AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

AESEW

Rept #88

University College of Wales

Coleg Prifysgol Cymru

Department of Agricultural Economics

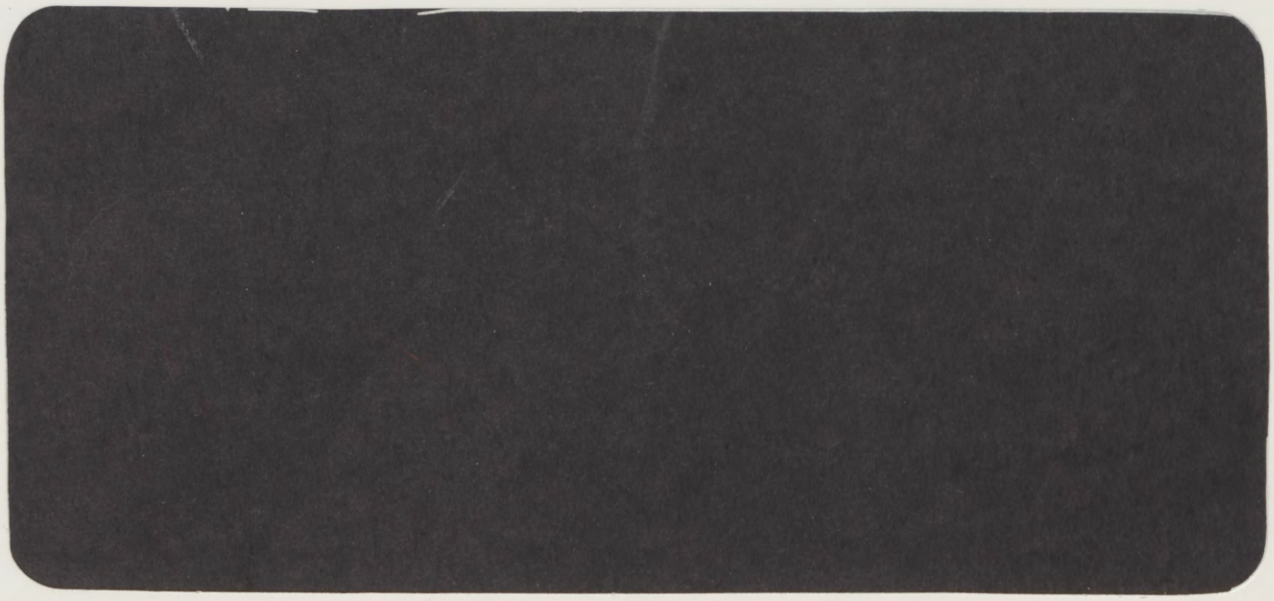
Aberystwyth

Adran Economeg Amaethyddol

GIANNINI FOUNDATION OF AGRICULTURAL ECONOMICS LIBRARY

WITHDRAWN

MAR 20 1984



AESEW

Rept #88

University College of Wales

Coleg Prifysgol Cymru

Department of Agricultural Economics

Aberystwyth

Adran Economeg Amaethyddol

GIANNINI FOUNDATION OF AGRICULTURAL ECONOMICS LIBRARY

WITHDRAWN

MAR 20 1984

HILL AND UPLAND CATTLE AND SHEEP FARMING IN WALES

T.N. Jenkins

Agricultural Enterprise Studies in England and Wales: Economic Report No.88

1983

AGRICULTURAL ENTERPRISE STUDIES IN ENGLAND AND WALES

University department 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. This community of interest is recognised by issuing enterprise studies reports prepared and published by individual departments in a common series entitled "Agricultural Enterprise Studies in England and Wales".

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

INTRODUCTION

This study of hill and upland cattle and sheep farming in Wales was conducted within the framework of the Farm Management Survey. The data used are those supplied annually by cooperating farmers together with some additional information made available by the majority of those cooperators who undertake cattle and sheep rearing activities in the hill and upland regions.

The author would therefore like to thank first and foremost those farmers whose willingness to provide information on their farm businesses is so vital to the Farm Management Survey and to supplementary studies of particular enterprises. Grateful acknowledgement is also made to the staff of the Farm Management Survey section of this Department who were primarily responsible for the collection and processing of the data supplied.

Methodological Note

A constant difficulty with studies of this nature lies with the presentation of aggregated farm results. For example, in the presentation of calculated figures, such as ratios, stocking densities, or financial results per animal or per hectare, the researcher is faced with two options:

- either the figures for individual farms can be calculated separately, and the averaged results of such calculations presented;
- or the data for individual farms can be averaged and the calculated result of such averages presented.

The first approach, by averaging individual farm results, gives equal weight to each farm and effectively ignores the fact that the farms are of different size in terms of the feature under study. The second approach, by averaging individual farm data, weights each farm according to its size in terms of the feature under study but effectively ignores differing performance levels by the individual farms. Both approaches may be valid depending on the use to be made of the results, but equally the approaches may give very different results where performance is dependent on farm size. In this study, where appropriate, both approaches are used and indicated in footnotes and in the text.

List of Tables

Terms and Definitions

Adjusted rough grazing:	rough grazing converted to its pasture equivalent from a subjective estimation of its stock-carrying capacity.
Effective area:	agricultural area with all rough grazing adjusted.
Enterprise output:	the gross returns to an enterprise from the output of its products, taking into account stock purchases, direct subsidies, and valuation adjustments.
Fixed Costs:	costs incurred by the farm but not specifically allocatable to individual enterprises singly.
Forage area:	the area of the farm available for the feeding of livestock, including grazing, grass conservation and fodder crops.
Forage variable costs:	variable costs directly incurred in the maintenance of the forage area.
Gross Margin:	enterprise outputs less variable costs.
Livestock units (lsu):	weights given to livestock to make them comparable in the calculation of overall stocking rates: beef cows - 0.75; bulls - 0.65; cattle >2yrs 0.80; cattle 1-2yrs - 0.65; calves - 0.34; hill ewes - 0.06; upland ewes - 0.08; rams - 0.08; sheep >1yr 0.08; store lambs <1yr - 0.04.
Management & Investment Income (MII):	enterprise outputs less all costs.
Net Farm Income (NFI):	MII plus the value attributed to the manual labour input of the farmer and spouse.
Rental value:	the value attributed to owner-occupied land to make an owner-occupier's costs comparable with a tenant farmer's.
Tenant's Capital:	the capital normally put up by a tenant rather than a landlord. Return on tenant's capital is MII expressed as a percentage of tenant's capital.
Variable costs:	costs incurred in the carrying on of a specific farm enterprise.

CHAPTER I

THE SAMPLE

This report is largely based on data for an identical sample of 118 cattle and sheep rearing farms in the less favoured areas of Wales for the years 1980/81 and 1981/82*. Attention is confined to farms on which other enterprises (such as dairying) are non-existent or relatively insignificant in terms of contribution to the farm business.

For the purposes of analysis, the farms are divided into 'hill' and 'upland' categories according to criteria which, while essentially arbitrary, are considered appropriate to Wales. Thus, for a farm to be classed as a 'hill' farm, at least three out of the following four criteria have to be satisfied:

(i) all breeding ewes receive the higher rate of Hill Livestock Compensatory Allowance (HLCA) (currently £6.25 per ewe)

(ii) rough grazings account for at least 83% of the total farm area

(iii) at least 50% of the total grazing livestock units are accounted for by sheep

(iv) the overall stocking density on the farm measures at least two hectares per grazing livestock unit.

---

* On occasions, the data are supplemented by more detailed coverage of a smaller sample (around 70) of similar farms carried out in 1978/79. Where this earlier survey is drawn upon, appropriate reference is made in the text.

Where a farm satisfies less than three of these criteria and yet is situated at least partly in areas designated 'less favoured' (LFA), it is classed as 'upland'.

Accordingly, the sample of 118 farms is structured as in Table 1 in terms of type and size of business.*

Table 1. The Structure of the Sample, 1981/82

Farm type: / Farm size:	Hill farms		Upland farms		All types
	LFA sheep	LFA cattle and sheep	LFA sheep	LFA cattle and sheep	
< 4 ESU	-	-	-	2	2
4- 7.9 ESU	4	2	6	23	35
8-15.9 ESU	9	6	-	40	55
16-23.9 ESU	4	3	1	8	16
24-39.9 ESU	1	-	2	7	10
All sizes	18	11	9	80	118

The majority of hill farms (62%) specialized in sheep although a significant proportion had substantial cattle enterprises. Few of the upland farms were sheep specialists, and two-thirds of those which did were relatively small farms in terms of business size. As far as size is concerned, the sample is heavily weighted towards the small family farm. Of the 29 hill farms, 27 were situated entirely within the LFA: of the 89 upland farms, 77 were wholly within the LFA and 12 had land partly inside and partly outside the LFA boundary.

The area of agricultural land covered by the sample was split fairly equally between hill farm land and upland farm land. On average, the hill farms were some one and a half times as large as the upland farms in terms of effective agricultural area. The use of the land on the sampled farms

* Full details of the type and size categories used are to be found on pp.4-5 of 'Welsh Agricultural Statistics Supplement 1980/81' published by Welsh Office, 1983.

Table 2. Land Use on the Sampled Farms, 1981/82

	Hill farms	Upland farms
Number of farms in sample	29	89
	ha.	ha.
Total agric. area[1] on sampled farms	10,005	9,930
Total effective area[2] on sampled farms	4,640	9,360
	%	%
of which: cereals	0.2	1.5
roots & fodder	1.2	2.2
hay	6.1	11.1
silage	1.8	7.7
pasture	33.1	51.0
rough grazing[3]	57.6	26.5

(1) Excluding common grazings.

(2) Including adjusted common grazings.

(3) Adjusted, both common and under sole occupation.

is outlined in Table 2, where crops and the conservation of grass can be seen to play a considerably more important role on upland than on hill farms. The proportion of grass cut for silage as opposed to hay was considerably higher on upland farms, although hay remained the predominant method of conservation overall. Rough grazing land formed a substantial proportion of agricultural area for many of the sampled farms - 80% on average for the hill farms and 30% for the upland farms. The rough grazing shown in Table 2 includes an estimate of the use made of common grazing: in fact, none of the hill farms made use of common grazing land, although 31 of the 89 upland farms did so, thereby often adding substantially to their effective hectarage.

The sampled farms taken together in 1981/82 maintained herds containing around 3,370 beef cows and flocks containing

Table 3. Stocking on the Sampled Farms

	Hill farms		Upland farms	
	1980/81	1981/82	1980/81	1981/82
Average number of beef cows per farm	22.7	22.6	29.9	30.5
Average number of cattle livestock units per farm (1)	33.8	32.4	47.2	47.3
Average number of breeding ewes (2) per farm	1012.7	1027.3	590.2	613.4
Average number of sheep livestock units per farm	83.0	82.5	51.3	54.0
Ratio of sheep lsu to cattle lsu:				
overall (3)	2.5	2.5	1.1	1.1
average per farm (4)	2.6	2.8	1.3	1.3
Ratio of total grazing lsu (5) to total area (6):				
overall (7)	0.3	0.3	0.6	0.6
average per farm (8)	0.4	0.4	0.8	0.8

(1) Excl. dairy cows

(2) Inc. ewe lambs

(3) Overall ratio of total sheep lsu to total cattle lsu on sampled farms

(4) Average of the ratios for individual farms, where both sheep and cattle lsu are of significance (i.e. both at least 10 lsu)

(5) Incl. any dairy cattle and horses

(6) Incl. common grazings

(7) Overall ratio of total grazing lsu to total area on sampled farms

(8) Average of the individual farm ratios.

around 84,400 breeding ewes and ewe lambs. Details of the stocking are given in Table 3, where the emphasis on sheep enterprises on hill farms is clearly in evidence. The higher ratio of sheep to cattle livestock units when averaging individual farm ratios may reflect the tendency for the larger farms to maintain higher proportions of beef cattle than the smaller farms which have a higher propensity to specialize in sheep. Similarly, the higher stocking density figure obtained when averaging individual farm results shows the tendency for smaller farms to stock more heavily than the larger. Stocking densities on upland farms were generally twice those observed on hill farms. Between the two years 1980/81 and 1981/82, there was an increase in the size of the breeding ewe flock of 3.9 per cent on the upland and 1.4 per cent on the hill farms: unlike on the hill farms, however, this was accompanied on the upland farms by an increase in total sheep numbers (including stores).

The family-farm character of the majority of farms in the sample may be inferred from Table 4. Over half the manual labour input is that of the farmer and spouse, and much of the remainder that of unpaid (normally close family) workers. Payments to hired workers represent a small expense for most of the farms: the average wage bill for the 118 farms in the sample amounted to £974 in 1981/82.

Table 5 shows the tenure position of the farms in the sample. Overall, 72% of the farm land covered by the sample was owner-occupied and 58% of the farms were wholly owned by their occupiers. The incidence of tenancy was much lower among the upland than among the hill farms - this probably reflects the ownership of large tracts of rough land by the hill farmers.

Table 4. Labour Characteristics on the Sampled Farms, 1981/82

	Hill farms	Upland farms
Percentage of total labour costs[1] attributable to:		
paid labour	13.5%	10.8%
unpaid labour	86.5%	89.2%
of which: farmer & spouse	58.9%	55.1%
other unpaid	27.6%	34.1%

(1) The costs attributed to unpaid labour are at the appropriate rate of comparable paid labour.

Table 5. Tenure Characteristics of Sampled Farms, 1981/82

	Hill farms	Upland farms
Percentage of total farm land		
owner-occupied	58.2%	85.3%
tenanted	41.8%	14.6%
Percentage of farms		
wholly owner-occupied	52%	61%
wholly tenanted	28%	10%
mixed	21%	29%

CHAPTER 2

THE BEEF HERDS IN THE SAMPLE

This chapter focusses exclusively on the beef cattle herds on the sampled farms. All but one of the 118 farms in the sample maintained beef cattle in some form in 1981/82, and 111 farms received the hill livestock compensatory allowance on all or the majority of their breeding cows. The herds could be classified as in Table 6. While the

Table 6. Classification of the Beef Herds in the Sample

Herd type:	Hill herds	Upland herds
Single suckling, spring calving selling predominantly weaned calves	8	5
Single suckling, autumn calving selling predominantly stores	5	10
Single suckling, spring and autumn calving, selling weaned calves, stores and fat cattle	12	41
Mixed single and multiple suckling	1	23
Buying and selling stores	-	2
Mixed breeding and fattening	3	5
Unclassified	-	2
All types	29	88

majority of the beef enterprises were breeding rather than fattening or mixed breeding and fattening enterprises, it should be noted that many farmers made use of the markets in a minor and speculative way, opportunity and resources permitting, to buy store cattle for future sale as either more advanced stores or as finished animals. In fact, as Table 6 shows, flexibility in calving and in selling is characteristic of the beef enterprise, with 45 per cent of the farms classified in the third category.

Table 7. Cattle Breeds, 1978/9 Sample

Breed	% of beef cows on sampled farms	No. of bulls on sampled farms
Pure Welsh Black	50.6	21
Welsh Black crosses(1)	8.1	1
Pure Hereford	7.4	24
Hereford crosses(2)	19.3	1
Pure Friesian	7.1	-
Friesian crosses(3)	1.0	-
Galloway/Galloway crosses	4.1	1
Angus/Angus crosses	1.2	-
Charolais/Charolais crosses	0.7	5
Other	0.5	1

(1) Almost entirely Welsh Black X Hereford.

(2) Almost entirely Hereford X Friesian and Hereford X Welsh Black.

(3) Mostly Friesian X Hereford.

Table 7 shows the distribution of the beef herd by breed on the farms sampled in 1978/79. Welsh Black (particularly) and Hereford types predominated among the cows although the use of Friesian cows was fairly widespread. The incidence of Galloways was exaggerated to the extent that one sizeable herd accounted for the majority. The use of Charolais bulls was starting to become noticeable, although Hereford and Welsh Black bulls remained favourites. On farms

practising A.I., the Hereford bull was used by fifty per cent of farmers, with the Welsh Black and Charolais sharing most of the remaining inseminations.

Calving rates are given in Table 8. The average per farm figures need to be viewed with some caution, since the allocation of calf births between years may not have been even on individual farms whose calving index was less than 365 days and where the accounting year end fell during a peak calving time. The overall calving rates were surprisingly low in both of the years under consideration, and no clear correlation between calving rates and herd size was apparent.

Table 8. Calving Rates[1] on the Sampled Farms

	Hill farms		Upland farms	
	1980/81	1981/82	1980/81	1981/82
Overall[2]	84.7	81.3	84.9	83.7
Average per farm[3]	88.5	81.3	81.6	82.1

(1) Number of beef calves reared per 100 breeding beef cows.

(2) Overall rate for the total calf and cow numbers on the sampled farms.

(3) Average of the rates for individual farms.

Table 9. Distribution of Calf Births, 1978/79 sample

Months	% of total calves born
September-November	18.8
December-February	25.5
March-May	43.2
June-August	12.5

Table 9, drawing on data collected for the 1978/79 survey, shows the distribution of calf births during that year on Welsh hill and upland farms. Spring calving predominated, and over two-thirds of all births occurred during the six months December to May.

Table 10 presents the basic financial results for the beef herds in the sample on a per hectare basis. The area taken is the effective forage hectarage utilized for the beef cattle herd on the farms concerned - land used for dairy herds and sheep flocks too is apportioned to the relevant enterprises on the basis of the grazing livestock units found in each enterprise. The per hectare results were strikingly different as between hill and upland farms, particularly on the output side with overall enterprise outputs in both years being 43% lower on hill than on upland farms. Cost differences were less pronounced, with variable costs some 15 or 16% lower on hill farms and forage costs showing a less consistent pattern.

Between the two years covered, enterprise outputs and gross margins showed considerable increases. On the hill farms, average per farm enterprise output rose by 25 per cent and led, despite cost increases, to a 29 per cent rise in gross margin per hectare after deducting forage costs. Comparable figures for the upland farms were a 30 per cent increase in enterprise output and a 43 per cent increase in gross margin after forage, such that the discrepancy in the returns per hectare between hill and upland herds rose fairly substantially.

Comparison of the overall beef herd results with the per farm results in Table 10 suggests that in general there may have been a tendency for the smaller hill herds to obtain higher enterprise outputs than the larger hill herds but also incur higher levels of variable costs, such that their gross margins before forage were lower on a per hectare basis. However, these smaller hill herds incurred lower forage variable costs than the average. In the case of upland cattle herds, there may have been a slight tendency for expenditure on forage costs in general to be higher with small herds, such that gross margins per hectare were considerably lower than with the larger upland cattle herds. It should be stressed however, that none of these correlations with herd size proved significant in a statistical sense.

Table 10. Beef Enterprise Financial Results[1]

	Hill farms		Upland farms	
	1980/81	1981/82	1980/81	1981/82
	£ per forage ha.			
Overall[2]				
Enterprise output	122.89	153.65	216.49	271.49
Variable Costs	45.38	53.46	54.28	63.25
Gross Margin before forage costs	77.50	100.18	162.22	208.23
Forage variable costs	19.57	28.70	22.20	16.69
Gross margin after forage costs	57.93	71.48	140.01	191.55
Per farm[3]				
Enterprise output	123.17	154.21	213.75	277.78
Variable costs	49.42	58.82	63.85	77.36
Gross margin before forage costs	73.76	95.39	149.90	200.42
Forage variable costs	17.92	23.22	23.14	18.66
Gross margin after forage costs	55.84	72.17	126.76	181.77

(1) Results are given per effective forage hectare attributed to beef cattle, with rough grazings, both common and under sole occupation, adjusted.

(2) Overall results using the total output and cost figures on the sampled farms.

(3) Average of the results for individual farms.

Table 11 shows the composition of the total variable costs attributable to the beef cattle herds in the sample. The predominant item for both hill and upland farms was bought-in concentrate feed — upland farms were able, however, to produce a considerably higher proportion of their requirements of hay, straw and silage. Forage costs accounted for a much higher proportion of the total on hill farms: this reflects the fact that their sheep are more likely to be grazed on unimproved rough land, leaving the improvable lower pasture more exclusively to the beef cattle herd. Veterinary expenditure and 'other costs' were generally considerably higher on upland farms, possibly suggesting a more committed attitude to their herds by the farmers concerned.

Table 11. Composition of Beef Enterprise Variable Costs, 1981/82

	Hill farms	Upland farms
Purchase concentrates	35.6%	41.4%
Purchased bulk feeds and bedding	20.1%	9.4%
Feeds and bedding produced on farm	2.5%	13.1%
Forage variable costs	34.9%	20.9%
Stock keep hired	0.4%	0.6%
Veterinary fees and medicines	3.7%	7.6%
Other(1)	2.8%	7.1%

(1) Incl. cattle insurance, service fees, cattle haulage expenses

Table 12. Composition of Beef Enterprise Output, 1981/82

	Hill farms	Upland farms
Store cattle <1 yr	29.3%	12.4%
Store cattle ≥1 yr	43.8%	39.6%
Fat cattle	5.1%	22.8%
Bulls and cows	13.1%	8.2%
Total sales less purchases	75.1%	64.3%
Direct subsidies	15.6%	12.1%
Herd valuation increase	9.3%	23.6%

Table 12 provides a breakdown of the total enterprise output yielded by the beef herds in the sample. The considerable output difference between herds on hill and upland farms shown in Table 10 was at least partly associated with the higher proportion of output from the sale of fat cattle on the upland farms. While the production of older stores formed the backbone of the beef output from both hill and upland farms, calves under one year old were considerably more prominent in the sales off the hill farms.

The 1978/79 survey revealed an almost total preference by the farmers concerned for the use of auction markets for the sale of all categories of beef herd stock, as shown in Table 13. Such preferences no doubt reflect motives which are more than purely economic.

Table 13. Farmer Preferences in the Marketing of Beef Cattle, 1978/79 Sample

Market outlet	Number of preferences for: Suckler calves	Older cattle	Cull cows
Auction sales	48	55	55
Sales to marketing groups	-	3	1
Private sales to dealers, other farmers, butchers, etc.	2	5	2
No preference(1)	19	6	11

(1) Including those making no sales in 1978/79.

CHAPTER 3

THE SHEEP FLOCKS IN THE SAMPLE

All 118 farms in the sample maintained sheep flocks in 1981/82. On the hill farms, all flocks were eligible for the higher rate of hill livestock compensatory allowance while on the upland farms the picture was more mixed with two-thirds of farms receiving the higher rate on all eligible ewes, another twenty per cent receiving the lower rate on all eligible ewes, and the remainder receiving a mixture of both subsidy rates.

Table 14. Sheep breeds, 1978/9 Sample

Breed type	% of breeding ewes on sampled farms	% of rams on sampled farms
Welsh Mountain types	80.0	66.9
Speckled face types	16.2	12.4
Halfbred types	3.6	-
Suffolk/Suffolk cross	0.2	11.7
Chevoit/Cheviot cross	-	6.0
Border Leicester	-	2.0
Other	-	0.9

Table 14 provides a breakdown of the sheep breeds encountered during the 1978/79 survey. While numerous variations, some regional, occur, the Welsh Mountain breeds taken as a whole were predominant amongst both ewes and rams, although in the case of rams a wide variety of breeds were found in fairly small numbers.

Table 15 shows the lambing rates on the farms in the sample. The lamb cropsinvolved are those for Spring 1980 and Spring 1981 respectively. The pattern between years was

Table 15. Lambing Rates[1] on the Sampled Farms

	Hill farms		Upland farms	
	1980/81	1981/82	1980/81	1981/82
Overall[2]	89.0	86.9	96.1	99.2
Average per farm[3]	90.6	88.8	98.9	101.3

(1) Number of lambs reared per 100 ewes and ewe lambs put to the ram.

(2) Overall rate for the total ewe and lamb numbers on the sampled farms.

(3) Average of the rates for individual farms.

inconsistent, with the hill farm rates falling and the upland farm rates rising between 1980 and 1981. Differences between hill and upland farms were quite pronounced. On both types of farm there was a slight tendency for the smaller farms to achieve on average slightly better lambing rates: the relevant correlations are set out in Table 16.

Table 17 compares the lambing rates observed in 1980/81 and 1981/82 with the figures obtained from the 1978/79 sample, and suggests improving performance in recent years.

Table 16. Correlation of Lambing Rates with Flock Size

	Hill farms		Upland farms	
	1980/81	1981/82	1980/81	1981/82
r	-0.22	-0.27	-0.24	-0.17
significance of r	0.13	0.08	0.01	0.05

Dependent variable: no. of lambs reared per 100 ewes and ewe lambs put to the ram

Independent variable: no. of ewes and ewe lambs put to the ram.

Table 17. Lambing rates - 1978/9 to 1981/2

	All farms		
	1978/79	1980/81	1981/82
Overall	87.5	93.6	94.9
Average per farm	89.7	96.8	98.2

Table 18 presents the basic financial results for the sheep flocks in the sample on a per hectare basis. The area taken is the effective forage hectarage used by the sheep flocks on the farms concerned. As with the beef enterprise results of Table 10, the difference in returns to land between flocks on hill and upland farms is striking: output in both years was over 40% lower on hill than on upland farms, and, although total variable costs were substantially higher on upland farms, this was reflected in post-forage gross margins which were lower for the hill farms by 43 per cent in 1980/81 and 46 per cent in 1981/82.

Again as with the beef enterprise results, substantial increases in outputs and gross margins between the two years covered were apparent for the sheep enterprises in the sample. The increase was particularly substantial for the upland farms, with the overall enterprise output figure rising by 29 per

cent and the gross margin after deducting forage costs rising by 35 per cent. As with the beef enterprises, such percentage increases were not entirely matched by the hill farms, whose output and gross margin rose by some 27 per cent.

Table 18. Sheep Enterprise Financial Results[1]

	Hill farms		Upland farms	
	1980/81	1981/82	1980/81	1981/82
	£ per forage ha.			
Overall[2]				
Enterprise output	176.65	224.27	298.25	384.90
Variable costs	38.42	46.51	47.72	53.14
Gross margin before forage costs	138.23	177.76	250.53	331.77
Forage variable costs	4.58	8.12	16.44	15.33
Gross margin after forage costs	133.65	169.65	234.09	316.43
Per farm[3]				
Enterprise output	198.05	247.07	368.69	459.86
Variable costs	41.47	49.41	50.02	57.76
Gross margin before forage costs	156.59	197.66	318.67	402.10
Forage variable costs	6.55	8.56	21.17	20.26
Gross margin after forage costs	150.04	189.09	297.50	381.84

(1) Results are given per effective forage hectare attributed to sheep, with rough grazings, both common and under sole occupation, adjusted.

(2) Overall results using the total output and cost figures on the sampled farms.

(3) Average of the results for individual farms.

The fairly substantial discrepancy evident in Table 18 between the overall and per farm results reflects the tendency for the smaller flocks to yield higher outputs and margins per hectare than the larger. The relevant correlations are set out in Table 19 and show a fairly strong relationship between returns to land and the size of sheep flock, a relationship which could not be determined statistically in the case of beef cattle enterprises.

Table 19. Correlation of Sheep Enterprise Financial Results with Flock Size, 1981/82

	Hill farms		Upland farms	
	r	significance of r	r	significance of r
Enterprise output	-0.30	0.07	-0.25	0.01
Gross margin before forage costs	-0.34	0.04	-0.27	0.01
Gross margin after forage costs	-0.34	0.04	-0.25	0.01

Comparison of Tables 10 and 18 reveals a substantial advantage for sheep over beef production at present levels of costs and returns and management methods. Overall output for the sampled farms was some 46 per cent higher per effective hectare for hill farm sheep enterprises over beef enterprises in 1981/82, the equivalent figure for upland farms being 42 per cent. The overall post-forage gross margin advantage for sheep was 137 per cent for hill farms and 65 per cent for upland farms and presumably underlies the movement away from cattle and into sheep noted on Welsh farms in recent years.

Table 20 presents the financial results for the sheep enterprises in the sample on a per breeding sheep basis. Substantial differences were again apparent between hill and upland farms, with the overall output per animal on hill farms some 27 per cent below that on upland farms in 1981/82. Total cost levels were little different as between the two types of farm, leaving gross margins after forage variable costs had been deducted some 33 per cent lower on hill than on upland farms. Forage costs were substantially higher on upland farms, reflecting the increased likelihood of sheep being maintained on improved (rather than rough) grazing on these farms.

Table 21 provides a breakdown of the total enterprise output from the sheep flocks in the sample. The small proportion

of output resulting from store lamb sales, even off the hill farms, is noteworthy, and bears out the observations of recent years that the majority of Welsh hill farmers aim to sell most of their lambs in a finished form. Virtually one quarter of the hill farms' sheep enterprise output was derived from direct subsidies, in contrast to their beef enterprise output where the subsidy proportion was only some 15 per cent.

Table 20. Sheep Enterprise Financial Results per Breeding Sheep(1)

	Hill farms		Upland farms	
	1980/81	1981/82	1980/81	1981/82
	£ per breeding sheep			
Overall(2)				
Enterprise output	19.02	23.11	24.87	31.82
Variable costs	4.14	4.79	3.98	4.39
Gross margin before forage	14.88	18.32	20.89	27.43
Forage variable costs	0.49	0.84	1.37	1.27
Gross margin after forage	14.39	17.48	19.52	26.16
Per farm(3)				
Enterprise output	19.79	24.13	26.92	34.19
Variable costs	3.90	4.44	3.74	4.41
Gross margin before forage	15.88	19.70	23.18	29.77
Forage variable costs	0.70	0.94	1.51	1.51
Gross margin after forage	15.18	18.76	21.66	28.26

(1) Results are given per breeding animal, which includes rams, ewes, and ewe lambs retained for breeding.

(2) Overall results using the total output and cost figures for the sampled farms.

(3) Average of the results for individual farms.

Table 21. Composition of Sheep Enterprise Output, 1981/82

	Hill farms	Upland farms
	%	%
Fat lamb sales	40.3	55.8
Store lamb sales	10.6	7.3
Ewes and rams sold	15.9	15.3
Wool sales	6.4	5.2
Total sales less purchases	68.2	72.5
Direct subsidies	24.8	16.3
Flock valuation increase	6.9	11.3

Table 22 shows the composition of the total variable costs attributable to the sheep flocks in the sample. While purchased concentrate feeds formed the major item for both hill and upland farms, the importance of agistment costs is also emphasised, particularly for the hill farms, where the relatively low expenditure on forage reflected the fact that sheep were mainly kept on unimproved rough land.

The 1978/79 survey included an assessment of the preference of farmers concerning market outlets for each category of sheep sold. The results are given in Table 23. As with beef cattle sales, the overwhelmingly preferred medium was the auction for all classes of stock, although sales of fat lambs to marketing groups also had some devotees.

Table 22. Composition of Sheep Enterprise Variable Costs, 1981/82

	Hill farms	Upland farms
Purchased concentrates	33.3%	37.2%
Purchased bulk feeds and bedding	8.1%	2.5%
Feeds and bedding produced on farm	-	1.3%
Forage variable costs	14.9%	22.4%
Stock keep hired	32.5%	20.5%
Veterinary fees and medicines	9.7%	13.4%
Other (1)	1.5%	2.7%

(1) Incl. haulage expenses, insurance.

Table 23. Farmer Preferences in the Marketing of Sheep, 1978/79 Sample

Market outlet	Number of preferences for:			
	Fat lambs	Store lambs	Draft ewes	Cast ewes
Auction sales	37	31	54	34
Sales to marketing groups	13	2	-	-
Private sales (1)	5	5	5	5
No preference (2)	14	31	10	30

(1) Sales to other farmers, dealers, butchers, etc.

(2) Including those making no sales in 1978/9

CHAPTER 4

THE FARMS IN THE SAMPLE

This chapter moves away from the cattle and sheep enterprises on the sampled farms and considers the results produced by the farms themselves. Table 24 presents the basic financial results for the sampled farms on a per effective hectare basis.

The difference in performance between hill and upland farms was considerable, with overall output in 1981/82 some 62 per cent higher per hectare on the latter and a management and investment income per hectare on the hill farms less than half that on the upland farms. Substantial improvements in the results were apparent for both types of farm between the two years, net farm income having improved by 50 per cent on hill farms and by over 60 per cent on upland farms. On both the cost and output sides, per farm results were somewhat higher than overall results, reflecting a tendency for the smaller farms to be more intensively run than the larger. However, particularly in the case of hill farms, this increased intensity was not always reflected in higher net farm incomes per hectare. The mean levels of net farm income per farm in the sample in 1981/82 were £9,904 and £12,895 for hill and upland farms respectively.

Table 25 illustrates the overriding importance of the cattle and sheep enterprises to both the hill and upland farms in the sample. Overall, the total enterprise output yielded by the 118 sampled farms was derived 59% from sheep and 35% from beef cattle.

Table 24. Financial Results on the Sampled Farms[1]

£ per effective ha.	Hill farms 1980/81	Hill farms 1981/82	Upland farms 1980/81	Upland farms 1981/82
Overall[2]				
Total enterprise output	168.55	214.48	279.17	347.03
Total costs	155.26	182.76	249.09	269.70
Management & Investment income	13.28	31.72	30.08	77.33
Labour of farmer & spouse	27.85	30.19	45.95	45.29
Net Farm Income	41.14	61.90	76.03	122.63
Per farm[3]				
Total enterprise output	183.20	226.62	303.14	371.51
Total costs	180.72	203.10	286.30	306.84
Management & Investment income	2.48	23.52	16.84	64.67
Labour of farmer & spouse	37.11	38.68	62.81	61.31
Net Farm Income	39.59	62.20	79.64	125.98

(1) Results are given per effective hectare of agricultural land, with rough grazings, both common and under sole occupation, adjusted.

(2) Overall results using the total output, cost and income figures on the sampled farms.

(3) Average of the results for individual farms. Mean farm sizes were as follows (in effective hectares):

hill farms		upland farms	
1980/81	1981/82	1980/81	1981/82
170	160	104	105

Table 25. Composition of Farm Enterprise Output, 1981/82

	Hill farms	Upland farms
Beef herd	22.3%	38.6%
Sheep flock	71.2%	54.6%
Other enterprises	6.5%	6.8%

Table 26 and 27 show the composition of farm costs. Fixed costs, which are not normally attributable to individual farm enterprises, were overall some 2.6 times greater than the variable costs, most of which were detailed in Tables 11 and 22. Of these fixed costs, the predominant portion was labour costs which accounted for over 40 per cent of the total on both hill and upland farms. The composition of fixed costs varied little between hill and upland farm categories in percentage terms, although cost levels generally were higher on the upland farms surveyed and fixed costs formed a higher proportion of those total costs.

Table 26. Composition of Farm Costs, 1981/82

	Hill farms	Upland farms
Total variable costs	31.4%	26.7%
Total fixed costs (incl. labour of farmer & spouse)	68.6%	73.3%

Table 27. Composition of Farm Fixed Costs, 1981/82

	Hill farms	Upland farms
Paid labour	5.9%	4.6%
Unpaid labour:		
farmer & spouse	25.8%	23.5%
other	12.1%	14.6%
Machinery & power	27.1%	25.4%
Rent/Rental value, rates	19.0%	21.8%
Other land expenses (1)	2.6%	2.5%
General farm costs (2)	7.4%	7.6%

(1) Mainly tenant-type repairs and current upkeep of land.

(2) Incl. electricity, water, insurances, etc. attributable to the farm.

Table 28. Tenant's Capital on the Sampled Farms

	Hill farms		Upland farms	
Overall[1]	1980/81	1981/82	1980/81	1981/82
Value of tenant's capital per effective ha. (£)	295.90	336.08	487.25	536.85
Rate of return on tenant's capital (%)	4.5	9.4	6.2	14.4
Per farm[2]				
Value of tenant's capital per effective ha. (£)	321.87	355.80	529.57	571.66
Rate of return on tenant's capital (%)	1.3	7.9	2.5	11.4

(1) Overall results using total figures for the sampled farms.

(2) Average of the results for individual farms.

Table 28 shows the level of tenant's capital employed on the farms in the sample and the return on that capital. The upland farms were considerably more capital intensive in this sense, overall employing 60 to 65 per cent more tenant's capital per effective hectare than the hill farms in the two years under consideration. Comparison of the overall and per farm figures suggests some tendency for the smaller farms of both types to be more intensive. Rates of return were substantially higher for the upland farms in both years, 1981/82 generally showing a large improvement over the previous year for both hill and upland farms. The positive correlation between farm size and returns on tenant's capital appeared relatively strong, especially for the hill farms, and the relevant statistics are given in Table 29.

Table 29. Correlation of Returns on Tenant's Capital with Farm Size

	Hill farms		Upland farms	
	1980/81	1981/82	1980/81	1981/82
r	0.43	0.50	0.32	0.36
significance of r	0.01	0.01	0.01	0.01

Dependent variable: Management and Investment Income as a percentage of tenant's capital.

Independent variable: farm size in effective hectares.

Table 30 shows the composition of the tenant's capital employed on the sampled farms. Little significant difference emerged as between hill and upland farms, with livestock obviously playing the major part and livestock and machinery combined accounting for well over 90 per cent of the total tenant's capital.

Table 30. Composition of Tenant's Capital, 1981/82

	Hill farms	Upland farms
Livestock	64.4%	64.1%
Machinery	27.6%	28.5%
Crops	4.0%	5.3%
Stores	4.0%	2.1%

LIST OF PUBLICATIONS ISSUED IN THE AGRICULTURAL ENTERPRISE STUDIES IN ENGLAND AND WALES SERIES

No. 1	Lowland Sheep: Production Policies and Practices Editor: W J K Thomas University of Exeter October 1970	50p
No. 2	Cucumber Production in the Lea Valley Profitability on a Sample of Nurseries By A H Gill University of Reading November 1970	30p
No. 3	Oilseed Rape: A study of its production based on economic surveys of the 1967, 1968 and 1969 harvests By J A L Dench University of Reading December 1970	50p
No. 4	Outdoor Pigs: Report on an economic investigation By M A B Boddington Wye College (University of London) August 1971	75p
No. 5	Year round Cauliflower production in Lincolnshire, Kent and Cornwall 1969 - 70: including trends in production, imports and prices of competing and complementary brassica supplies By Helen M Cole University of Exeter October 1971	50p
No. 6	The Economics of Carrot Production and Marketing in Britain: A Commodity Study By W L Hinton University of Cambridge December 1971	50p
No. 7	Sugar Beet: An Economic Report By M C Thompson and F G Sturrock University of Cambridge December 1971	20p
No. 8	Lowland Sheep: An economic analysis of lamb production, 1970 Editor: W J K Thomas University of Exeter December 1971	30p
No. 9	Two Systems of Beef Production on Arable Farms: An economic study on farms in the East of England, 1968-1970 By I G Simpson University of Leeds February 1972	40p
No.10	Field Beans as a Break Crop By W S Senior University of Nottingham February 1972	30p

No. 11	Early Tomato Production: Fourth Report on the British Isles Tomato Survey By J A H Nicholson Wye College (University of London) March 1972	75p
No. 12	Glasshouse Lettuce: An Economic Survey in Lancashire University of Manchester February 1972	20p
No. 13	Break Crops: An Economic Survey in Southern England - with a technical appraisal by ADAS By several authors Accompanied by a break crop bibliography compiled by Miss Wendy Brooker University of Reading May 1972	75p
No. 14	Economic Aspects of Cucumber Production and Marketing in Britain (including a survey of the 1969 and 1970 crops in the East Riding of Yorkshire) By R A Giles University of Leeds February 1973	50p
No. 15	Threshed Peas:A study of the 1971 crop in the East Midland Region By H W T Kerr University of Nottingham January 1973	30p
No. 16	Pig Production: Results of a study in South West England in 1971/72 By W J K Thomas and Miss E Burnside University of Exeter January 1973	30p
No. 17	The Economics of Growing and Selling Plums 1923-1971 By J Rendell and S R Wragg University of Bristol January 1973	30p
No. 18	Peas in Britain and Europe: A Commodity Study By W L Hinton University of Cambridge July 1973	£1.00
No. 19	Early Potatoes in West Cornwall 1962-1972: An Economic Study By Helen M Cole University of Exeter June 1973	35p
No. 20	The Economics of Hill Sheep Production By W Dyfri Jones (with others) University College of Wales, Aberystwyth July 1973	£1.00
No. 21	Red Beet By H W T Kerr University of Nottingham August 1973	30p

No. 22 Hill and Upland Beef Herds: an economic analysis of mainly single-suckled calf production in the hill and upland areas of the North of England and Wales
By S Robson and D C Johnson
University of Newcastle upon Tyne
August 1973 £1.00

No. 23 Veterinary and Medicine Costs and Practices in Lowland Sheep
By D D Pout and W J K Thomas
University of Exeter
(September 1973) REPRINT MARCH 1977. 60p

No. 24 Results of Pig Management Scheme 1973
By R F Ridgeon
University of Cambridge
January 1974 30p

No. 25 Dry Bulb Onions: A study of production economics of the 1971 dry bulb onion crop in the East Midland Region including the Holland Division of Lincolnshire
By H W T Kerr
University of Nottingham
November 1973 40p

No. 26 Pig Production: Results of a study in South West England in 1972/73
By W J K Thomas and E Burnside
University of Exeter
January 1974 35p

No. 27 Dessert Apples and Pears in 1972/73
By R R W Folley
Wye College (University of London)
April 1974 40p

No. 28 Beans for Processing
by W L Hinton
University of Cambridge
May 1975 50p

No. 29 Hardy Nursery Stock in England and Wales
A brief study of scale, location and structure
By J Rendell and S R Wragg
University of Bristol
August 1974 25p

No. 30 Pig Management Scheme 1974
By R F Ridgeon
University of Cambridge
January 1975 50p

No. 31 Pig Production: Results of a study in South West England 1973/74
By W J K Thomas and A Sheppard
University of Exeter
February 1975 50p

No. 32	Field Beans: A study of the husbandry and production economics of the 1973 crop in England by H. W. T. Kerr, P.D. Hebblethwaite and K. N. Holloway University of Nottingham March 1975	60p
No. 33	Culinary Apples in 1973 by R. R. W. Folley Wye College (University of London) 1975 (Issued January 1976)	70p
No. 34	Dessert Apples and Pears: 1973 and after by R. R. W. Folley and B. B. Beattie Wye College (University of London) June 1976	£1.25
No. 35	Grass as a Break. An Economic Study in Southern England by J. A. L. Dench University of Reading December 1975	£1.00
No. 36	Grass on the Arable Farm by H. W. T. Kerr University of Nottingham January 1976	90p
No. 37	Pig Management Scheme: Results for 1975 by R. F. Ridgeon University of Cambridge December 1975	65p
No. 38	The Early Strawberry Crop by Helen M. Cole University of Exeter February 1976	£1.00
No. 39	Pig Production: Results of a study in S.W. England 1974/75 by W. J. K. Thomas University of Exeter January 1976	75p
No. 40	Fattening Older Cattle on Grass by H. W. T. Kerr and P. H. Pitchford University of Nottingham April 1976	65p
No. 41	Oilseed Rape: 1975 by Susan M. Fletcher with J. A. L. Dench and R. L. Vaughan University of Reading September 1976	50p
No. 42	The U.K. Broiler Industry 1975 by Sue Richardson University of Manchester September 1976	£1.50
No. 43	Sheep Production and Management in Wales A survey of 413 flocks by A. Lloyd University of Aberystwyth March 1977	£1.00

No 44 Early Potato Production in England & Wales 1975
by Allan Lloyd
University of Aberystwyth
January 1977 £1.00

No 45 The Tomato Industry Situation
by Julian Nicholson
Wye College (University of London)
December 1977 £3.00

No 46 Ewe Flocks in England - Breeds, Lamb Production and other aspects of Husbandry 1973-74
by W J K Thomas
University of Exeter
November 1976 £1.00

No 47 Cereals 1971-1977
by J G Davidson and I M Sturgess
University of Cambridge
October 1978 £2.00

No 48 Potatoes in Scarcity
by Lynn Hinton
University of Cambridge
August 1977 £1.50

No 49 The Economics of Cider Apple Production
by S R Wragg and J Rendell
University of Bristol
February 1977 60p

No 50 Fodder Crops
by J A L Dench and W I Buchanan
University of Reading
March 1977 70p

No 51 Pig Management Scheme - Results for 1976
by R F Ridgeon
University of Cambridge
December 1976 70p

No 52 Pig Production in SW England 1975/76
by E Burnside, A Sheppard and W J K Thomas
University of Exeter
January 1977 75p

No 53 Oilseed Rape 1976
by Susan Fletcher
University of Reading
1977 75p

No 54 Hill & Upland Farming in the North of England
by S Robson and D C Johnson
University of Newcastle
May 1977 £1.50

No 55 National Mushroom Study 1975
by Peter Thompson
University of Manchester
June 1977 75p

No 56	Economics of Scale in Farm Mechanisation by F G Sturrock, J Cathie & T A Payne University of Cambridge January 1978	95p
No 57	Lowland Sheep - Economics of Lamb Production in England 1976 by W J K Thomas University of Exeter December 1977	£1.00
No 58	Hill and Upland Farming in Wales by A Lloyd and W Dyrfi Jones August 1978	£1.50
No 59	The use of Fixed Resources in Cereal Production by H W T Kerr University of Nottingham December 1977	£1.00
No 60	Pig Production in SW England 1976/77 by E Burnside, A Sheppard & W J K Thomas University of Exeter January 1978	£1.00
No 61	Pig Management Scheme. Results for 1977 by R F Ridgeon University of Cambridge January 1978	£1.00
No 62	Beef Production from Older Cattle by R Evans University of Newcastle December 1977	£1.50
No 63	The Economics of Egg Production - a Study of Production and Marketing on 70 Farms by David A Burton University of Manchester April 1978	£2.50
No 64	An Economic Survey of Lettuce Production in the Open by John E Farrar University of Manchester June 1978	£1.00
No 65	Pig Management Scheme. Results for 1978 by R F Ridgeon University of Cambridge January 1979	£1.00
No 66	Pig Production in South West England 1977-78 by W J K Thomas University of Exeter January 1979	£1.50

No. 67	Protected Lettuce By J. Rendell University of Reading 1979	£1.00
No. 68	Vining Peas By R A Macaskill University of Nottingham September 1979	£1.35
No. 69	Pig Production - in South West England By W J K Thomas University of Exeter January 1980.	£1.50
No. 70	Dry Bulb Onions By H W T Kerr and C H Tilston University of Nottingham January 1980	£2.00
No.71	Pig Management Scheme Results for 1979 By R F Ridgeon University of Cambridge December 1979	£1.00
No.72	Outlook for the Glasshouse Tomato Industry By J A H Nicholson Wye College (University of London) 1980	£6.00
No.73	Combine Harvested Non-Cereal Crops 1977 and 1978 By Susan M Burns University of Reading November 1980	£1.00
No. 74	Protected Lettuce by J Rendell University of Reading February 1981	£1.00
No.75	Pig Production in South West England 1979/80 by W J K Thomas University of Exeter February 1981	£1.50

No.76	Pig Management Scheme Results for 1980 by R F Ridgeon University of Cambridge December 1980.	£1.50
No.77	English Strawberries - An Economic Study on the Production and Marketing of Strawberries by W L Hinton University of Cambridge February 1981.	£2.50
No.78	A National Beef Survey by J A L Dench and R L Vaughan University of Reading December 1981	£1.00
No.79	Hill and Upland Farming in the North of England 1978/79 and 1979/80 Plus Appendices to Report by S Robson and D C Johnson University of Newcastle August 1981	£1.00
No.80	Pig Management Scheme Results for 1981 by R F Ridgeon University of Cambridge December 1981	£1.75
No.81	Pig Production in South West England 1980-81 by W J K Thomas, E Burnside and A Sheppard University of Exeter February 1982	£2.00
No.82	Grass Conservation: 1980 Susan M Burns with M R Lewis and J Rendell University of Reading 1982	£1.50
No.83	Cereals 1979/80 A study of cereal production and marketing in the United Kingdom by J G Davidson University of Cambridge July 1982	£3.00
No.84	Lowland Sheep Interim results of a survey of the 1981 lamb-crop in England and Wales by W J K Thomas, University of Exeter October 1982	£1.25

No.85 Pig Production in South West England 1981-82
by Estelle Burnside and Andrew Sheppard
University of Exeter
February 1983 £2.00

No.86 Pig Management Scheme Results for 1982
by R F Ridgeon
University of Cambridge
December 1982 £1.75

No.87 Hill and Upland Cattle and Sheep Farming in Wales
by T.N. Jenkins
University College of Wales, Aberystwyth
October, 1983 £2.50

ADDRESSES OF UNIVERSITY DEPARTMENTS PUBLISHING IN THIS SERIES

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

The Departments of Agricultural Economics at Bristol and at Leeds Universities are now closed but copies of their previous publications can be obtained from:

BRISTOL	The Secretary Department of Animal Husbandry Bristol University Field Station Langford House Langford, Bristol BS18 7DU
LEEDS	School of Economic Studies The University of Leeds Leeds LS2 9JT