe lamb mortality (%)	5.6	4.7	3.8	4.2
Ewe and ewe lamb performance		% of number put to ram		
Total lambs born	139.1	144.3	158.5	158.9
Lambs weaned	132.2	137.7	146.4	147.8
Productive ewes	89.1	91.3	92.6	90.2
Lamb disposal		% of available lambs		
Post-weaning mortality	1.4	1.1	1.2	1.2
Other lambs sold	20.6	24.4	17.5	20.1
Retained on farm	12.9	18.5	13.9	13.4
Total finished lambs	65.1	56.0	67.4	65.3

Table 1.9 Flock output, costs and margins and physical data by overall stocking rate

Stocking rate (ewes per forage ha)	Under 9.30	9.31- 11.70	11.71- 15.00	15.01 & over
	£ per 100 ewes			
Output				
Lambs	5990	5690	5273	5313
Wool	326	321	309	290
Ewe premium	612	614	568	560
Less flock replacement	-455	-637	-527	-428
Total	6473	5988	5623	5735
Variable costs				
Concentrates	795	826	805	832
Purchased fodder	106	78	61	64
Forage variables	610	492	483	456
Other variables	672	658	587	590
Total	2183	2054	1936	1942
Gross margin	4290	3934	3687	3793
Fixed costs				
Labour - sheep	1968	1920	1638	1668
- forage	112	101	92	65
Rent/rental value	1213	855	706	511
Machinery - sheep	312	245	202	220
- forage	237	221	223	178
Overheads	2257	1949	1576	1506
Total	6099	5291	4437	4148
Net margin	-1809	-1357	-750	-355
Gross margin per adj forage ha £	319	411	483	688
Net margin per adj forage ha £	-135	-142	-98	-64
Flock size	226	226	240	214
Stocking) - grassland (ewes/ha)	8.05	10.97	13.93	18.94
rate) - overall (ewes/ha)	7.44	10.44	13.11	18.15
Nitrogen (kg/grass ha)	56	76	104	124
Concentrates (kg/ewe)	60.3	60.7	56.0	57.9
Labour use (hours/ewe)	5.3	5.0	4.4	4.5
Ewe lambs in flock (%)	8.4	11.1	11.9	16.6
Flock maintenance rate (%)	21.8	20.9	23.8	28.8
Ewe and ewe lamb mortality (%)	4.3	4.3	4.8	5.5
Ewe and ewe lamb performance		% of number put to ram		
Total lambs born	158.3	157.4	147.6	146.0
Lambs weaned	146.2	143.7	134.2	133.7
Productive ewes	91.6	91.8	90.3	89.2
Lamb disposal		% of available lambs		
Post-weaning mortality	1.2	1.0	1.3	1.4
Other lambs sold	22.1	19.1	22.3	21.4
Retained on farm	13.6	17.2	15.5	14.7
Total finished lambs	63.1	62.7	60.9	62.5

Table 1.10 Flock output, costs and margins and physical data by percentage of lambs sold finished

Lambs sold finished (%)	Under 25.0	25.1- 50.0	50.1- 75.0	75.1 & over
	£ per 100 ewes			
Output				
Lambs	4812	5054	5517	6048
Wool	291	337	330	299
Ewe premium	575	576	564	612
Less flock replacement	-278	-580	-558	-541
Total	5400	5387	5853	6418
Variable costs				
Concentrates	746	673	752	927
Purchased fodder	84	71	69	82
Forage variables	383	466	534	557
Other variables	555	703	599	638
Total	1768	1913	1954	2204
Gross margin	3632	3474	3899	4214
Fixed costs				
Labour - sheep	1526	1959	1730	1870
- forage	81	93	102	93
Rent/rental value	822	808	809	845
Machinery - sheep	144	264	218	287
- forage	206	223	217	215
Overheads	1579	1987	1806	1856
Total	4358	5334	4882	5166
Net margin	-726	-1860	-983	-952
Gross margin per adj forage ha f	419	349	438	467
Net margin per adj forage ha f	-84	-187	-110	-105
Flock size	256	234	242	209
Stocking) - grassland (ewes/ha)	11.82	10.70	11.96	11.63
rate) - overall (ewes/ha)	11.53	10.06	11.24	11.08
Nitrogen (kg/grass ha)	63	78	78	106
Concentrates (kg/ewe)	56.3	48.4	47.4	70.0
Labour use (hours/ewe)	4.0	5.2	4.6	5.0
Ewe lambs in flock (%)	16.0	15.7	11.7	9.2
Flock maintenance rate (%)	32.8	29.3	20.1	20.7
Ewe and ewe lamb mortality (%)	4.4	4.7	5.3	4.5
Ewe and ewe lamb performance		% of number put to ram		
Total lambs born	148.0	145.9	151.8	156.7
Lambs weaned	135.0	132.1	137.8	144.8
Productive ewes	88.1	89.6	90.7	92.1
Lamb disposal		% of available lambs		
Post-weaning mortality	1.2	1.2	1.6	1.1
Other lambs sold	70.9	38.8	13.9	4.6
Retained on farm	16.7	24.1	21.6	8.2
Total finished lambs	11.2	35.9	62.9	86.1

Table 1.11 Flock output, costs and margins and physical data per average flock

	£ per ewe	£ per flock
Output		
Lambs	55.68	12620
Wool	3.12	707
Ewe premium	5.89	1335
Less flock replacement	-5.14	-1164
Total	59.55	13498
Variable costs		
Concentrates	8.15	1847
Purchased fodder	0.77	175
Forage variables	5.11	1158
Other variables	6.26	1419
Total	20.29	4599
Gross margin	39.26	8899
Fixed costs		
Labour - sheep	17.99	4078
- forage	0.93	211
Rent/rental value	8.26	1872
Machinery - sheep	2.45	555
- forage	2.15	487
Overheads	18.26	4139
Total	50.04	11342
Net margin	-10.78	-2443
Gross margin per adj forage ha £		431
Net margin per adj forage ha £		-119
Flock size		227
Stocking) - grassland (ewes/ha)		11.57
rate) - overall (ewes/ha)		11.00
Nitrogen (kg/grass ha)		90
Concentrates (kg/ewe)		58.7
Labour use (hours/ewe).		4.8
Ewe lambs in flock (%)		11.9
Flock maintenance rate (%)		23.8
Ewe and ewe lamb mortality (%)		4.7
Ewe and ewe lamb performance		% of number put to ram
Total lambs born		152.4
Lambs weaned		139.5
Productive ewes		90.7
Lamb disposal		% of available lambs
Post-weaning mortality		1.2
Other lambs sold		21.3
Retained on farm		15.2
Total finished lambs		62.3

APPENDIX II

Background statistics on the sheep sector

Table

- 2.1 Sheepmeat production and trade for the UK, 1979 to 1989.
- 2.2 Wool production in the UK, 1979 to 1989.
- 2.3 Sheepmeat exports from the UK, 1987 and 1988.
- 2.4 Indices of meat purchases for home consumption in GB.
- 2.5 Weekly sheep guide prices in GB, 1988 to 1989.
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- 2.7 Meat and sheepmeat: EC self-sufficiency.
- 2.8 Total sheep numbers in the European Community, 1988.
- 2.9 Sheepmeat production in selected countries, 1987 to 1989.
- 2.10 Breeding sheep numbers in the European Community, 1987 and 1988.
- 2.11 EC annual import quantities of sheepmeat under voluntary restraint agreements.
- 2.12 Forecast sheepmeat production and consumption in the European Community, 1987 to 1990.
- 2.13 Total number of sheep and lambs in England and Wales by EC region, 1979 to 1989.
- 2.14 Number of breeding ewes in England and Wales by EC region, 1979 to 1989.
- 2.15 Number of breeding ewe flocks in England and Wales by EC region, 1979 to 1989.

Table 2.1 Sheepmeat production and trade for UK, 1979 to 1989

	Production	Imports	Exports	Production as % of total new supply
	'000 tonnes			
1979	239	208	48	60%
1980	286	191	47	66%
1981	269	158	48	71%
1982	276	222	49	61%
1983	298	166	54	73%
1984	298	153	58	76%
1985	314	168	59	74%
1986	301	136	72	82%
1987	311	146	91	85%
1988	343	131	97	91%
1989	383	131	110	95%

Source: HMSO, Annual Review of Agriculture; Agriculture in the UK, 1988 and 1989

Table 2.2 Wool production in the United Kingdom, 1979 to 1989

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
	million kg										
Production	48	52	50	50	52	54	58	59	62	67	73
(of which clip)	(35)	(39)	(39)	(38)	(41)	(40)	(41)	(42)	(45)	(49)	(53)
Production as % of total new supply	35%	44%	40%	41%	39%	39%	37%	45%	41%	52%	61%

Source: HMSO, Annual Review of Agriculture; Agriculture in the UK, 1988 and 1989

Table 2.3 Sheep meat exports from UK, 1987 and 1988

Category	1987	1988
	'000 tonnes	
<u>Total mutton and lamb</u>	71.2	76.0
Of which to:-		
France	53.8	56.6
West Germany	2.6	3.1
Belgium/Luxembourg	7.9	8.1
Spain	1.7	1.8
Italy	2.2	2.8
Other EC	0.4	1.3
Total EC	68.6	73.7
Switzerland	2.1	2.0
Other non-EC	0.5	0.3
Total non-EC	2.6	2.3
Mutton	7.6	14.4
Lamb carcasses	61.5	58.5
Lamb cuts	2.1	3.1

Source: Meat and Livestock Commission, Sheep Yearbook 1989

Table 2.4 Indices¹ of meat purchases for home consumption in Great Britain

	1961	1971	1981	1987
Mutton and lamb	150	120	94	59
Beef and veal	112	98	86	83
Pork	47	74	92	77
Poultry	36	73	109	119
All other meat/meat products	98	105	102	98

¹1980=100

Source: HMSO, Social Trends 1989

Table 2.5 Weekly sheep guide prices in Great Britain, 1988 to 1989

Week commencing	p per kg dressed carcass wt* (estimated or actual)	Week commencing	p per kg dressed carcass wt* (estimated or actual)
1988			
Jan 4	245.0	Aug 22	205.7
11	249.7	29	205.7
18	255.4	Sep 5	205.7
24	259.1	12	205.7
Feb 1	263.8	19	205.7
8	267.5	26	206.0
15	269.6	Oct 3	206.0
22	271.1	10	206.2
29	272.7	17	206.5
Mar 7	274.0	24	207.5
14	274.9	31	209.1
21	274.9	Nov 7	210.7
28	274.4	14	213.8
Apr 4	274.0	21	216.8
11	273.7	28	219.9
18	272.5	Dec 5	223.3
25	270.6	12	227.9
May 2	268.4	19	232.5
9	266.1	26	236.0
16	262.5	1989	
23	251.2	Jan 2	234.4
30	244.4	9	238.9
Jun 6	238.1	16	244.3
13	232.0	23	247.9
20	225.8	30	252.4
27	219.6	Feb 6	255.9
Jul 4	214.3	13	257.9
11	209.2	20	259.3
18	207.1	27	260.9
25	206.1	Mar 6	262.2
Aug 1	205.7	13	263.0
8	205.7	20	263.0
15	205.7	27	262.5

*Variable premium payable through this period up to a maximum certified weight of 26.5 kg dw.

Source: Meat and Livestock Commission, Sheep Yearbooks 1988 and 1989

Table 2.6 Sheep Annual Premium Payments, 1985 to 1989

Year	£ per ewe
1985	7.32
1986	5.12
1987	6.24
1988	6.11
1989	6.94

*Given in three separate instalments

Source: Ministry of Agriculture, Fisheries and Food

Table 2.7 Meat and Sheepmeat: EC self-sufficiency

	Meat		Sheepmeat	
	1980	1987	1980	1987
European Community (12)	n.a.	102	n.a.	81
Belgium-Luxembourg	121	130	20	22
Denmark	327	295	0	25
West Germany	89	91	39	49
Greece	73	65	88	88
Spain	97 ¹	97	100 ¹	99
France	97	101	78	62
Ireland	246	275	142	204
Italy	76	42	64	53
Netherlands	208	240	287	233
Portugal	97 ¹	95	100 ¹	90
United Kingdom	76	82	64	84
European Community (10)	100 ²	n.a.	74 ²	n.a.

1 = 1984

2 = 1982

Source: Commission of the EC, The Agricultural Situation in the Community, 1989 Report

Table 2.8 Total Sheep numbers in the European Community, 1988

	'000 head	as % of EC12
European Community (12)	90900	100.0
Belgium	133	0.1
Denmark	73	0.1
West Germany	1414	1.6
Greece	10816	11.9
Spain	20305	22.3
France	10221	11.2
Ireland	4301	4.7
Italy	11457	12.6
Luxembourg	7	..
Netherlands	1320	1.5
Portugal	3035	3.3
United Kingdom	27820	30.6
European Community (10)	67560	74.3

¹December survey

Source: Commission of the EC, The Agricultural Situation in the Community, 1989 Report

Table 2.9 Sheepmeat production in selected countries 1987 to 1989

	1987	1988	1989 ¹
	'000 tonnes		
European Community (12) ²	1001	1043	1082
Australia	592	543	603
Argentina	82	83	86
China	690	800	880
New Zealand ³	610	576	527
USSR ²	905	910	915
United States ²	143	151	155

¹Forecast

²Including goatmeat

³Year ended September

Source: Meat and Livestock Commission, International Meat Market Review No. 5

Table 2.10 Breeding sheep numbers in the European Community, 1987 and 1988¹

	1987	1988	% change
		'000 head	
European Community (12)	64184	67429	+5.1
Belgium	103	107	+3.9
Denmark	57	68	+19.3
West Germany	1003	1021	+1.8
Greece	7019	6900 ²	-1.7 ²
Spain	14588	16570	+13.6
France	7333	7091	-3.3
Ireland	3120	3600	+15.4
Italy	8802	8844	+0.5
Luxembourg	5	5	..
Netherlands	990	1055	+6.6
Portugal	2025	2167	+7.0
United Kingdom	19139	20001	+4.5
European Community (10)	47571	48692	+2.4

¹December

²Estimated

Source: Meat and Livestock Commission, International Meat Market Review
No. 5

Table 2.11 EC annual import quantities of sheepmeat under voluntary restraint agreements

Country	Fresh, chilled or frozen sheepmeat	Live sheep
	tonnes carcase weight equivalent	numbers
Australia	17500	-
New Zealand	245500	-
Argentina	23000	-
Uruguay	5800	-
Bulgaria	1250 ¹	2000
Czechoslovakia	800 ¹	-
Hungary	1150 ¹	10050
Poland	200 ¹	5800
Iceland	600 ²	-
Austria	-	300
Romania	75 ¹	475
Yugoslavia	4800 ¹	200
East Germany	-	2400

¹Fresh or chilled meat only

²of which maximum of 10 per cent fresh or chilled meat

Source: Meat and Livestock Commission, Sheep Yearbook 1989

Table 2.12 Forecast sheepmeat¹ production and consumption in the European Community, 1987 to 1990

	1987	1988	1989 ²	1990 ²
	'000 tonnes			
Production ³	1001	1043	1082	1106
Consumption ⁴	1233	1249	1268	1273
Self-sufficiency (%)	81.2	83.5	85.3	86.9

¹Including goatmeat

²Forecast

³Indigenous

⁴Net of UK stock change

Source: Meat and Livestock Commission, International Meat Market Review No. 5

Table 2.13 Total number of sheep and lambs in England and Wales by EC Region, 1979 to 1989

	'000 at June each year					
	1979	1980	1981	1982	1983	1984
North	5895.3	6167.9	6247.1	6483.0	6681.6	6811.8
East	3067.5	3163.2	3225.1	3318.2	3413.6	3485.3
West	5035.9	5223.3	5394.9	5543.9	5805.4	5800.7
England	14001.6	14554.5	14867.1	15345.1	15900.5	16097.8
Wales	7539.2	7946.7	8134.5	8349.3	8656.7	8942.4
England & Wales	21540.8	22501.2	23001.5	23694.5	24557.2	25040.2

Table 2.13 (cont.)

	'000 at June each year					% change
	1985	1986	1987	1988	1989	1979-1989
North	7040.5	7295.9	7645.2	8163.3	8549.3	+45.0
East	3556.4	3750.2	3950.2	4179.2	4380.7	+42.8
West	5843.5	6184.0	6540.5	6936.8	7467.5	+48.3
England	16440.5	17230.1	18135.9	19279.3	20397.6	+45.7
Wales	9071.4	9403.3	9737.4	10238.2	10696.1	+41.9
England & Wales	25511.8	26633.4	27873.4	29517.5	31093.7	+44.3

Source: Ministry of Agriculture, Fisheries and Food, June census

Table 2.14 Number of breeding ewes in England and Wales by EC Region, 1979 to 1989

	'000 at June each year					
	1979	1980	1981	1982	1983	1984
North	2728.9	2772.4	2822.7	2926.8	3023.8	3066.5
East	1374.4	1381.3	1403.9	1441.4	1495.0	1523.5
West	2347.6	2391.1	2472.7	2553.1	2645.0	2672.0
England	6450.9	6544.8	6699.4	6921.4	7163.8	7262.0
Wales	3779.6	3866.2	3983.7	4093.8	4225.0	4354.8
England & Wales	10230.5	10411.0	10683.0	11015.2	11388.7	11616.7

Table 2.14 (cont.)

	'000 at June each year					% change
	1985	1986	1987	1988	1989	1979-1989
North	3159.4	3264.8	3402.0	3606.8	3793.8	+39.0
East	1549.7	1631.9	1712.9	1819.1	1922.0	+39.8
West	2697.5	2816.1	2975.4	3185.7	3433.8	+46.3
England	7406.6	7712.8	8090.3	8611.6	9149.6	+41.8
Wales	4423.1	4529.5	4663.6	4855.9	5074.1	+34.2
England & Wales	11829.6	12242.3	12753.8	13467.4	14223.7	+39.0

Source: Ministry of Agriculture, Fisheries and Food, June census

Table 2.15 Number of breeding ewe flocks in England and Wales by EC Region, 1979 to 1989

	'000 at June each year					
	1979	1980	1981	1982	1983	1984
North	n.a.	14.871	14.820	15.054	15.229	15.269
East	n.a.	8.797	8.912	9.179	9.532	9.713
West	n.a.	17.023	17.118	17.304	17.505	17.559
England	41.293	40.691	40.850	41.537	42.206	42.541
Wales	16.380	15.750	15.771	15.917	16.035	16.150
England & Wales	57.673	56.441	56.621	57.454	58.301	58.691

Table 2.15 (cont.)

	'000 at June each year					% change
	1985	1986	1987	1988	1989	1979-1989
North	15.554	15.870	16.237	16.639	16.237	+9.2*
East	9.977	10.247	10.636	10.986	10.636	+20.9*
West	17.818	18.273	18.795	19.354	18.795	+10.4*
England	43.339	44.390	45.668	46.979	45.668	+10.6
Wales	16.322	16.508	16.724	17.000	16.724	+2.1
England & Wales	59.661	60.898	62.392	63.979	62.392	+8.2

n.a. = not available

* % change calculated 1980-1989

Source: Ministry of Agriculture, Fisheries and Food, June census

APPENDIX III

Accounting methods and definitions

Flock output

Lambs includes the return for all lambs sold (including those for breeding), together with the value of lambs still on the farm at the end of the costing period. Prices are gross of marketing charges. The cost of store lambs purchased has been deducted in the figure shown.

Wool is the return from the sale of wool from the breeding flock.

Ewe premium is the total payments received in respect of the 1987/88 marketing year.

Flock replacement cost is calculated as the opening valuation of the breeding flock plus purchases less sales and less the closing valuation.

Variable costs

Concentrates are shown separately for purchased feeds (charged at delivered cost to the farmer) and home-grown cereals (valued at appropriate market prices).

Bulk feed is shown separately as purchased bulk feed (charged at delivered cost to the farmer) and other fodder, including straw (valued at appropriate market prices).

Forage variable costs are fertilisers, seed, sprays, contract charges and such sundries as baler twine and silage additives. These costs relate to grazing, conserved grass and other home-grown fodder.

Other livestock costs include commission and marketing charges. Haulage, veterinary charges (including fees, drenches, vaccines and dip) and miscellaneous variable costs are shown separately.

Gross margin is enterprise output less total variable costs.

Fixed costs

Sheep labour refers to the time spent on the breeding flock and includes all manual labour, including contract and seasonal, used during the year in tending, feeding and shepherding the flock and its 1987/88 lamb crop. Employed labour was charged at the actual rate paid by the farmers. Unpaid family labour (including any manual work performed by the farmer and spouse) was charged at the equivalent rate for hired workers.

Forage labour represents the work involved in grassland and other forage production and conservation, adjusted to include only the share attributable to the breeding flock and its progeny.

Rent/rental value includes the rent and/or the rental value of all hectares used by the breeding flock and its progeny.

Machinery costs refer to depreciation and repairs of (i) all specific sheep equipment and (ii) machinery used for grassland and conservation. Repair costs for such field equipment were based on standards derived from the Farm Business Survey. Tractors were costed at hourly rates appropriate to their engine size.

Margin before overheads is gross margin less total fixed costs. It represents the margin available to cover a share of general farm overheads (electricity, office expenses, professional fees etc) and to provide a reward to management and a return on the tenant's capital invested in the sheep enterprise.

Overheads include imputed costs for overhead labour and machinery and for general overheads, which includes electricity, office expenses, accountancy charges and general sundries. These costs were obtained from an analysis of Farm Business Survey data.

Net margin is the difference between total output and total costs and represents the sum of the reward to management and the return on tenant's capital invested in the sheep enterprises.

Family income is net margin (the management and investment income of the enterprise) plus the value of the manual labour of the farmer and spouse and other unpaid family labour.

Occupiers income is family income less the value of unpaid labour (other than that of farmer and spouse) plus actual rent paid.

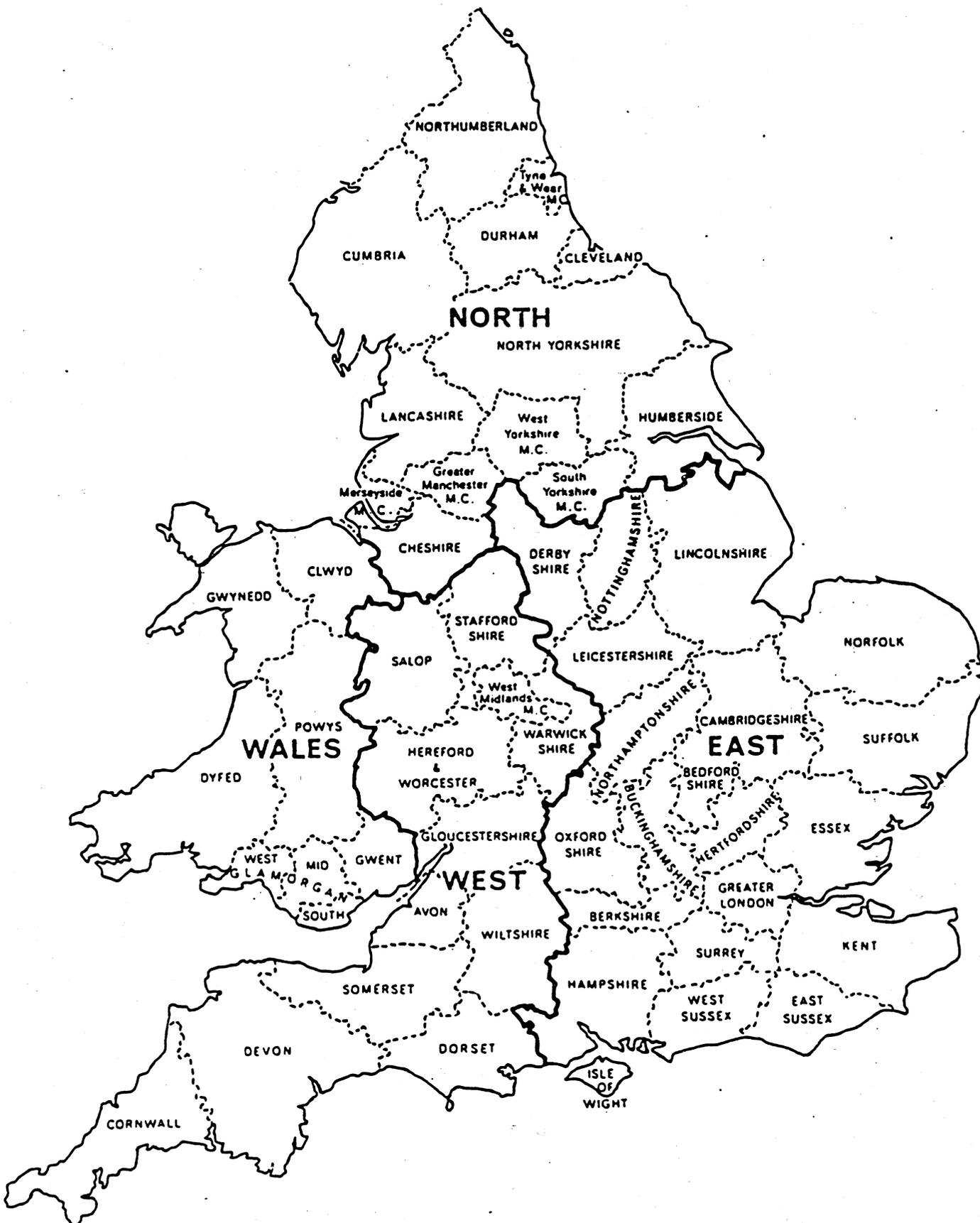
Physical indicators of efficiency

Stocking rate is calculated using (i) the total share of the grassland area attributable to the breeding flock and progeny, allowing for usage of grazing, hay and silage, and (ii) including also the flock share of fodder crops grown on the farm.

Flock maintenance rate is total flock disposals (sales, deaths and transfers out) as a percentage of the number of ewes and ewe lambs put to the ram.

Ewe and ewe lamb mortality is deaths as a percentage of the numbers put to the ram.

European Community regions, the basis for the regional analyses in this report. The regional boundaries are shown below.



Regional boundaries

APPENDIX IV

Reports on special studies in agricultural economics

Special Studies in Agricultural Economics is a new series of economic reports on agriculture and the rural economy. Similar reports in the past have been published in the series Agricultural Enterprise Studies in England and Wales. The most recent publications are listed below. A complete list is available from Economics (Farm Business) Division, Ministry of Agriculture, Fisheries and Food, Whitehall Place (West), London, SW1A 2HH.

Agricultural Enterprise Studies in England and Wales

- | | | | |
|-----|---|----------------|-------|
| 8 | Lowland Sheep: An economic analysis of lamb production 1970
W J K Thomas
University of Exeter | December 1971 | £0.30 |
| 57 | Lowland Sheep: Economics of lamb production in England 1976
W J K Thomas
University of Exeter | December 1977 | £1.00 |
| 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 |
| 87 | Lowland Sheep: Aspects of lamb production in England and Wales 1981-82
W J K Thomas
University of Exeter | October 1983 | £2.50 |
| 100 | Potatoes in Surplus
W L Hinton
University of Cambridge | September 1987 | £6.00 |
| 101 | UK Cereals, 1985-86: Part I - Production Economics
J G Davidson
University of Cambridge | November 1987 | £6.00 |
| 102 | Pig Management Scheme Results for 1987
R F Ridgeon
University of Cambridge | December 1987 | £3.00 |
| 103 | Pig Production in South West England 1986-87
Andrew Sheppard and Estelle Burnside
University of Exeter | February 1988 | £3.00 |

Special Studies in Agricultural Economics

- | | | | |
|---|---|----------|-------|
| 1 | Very Small Farms: An Economic Study
D J Ansell, A K Giles and J R Rendell
University of Reading | May 1988 | £6.00 |
|---|---|----------|-------|

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|----|---|---------------|-------|
| 2 | Pig Management Scheme Results 1988
R F Ridgeon
University of Cambridge | January 1989 | £4.00 |
| 3 | Profits and Losses from Beef Production
1986/87: An Economic Survey of Lowland
Beef Enterprises
John Farrar, David Colman, Bill Richardson
University of Manchester | February 1989 | £7.50 |
| 4 | Pig Production in South West England 1987/88
Andrew Sheppard
University of Exeter | February 1989 | £4.00 |
| 5 | Very Small Farms: A Neglected Component?
D J Ansell, A K Giles and J R Rendell
University of Reading | May 1989 | £6.00 |
| 6 | UK Cereals, 1985/86: Part II - Marketing
J G Davidson
University of Cambridge | May 1989 | £6.00 |
| 7 | Pig Management Scheme Results 1989
R F Ridgeon
University of Cambridge | January 1990 | £5.00 |
| 8 | Pig Production in South West England 1988/89
Andrew Sheppard
University of Cambridge | February 1990 | £5.00 |
| 9 | Economics of Very Small Farms: A Further Look
D J Ansell, A K Giles and J R Rendell
University of Reading | May 1990 | £6.00 |
| 10 | Economics of Beef Production: A Survey of
Lowland Beef Enterprises 1987/88
John Farrar
University of Manchester | May 1990 | £7.50 |

APPENDIX V

Provincial centres of agricultural economics

Province	Agricultural Economist
Northern (NEWCASTLE)	Professor D R Harvey BSc MA (Econ) PhD Department of Agricultural Economics and Food Marketing University of Newcastle upon Tyne NEWCASTLE UPON TYNE NE1 7RU Telephone: 091 222 6000
North Eastern (ASKHAM BRYAN)	M D Pollard NDA SDDH Principal Askham Bryan College of Agriculture and Horticulture Askham Bryan YORK YO2 3PR Telephone: 0904 702121
North Western (MANCHESTER)	Professor D R Colman BSc MS PhD Department of Agricultural Economics The University MANCHESTER M13 9PL Telephone: 061 275 4793
East Midlands (NOTTINGHAM)	M F Seabrook BSc PhD Department of Agriculture and Horticulture School of Agriculture University of Nottingham Sutton Bonington LOUGHBOROUGH Leics LE12 5RD Telephone: 0602 484848
Eastern (CAMBRIDGE)	I M Sturgess MA MS Agricultural Economics Unit Department of Land Economy University of Cambridge 19 Silver Street CAMBRIDGE CB3 9EL Telephone: 0223 337147
South Eastern (WYE)	Dr J P G Webster BSc PhD Dip FBA FBIM Farm Business Unit Department of Agricultural Economics Wye College (University of London) ASHFORD Kent TN25 5AH Telephone: 0233 812401

Province	Agricultural Economist
Southern (READING)	Professor A K Giles BSc (Econ) FBIM Department of Agricultural Economics and Management University of Reading 4 Earley Gate Whiteknights Road PO Box 237 READING RG6 2AR Telephone: 0734 318966
South Western (EXETER)	Professor J P McInerney BSc PhD Dip Ag Econ NDA Agricultural Economics Unit University of Exeter Lafrowda House St German's Road EXETER EX4 6TL Telephone: 0392 263839
East of Scotland (EDINBURGH)	Dr N B Lilwall BSc MA PhD East of Scotland College of Agriculture Rural Resource Management Department 42 South Oswald Road EDINBURGH EH9 2HH Telephone: 031 662 4395
North of Scotland (ABERDEEN)	Dr G E Dalton BSc MSc PhD Economics Division School of Agriculture 581 King Street ABERDEEN AB9 1UD Telephone: 0224 480291
West of Scotland (AUCHINCUIVE)	M Buckett BSc MSc FRAGS CBIOL MIBIOL West of Scotland College AUCHINCUIVE Ayr KA6 5HW Telephone: 0292 520331
Wales (ABERYSTWYTH)	Professor D I Bateman MA Department of Economics and Agricultural Economics University College of Wales Rural Science Building Penglais ABERYSTWYTH SY23 3DD Telephone: 0970 623111
Northern Ireland (BELFAST)	Economics and Statistics Division Department of Agriculture for Northern Ireland Dundonald House Upper Newtownards Road BELFAST BT4 3SB Telephone: 0232 650111

Provincial centres of agricultural economics

