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Sugar beets -
Cost of
production
6-5.

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UNIVERSITY OF MANCHESTER
Faculty of Economic and Social Studies

AGRICULTURAL ECONOMICS DEPARTMENT
(Shropshire and Staffordshire Area)

Sugar Beet Costs and Returns
1947 Crop

April 1948

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INTRODUCTION

The scope of this annual inquiry into the economics of sugar beet production has been still further extended this year with a view to increasing representation in the sample of the very small scale grower. Cost data was obtained from 61 farms in Shropshire and Staffordshire, individual enterprises ranging in size from one acre to $66\frac{1}{2}$ acres. Although the sample contains 11 growers over 30 acres not a single example of mechanical harvesting was recorded..

Distance from the factory varied from one to 35 miles, the overall average being approximately sixteen. Generally speaking the large scale growers are found at or near the centre of the factory areas and the smallest growers around the outer perimeter. An increasing number of large growers are acquiring their own transport. Apart from the general consideration of relative cheapness, private transport for beet haulage has other advantages. In favourable weather it permits the direct haulage of beet from field to factory thus eliminating double loading and secondly it facilitates the regular transport of wet pulp supplies back to the farm.

An explanation of the methods and standards used in the subsequent calculations will be found in the appendix on page 10.

Factory Data

Shropshire and Staffordshire are served by the two factories at Allscott and Kidderminster so that there is no suitable beet growing area in the two counties which is excessively distant from one or other of these factories.

TABLE I

Distribution of Growers in Acreage Groups (a)

Size Group	Number of Growers	
	Allscott	Kidderminster
1 - 5 acres	1009	1553
5.1 - 10 "	523	631
10.1 - 15 "	170	125
15.1 - 20 "	103	79
Over 20 "	179	86
Total	1984	2474

(a) These figures relate to the whole factory areas and include several other counties besides Shropshire and Staffordshire.

The most interesting point in the above table is the numerical importance of the small grower. More than half the growers in each factory area grew only 5 acres or less while in the Kidderminster area over 80% of the growers grew between one and 10 acres. These figures more over stress the point that mechanical harvesters, even when they are brought to technical perfection, would find a very limited market in the West Midlands and it is obviously such considerations as this which will have an important bearing on their future cost of production and price.

TABLE II
Factory Returns 1947-48 Season

	Allscott	Kidderminster
Total Crop Acreage	17126 acres	15586 acres
Average Acreage per Grower	8.6 acres	6.3 acres
Untared Beet	186174 tons	140567 tons
Clean Beet	166944 tons	131068 tons
Total Tare per cwt.	11.6 lbs.	8.1 lbs.
Average Sugar Content	17.54 %	17.62 %
Average Clean Beet Yield Per Acre	9.8 tons	9.3 tons
Average Price per ton Clean Beet	110/7½d.	110/11½d.

Seasonal Notes

The year 1947 was probably one of the latest for beet sowing in the West Midlands since the crop was first introduced. The first really fine spell occurred in the second week in April but as there remained a considerable acreage of corn to plant, much of the root ground had still to be ploughed and cultivated. Conditions in May were on the whole favourable although heavy rain, more than double the average fall for this particular month, hindered sowing especially on the heavier land.

Rainfall in June was very slight so that cleaning operations could be rapidly and successfully completed. In view of the records established for low rainfall in August and September it was fortunate that rainfall in July was considerably above average. August and September were two particularly dry months with high temperatures and long hours of sunshine, to which latter feature can no doubt be attributed the subsequent high sugar content of the beet. It is worth noting that in spite of the late season and the very dry conditions experienced in these two critical months of growth, the factory yields were well above average, a point which would seem to suggest that fertility in the West Midland beet area, especially the humus content and moisture retaining capacity of the soil, is particularly high.

Fine dry weather during harvest time, free from prolonged periods of heavy frost particularly during the first three months of the factory season, greatly facilitated harvesting. An early corn and potato harvest also proved most advantageous in this respect.

TABLE III

Seasonal Data March 1947 - January 1948 (a)

Month	Average Temperature		Rainfall Inches	Sunshine Hours
	Max. Deg.C.	Min. Deg.C.		
March	44.1	32.3	4.42	63.7
April	54.9	39.3	1.55	143.4
May	64.2	46.3	4.99	158.8
June	68.0	50.3	0.84	168.1
July	69.5	53.0	3.84	151.1
Aug.	76.0	51.4	0.81	253.8
Sept.	66.2	48.6	1.15	131.9
Oct.	58.6	41.1	0.69	88.4
Nov.	49.9	37.5	1.75	80.2
Dec.	45.7	36.2	1.72	36.7
Jan.	46.5	36.4	3.87	40.6

(a) Recorded at the Weather Station, Harper Adams College, Newport, Salop.

General Results

This is the first year since 1933 in which gross costs per acre, as shown by the results of this enquiry, have fallen below the level established in the previous year (see Table IV). On the cultural side the most important change was a reduction in average ploughing costs from £1. 0. 7 per acre last year to 15/7d. this year. This is attributable to the pressure of spring work which tended to reduce the amounts both of very deep ploughing and of double ploughing. Carting off the field, loading for transport and transport itself are however the most important contributory factors. The fine dry weather during the first three months of harvesting greatly facilitated movement over the fields and through field gates for both horses and tractors. Moreover the beets were particularly clean so relatively little dirt was carted either from field to roadside ruck or from the ruck to factory. The fine weather also enabled many growers, especially those with their own lorry transport and those not too far distant from the factory to use tractor and trailer, to move a much larger tonnage than usual straight from the field to the factory. The cost of carting off and loading for transport in 1946-47, a particularly difficult harvest year was £4. 8. 11 per acre and this has now fallen to £2. 15. 9 per acre. Transport to the factory which in 1946-47 amounted to £4. 11. 0 per acre fell to £3. 9. 4 per acre. Besides the points already mentioned the lower yield recorded this year must also be regarded as a contributory factor in reducing harvesting and transport costs.

TABLE IV.

Costs and Returns per Acre 1946-47 and 1947-48

	1946-47	1947-48
Number of Farms Costed	48	61
Total Acreage Costed	1005	1185
Average Acreage per Farm	21	19
Yield of Clean Beet (tons)	11.6	10.8
	£ s d	£ s d
Gross Costs	46 18 8	43 10 11
Value of Beet	52 11 1	59 15 3
Cash Return	5 12 5	16 4 4
Add Net Residuals	4 3 9	2 17 5
Add Value of Tops	4 3 3	3 10 8
Presumed Real Profit	13 19 5	22 12 5

The increase in the figure of "presumed real profit" is the result of a combination of several factors, first and foremost of which was an increase in receipts of £7. 4. 2 per acre in spite of the reduced yield. This was due to the substantial increase of 14/- in the standard price per ton paid for the 1947-48 crop and to the considerably higher sugar content which added further to its value. The reduction in gross costs, already referred to, was £3. 7. 9 per acre. On the other hand the value of net manurial and cultural residues to be carried forward were lower by £1. 6. 4 per acre and the value of tops was lower by 12/7d. per acre.

Distribution of Acreages, Yields, Costs and Returns

The average size of enterprise costed was 19.4 acres. The range was from one acre to 66½ acres. The dsitribution by size of the 61 growers is shown in the following table.

TABLE V

Distribution of Beet Acreage Costed

Acreage per Farm	No: of Farms	Av: Ac eage per Farm	Total Acreage
0 - 5 acres	15	3.9	58
6 - 10 acres	12	9.0	103
11 - 30 acres	23	21.4	493
Over 30 acres	11	48.2	531
Total	61	19.4	1185

Beet followed corn on 661 acres or 55% of the total acreage costed. Autumn cultivations were carried out on 581 acres which means that approximately 88% of the stubbles preceding beet were cleaned in the autumn, a rather higher proportion than usual.

Farm yard manure, in dressings varying between 5 and 20 tons per acre, was applied on 566 acres as follows; after corn 387 acres, after leys 92 acres, after potatoes 81 acres, after other crops 6 acres.

TABLE VI
Distribution of Previous Crops (Acres)

Corn	Ley	Potatoes	Other Roots	Other Crops
661	233	211	54	26

In spite of the unpromising start in the spring and the dry conditions which prevailed during the second half of the growing season yields were surprisingly satisfactory. Furthermore sugar content which had shown a tendency to fall during recent years was particularly high. Some partial failures were recorded but with one exception they were by no means disastrous. The average yield for the sample of farms costed at 10.8 tons per acre again exceeded the factory averages of 9.8 tons at Allscott and 9.3 tons at Kidderminster. Yields varied from the low figure of 1.6 tons per acre to 19.8 tons per acre.

TABLE VII
Distribution of Farms, Acreages & Costs
in Yield per Acre Groups

	Tons of washed beet per acre				
	Under 8	8 - 9.9	10 - 11.9	12 - 13.9	Over 14
Number of Farms	14	15	16	11	5
Acreage	186	288	410	176	125
Net Cost Per Acre (£)	38.0	40.1	37.1	39.8	38.2

It is interesting to note the absence in the above table of any indication that higher yields per acre are accompanied by higher cost per acre. Of all the factors relating to the economics of beet production cost per acre is the one which displays the least degree of variation from farm to farm. Of the 61 individual farm costs 60% fall within the range of plus or minus £5 about the average cost.

TABLE VIII
Distribution of Farms, Acreages & Yield
in Net Cost Per Acre Groups

	Net Costs Per Acre			
	Under £35	£35-40	£40-45	Over £45
Number of Farms	14	21	19	7
Acreage	418	376	332	59
Yield Per Acre (tons)	10.1	10.0	9.6	11.0

Costs per ton, being derived directly from cost and yield per acre, reflect the wide variations found in the latter figures.

TABLE IX
Distribution of Farms, Acreage, Yield
& Net Cost Per Acre in Net Cost Per Ton Groups

	Net Cost (Shillings Per Ton)					
	Under 50	51-60	61-70	71-80	81-90	Over 90
Number of Farms	6	8	10	9	8	20
Acreage	232	187	194	172	166	234
Av: Size (Acres)	38	23	19	19	21	12
Av: Yield (tons)	14.9	13.6	11.0	11.0	8.9	7.1
Av: Net Cost Per Acre (£)	32.3	37.7	36.4	41.9	38.8	41.1

Of the 61 enterprises costed 19 made cash losses and 11 made net losses (i.e. after crediting net cultural residues and tops.) The figures in Table X show that profitability is closely related to the scale of production and to the yield per acre obtained. As will be seen from this and previous tables costs per acre follow no particular pattern of distribution with relation to either yields or profits although in Table XI some degree of relationship appears to exist between cost per acre and the size of the enterprise. The higher yields per acre obtained by the larger growers are, however, more important determinants of their profits than are their lower costs per acre.

TABLE X

Distribution of Farms, Acreage, Yields & Net Cost
in Net Profit Per Acre Groups

	Loss			Profit		
	Over £10	£10-0	0-£10	£11-20	£21-30	Over £30
Number of Farms	3	8	10	15	10	15
Acreages	17	102	162	285	195	424
Av: Size (Acres)	6	13	16	19	20	28
Av: Yield (tons)	3.1	7.2	7.9	10.0	11.4	14.1
Net Cost Per Acre (£)	37.9	43.1	38.7	37.3	38.9	36.0

The superiority of the large grower over the small grower is made very apparent in Table XI. Not only are costs per acre lower but what is more important, the yields are considerably higher. Between the under 5 acre grower and the over 30 acre grower there is a margin of £6. 15. 8 in gross costs in favour of the latter. The higher yields of beet and tops adds a further £11. 3. 2 to the balance in favour of large scale production.

TABLE XI

Costs and Returns Per Acre 1947-48

	Under 5 Acres			5-10 Acres			11-30 Acres			Over 30 Acres		
	£	s	d	£	s	d	£	s	d	£	s	d
Manual Labour	19	18	9	18	18	10	17	16	2	17	6	2
Horse Labour	2	12	3	2	4	2	1	3	1	1	5	6
Tractor Labour	2	2	6	2	1	2	2	15	5	2	2	6
TOTAL LABOUR	24	13	6	23	4	2	21	14	8	20	14	2
Seeds		19	0		18	7		17	1		17	9
Net Manures	9	9	6	9	8	3	9	2	4	8	9	9
Transport	3	17	1	3	16	2	3	18	1	2	19	1
Rent	1	18	4	1	14	6	1	16	3	1	12	10
Overheads	5	4	9	4	18	8	4	15	1	4	12	11
TOTAL	46	2	2	44	0	4	42	3	6	39	6	6
Less value of Tops & Net Cult. Residues	4	1	10	4	6	2	3	15	8	4	7	4
Net Costs	42	0	4	39	14	2	38	7	10	34	19	2
Receipts	52	0	2	54	6	9	58	9	1	62	17	6
NET PROFIT	9	19	10	14	12	7	20	1	3	28	18	4

TABLE XII

Cost of Production Per Acre

	Average of 61 Farms			Your Farm		
	£	s	d	£	s	d
Autumn Cultivations		4	8			
Ploughing		15	7			
Seed bed preparation		15	10			
Applying F.Y.M.	1	9	3			
Applying lime & artificials		14	0			
Drilling Seed		5	10			
Inter-row cultivations	1	8	10			
Singling & hand cleaning	6	6	10			
Total Cultivations	42 12	0 0	6 10			
Ploughing out		15	6			
Pulling & topping	5	19	2			
Carting off and loading	2	15	9			
Transport to factory	3	9	4			
Total Harvesting	15 12	17 19	4 9			
F.Y.M.	3	11	8			
Lime & artificials	7	1	10			
Seeds		17	7			
Total Materials	42 11	11 11	1 1			
Rent	1	14	8			
Overheads	4	14	11			
Add residues brought forward						
Manurial	1	10	7			
Cultural		18	6			
Gross Costs	46 45	0 10	0 4			
Deduct residues carried forward						
Manurial	3	16	6			
Cultural	1	10	0			
Value of tops	3	10	8			
Net Cost	37 36	2 13	10 2			

TABLE XIII

Primary Costs & Returns Per Acre

	Average of 61 Farms			Your Farm		
	£	s	d	£	s	d
Manual Labour	17	15	9			
Horse Labour	1	7	5			
Tractor Labour	2	7	9			
Total Labour	21	10	11			
Seeds		17	7			
Manures (Net)	8	17	7			
Transport	3	9	4			
Rent	1	14	8			
Overheads	4	14	11			
Total	41	5	0			
Less value of tops & Net Cultural Residues	4	2	2			
Net Costs	37	2	10			
Receipts	59	15	3			
NET PROFIT	22	12	5			

TABLE XIV

Cost & Returns Per Ton of Clean Beet 1946-47 & 1947-48

	1946-47			1947-48		
	£	s	d	£	s	d
Cultivations	1	0	3	1	2	2
Harvesting & transport	1	7	3	1	3	11
Seed & manures (net)		16	2		18	0
Rent & overheads		11	10		11	11
Total	3	15	6	3	16	0
Less value of tops & Net Cultural Residues		8	5		7	9
Net Cost	3	7	1	3	8	3
Value Per Ton	4	10	3	5	10	3
NET PROFIT	1	3	2	2	2	0

APPENDIX

Notes on Compilation of Costs

Manual Labour

Males (over 21) Waggoners and Tractor Drivers

Up to 31st August 1/10 per hour
After 31st August 2/1 " "

Labourers

Up to 31st August 1/8 per hour
After 31st August 1/11 " "

Other categories and piece work at appropriate rates

Horse Labour

1/- per hour

Tractors

Wheel types (light and medium) 3/- per hour
Wheel types (heavy) 4/- " "
Crawler types 5/- " "

Farm Yard Manure

14/6 per ton exclusive of cost of carting and spreading

Artificial & Lime

At net cost delivered on farm

Manurial Residues

Calculated according to recommendations of the Scott Watson Committee on Residual Manurial Values of fertilizers and feeding stuffs

Cultural Residues

Preceding Crop Charge Per Acre

Corn	nil
Seeds mown	40/-
Roots carted	30/-
Roots folded	70/-
Potatoes	45/-
Old turf	50/-

Beet being itself a cleaning crop was in all cases credited with a cultural residue of 30/- per acre

Overheads

A flat charge of 15/- per acre is included to cover overhead labour charges. The cost of depreciation and repairs to implements (excluding tractors), car expenses, insurances, professional charge etc. are charged at 4/6 for every £1 of manual labour spent on beet production. This rate is based on data extracted from the Farm Management Survey

Beet Tops

The weight of tops was calculated at 70% of the yield of clean beet. The effective consumption was estimated at 3/5th of the total weight and was then credited at 16/- per ton. Tops ploughed in were credited at 4/6 per ton

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