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Wheat - Cost of production

April, 1960

REPORT No. 118

UNIVERSITY OF BRISTOL

Department of Economics (Agricultural Economics)
Bristol II. Province



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WHEAT PRODUCTION IN SOUTH-WEST ENGLAND

An Economic Study on 56 Farms in Cornwall,
Devon and Dorset, 1958

I, COURTENAY PARK,
NEWTON ABBOT,
DEVON.

Price Three Shillings and Sixpence

UNIVERSITY OF BRISTOL

Department of Economics
(Agricultural Economics)

WHEAT PRODUCTION IN SOUTH WEST ENGLAND

An Economic Study on 56 Farms
in Cornwall, Devon and Dorset, 1958.

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Cover Photograph:
Capelle-Wheat grown by Mr. S.G. Higman,
Higher Lillisford, Ipplepen, Near Totnes.

Yield 42 cwt grain and
46 $\frac{1}{2}$ cwt. reed per acre, 1959.

H.W.B. Luxton.

I. INTRODUCTION

The 1958 crop acreage statistics for England and Wales, the South West Province and for the three counties, Cornwall, Devon and Dorset are set out in Appendix I. For England and Wales cereals accounted for 25.2% of the total area of crops and grass. In the three South Western counties it varied from 13.5% (Devon) to 16.9% (Dorset) and averaged 15.1% for the Province. It is evident therefore that corn growing is less important in the South West than in England and Wales as a whole. Cash cereal production is comparatively important only in East Dorset and in the lower rainfall areas in Cornwall and Devon, the Newquay-Padstow district in North Cornwall and the Exeter and Kingsbridge districts in Devon. In England and Wales the wheat crop accounted for 34.2% or just over one-third of the total cereal acreage whereas in the South West Province the proportion was only 10%. There was considerable variation between the three counties, the wheat crop being least important in Cornwall with 5.5% of the total cereal acreage compared with 8.1% in Devon and 20.4% in Dorset. It is therefore only in Dorset that wheat is an important cash crop. Small acreages of wheat are grown on many farms in Cornwall and Devon because the straw is valued for thatch both for stacks and for buildings. When grown with this purpose in view the crop is harvested by binder and a special attachment is used on the threshing machine which threshes the grain and at the same time "combs" the straw and removes the flag. The wheat straw so prepared is known as "Reed" in the South West and was the material used in the roofs of many of the old farm houses and cottages, although the majority of these old roofs have been replaced with other materials. Wheat straw thatch is still being used where it's distinctive architectural features are desired.

The statistical data in the tables in Appendix I also give the trends in the total cereal and wheat acreages since 1939. The peak war time cereal acreages were reached in 1943, when the acreage for the Province was just over two and one quarter times the 1939 level. The acreage in Cornwall was double the 1939 level and in Devon and Dorset it was approximately two and a half times greater. For England and Wales the increase was not so great and the 1943 acreage was rather less than double the 1939 figure. By 1958 the position had changed radically. In Cornwall the cereal acreage had returned nearly to the 1939 level and in Devon it was only 15% greater. In Dorset however, the 1958 cereal acreage was still 84% greater than in 1939 which compared with 22% for the South West Province and 53% for England and Wales. In 1939 the South West Province accounted for 6.8% of the total cereal acreage in England and Wales compared with 5.5% in 1958.

The trends in the wheat acreage show that the crop has lost ground in the South West, the 1958 acreage was some 23% less than in 1939, compared with an increase of 26% for England and Wales. The position for the three counties varies. In Dorset the acreage was only 1% less in 1958 than in 1939 but in Devon it fell by 46% and in Cornwall by 30%. In 1939, 2.8% of the total wheat acreage in England and Wales was grown in the South West Province compared with 1.6% in 1958, an indication of the declining importance of this crop in the South West. The ratio of the wheat acreage to the total crops and grass acreage in 1958 as compared with 1939 has fallen in the South West Province from 2.2% to 1.5%, whereas for England and Wales there was an increase from 6.8% to 8.6%. The importance of the wheat acreage relative to the total cereal acreage has declined from 41.6% in 1939 to 34.2% for England and Wales. For the South West Province it has fallen from 16.9% to 10.0% with similar trends in each of the three counties.

Physical conditions for the 1958 wheat crop were comparatively favourable for sowing and growth but unfavourable at harvest time. The result was a late and prolonged harvest and reduced yields. Much of the grain, particularly in Cornwall was of such poor quality that it did not qualify for deficiency payments.

II. THE SAMPLE

Data for the 1958 wheat crop were recorded on a sample of 56 farms equally distributed between the counties of Cornwall, Devon and Dorset. The sample in Cornwall was concentrated in the arable area between Newquay and Padstow and most of the Devon farms were located in the arable area north of Exeter, stretching from Crediton to Whimble. The Dorset farms were distributed over most areas of the county except the north, but the majority were large arable farms on the chalk.

Table 1. Distribution of the Sample.

	No. of Farms	Acres Costed	Acres per Farm	No. of Fields*	Average Size of Field*	Acres of Cereals per Farm
Cornwall	19	139	7.3	19	7.3	51.9
Devon	19	205	10.8	28	7.3	56.1
Dorset	18	554	30.8	44	12.6	146.5
All Groups	56	898	16.0	91	9.9	88.3

* Fields or parts of fields.

The total area costed was 898 acres which comprised 85% of the total wheat grown on the 56 farms. An average of 16 acres per farm was costed in a total of 91 fields or parts of fields averaging 9.9 acres in size. The Dorset farms accounted for 61.7% of the total costed which was divided into 44 fields averaging 12.6 acres, compared with an average field size of 7.3 acres in Cornwall and Devon.

In table 2 the wheat acreage has been classified by county and into spring and winter groups. On the whole sample approximately two-thirds of the crop was autumn sown, with varying proportions in the counties, ranging from 100% winter wheat in Cornwall to 60% in Dorset. The higher proportion of spring wheat in Dorset is possible

because the conditions for early spring cultivations and sowing are more favourable on the chalk farms in that county.

Table 2. Spring or Winter Wheat

	Spring Wheat				Winter Wheat			
	No. of Farms	Acres		% of Total Costed	No. of Farms	Acres		% of Total Costed
		Total	Per Farm			Total	Per Farm	
Cornwall	-	-	-	-	19	139	7.3	100.0
Devon	8	61	7.6	29.6	13	144	11.1	70.4
Dorset	8	222	27.8	40.0	13	332	25.5	60.0
All Groups	16	283	17.7	31.5	45	615	13.7	68.5

Note: 5 farms, 3 in Dorset and 2 in Devon grow both spring and winter wheat.

Particulars of the method of harvesting are given by county in table 3. For the whole sample, nearly three quarters or 72.4% of the acreage costed was combined. In Dorset, 100% was combined compared with 26.6% in Devon. It is clear from the analysis of the sample

Table 3. Method of Harvesting

	Combined				Cut and Threshed			
	No. of Farms	Acres		% of Total Costed	No. of Farms	Acres		% of Total Costed
		Total	Per Farm			Total	Per Farm	
Cornwall	5	42	8.4	30.0	14	98	6.9	70.0
Devon	6	54	9.8	26.6	13	150	11.6	73.4
Dorset	18	554	30.7	100.0	-	-	-	-
All Groups	29	650	22.4	72.4	27	248	9.2	27.6

that wheat growing in Dorset is in many ways a different enterprise than in Cornwall and Devon. The overall cropping statistics referred to earlier would suggest that the wheat crop is of comparatively greater importance in the economy of the farming in Dorset than in Cornwall and Devon. In Dorset there is a greater preference for spring wheat, the crop is grown on a larger scale and in the sample the whole acreage was combined. These differences therefore, to a large extent determine the pattern of the analysis of the returns, inputs and margins of wheat production in the three counties.

III. RETURNS, INPUTS AND MARGINS. 1958 WHEAT CROP

(1) Summary of Financial Results

The financial results for the 1958 wheat crop are summarised in table 4. The results are shown for the counties separately and aggregated for the whole sample and they are expressed both per acre and per hundred-weight of grain. The yields of grain and straw are also shown.

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

	Cornwall	Devon	Dorset	All Groups
	£ s d	£ s d	£ s d	£ s d
<u>Per Acre</u>				
Returns - Grain	21 8 0	38 4 0	42 12 0	38 7 0
Straw	4 7 0	7 4 0	3 6 0	4 7 0
	25 15 0	45 8 0	45 18 0	42 14 0
Inputs	21 3 0	26 3 0	21 11 0	22 10 0
Margin	4 12 0	19 5 0	24 7 0	20 4 0
<u>Per Cwt</u>				
Returns - Grain	1 6 2	1 9 10	1 8 6	1 8 7
Inputs*	1 0 6	14 9	12 3	13 7
Margin	5 8	15 1	16 3	15 0
<u>Yields</u>	cwt	cwt	cwt	cwt
Grain	16.3	25.6	30.0	26.9
Straw	17.9	27.2	16.9	21.4
<u>Average Prices</u>		Per Cwt.		
	£ s d	£ s d	£ s d	£ s d
Grain†	1 6 2	1 9 10	1 8 6	1 8 7
Straw	5 8	5 4	3 11	5 0

* Total inputs less value of straw.

† Including deficiency payments.

The main feature of the financial results is the variation in returns and margin per acre as between counties. These results reflect the varying conditions under which wheat is produced in the South West. The Dorset sample represents relatively large scale grain production on arable farms, typical of much of the farming in Southern England. A large measure of efficiency in corn growing has been reached on these farms and combine harvesting is the general rule. In spite of the rather unfavourable harvesting conditions in 1958, a good grain yield averaging 30 cwts per acre was obtained and the returns per hundred-weight of grain were only a little lower than in Devon where a proportion of the crop was harvested by binder and threshed from the stack. Although in Dorset the straw was either burned or ploughed in on 81.5 acres or 14% of the total, the straw harvested averaged 16.9 cwt per acre and contributed £3. 6s. 0d. per acre to total returns. In spite of the high level of returns total inputs were only a little above the lowest level which occurred on the Cornish sample. The resulting margin of £24. 7s. 0d. per acre, which represents management and investment income, was the highest of the three groups.

The next highest margin £19. 5s. 0d. per acre, was achieved on the Devon farms. Although grain yield was rather lower, 25.6 cwts per acre, total returns were nearly as high as in Dorset, the lower grain yield being largely offset by a higher return per cwt and the additional value of the straw. In the Devon sample all the straw was harvested and the higher returns stem, at least partly, from the use of binders. Inputs, however, were considerably higher in the Devon group.

The lowest margins were obtained in the Cornish group, the average being £4. 12s. 0d. per acre. Although the inputs were the lowest for the three groups, the returns were also very low, resulting from a poor grain yield of 16.3 cwt per acre which realised the lowest price per cwt and a much lower yield of straw than in Devon. The low returns from straw in Cornwall is surprising because there is a considerable demand by dairy farmers in South West Cornwall for bedding straw, and a high proportion of the crop was harvested by binder. There is some evidence however, that the weather conditions at harvest time affected the Cornish sample to a greater extent than in Devon and Dorset.

On 17.5 acres or 12% of the total, the straw was not harvested and the average quality of the grain was low as borne out by the returns per cwt. In fact much of the grain failed to qualify for deficiency payments because of poor quality. There is little doubt that on well equipped arable farms in Dorset grain crops can be harvested more effectively under unfavourable weather conditions than on smaller

mixed farms in the South West, where harvesting is largely by binder or by a contractor's combine.

An analysis of the utilisation of the 1958 wheat crop is made in table 5. Just over 20% of the grain in Cornwall was retained for stock-feed compared with very little in Devon and Dorset. The highest proportion of straw sold was in Dorset nearly one-third of the total. Some 40.7% in Cornwall was used for thatch and 15.8% in Devon.

Table 5. Utilisation of the Wheat Crop

	Cornwall	Devon	Dorset
	%	%	%
<u>Grain</u>			
Sold	78.0	97.4	94.1
Kept - seed	1.8	.8	.3
feed	20.2	1.8	5.6
Total	100.0	100.0	100.0
<u>Straw</u>			
Sold	21.5	18.3	31.5
Kept - litter	37.8	65.9	68.5
thatch	40.7	15.8	-
Total	100.0	100.0	100.0

(2) Analysis of Inputs

In the summary of the financial results the variations in components of total returns, i.e. yields of grain and straw and the prices obtained have been discussed, but only the variations in total inputs as between groups have been noted. The inputs have been analysed in greater detail and the results are given in the tables which follow. The level of the various inputs determines not only the total cost level but also the level of returns, for example the rate of manuring and the quality of seed used may directly affect yields.

Table 6. Analysis of Inputs

Per Acre

	Cornwall	Devon	Dorset	All Groups
	£ s.	£ s.	£ s.	£ s.
Labour and Power:				
Manual	6 3	5 6	2 14	3 15
Horse	4	-	-	1
Tractor	2 6	2 7	1 17	2 1
Machinery Depreciation	1 4	1 10	2 2	1 16
Contract	1 17	2 4	1 18	1 19
Total	11 14	11 7	8 11	9 12
Seeds	2 17	3 3	3 4	3 3
Manures (net)	1 4	5 17	4 12	4 7
Rent	1 12	2 13	2 6	2 6
Overheads:				
General	1 11	1 6	13	19
Hedging and Drainage	10	10	10	10
Miscellaneous	1 15	1 7	1 15	1 13
Total	21 3	26 3	21 11	22 10

Table 7.

Analysis of Inputs

Per Cent

	Cornwall	Devon	Dorset	All Groups
	%	%	%	%
Labour and Power:				
Manual	29.2	20.2	12.4	16.9
Horse	.8	-	-	.1
Tractor	10.8	9.1	8.6	9.0
Machinery Depreciation	5.7	5.6	9.7	8.0
Contract	8.8	8.5	8.8	8.8
Total	55.3	43.4	39.5	42.8
Seeds	13.5	12.1	14.9	13.9
Manures (net)	5.7	22.1	21.6	19.4
Rent	7.4	10.2	10.6	10.1
Overheads:				
General	7.3	5.1	3.0	4.2
Hedging and Drainage	2.4	1.9	2.3	2.2
Miscellaneous	8.4	5.2	8.1	7.4
Total	100.0	100.0	100.0	100.0

Table 8.

Analysis of Labour Hours

	Cornwall			Devon			Dorset			All Groups		
	Hrs.	£	s.	Hrs	£	s.	Hrs	£	s.	Hrs	£	s.
<u>Preharvest</u>												
Manual	10 $\frac{1}{4}$	1	19	7	1	8	6 $\frac{1}{2}$	1	4	7	1	7
Horse	2		3	-		-	-		-	2 $\frac{2}{3}$		1
Tractor	8 $\frac{1}{2}$	1	14	6 $\frac{1}{2}$	1	7	6	1	5	6 $\frac{1}{2}$	1	7
Contract	-		4	-		-	-		2	-		2
Total	-	4	0	-	2	15	-	2	11	-	2	17
<u>Harvesting</u>												
Manual	19	4	4	20 $\frac{1}{2}$	3	18	8	1	10	13 $\frac{3}{4}$	2	8
Horse	2 $\frac{2}{3}$		1	-		-	-		-	-		-
Tractor	3		12	5	1	0	3		12	3 $\frac{1}{2}$		14
Contract	-	1	13	-	2	4	-	1	16	-	1	17
Total	-	6	10	-	7	2	-	3	18	-	4	19
<u>All Operations</u>												
Manual	29 $\frac{1}{4}$	6	3	27 $\frac{1}{2}$	5	6	14 $\frac{1}{2}$	2	14	20 $\frac{3}{4}$	3	15
Horse	2 $\frac{2}{3}$		4	-		-	-		-	2 $\frac{2}{3}$		1
Tractor	11 $\frac{1}{2}$	2	6	11 $\frac{1}{2}$	2	7	9	1	17	10	2	1
Contract	-	1	17	-	2	4	-	1	18	-	1	19
Total	-	10	10	-	9	17	-	6	9	-	7	16

(i) Labour and Power

In tables 6 and 7 the inputs have been classified and the items in labour and power have been grouped. In table 8 a further analysis is shown. Labour and power together account for 42.8% of the total costs of growing wheat for the sample as a whole. The variation between counties is considerable and the figures range from 55.3% in Cornwall to 39.5% in Dorset. The greatest variation is in the manual labour input which in Dorset is only £2 14s. Od. per acre compared with £6 3s. Od. in Cornwall. Although manual labour is somewhat lower in the Devon group than in the Cornwall group, total labour and power inputs are very similar. The labour economy in the Dorset group results from the greater degree of mechanisation and although a higher charge for machinery depreciation is incurred the total labour and power inputs are only £8 11s. Od. on the Dorset farms compared with £11 14s. Od. and £11 7s. Od. respectively in the Cornwall and Devon samples. Whereas in Cornwall manual labour is the greatest single input, it is lower than manures in Devon and less than both seeds and manures in Dorset. The figures in table 8 show that the preharvest manual labour input was higher in Cornwall than in Devon or Dorset but the greatest economy in manual labour is in the harvesting and threshing operations in Dorset where only 8 hours were used compared with 19 in Cornwall and 20½ in Devon. This is accounted for by the fact that all the wheat in Dorset was combine harvested.

(ii) Seed

Particulars of seed used and rate of seeding are given in table 9. On average approximately one quarter, or 25.8% of the seed used was homegrown compared with rather less than a quarter in Devon

Table 9. Seed Details

	Homegrown			Purchased		
	% of Total Seed Used	Seed Rate per Acre	Cost per Cwt.	% of Total Seed Used	Seed Rate per Acre	Cost per Cwt.
	%	cwt	£ s d	%	cwt	£ s d
Cornwall	33.2	1.6	1 5 0	66.8	1.6	2 1 7
Devon	24.6	1.7	1 5 0	75.4	1.6	2 0 10
Dorset	24.4	1.4	1 5 0	75.6	1.6	2 6 4
All groups	25.8	1.5	1 5 0	74.2	1.6	2 4 4

and Dorset. Homegrown seed was valued at 25s. 0d. per cwt at sowing time and the average price of purchased seed was £2 4s. 4d. per cwt. The most expensive seed was used in Dorset, the average price paid being £2 6s. 4d. compared with £2 1s. 7d. and £2 0s. 10d. per cwt in Cornwall and Devon respectively. The more expensive and higher proportion of purchased seed used in Dorset may have some bearing on the higher yields achieved on the Dorset farms. The majority of the seed was dressed, the exceptions being 17.6% of the homegrown and 6.2% of the commercial seed.

(iii) Manuring and Position in the Rotation

The net cost of manuring the wheat crop is shown in table 10 for the individual counties and the average for the whole sample.

Table 10. Analysis of Manuring*

	Cornwall	Devon	Dorset	All Groups
	£ s.	£ s.	£ s.	£ s.
Artificial (net)	19	3 9	3 12	3 3
Farmyard Manure (net)	5	2 8	1 0	1 4
Total	1 4	5 17	4 12	4 7

* Net of Residues brought and carried forward.

The net figures for the artificial fertilisers represent very closely the value of fertilisers applied directly to the wheat crop, because in each group the values of the residues brought and carried forward were almost equal. The net figures for farmyard manure are influenced to a greater extent by residues brought forward from preceding crops, and direct application of farmyard manure to the wheat crop was made in only a limited number of cases. The place of the wheat crop in the rotation will to a large extent determine the amount of manurial residues from preceding crops. When wheat follows root crops, which often receive a large application of dung, a high charge for residues will be borne by the wheat. The charge for dung in the Devon group is particularly high and this combined with high level of artificial application results in the highest total manuring charge between the county samples. The level of manuring was very low in the Cornish sample, only 19 shillings worth of artificial fertilisers being used, compared with £3 9s. 0d. in Devon and £3 12s. 0d. in

Dorset. It is very likely that the low manuring level in Cornwall is a factor in the low yield in that sample.

Table 11. Proportion of Total Acreage to which Manures were Directly Applied.

	Cornwall	Devon	Dorset	All Groups
	Per Cent of Acreage			
No Manures	51.4	5.1	1.1	9.8
Compounds only	4.9	36.0	42.5	35.2
Nitrogen "	23.4	14.0	-	6.8
Phosphate "	-	6.1	1.8	2.5
Mixture of above	20.3	38.8	54.6	45.7
Total	100.0	100.0	100.0	100.0

The analysis of manures applied in table 11 shows that on just over half the acreage in the Cornish sample no fertilisers were applied, while in Devon and Dorset only small acreages received no fertilisers. In Devon and Dorset and in the whole sample various mixtures of the fertilisers shown in table 11 was the most popular treatment. In the whole sample 45.7% of the acreage received this treatment, 38.8% in Devon and 54.6% in Dorset. On 35.2% of the total acreage compounds only were applied compared with 36% in Devon and 42.5% in Dorset.

Table 12. Preceding Crop

	Winter Wheat			Spring Wheat	
	Corn-wall	Devon	Dorset	Devon	Dorset
	Per Cent of Acreage				
Preceding Crop:					
Cereal	9.4	48.4	2.9	23.9	4.7
Grass	90.6	32.6	78.4	16.1	42.1
Root and Green Crops	-	15.2	8.1	58.8	44.2
Bare Fallow	-	3.8	10.6	-	-
Vegetables	-	-	-	1.2	-
Lucerne	-	-	-	-	9.0
Total	100.0	100.0	100.0	100.0	100.0

In table 12 the sample has been divided into winter and

spring wheat for the analysis of preceding crops because winter and spring wheat tend to occupy somewhat differing positions in the rotation. Spring wheat for example, tends to follow the rootbreak more frequently than winter wheat because it is not often possible to clear roots and particularly green crops in time for autumn sowing. A high proportion of the wheat crop followed cereals in Devon compared with very little in Cornwall and Dorset. In Cornwall, the bulk of the wheat, 90.6% followed grass and in Dorset the proportion was nearly as high. In Devon 58.8% and in Dorset 44.2% of the spring wheat followed either roots or green crops.

(iv) Rent

The highest rent charges per acre were on the arable farms in Devon and averaged £2 13s. Od. In the Cornwall group, the farms are situated on the thinner soils of the coastal belt north of Newquay and the rental value was only £1 12s. Od.

Although the average rent per acre in Dorset was £2 6s. Od. it varied from about £3 10s. Od. on those farms in the west of the county to approximately £1 15s. Od. on the chalk farms further east.

(v) Overheads

As might have been expected, the cost of depreciation in respect of special machinery (i.e. combines, balers, dryers, etc.) was highest in Dorset where all the crop was combine harvested.

Since the share of general farm expenses attributed to the wheat were allocated on a manual labour basis, these charges were consequently highest on the Cornwall farms and lowest in Dorset.

IV. COMPARISON OF WINTER AND SPRING WHEAT

For the comparison of the results from winter and spring wheat two groups of farms in Dorset have been selected because a higher proportion of spring wheat was grown on the farms in the Dorset sample, 40% compared with approximately 30% in Devon and none in Cornwall, and because other conditions were more homogeneous. By restricting the comparison to the Dorset farms and to those on which the harvesting was carried out by the owners combines, uniformity of the conditions, including weather, soil and scale of operation are reasonably assured. The results of the analyses are set out in table 13.

The returns from the winter wheat exceeded those from the spring wheat by £7 per acre, the greater return being almost wholly due to the higher yield of grain for the winter wheat which exceeded spring wheat by nearly $5\frac{1}{2}$ cwt. per acre. The average prices received for the winter and spring wheat were very similar, £1 8s. 5d. and £1 8s. 11d. respectively. On the costs side there was very little difference in total inputs, £21 7s. 0d. for the winter compared with £21 0s. 0d. per acre for the spring wheat. Although labour and power inputs were rather lower for the winter wheat, this was more than outweighed by higher expenditure on other inputs. The resulting margin was £6 13s. 0d. per acre higher for the winter wheat than for the spring wheat on this sample of farms.

Some caution is necessary in the interpretation of these results as they apply to a limited sample in one area and in one year only. It has already been shown that winter and spring wheat tend to occupy different positions in the rotation and therefore they are not perfect substitutes. Spring wheat is also often sown as a second choice when it was not possible to grow winter wheat because of unfavourable weather for autumn sowing or because the land could not be cleared of the previous crop in time for winter wheat. If it is possible to sow either winter or spring wheat then it is legitimate to comprise the two crops, but if winter wheat is not possible, then the choice may be between spring wheat or another spring sown cereal, e.g. barley. There are other considerations too in the choice between winter and spring sown cereals, such as the advantages of spreading the work load of cultivations and in the time differential in ripening which helps to spread the peak in the harvesting operations.

Table 13. Comparison of Results Winter and Spring Wheat 1958
Dorset. Own Combine only.

Per Acre

	Winter		Spring	
Number of farms	10		7	
Number of lots	19		17	
Acreage of wheat: Total	284		218.5	
Per Farm	28.4		31.2	
	£ s		£ s	
<u>RETURNS</u>				
Grain	46 9		39 12	
Straw	3 6		3 3	
TOTAL RETURNS	49 15		42 15	
<u>INPUTS</u>	Hrs	£ s	Hrs	£ s
Labour and Power:				
Preharvest - Manual	6.3	1 4	6.3	1 3
Tractor	5.7	1 2	5.9	1 7
Contract	-	-	-	5
Harvest - Manual	8.4	1 11	7.7	1 8
Tractor	3.2	13	2.7	11
Contract	-	17	-	1 6
Total Labour	-	5 7	-	6 0
Fuel		2		4
Machinery Depreciation		2 3		2 5
Total Labour & Power		7 12		8 9
Other Inputs		13 15		12 11
TOTAL INPUTS		21 7		21 0
MARGIN		28 8		21 15
<u>YIELD: Per Acre</u>	cwt.		cwt.	
Grain	32.7		27.3	
Straw	14.7		17.6	

V. METHOD OF HARVESTING

The methods of harvesting the wheat crop varied considerably in 1958 on the sample of farms costed. An analysis of this aspect has already been given in table 3. Combining was universal in the Dorset sample, but nearly three quarters of the crop was cut by binder and threshed in the samples in Devon and Cornwall. In table 14 the results of an analysis of the financial data by method of harvesting is given with particular emphasis on labour and power requirements. In table 15 an analysis of manual labour and tractor time is shown. Some attention has been given to scale, and because the results from the Cornish sample were somewhat out of line with the rest from the point of view of yields and weather conditions at harvest, they have not been included in this analysis.

The total area of cereals per farm give an indication of the scale of cereal production on the four groups of farms, and the scale of wheat growing follows approximately this pattern. In the binder group of Devon farms labour and power costs, particularly manual labour, are high but returns are also comparatively good, partly because of the higher revenue from straw which may result from the binder method of harvesting. The heavy manual labour requirement for harvesting by binder and threshing is clearly illustrated in table 15.

The combine harvested wheat has been divided into three groups, the first group, smaller scale units harvested by contract combines, the second group, smaller scale units harvested by owners' combines and the third group, larger scale units also harvested by owners' combines. In both smaller scale groups costs are lower than in the Devon binder group, the differences in costs being mostly in the labour and power group of inputs. Even on the smaller units, where an average of 78.4 acres of cereals are grown, costs particularly at harvest where combines are owned are appreciably less than where harvesting is carried out by contract combining. The greatest economy in costs is shown by the larger scale cereal growers in the Dorset sample on which farms the wheat acreage averaged nearly 40 acres and total cereals 249 acres. In this group, total labour and power costs averaged £7 14s. Od. per acre compared with £12 6s. Od. in the Devon binder group. Total labour and power costs in the smaller scale combine groups were intermediate between these extremes. On the large scale own combine Dorset group there were also economies in "other inputs" so that total costs were £20 3s. per acre compared with £26 11s. in the Devon binder group. Returns also were highest

Table 14. Comparison of Results by Method of Harvesting

	<u>Per Acre</u>			
	Binder Devon	Combine Contract Devon & Dorset	Own Combine Devon & Dorset	Own Combine Dorset - Lge. Scale
Number of farms	12	7	6	8
Number of lots	18	10	12	19
Acreage of wheat: Total	150.5	67.0	81.75	314.5
Per Farm	12.5	9.6	13.6	39.3
Total cereals: Acs. " "	53.9	100.1	78.4	249.1
	£ s.	£ s.	£ s.	£ s.
<u>RETURNS</u>				
Grain	37 15	33 12	29 19	46 7
Straw	7 17	4 5	3 7	2 15
TOTAL RETURNS	45 12	37 17	33 6	49 2
<u>INPUTS</u>				
Labour and Power:				
Preharvest - Manual	1 10	1 2	1 5	1 1
Tractor	1 8	1 3	1 4	1 5
Contract	-	4	-	3
Harvest - Manual	4 16	1 0	1 2	1 8
Tractor	1 6	8	10	10
Contract	2 3	4 17	2 11	19
Total Labour	11 3	8 14	6 12	5 6
Fuel	-	2	1	3
Machinery Depreciation	1 3	1 11	1 17	2 5
Total Labour & Power	12 6	10 7	8 10	7 14
Other Inputs	14 5	15 3	14 0	12 9
TOTAL INPUTS	26 11	25 10	22 10	20 3
MARGIN	19 1	12 7	10 16	28 19
<u>YIELD: Per Acre</u>	cwt.	cwt.	cwt.	cwt.
Grain	25.6	24.1	19.7	31.5
Straw	28.7	22.9	12.0	15.1

in the large scale Dorset group, largely because of the superior grain yield, the returns from grain averaging £46 7s. 0d. per acre compared with £37 15s. 0d. in the Devon binder group, the next highest. Because of high returns and low costs, the margin in the large scale Dorset group is most satisfactory, £28 19s. 0d. per acre, nearly £10 per acre greater than in the Devon binder group and nearly three times as high as in the group with the lowest margin. The results from the Dorset large scale own combine group illustrate a high degree of efficiency in wheat production. Economies of scale are achieved because the large acreage of cereals per farm allows efficient mechanisation and specialisation in cereal growing has allowed the achievement of high returns per acre, in fact the highest of the groups costed.

Table 15. Analysis of Labour and Tractor Hours according to Method of Harvesting.
Per Acre

	Binder	Combine Contract	Own Combine	Own Combine
	Devon	Devon & Dorset Smaller Scale		Dorset - Lge. Scale
Number of farms	12	7	6	8
Acres of wheat per farm	12.5	9.6	13.6	39.3
<u>Labour & Tractor Hours</u>	Hours			
Manual - Preharvest	8.0	6.0	6.8	5.8
Harvest	25.6	5.5	5.7	7.5
Total	33.6	11.5	12.5	13.3
Tractor- Preharvest	7.0	6.0	6.0	5.5
Harvest	6.2	2.0	2.5	2.5
Total	13.2	8.0	8.5	8.0

VI. SUMMARY

1. This report summarises the returns, inputs and margins of growing wheat on a sample of 56 farms in Cornwall, Devon and Dorset for the 1958 harvest year.
2. In Cornwall and Devon the 1958 wheat acreage was well below the 1939 level but in Dorset the 1958 acreage was within 1% of the 1939 figure.
3. Although conditions for autumn and spring sowing were favourable and 1958 was a good growing season, weather at harvest time was extremely unfavourable.
4. Cereal production is comparatively more important in East Dorset than in either Cornwall or Devon. The greater scale of cereal production in general and wheat in particular in Dorset is illustrated by the Dorset sample. Considerable variations exist in the extent of mechanisation, particularly in harvesting, and in the proportion of winter and spring wheat grown.
5. Records were obtained from 56 farmers, 18 of whom were in Dorset, 19 in Devon and 19 in Cornwall. The area costed was 554 acres in Dorset, 205 acres in Devon and 139 acres in Cornwall which totalled 898 acres in the three counties.
6. Of the total wheat costed in Dorset 40% was spring sown compared with 30% in Devon and none in Cornwall.
7. In the Dorset sample the whole acreage was combine harvested compared with less than one-third in Devon and Cornwall. The average for the whole sample was 72% combined.
8. The margin, which is the net difference between inputs and returns averaged £20. 4s. Od. per acre for the whole sample. The lowest margin, £4 12s. Od. per acre was in the Cornish sample and the highest, £24 7s. Od. per acre was made by the Dorset group. The average margin in the Devon group was £19 5s. Od. per acre. The low margin in the Cornish sample was due to low yields rather than high costs.
9. Total costs per acre in the Dorset and Cornwall groups were very similar, but the composition of the costs differed greatly. The economy in labour costs in the mechanised Dorset group was largely offset by greater expenditure on fertilisers, but the additional

costs of manures would appear to be fully justified when the Dorset and Cornish yields are compared. The returns for grain in the Dorset sample were almost double the Cornish figures, the resulting margin was therefore much greater in Dorset, in fact just over five times as high as in Cornwall. In the Devon group both costs and returns were comparatively high resulting in a margin somewhat lower than in Dorset.

10. Yields of grain, an important factor in profitability, were 16.3, 25.6 and 30.0 cwt. per acre in Cornwall, Devon and Dorset respectively and averaged 26.9 cwt. per acre for the whole sample.
11. A comparison of the results from winter and spring wheat made on a sample of similar farms in Dorset showed that the winter crop was more profitable, the respective margins being £28 8s. and £21 15s. per acre for winter and spring wheat. Costs were very similar in both groups, but the returns were higher for the winter wheat because of better grain yields, 32.7 compared with 27.3 cwt. per acre.
12. The analysis by method of harvesting shows that wheat growing in the Dorset sample is much more highly mechanised and on a larger scale. While the benefits of mechanisation and scale lead to reduced labour costs, technical efficiency in wheat growing has not been sacrificed. In fact, levels of manuring and cultivation are such that yields, returns and margins per acre on the larger scale Dorset units are higher than for any other group.

APPENDIX I.

Table 1. Cropping Statistics

Crops and Grass, South West Province and England and Wales, 1958.

	Cornwall	Devon	Dorset	South West Province	England and Wales
	acres				000's acres
Wheat	5932	12443	15439	33814	2115
Barley	38136	70829	46359	155324	2526
Oats	11825	37442	11258	60525	1247
Dredge	51096	33779	2621	87496	294
Total Cereals	106989	154493	75677	337159	6182
Other Crops & Fallow	52350	102733	34723	189806	3129
Total Tillage	159339	257226	110400	526965	9311
Temporary Grass:					
Cut	96556	149075	58535	304166	2446
Grazed	123099	140520	40312	303931	1732
Total Arable	378994	546821	209247	1135062	13489
Permanent Grass:					
Cut	45637	142626	94867	283130	3087
Grazed	204740	460450	142816	808006	7930
Total Crops and Grass*	629371	1149897	446930	2226198	24506

* Excluding rough grazing.

Table 2. Crops and Grass, South West Province and
England and Wales, 1958.

Per 100 Acres

	Cornwall	Devon	Dorset	South West Province	England and Wales
	%	%	%	%	%
Wheat	.9	1.1	3.4	1.5	8.6
Barley	6.1	6.2	10.4	7.0	10.3
Oats	1.9	3.3	2.5	2.7	5.1
Dredge	8.1	2.9	.6	3.9	1.2
Total Cereals	17.0	13.5	16.9	15.1	25.2
Other Crops & Fallow	8.3	8.9	7.8	8.5	12.8
Total Tillage	25.3	22.4	24.7	23.6	38.0
Temporary Grass:					
Cut	15.3	13.0	13.1	13.7	10.0
Grazed	19.6	12.2	9.0	13.7	7.0
Total Arable	60.2	47.6	46.8	51.0	55.0
Permanent Grass:					
Cut	7.3	12.4	21.2	12.7	12.6
Grazed	32.5	40.0	32.0	36.3	32.4
Total Crops and Grass*	100.0	100.0	100.0	100.0	100.0

* Excluding rough grazing.

Table 3. Trends in Cereal Acreages 1939 - 1958

	1939	1943	1947	1951	1955	1958
	acres					
Cornwall	101084	203917	145264	132249	106436	106989
Devon	134920	324834	230477	192661	151073	154493
Dorset	41212	102849	79781	73704	62645	75677
S.W. Province	277216	631654	455522	398614	320154	337159
% of England and Wales	6.8	8.3	7.1	6.3	5.4	5.5
	1939 = 100					
Cornwall	100	202	144	131	105	106
Devon	100	241	171	143	112	115
Dorset	100	250	194	179	152	184
S.W. Province	100	228	164	144	115	122
England and Wales	100	189	159	156	147	153

Table 4. Trends in Wheat Acreages 1939 - 1958

	1939	1943	1947	1951	1955	1958
	acres					
Cornwall	8509	34951	16901	7750	5787	5932
Devon	22893	95459	47705	18267	11529	12443
Dorset	15561	49996	31102	20451	14660	15439
S.W. Province	46963	180406	95708	46468	31976	33814
% of England and Wales	2.8	5.5	4.6	2.3	1.7	1.6
	1939 = 100					
Cornwall	100	411	199	91	68	70
Devon	100	417	208	80	50	54
Dorset	100	321	200	131	94	99
S.W. Province	100	384	204	99	68	72
England and Wales	100	195	123	122	113	126

Table 5. Relative Importance of Wheat Acreage 1939 - 58

	1939	1943	1947	1951	1955	1958
	Per Cent of Crops and Grass					
Cornwall	1.4	5.7	2.7	1.2	.9	.9
Devon	2.0	8.4	4.2	1.6	1.0	1.1
Dorset	3.7	11.8	7.3	4.7	3.3	3.5
S.W. Province	2.2	8.3	4.4	2.1	1.4	1.5
England and Wales	6.8	13.5	8.5	8.4	7.7	8.6
	Per Cent of Total Cereals					
Cornwall	8.4	17.1	11.6	5.9	5.4	5.5
Devon	17.0	29.4	20.7	9.5	7.6	8.1
Dorset	37.8	48.6	39.0	27.7	23.4	20.4
S.W. Province	16.9	28.6	21.0	11.7	10.0	10.0
England and Wales	41.6	43.0	32.2	32.6	31.8	34.2

APPENDIX 2

Table 1. Varieties Grown. Per Cent of Acreage

Varieties	Cornwall	Devon	Dorset	All Groups
	%	%	%	%
<u>WINTER</u>				
Capelle	59.2	56.5	58.1	57.9
Squarehead	-	1.9	1.8	1.6
Banco	3.6	4.4	-	1.6
Victor	9.5	-	-	1.5
Little Joss	9.4	-	-	1.4
No. 59	-	6.1	-	1.4
Yveline	7.9	-	-	1.2
Hybrid 46	5.2	-	-	.8
Leda	2.7	-	-	.4
Benign	2.5	-	-	.4
Red Standard	-	1.5	-	.3
TOTAL WINTER	100.0	70.4	59.9	68.5
<u>SPRING</u>				
Atle	-	8.7	19.6	14.1
Svenno	-	13.9	6.7	7.2
Atson	-	1.2	7.3	4.8
Koga II	-	1.2	4.5	3.1
Fylgia	-	3.6	2.0	2.1
Peko	-	1.0	-	.2
TOTAL SPRING	-	29.6	40.1	31.5
ALL WHEAT	100.0	100.0	100.0	100.0

APPENDIX 3

Costing Method

(i) Labour Charges

Manual:	Adult Male	3/9 per hour
	Adult Female	2/9 " "
	Youths	2/6 " "
Horse		1/6 " "

(ii) Equipment Charges

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

(iii) Seed

Purchased: at actual cost to the farmer

Homegrown: at 25/- per cwt exclusive of cost of dressing.

(iv) Overheads

Charged at 5/- per £ of manual labour, plus 10/- per acre for boundary upkeep and draining.

(v) Manures

Artificially 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 89 records, on 897 $\frac{3}{4}$ acres, on 56 farms.

Table 1. Summary of Average Costs per Acre

Item of Cost	Hours			£ s.
	Men	Youths	Females	
	Regular Labour	17.8	5.4	
Casual and Gang Labour		.9		4
Power: Tractor		11.1		2 5
Horse		.8		1
Machinery Depreciation & Repair Allowance				1 9
Contract Services				2 11
Other Fuel				2
Materials: Seed				3 5
Fertiliser and Manures applied				2 12
Sundries				1 8
Rent				2 3
TOTAL DIRECT COSTS				20 11
Share of General Farm Expenses				1 14
Adjustment for Residual Manurial Values				18
GROSS COST				23 3
Credit Value of Straw				5 6
NET COST				17 17

Table 2. Summary of Average Yields and Receipts.

	Quantity Per Acre	Receipts Per Cwt.	
	cwt.	s.	d.
Grain Used on Farm	1.8	12	6
Grain Sold	21.3	20	0
Deficiency Payment Receipts	-	6	3

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

Material			Overall Average per Acre
			cwt.
Seed: Purchased) Homegrown)			1.6
Fertilisers and Manures:			
Area Dressed Only			
	Acres	Cwt. per Acre	
F.Y.M.	44½	200.0	3.6
Lime	-	-	-
Artificialals:			
Straights			
Nitrogenous	471½	1.9	.9
Potassic	57	1.5	.1
Phosphatic	39	2.6	.2
Compounds	673¼	2.6	1.6
Yield of Grain: Head Corn			22.7
Tail Corn			.2
Yield of Straw			20.8

