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BARLEY PRODUCTION IN SOUTH WEST ENGLAND

An Economic Study on 57 Farms in Cornwall, Devon and Dorset 1959

Price Three Shillings and Sixpence

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NEWTON ABBOT,
DEVON.

U N I V E R S I T Y O F B R I S T O L

Department of Economics
(Agricultural Economics)

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1959

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I. INTRODUCTION

The 1959 crop acreage statistics for England and Wales, the South West Province and for each of the three South Western counties are given in Appendix I.

From these statistics it is evident that cereal growing is less important in the South West than in England and Wales as a whole. In England and Wales cereals account for 24·2% of the total area of crops and grass compared with 14·6% for the South West Province and 13·3% for Devon.

There was considerable variation between the three counties with regard to the importance of the barley crop in relation to other cereals. For instance in Dorset, where cash cereal production is comparatively more important than elsewhere in the Province, the barley acreage in 1959 was 67·9% of the total cereal acreage whereas in Cornwall and Devon it was only 45·7% and 56·0% respectively. Cereal production in Cornwall accounted for about the same proportion of the total acres of crops and grass as did the Dorset cereals, viz: 16·6% and 16·5% respectively - but in Cornwall there was nearly as much area devoted to mixed corn as there was to barley as compared with Dorset where very little mixed corn was grown.

The trends in the total cereal and the barley acreages since 1939 are also given in the statistical data in Appendix I. In 1959 the cereal acreage in Cornwall was only 3% greater than in 1939 and 10% greater in Devon compared with 79% in Dorset. The total cereal acreage for the province was 18% higher than in 1939, which compares with a peak of about two and a quarter times the 1939 level reached during the war. In Cornwall the cereal acreage doubled and in Devon and Dorset it rose to almost two and a half times the 1939 level. Thus it is only in Dorset that the cereal acreage has remained very much higher than in 1939.

Even more significant however, has been the change in the relative importance of barley over the past twenty years - particularly in the last year or two. If one compares the barley acreage as a proportion of total cereal acreage for the years 1939, 1955 and 1959, one sees a greater change between 1955 and 1959 than between 1939 and 1955. For example, in the South West Province barley accounted for 13·6% of cereal acreage in 1939, 26·7% in 1955 and 55·3% in 1959. The trends in barley acreages in the three counties, the province and in England and Wales illustrate the growing popularity of the

crop. In 1959 the acreage was nearly five times the 1939 level for the South West Province compared with three times for England and Wales. In Cornwall and Dorset it was nearly six times as high and nearly four times in Devon. A large part of this increase took place between 1955 and 1959.

The South Western counties have also added a greater contribution to the barley acreage in England and Wales in the last year or two than previously. In 1939 and 1955 4·1% of the barley acreage of England and Wales was grown in the South West but in 1959 this was increased to 6·4% despite the fact that the South West's contribution to total acreage of cereals fell from 6·8% in 1939 to 5·5% in 1959.

Weather Conditions

1959 will long be remembered for the excellent weather conditions during harvest except for a few days at the beginning of August. Generally speaking the harvest was a week or two earlier than average and most crops were gathered in ideal conditions.

Physical conditions at sowing were rather varied according to the time of drilling. Those farmers who were able to till their barley before the end of February had very favourable weather, but then a wet spell set in which lasted through the whole of March and a good part of April and those who were hoping to drill during this period were forced to delay drilling until late in April and in some cases even early in May. These late sowings resulted on the whole in much lighter crops being harvested due to the dry conditions which lasted from May until harvest time.

II. THE SAMPLE

Records for the 1959 barley crop were obtained for a sample of 57 farms distributed fairly equally between the counties of Cornwall, Devon and Dorset.

The sample in Cornwall was mainly in the arable area between Newquay and Padstow but one or two were situated as far away as Truro and Liskeard. Two-thirds of the Devon farms were located in the arable area north of Exeter and one-third were situated near Kingsbridge in South Devon. The Dorset sample of farms was distributed over most areas of the county except the north.

Table 1 Distribution of the Sample

	No. of Farms	No. of Fields*	Acres Costed	Average Size of Field*	Acres Costed per Farm
			acres	acres	acres
Cornwall	21	24	212	8.8	10.1
Devon	17	55	449$\frac{1}{2}$	8.2	26.4
Dorset	19	53	739$\frac{3}{4}$	14.0	38.9
All Farms	57	132	1401$\frac{1}{4}$	10.6	24.6

* Fields or part of fields

The total acreage of barley costed was 1401$\frac{1}{4}$ acres which represented 44.8% of the total barley grown on the sample farms. An average of nearly 25 acres per farm was costed in 132 fields or parts of fields averaging 10.6 acres in size.

Average Cropping on Sample Farms

In Table 2 the data are set out for the sample farms in each county and an average is given for the sample as a whole. A cursory glance is sufficient to indicate that cereals are much more important on the Dorset farms than on those in Devon and Cornwall.

Barley accounts for approximately half the total cereal acreage on the sample farms in each county and for one-fifth of the total area of crops and grass in the whole sample. This is a higher proportion than for the Province as a whole, the reason being the concentration of the sample in the barley growing areas of the South West.

Table 2 Crop Acreages on Sample Farms. By County and for All Farms. 1959.

Crop	Cornwall	Devon	Dorset	All Farms	
	acres	acres	acres	acres	%
Barley	24·9	44·9	98·4	55·9	20·0
Wheat	2·2	11·1	31·5	14·8	5·3
Oats	2·7	8·0	16·9	9·1	3·3
Mixed Corn	11·7	2·5	1·7	5·5	2·0
Other Crops	11·3	23·0	49·3	27·7	9·9
Bare Fallow	-	-	·6	·2	-
Total Tillage	52·8	89·5	198·4	113·2	40·5
Temporary Grass	49·3	56·2	143·4	83·3	29·9
Permanent Grass	35·1	94·2	113·7	79·7	28·5
Orchards	·1	4·4	·6	1·5	·5
Rough Grazings (Equiv.)	1·4	·4	3·1	1·6	·6
Total Crops and Grass	138·7	244·7	459·2	279·3	100·0

The average size of fields was similar in Cornwall and Devon at between 8 and 9 acres whereas those in Dorset averaged 14 acres.

Method of Harvesting

An analysis of the methods of harvesting found in the sample is set out in Table 3. All barley in the Dorset sample was combine harvested, and in both Devon and Cornwall the combine was more commonly used than the binder. On three farms in the sample, two in Cornwall and one in Devon, both combine and binder were used.

Table 3 Analysis of Barley Acreage by Method of Harvesting and by County. 1959.

	No. of Farms where barley was:-		Acres Combined	Acres Combined as % of Total Acres Costed
	Combined	Cut & Threshed		
Cornwall	17	6*	160	75.5
Devon	16	2*	432½	96.2
Dorset	19	-	739¾	100.0
All Farms	52	8	1332¼	95.1

* Both combine and binder were used on two farms in Cornwall and on one in Devon.

Ninety-five per cent of the barley acreage in the sample was harvested by combine harvester and varied within the three counties from 100% in Dorset to 75% in Cornwall. This shows a significant difference when compared with wheat which appeared in a recent study of Wheat Production in the South West. ϕ With wheat only about 30% of the Cornwall and Devon acreage was cut by combine and this was due to the higher value put on the straw which was widely used for thatch both for stacks and for buildings.

ϕ Wheat Production in South-West England. University of Bristol, II. Department of Agricultural Economics. April, 1960.

III. RETURNS, INPUTS AND MARGINS, 1959

(1) Summary of Financial Results

The financial results for the 1959 barley crop are summarised in Table 4 for each of the counties and for the whole sample in the South West.

Table 4 Returns, Inputs and Margins by County, 1959
Per Acre and Per Cwt.

	Cornwall	Devon	Dorset	All Farms
Per Acre	£ s d	£ s d	£ s d	£ s d
Returns - Grain	26 1 7	27 3 4	28 7 0	27 12 7
Straw	4 0 10	3 19 10	3 12 0	3 15 10
D.P.	9 4 8	9 4 8	9 4 8	9 4 8
	39 7 1	40 7 10	41 3 8	40 13 1
Inputs	18 5 7	19 19 7	17 10 5	18 8 5
Margin	21 1 6	20 8 3	23 13 3	22 4 8
Per Cwt.				
Returns - Grain	19 1	19 8	18 10	19 2
D.P.	6 9	6 8	6 2	6 5
	1 5 10	1 6 4	1 5 0	1 5 7
Inputs *	10 5	11 7	9 3	10 2
Margin	15 5	14 9	15 9	15 5
Yields per Acre	cwt.	cwt.	cwt.	cwt.
Grain	27·3	27·6	30·1	28·9
Straw	16·8	16·5	18·1	17·4

* Less value of straw

The average returns for all farms amounted to £40 13s. 1d.

comprised of £27 12s. 7d. for the value of grain, £3 15s.10d. for straw and £9 4s. 8d. per acre deficiency payment. Total inputs per acre were £18 8s. 5d. leaving a margin of £22 4s. 8d. per acre. The deficiency payment was just under a quarter of the total returns per acre and nearly a half of the total margin. With an average yield of 28·9 cwt. of grain per acre the returns for grain were 19s. 2d. per cwt. in addition to which was a deficiency payment of 6s. 5d. per cwt. For the per cwt. calculation the value of the straw has been treated as a credit and deducted from the inputs. The deficiency payment averaged almost exactly one-third of the return for the grain and a quarter of the total returns less the value of straw.

In comparing the results between the samples for the three counties it will be noted that the highest margin both per acre and per cwt. was achieved in Dorset. This resulted from a combination of the highest return per acre and lowest inputs. The yield of grain was also higher than in Cornwall and Devon. The higher yield and lower level of costs more than compensated the slightly lower return per cwt. for the grain. The margin per acre varied from £20 8s. 3d. on the Devon farms to £23 13s. 3d. for the Dorset sample. Although the returns per acre were higher in Devon than in Cornwall, inputs were even higher giving rise to a smaller margin on the Devon farms. The larger returns per acre were not sufficient to cover the higher level of costs. Yields of grain were very similar in Devon and Cornwall.

An analysis of the utilisation of the barley crop has been made and the results of the disposal of the grain and straw are given in the following table.

Table 5 Utilisation of the 1959 Barley Crop

	Cornwall	Devon	Dorset	All Farms
	%	%	%	%
Grain:				
Sold	30·0	62·0	66·2	59·8
Kept for seed	2·9	2·3	·5	1·4
Kept for feed	67·1	35·7	33·3	38·8
Total	100·0	100·0	100·0	100·0
Straw:				
Sold	9·0	37·4	52·3	41·5
Kept	91·0	62·6	47·7	58·5
Total	100·0	100·0	100·0	100·0

On average some 60% of the grain was sold and the remainder, except for a small quantity retained for seed was fed to livestock on the farms. Approximately 40% of the straw was also sold and the remainder retained on the farms. Weather for harvesting was ideal in 1959 and there was ample opportunity to bale and collect the straw in good condition. In Dorset almost two-thirds of the grain was sold and just over half the straw. In Devon the proportion of the grain sold was nearly as great but less of the straw was sold. On the Cornish farms nearly all the straw, 91%, was retained on the farms and about two-thirds of the grain for feeding, only 30% being sold. This is in keeping with the tradition of pig farming in Cornwall, while the proportion of grain sold in the Dorset and Devon samples would indicate a greater emphasis on the cash crop nature of the barley crop on these farms.

(2) Analysis of Inputs

In addition to being the main determinant of the level of costs - the level of inputs can also have an important influence on the level of output and hence on returns - examples of this are where the rate of manuring and quality of the seeds used can have a direct effect on the level of returns. In the two following Tables 6 and 7, the inputs have been analysed in greater detail - on a per acre and percentage basis.

(i) Labour and Power

In the two tables the inputs have been broken down into their component parts. Labour and power together constitute 41·6% of the total cost of barley growing in the sample as a whole. There is a wide variation between the counties ranging from 39·1% in Dorset to 51·4% in Cornwall. The variation in manual labour shows a particularly wide difference, from £2 5s. 0d. per acre in Dorset to £3 5s. 0d. per acre in Cornwall.

The labour economy among the Dorset group is the result of a greater degree of mechanisation - and although a higher charge for machinery depreciation is incurred - the total labour and power input is only £6 17s. 0d. per acre in Dorset compared with £9 8s. 0d. and £8 6s. 0d. per acre respectively in the Cornwall and Devon samples. In the Cornwall sample manual labour was the greatest single input.

The labour requirements, manual and mechanical, up to the point of sale, for the 1959 barley crop are set out in greater detail in Table 8. The average manual labour used per acre was 13 hours for the whole sample. This ranged from 11½ hours in Dorset to 16¾ hours in

Table 6 Analysis of Inputs

Per Acre

	Cornwall	Devon	Dorset	All Farms
	£ s	£ s	£ s	£ s
Labour and Power:				
Manual	3 5	2 14	2 5	2 11
Tractor	1 19	1 15	1 11	1 13
Machinery Depreciation	2 9	3 0	2 6	2 11
Contract	1 15	17	15	18
Total Labour & Power	9 8	8 6	6 17	7 13
Seeds	1 17	1 18	2 6	2 2
Manures (net)	2 19	4 13	3 15	3 18
Rent	1 12	2 14	2 7	2 7
Overheads: General	16	14	11	13
Hedging, etc.	10	10	10	10
Miscellaneous	1 4	1 5	1 4	1 5
TOTAL INPUTS	18 6	20 0	17 10	18 8

Table 7 Analysis of Inputs

Per Cent

	Cornwall	Devon	Dorset	All Farms
	%	%	%	%
Labour and Power:				
Manual	17.8	13.5	12.9	13.9
Tractor	10.7	8.8	8.8	8.9
Machinery Depreciation	13.4	15.0	13.1	13.9
Contract	9.5	4.2	4.3	4.9
Total Labour & Power	51.4	41.5	39.1	41.6
Seeds	10.1	9.5	13.2	11.4
Manures (net)	16.1	23.3	21.4	21.2
Rent	8.7	13.5	13.4	12.8
Overheads: General	4.4	3.5	3.1	3.5
Hedging	2.7	2.5	2.9	2.7
Miscellaneous	6.6	6.2	6.9	6.8
TOTAL INPUTS	100.0	100.0	100.0	100.0

Cornwall with an intermediate figure of 13¾ hours for Devon. The tractor hours varied from 7½ hours in Dorset to 9¾ hours in Cornwall with again an intermediate figure of 8¾ hours for Devon. The average tractor requirement was 8¼ hours per acre. In addition there was a negligible amount of horse labour used in Cornwall and on average a

Table 8. Analysis of Labour Requirements

Hours per Acre

	Cornwall		Devon		Dorset		All Farms	
	Hrs.	£ s	Hrs.	£ s	Hrs.	£ s	Hrs.	£ s.
Preharvest								
Manual	8	1 11	7½	1 9	6¼	1 4	6¾	1 7
Horse	¼	-	-	-	-	-	-	-
Tractor	7½	1 10	6¾	1 7	5¾	1 3	6¼	1 5
Contract	-	3	-	2	-	3	-	2
Total	-	3 4	-	2 18	-	2 10	-	2 14
Harvesting								
Manual	8¾	1 14	6¼	1 5	5¼	1 1	6¼	1 4
Horse	-	-	-	-	-	-	-	-
Tractor	2¼	9	2	8	1¾	8	2	8
Contract	-	1 12	-	15	-	12	-	16
Total	-	3 15	-	2 8	-	2 1	-	2 8
All Operations								
Manual	16¾	3 5	13¾	2 14	11½	2 5	13	2 11
Horse	¼	-	-	-	-	-	-	-
Tractor	9¾	1 19	8¾	1 15	7½	1 11	8¼	1 13
Contract	-	1 15	-	17	-	15	-	18
Total	-	6 19	-	5 6	-	4 11	-	5 2

contract charge of 18s. 0d. per acre which ranged from 15s. 0d. to £1 15s. per acre in Dorset and Cornwall respectively. The greater economy in both

manual and mechanical labour use is evident in the Dorset sample and this is no doubt largely due to the favourable conditions in Dorset for large scale cereal production which is a feature of the arable farms in that county.

(ii) Seed

Details of the seed used and the rate of seeding are given in Table 9. On the farms as a whole, about two-thirds, 66·2%, of the seed was homegrown and varied between 57·1% in Dorset and 79·5% in Cornwall.

Table 9 Seed Details

	Homegrown				Purchased			
	% of Total Seed Used	Seed Rate per Acre	Cost per Cwt.	% of Seed Dressed	% of Total Seed Used	Seed Rate per Acre	Cost per Cwt.	% of Seed Dressed
	%	cwt.	£ s	%	%	cwt.	£ s	%
Cornwall	79·5	1·4	1 1	81·2	20·5	1·4	2 6	100·0
Devon	75·1	1·4	1 1	92·0	24·9	1·4	2 10	100·0
Dorset	57·1	1·4	1 1	42·8	42·9	1·4	2 9	94·4
All Farms	66·2	1·4	1 1	67·5	33·8	1·4	2 9	96·2

Thus, a much greater proportion of the seed used in Dorset was purchased as compared with Cornwall and Devon.

(iii) Manuring

The net costs of manuring the barley crop are shown in Table 10 for individual counties. The average for the sample as a whole is also given.

The level of manuring was lowest in Cornwall where only £2 10s. 0d. worth of artificials was used, compared with £3 1s. 0d. and £3 5s. 0d. in Devon and Dorset.

In total, the Cornish sample spent £2 19s. 0d. on manurial treatments including artificials, farmyard manure and lime - while

£4 13s. 0d. and £3 15s. 0d. were spent in Devon and Dorset respectively.

A comparison of yields in the three counties shows that on average, Cornish farms had a lower grain yield than either Devon or Dorset farms and this may be related to the smaller amount spent on fertilisers.

Table 10 Analysis of Manuring*

Per Acre

	Cornwall	Devon	Dorset	All Farms
	£ s	£ s	£ s	£ s
Artificials	2 10	3 1	3 5	3 1
Farmyard Manure	5	1 9	9	15
Lime	4	3	1	2
Total	2 19	4 13	3 15	3 18

* Net of Residues brought and carried forward

The average application of artificial fertilisers on the barley in 1959 was equivalent to:-

31.0 lb. N per acre
33.1 lb. P_2O_5 per acre
50.9 lb. K_2O per acre

This was obtained from straight fertilisers and compounds in the following ratio:-

	N	P_2O_5	K_2O
% from straights	20.9	11.3	17.2
% from compounds	79.1	88.7	82.8
	100.0	100.0	100.0

An analysis of the preceding crops is given in Table 11. On the larger arable farms of Dorset, barley, commonly followed barley. The second most common position in the rotation was in the more traditional position i.e. after the root break. In Devon a similar trend in the

rotation was evident. On the farms in the Cornish sample, barley commonly

Table 11 Preceding Crop

Preceding Crop	Cornwall	Devon	Dorset
	Per Cent. of Acreage		
Barley	21.2	32.3	28.9
Other Cereals	41.2	24.0	22.9
Grass	20.6	14.0	19.7
Root & Green Crops	17.0	29.7	26.6
Lucerne	-	-	1.9
Total	100.0	100.0	100.0

followed other cereals and in 21.2% of the acreage surveyed, barley was found to follow barley in the rotation.

(iv) Rent

The highest rents were found in the Devon sample where a weighted average rent was £2 14s. 0d. per acre with a range from £1 10s. 0d. to £5 2s. 0d. per acre. Among the farms in the Dorset sample, the average rent was found to be £2 7s. 0d. per acre with a variation from £1 5s. 0d. to £3 10s. 0d. In the Cornish sample the weighted average was £1 12s. 0d. per acre with a variation from £1 0s. 0d. to £3 0s. 0d.

(v) Overheads

The highest machinery depreciation charges were found in the Devon and Cornwall groups where the farmers used their own combines. The average depreciation charges amounted to £3 0s. 0d. and £2 9s. 0d. per acre respectively in these groups compared with £2 6s. 0d. in the Dorset group.

General farm expenses were allocated on a manual labour basis which accounts for this item constituting a higher expense in the Cornwall sample than in the Devon or Dorset samples. The figures were 16s. 0d., 14s. 0d. and 11s. 0d. per acre respectively in Cornwall, Devon and Dorset.

IV. ADDITIONAL ANALYSES

(1) Method of Harvesting

An analysis of the financial results by method of harvesting was made on 50 of the farms in the sample. On the remaining farms a mixture of methods was used and the information was not readily available for a comparison of the different systems. The analyses by method of harvesting covered a total of 1229¾ acres. Three systems of harvesting were involved, cutting by binder, stacking and threshing, 51½ acres, harvesting by hired combine, 94 acres, and, harvesting by the farmer's own combine, 1084¼ acres. Harvesting by binder was confined to four farms in Devon and Cornwall and by hired combine to eight farms also in the same counties. The farmers used their own combines on 38 farms, 21 in Devon and Cornwall, and 17 in Dorset. Binders and hired combines were used where relatively small acreages were grown and larger acreages were found on the farms on which farmers owned combines. The average acreage costed on these farms in Devon and Cornwall was 20·3 acres compared with nearly twice the acreage, 38·8 acres on the Dorset farms. Because of this difference in acreage the Devon and Cornwall farms on the one hand and the Dorset farms on the other have been treated separately. The figures for the four resulting groups are set out in Table 12. In Table 13 the manual labour and tractor requirements are given.

The weather at harvest time was such that the minimum amount of trouble was necessary for completing the harvest whatever system was used. Thus, harvesting by binder was seen under the most favourable circumstances and the differences between the systems was most probably at a minimum. In comparing the binder and hired combine methods, the harvest labour requirement was considerably higher on the binder group, 17·7 hours compared with 5·0 hours for the hired combine method. The tractor requirement was also greater on the binder farms. When the contract charges are taken into account however, these offset the saving in labour with the result that the total labour and contract costs were the same for both groups, £9 3s. 0d. per acre. Machinery depreciation and other inputs tended to be higher in the hired combine group so that total inputs were 11s. 0d. per acre greater than in the binder group. Although yields were lower in the binder group the returns for grain were higher as they were also for straw which gave these farms an advantage of £1 14s. 0d. per acre in total returns. The net result was a higher margin of £2 5s. 0d. per acre for the binder group in this particular season with ideal harvesting conditions. In the previous year, 1958, when the wheat crop was costed, conditions at harvest time were extremely unfavourable. Under these circumstances it was found that both manual and tractor labour requirements

Table 12 Comparison of Results by Method of Harvesting

Per Acre

	Own Binder	Hired Combine	Own Combine	
	Devon & Cornwall	Devon & Cornwall	Devon & Cornwall	Dorset
Number of farms	4	8	21	17
Acres costed - total	51½	94	425½	658¾
per farm	12.9	11.8	20.3	38.8
RETURNS	£ s	£ s	£ s	£ s
Grain	24 17	24 7	27 18	28 10
Straw	4 3	2 19	4 7	3 9
Deficiency Payments	9 5	9 5	9 5	9 5
TOTAL RETURNS	38 5	36 11	41 10	41 4
INPUTS				
Labour:				
Preharvest - Manual	1 15	1 18	1 8	1 3
Tractor	1 13	1 16	1 5	1 2
Contract	3	3	2	3
Harvest - Manual	3 8	1 0	1 4	1 1
Tractor	12	7	8	8
Contract	1 12	3 19	3	3
Total Labour	9 3	9 3	4 10	4 0
Fuel	-	2	7	3
Machinery Depreciation	1 6	1 9	3 5	2 8
Total Labour & Power	10 9	10 14	8 2	6 11
Other Inputs	9 13	9 19	10 7	10 4
TOTAL INPUTS	20 2	20 13	18 9	16 15
MARGIN	18 3	15 18	23 1	24 9
YIELD: Per Acre	cwt.	cwt.	cwt.	cwt.
Grain	23.1	26.6	28.6	30.1
Straw	15.7	13.6	16.9	17.6

were considerably greater in the binder group as compared with the hired combine group, but even so this disadvantage was outweighed by higher returns for grain and straw as in the case of barley in 1959. Some at least of this advantage can be attributed to the binder method of harvesting, particularly in the case of wheat where combined straw is of no use for thatch.

Table 13 Analysis of Labour and Tractor Hours According to Method of Harvesting Per Acre

	Own Binder	Hired Combine	Own Combine	
	Devon & Cornwall	Devon & Cornwall	Devon & Cornwall	Dorset
Number of farms	4	8	21	17
Acres costed per farm	12.9	11.3	20.3	38.8
Labour and Tractor Hours	Hours			
Manual - Preharvest	9.0	9.8	7.1	5.8
Harvest	17.7	5.0	6.1	5.4
Total	26.7	14.8	13.2	11.2
Tractor - Preharvest	8.3	9.0	6.4	5.4
Harvest	3.0	1.8	2.0	1.9
Total	11.3	10.8	8.4	7.3

The binder and hired combine methods, however, are used mainly on the smaller farms with small cereal acreages. Where cereal growing as a cash crop is an important enterprise the farms are generally equipped with combines, which is the case on the majority of farms on which the barley crop was costed in 1959. The 'own combine' group has been divided on a county basis because this classification shows the difference in scale of barley growing in Dorset as compared with Devon and Cornwall. There is very little difference in the returns for the two groups, and both are appreciably higher than in the binder and hired combine groups. This is most probably a result of the greater specialisation in barley growing on the larger farms. Yields of grain were a little better on the Dorset farms, but the higher returns for straw rather more than compensated this on the Devon and Cornwall farms. Total labour and power

costs were £1 11s. 0d. per acre less in the Dorset own combine group as compared with the similar group in Devon and Cornwall, and in both these groups there was a considerable advantage over the binder and hired combine groups. The advantage of scale is evident in the Dorset own combine group, particularly in respect of machinery depreciation where this fixed charge is spread over a greater acreage. The highest margin of all, £24 9s. per acre, was in the Dorset own combine group. This compared with £23 1s. per acre in the Devon and Cornwall own combine group which is in turn much better than in the binder and hired combine groups. The superiority of the results from the Dorset own combine group no doubt stems from the economy in labour and power costs which is largely the result of greater scale of production as compared with the Devon and Cornwall own combine group. The larger scale growers, with their own combines and more specialised methods of production, achieved considerably higher margins than the growers in the Devon and Cornwall binder and hired combine groups. This is achieved by both higher returns and lower costs per acre.

(2) Gross Profits

The gross profits for the 1959 barley crop have been calculated and the results are presented in Table 14 for each of the four groups. The gross profit is the sum available from the enterprise to cover the fixed costs on the farm and a contribution to profit; it is, therefore, the total gross output less the variable costs. The variable costs are those such as seed, manures, etc. which are specific to the particular crop and must be incurred if that crop is grown. Their level of employment, e.g. the amount of fertiliser or seed used can however be varied by the farmer. The fixed costs such as rent and equipment depreciation result from previous commitments and arise whether or not the particular crop is grown and they are not capable of being varied. The regular labour force of the farm for this purpose is regarded as a fixed cost because in the short run it is not easily varied.

The analysis in Table 14 is by method of harvesting and by county and this classification also takes into consideration to some extent the question of scale because it so happens that the own combine group in Dorset represents the larger scale cereal growing which is a feature of farming in East Dorset particularly. Theoretically the method of harvesting should have little effect on the level of gross output and the variations in this item between the groups probably result from a combination of factors relating to geographical conditions and managerial practices. These would include climatic and soil conditions. Thus the large scale growers in Dorset tend to specialise more in cereal production and a higher level of technical efficiency would be expected from them.

This factor may account for the higher cost of seeds, the higher level of manuring and the greater expenditure on sprays in the Dorset group. The differences in the levels of these items of variable costs no doubt influence the yield levels and therefore the value of gross output per acre. In this respect the large scale growers particularly the Dorset farmers, show an advantage over the remainder of the sample, although it must be noted that the slightly lower grain output on the Devon and Cornwall own combine group was rather more than compensated by higher straw output. Against this however, is the fact that drought conditions are comparatively unfavourable for the lighter Dorset soils.

Bearing these factors in mind, the levels of variable and fixed costs are worth considering. The highest level of variable costs occurs in the hired combine group, the contract charges in this case being the outstanding item. This is offset to some extent by the relatively lower level of fixed costs which results from less investment in machinery. However, gross output is low, which may be a reflection of the comparatively low level of manuring, and both gross profit and margin per acre are low. The margin is only a little higher in the own binder group in which variable costs are low but there is a greater incidence of fixed costs. In this group increased expenditure on seed, manures and sprays may be the right policy to increase yields and raise the level of gross profit to meet the high fixed costs and to increase the profit margin. The variable costs are relatively low in both the Devon and Cornwall and the Dorset own combine groups in spite of higher expenditure on manures and seeds, particularly in the Dorset group. The gross output in both groups was however a good deal higher with a result that gross profits too were better than in the other groups. The higher gross profits were associated also with a relatively low level of fixed costs particularly in the Dorset group which because of the combination of these factors showed the greatest margin per acre. In spite of somewhat higher fixed costs, the favourable gross profit level in the Devon and Cornwall own combine group showed a margin of £23 1s. 0d. per acre compared with £24 9s. 0d. for the Dorset farms. The scale of operation is no doubt a factor in the low level of fixed costs in the Dorset group.

From the result of this analysis it would seem that economic success in barley growing is likely to arise from a high level of gross output per acre, achieved by the optimum level of variable inputs, particularly seeds and fertilisers, and a sufficient scale of operation to spread the fixed costs and reduce the charge per acre. The farms in the Dorset sample with their larger scale of production and their own harvesting equipment succeeded in obtaining the best profit margins. In spite of the greater burden of fixed costs per acre the own combine group in Devon and Cornwall showed a profit margin only a little lower because

Table 14 Gross Profits by Method of Harvesting

Per Acre

	Own Binder	Hired Combine	Own Combine	
	Devon & Cornwall	Devon & Cornwall	Devon & Cornwall	Dorset
Number of Farms	4	8	21	17
Acres costed - total	51½	94	425½	658¾
per farm	12.9	11.8	20.3	38.8
	£ s d	£ s d	£ s d	£ s d
GROSS OUTPUT				
Grain - sold	23 12 4	1 19 9	15 18 0	20 2 7
fed	8 9	22 8 0	11 1 4	8 4 5
kept for seed	16 4	-	18 9	3 6
Total	24 17 5	24 7 9	27 18 1	28 10 6
Deficiency Payment	9 4 8	9 4 8	9 4 8	9 4 8
Straw	4 2 11	2 18 7	4 7 0	3 8 9
TOTAL GROSS OUTPUT	38 5 0	36 11 0	41 9 9	41 3 11
VARIABLE COSTS				
Seeds	1 11 10	2 2 9	1 17 11	2 6 4
Manures	2 13 1	2 13 4	2 18 1	3 7 0
Sprays	2 8	7 7	8 8	9 0
Fuel	18 0	17 0	1 0 5	15 0
Contract	1 3 11	4 0 2	5 1	2 4
Miscellaneous	12 10	4 2	3 7	9 0
TOTAL VARIABLE COSTS	7 2 4	10 5 0	6 13 9	7 8 8
GROSS PROFIT	31 2 8	26 6 0	34 16 0	33 15 3
FIXED COSTS	12 19 8	10 8 0	11 15 0	9 6 3
MARGIN	18 3 0	15 18 0	23 1 0	24 9 0

Table 15 Gross Profit - 1959

Per Acre

	Own Binder	Hired Combine	Own Combine	
	Devon & Cornwall	Devon & Cornwall	Devon & Cornwall	Dorset
GROSS OUTPUT - average all farms		£		
Grain - sold		17·43		
fed		9·96		
kept for seed		·45		
Total		27·84		
Deficiency Payment		9·23		
Straw		3·75		
TOTAL GROSS OUTPUT		40·82		
VARIABLE COSTS				
(a) Independent of Harvesting Method - average all farms:				
Seeds		2·13		
Manures		3·11		
Sprays		·43		
Total		5·67		
(b) Dependent on Harvesting Method:	£	£	£	£
Fuel	·90	·85	1·02	·75
Contract	1·20	4·01	·25	·12
Miscellaneous	·64	·21	·18	·45
TOTAL VARIABLE COSTS(a+b)	8·41	10·74	7·12	6·99
GROSS PROFIT	32·41	30·08	33·70	33·83

Note: The main classification is by method of harvesting but the own combine farms have been shown separately for Dorset because they represent larger scale barley growing. Gross output and the variable costs which are not affected by method of harvesting have been standardised. The costs which vary according to method of harvesting are shown in each group.

they obtained a slightly better gross output at a lower level of variable costs per acre. The hired combine group because of a low gross output, and a high level of variable costs, particularly contract charges, showed the lowest gross profit per acre. The relatively heavy burden of fixed costs per acre was a further factor in this group obtaining the lowest margin per acre.

In Table 15 gross profits per acre are given for the various systems of harvesting. Because only the level of some of the variable costs are dependent on the method of harvesting, mainly fuel, contract and miscellaneous charges, only these have been shown for each of the groups. The remaining variable costs, which are not dependent on the method of harvesting and the gross output have been averaged for all groups. The result is a standard gross output and standard variable costs which are independent of harvesting methods to which can be added the appropriate variable costs for each method of harvesting. A total gross profit per acre is then obtained for each method of harvesting assuming a similar level of gross output and expenditure on seeds, manures and sprays in each case. Because of the difference in scale between the own combine farms in Dorset and in Devon and Cornwall, these groups have again shown separately. On this presentation the farms with their own combines showed the greatest gross profits per acre.

V. SUMMARY

1. In this report the returns, inputs and margins of barley growing on a sample of farms in Cornwall, Devon and Dorset are summarised.

2. The agricultural statistics show that cereal growing is comparatively unimportant in the South West as a whole, but there are areas in Cornwall and Devon and particularly in Dorset where cash cereal production is an important enterprise.

3. Cereal acreages in Cornwall and Devon in 1959 were only 3% and 10% respectively greater than in 1939 but in Dorset the acreage was 79% greater.

4. The increases in the barley acreage since 1939 have been remarkable in the South West, and the rate of increase was particularly high between 1955 and 1959. For England and Wales the barley acreage was three times greater in 1959 than in 1939, compared with nearly five times for the South West Province and nearly six times in Cornwall and Dorset.

5. The popularity of barley relative to the other cereals has increased remarkably since 1939. In 1959 it accounted for 55·3% of total cereals in the South West Province compared with 13·6% in 1939. This increase in popularity is greater than for England and Wales as a whole and in Dorset it is greater than in Cornwall and Devon.

6. Conditions for early sowing were good in 1959 but a deterioration set in later with a result that some of the barley crop was sown late. Harvesting conditions were ideal.

7. The sample included 57 farms, 21 of which were located in Cornwall, 17 in Devon and 19 in Dorset. Fields or parts of fields costed numbered 132 and comprised a total 1401¼ acres, 212 in Cornwall, 449½ in Devon and 739¾ in Dorset.

8. Of the total acreage costed, 95·1% was combine harvested, varying from 75·5% in Cornwall to 100% in Dorset.

9. Total returns averaged £40 13s. 1d. per acre and inputs

£18 8s. 5d. leaving an average margin of £22 4s. 8d. per acre for all farms. The margin varied from £20 8s. 3d. per acre in Devon to £23 13s. 3d. in Dorset.

10. Average yield of grain ranged from 27·3 cwt. per acre in Cornwall to 30·1 cwt. in Dorset and was 28·9 cwt. for all farms. The yield of straw averaged 17·4 cwt. per acre.

11. In Dorset the highest returns, £41 3s. 8d. per acre, were associated with the lowest inputs, £17 10s. 5d. per acre, resulting in the highest margin. In Devon the costs were appreciably higher than in Dorset with somewhat lower returns. In Cornwall returns were still lower but costs were rather less than in Devon but greater than in Dorset.

12. Considerable economies were achieved, particularly in labour and power, on the farms where the farmers owned and used their own combines. These economies were especially marked on the larger scale units in Dorset. The highest input of labour and power were used on the farms where hired combines were employed, but conditions were particularly favourable for harvesting by binder in 1959.

13. The highest gross profits per acre were achieved generally on the farms where the farmers used their own combines, but it must be remembered that these tend to be the specialist cereal and barley growers. The own combine farms in Cornwall and Devon showed a greater gross profit than those in Dorset, the latter using higher inputs of manures and seeds. When the fixed costs are also taken into account however, the advantages of scale on the Dorset farms become evident with a result that these farms achieved the highest margin or profit level.

14. When returns and costs other than those effected by the method of harvesting are standardised, then gross profits per acre are highest on the own combine farms.

APPENDIX I

Table 1 Cropping Statistics

Crops and Grass, South West Province and England and Wales, 1959.

	Cornwall	Devon	Dorset	South West Province	England and Wales
	acres				000's acres
Barley	47,952	83,421	50,515	181,888	2,803
Wheat	4,179	7,953	13,136	25,268	1,842
Oats	9,592	29,994	8,678	48,264	1,112
Dredge and Rye	43,127	28,205	1,873	73,205	237
Total Cereals	104,850	149,583	74,202	328,625	5,994
Other Crops & Fallow	52,050	99,927	32,280	184,257	3,017
Total Tillage	156,900	249,500	106,482	512,882	9,011
Temporary Grass: Cut & grazed	226,576	299,684	104,239	630,499	4,494
Total Arable	383,476	549,184	210,721	1,143,381	13,505
Permanent Grass: Cut & grazed	245,668	601,635	236,852	1,084,155	10,966
Total Crops and Grass*	629,144	1,150,819	447,573	2,227,536	24,472

* Excluding rough grazing

Table 2 Crops and Grass, South West Province and England and Wales, 1959

Per 100 Acres

	Cornwall	Devon	Dorset	South West Province	England and Wales
	%	%	%	%	%
Barley	7·6	7·5	11·2	8·2	11·4
Wheat	·6	·7	3·0	1·1	7·5
Oats	1·5	2·6	1·9	2·1	4·5
Dredge and Rye	6·9	2·5	·4	3·2	·8
Total Cereals	16·6	13·3	16·5	14·6	24·2
Other Crops & Fallow	8·3	8·6	7·3	8·2	12·5
Total Tillage	24·9	21·9	23·8	22·8	36·7
Temporary Grass* Cut & grazed	36·0	25·8	23·3	28·3	18·4
Total Arable	60·9	47·7	47·1	51·1	55·1
Permanent Grass: Cut & grazed	39·1	52·3	52·9	48·9	44·9
Total Crops and Grass*	100·0	100·0	100·0	100·0	100·0

* Excluding rough grazing

Table 3 Trends in Cereal Acreages 1939 - 1959

	1939	1943	1947	1951	1955	1959
	acres					
Cornwall	101,084	203,917	145,264	132,249	106,436	104,850
Devon	134,920	324,834	230,477	192,661	151,073	149,583
Dorset	41,212	102,849	79,781	73,704	62,645	74,202
S.W. Province	277,216	631,654	455,522	398,614	320,154	328,625
% of England & Wales	6·8	8·3	7·1	6·3	5·4	5·5
	1939 = 100					
Cornwall	100	201	143	130	105	103
Devon	100	240	170	142	111	110
Dorset	100	249	193	178	151	179
S.W. Province	100	227	164	143	115	118
England and Wales	100	188	159	153	147	147

Table 4 Trends in Barley Acreages 1939 - 1959

	1939	1943	1947	1951	1955	1959
	acres					
Cornwall	8,139	27,138	12,476	9,518	14,095	47,952
Devon	21,262	65,248	50,152	44,068	42,235	83,421
Dorset	8,430	20,568	21,162	23,508	29,054	50,515
S.W. Province	37,837	112,954	83,790	77,094	85,384	181,888
% of England & Wales	4·1	7·3	4·5	4·4	4·1	6·4
	1939 = 100					
Cornwall	100	333	153	116	173	589
Devon	100	366	235	207	198	392
Dorset	100	243	250	278	344	598
S.W. Province	100	298	221	203	225	480
England and Wales	100	127	206	190	242	308

Table 5 Relative Importance of Barley Acreage 1939 - 1959

	1939	1943	1947	1951	1955	1959
	Per Cent of Crops and Grass					
Cornwall	1·3	4·4	2·0	1·5	2·3	7·6
Devon	1·9	5·7	4·4	3·9	3·7	7·1
Dorset	2·0	4·9	5·0	5·4	6·6	11·2
S.W. Province	1·8	5·2	3·8	3·5	3·9	8·1
England and Wales	3·7	6·4	7·7	7·1	8·6	11·4
	Per Cent of Total Cereals					
Cornwall	8·1	13·3	8·6	7·2	13·2	45·7
Devon	15·8	20·1	21·8	22·9	28·0	56·0
Dorset	20·5	20·0	26·5	31·9	46·4	67·9
S.W. Province	13·6	17·9	18·4	19·3	26·7	55·3
England and Wales	22·5	20·4	29·2	27·5	35·3	47·5

APPENDIX 2

Table 1 Yields by Varieties. 1959 Barley

	Cornwall		Devon		Dorset		All Farms	
	acres	Yield per acre	acres	Yield per acre	acres	Yield per acre	acres	Yield per acre
		cwt.		cwt.		cwt.		cwt.
Proctor	91¾	23·5	256	25·8	346¼	30·2	694	27·7
Rika	40½	30·9	142	31·2	329	29·7	511½	30·2
Freja	10	25·0	14½	21·9	34½	33·5	59	29·2
Maythorpe	13½	28·6	9	35·6	22	31·9	44½	31·6
Carlsberg	-	-	28	26·4	8	27·5	36	26·7
Herta	23½	35·0	-	-	-	-	23½	35·0
Abed Kenia	21¼	30·2	-	-	-	-	21¼	30·2
Provost	9	25·0	-	-	-	-	9	25·0
Ingrid	2½	18·0	-	-	-	-	2½	18·0

Table 2 Varieties Grown as Percentage of Total Acreage

	Cornwall	Devon	Dorset	All Farms
Total Acreage	212	449·5	739·7	1401·25
Proctor	43·2	57·0	46·8	49·5
Rika	19·1	31·6	44·5	36·4
Freja	4·4	3·2	4·7	4·2
Maythorpe	6·2	2·0	2·9	3·2
Carlsberg	-	6·2	1·1	2·5
Herta	12·0	-	-	1·8
Abed Kenia	10·0	-	-	1·5
Provost	4·0	-	-	·7
Ingrid	1·1	-	-	·2
Total	100·0	100·0	100·0	100·0

APPENDIX 3

Costing Method

(i) Labour Charges

Manual:	Adult Male	3/11	per hour
	Adult Female	2/10	" "
	Youths	2/7	" "
Horse		1/6	" "

(ii) Equipment Charges

Tractors:	Wheeled	4/-	" "
	Crawler	8/-	" "
General Implements		15/-	per acre
Binder		3/-	" "
Combine Harvester:	$\frac{\text{Capital Cost less 5\%}}{\text{11 years}} \div \text{acres cut in year}$		per acre
	Repairs	5/-	" "
Baler:	$\frac{\text{Capital Cost less 5\%}}{\text{11 years}} \div \text{acres cut in year}$		per acre
	Repairs	4/-	" "
Thresher		2/-	" "
Dutch Barn		5/-	" "
Drier and Installations	$\frac{\text{Capital Cost}}{\text{15 years}} \div \text{tons dried in year}$		per ton

(iii)	Seed	
	Purchased:	at actual cost to farmer
	Homegrown:	at 21/- per cwt. exclusive of cost of dressing.
(iv)	Overheads	Charged at 5/- per £1 of manual labour plus 10/- per acre for boundary upkeep and draining.
(v)	Manures	Artificials were charged at cost price on the farm less subsidy. One-third of these costs were carried forward to the succeeding crop, and one-third of the preceding years manure costs were brought forward to allow for unexhausted manures.
(vi)	Miscellaneous Costs	Includes fuel for combine and baler engines, baler and binder twine, sack hire, sprays, seed dressings, spars, thatch, etc.

Weighted averages have been used throughout the report except in Appendix 4 where simple averages were used.

APPENDIX 4

Standard Supplement

The figures in this Appendix are based on 132 records, on 1401¼ acres, on 57 farms.

Table 1 — Summary of Average Costs per Acre

Item of Cost	Hours			£ s
	Men	Youths	Females	
Regular Labour	12·6	·1	-	2 17
Casual and Gang Labour		·1		-
Power: Tractor		8·25		1 16
Horse		-		-
Machinery Depreciation and Repair Allowance				2 7
Contract Services				1 8
Materials: Seed				2 3
Fertilisers and Manures applied				2 15
Sundries (including fuel)				1 1
Hedging and Ditching				10
Rent				2 4
TOTAL DIRECT COSTS				17 1
Share of General Farm Expenses				14
Adjustment for Residual Manurial Values				8
GROSS COST				18 3
Credit Value of Straw				3 17
NET COST				14 6

Table 2 Summary of Average Yields and Receipts

	Quantity Per Acre	Receipts Per Cwt.
	cwt.	s. d.
Grain used on farm	11.6	20 1
Grain sold	16.2	19 10
Deficiency payment	£9 4s. 8d. per acre	

Table 3 Summary of Average Quantities of Materials and Yields Per Acre

	Area Dressed Only		Overall Average per Acre
			cwt.
Seed: Purchased) Homegrown)			1.4
Fertilisers and Manures:	Acres	Cwt. per Acre	
F.Y.M.	-	-	-
Lime	-	-	-
Artificials:			
Straights-			
Nitrogenous	696.5	.9	.4
Potassic	170.2	.8	.1
Phosphatic	96.5	2.2	.1
Compounds	1240.7	2.5	2.2
Yield of Grain: Head Corn			28.8
Tail Corn			-
Yield of Straw			17.3