

Sugar beets - Cost of production

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SUGAR BEET PRODUCTION

in the Eastern Counties

An economic study of the 1961
and 1962 sugar beet crop

by

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The data was tabulated very efficiently by Miss J. M. Lowe.

SUGAR BEET PRODUCTION

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Addendum

Table 5.1, p. 19

Own harvester

Opportunities lost 144 0s.

Erratum

Table 3.2, p. 11

Total production costs 68 8s.

Net profit 21 2s.

SUGAR BEET PRODUCTION IN THE EASTERN COUNTIES
AN ECONOMIC STUDY OF THE 1961 AND 1962 CROP RESULTS

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CHAPTER I INTRODUCTION

This report presents the results of a survey of the sugar beet crop in the Eastern Counties,¹ for the harvest years 1961 and 1962. In recent years just over a quarter of a million acres have been grown annually in the region and following the increase in the national quota acreage this figure has risen to more than 275,000 acres in 1964. The profitability of the crop is therefore of particular interest at the present time. In addition to the usual information on costs and returns per acre, this report also includes discussion of some topics of current interest. For example, a work study investigation carried out at the same time as the survey, demonstrated the substantial savings in harvesting labour obtainable with a tanker harvester (Chapter 4, section (d)). Average labour efficiency at harvesting rose by about one fifth in the two years covered by the survey, although this rise could not be ascribed to increased use of tankers (Chapter 4, section (a)). Chapter 5 includes a discussion of the possible advantages of employing a contractor to harvest the crop (sections (b) and (c)) and a summary of the tax allowances which can be claimed on a harvester (section (d)).

The present report also incorporates some changes in the presentation of results, aimed at making them more suitable for comparison with other farms. For example, Chapter 2 includes figures for margins over materials costs, and "standardised" gross margins, as well as the actual gross margins, which depend on farm practice. Figures for average labour requirements (Chapter 4) are based on the number of farms carrying out the operation, not necessarily all those in the survey, and only the typical operations are included in the annual totals.

The Survey Sample

In the two years covered by this report the crop was generally satisfactory, although the severe weather at the beginning of 1963 prevented some of the 1962 harvest being lifted. Of the farms in the survey, those in west Norfolk suffered particularly badly, losing 12 percent of their crop. Factories had to close earlier than usual, and when the thaw came in March (1963) the beet still in the ground had deteriorated so far that there was no point in harvesting it.²

¹ Comprising the counties of Bedford, Cambridge, Essex, Hertford, Holland (Lincs.), Huntingdon, the Isle of Ely, Norfolk, the Soke of Peterborough, and Suffolk.

² Further information on weather and growing conditions is given in Appendix A.

The survey covered one beet field on 65 farms in 1961, and 60 of these farms in 1962. The sample comprised farms in five different areas, representing different types of soil. The districts were south Cambridgeshire, west Norfolk, north Essex and West Suffolk, the Isle of Ely, and Holland. Differences between districts were not always very marked, and in a number of tables the only distinction drawn is between fen and upland farms.¹ However, figures for each district separately are also given in Appendix B.

Some basic information about the survey sample and the practices adopted, is given in Table 1.1. It is evident that F. Y. M. application was not typical, and was particularly uncommon in the Fens. Hand chopping-out and singling was typical, but machine harvesting was usual except on the west Norfolk farms. The number using cleaner-loaders doubled even in the two years surveyed.

Further information on the seed and fertiliser used, and the type of labour, is given in the Appendix (Tables B1 and B2). Rubbed seed was used by 77 percent of the farms in 1962, compared with only 69 percent in 1961. Contract work was mainly confined to spreading kainit, and hauling the beet to the factory. Casual labour was usually called on only for chopping-out and singling (in the remainder of the report these two operations are usually referred to collectively as "thinning").

1 The fen districts are defined as Holland and the Isle of Ely.

Table 1.1 The Survey Sample

	South Cambridge		West Norfolk		North Essex & West Suffolk		Isle of Ely		Holland		All Districts	
	1961	1962	1961	1962	1961	1962	1961	1962	1961	1962	1961	1962
No. of farms (fields)	10	10	12	11	21	19	12	11	10	9	65	60
Av. size of fields costed - acres	17.0	26.8	21.7	21.9	13.6	19.7	19.8	16.3	11.0	8.4	16.3	19.0
No. Applying F. Y. M. % Total	6 60.0	3 30.0	3 25.0	5 45.4	5 23.8	6 31.6	-	1 9.1	1 10.0	-	15 23	15 25
Drilling: Precision	8	7	3	3	10	13	4	3	4	5	29	31
Placement	-	-	3	2	-	-	1	1	-	-	4	3
Ordinary	2	3	6	6	11	6	7	7	6	4	32	26
Thinning etc.:												
No. using hand only	6	7	10	11	21	18	10	10	10	9	57	55
" " D. R. T. * only	1	1	-	-	-	-	-	-	-	-	1	1
" " hand & D. R. T.	3	2	2	-	-	1	2	1	-	-	7	4
Harvesting:												
No. using harvester	10	10	4	4	13	14	12	11	10	9	49	48
" " hand harvesting only	-	-	8	7	8	4	-	-	-	-	16	11
Loading for factory:												
No. using cleaner loader	2	3	3	4	1	5	-	1	-	-	6	13
" " other	8	7	9	7	20	13	12	10	10	9	59	46
Percentage of acreage of costed fields lifted	100	100	100	88	100	96	100	95	100	99	100	95

* Down the row thinner

CHAPTER 2 YIELDS, RETURNS AND GROSS MARGINS

The yield per acre is one of the principal factors affecting the profitability of the sugar beet crop. The important consideration is the yield of sugar per acre, rather than the weight of roots. Indeed a heavy crop with a low sugar percentage has the disadvantage of costing more, to lift and haul to the factory. In the two years surveyed, yields of sugar on the farms costed were reasonably satisfactory. Although yields of roots were in many cases rather lower in 1962, generally higher sugar percentages helped to maintain the yield of sugar. Yields and sugar percentages in each district and for the sample as a whole, are shown in Table 2.1. As usual, the highest yields were obtained on the silt soils of Holland, followed by the Ely black fens. For comparison, the average yield for England was 14.1 tons in 1961, and 12.7 tons in 1962.

Table 2.1 Yields, tare, and sugar content

	South Cambridge		West Norfolk		North Essex & West Suffolk		Isle of Ely		Holland		All Districts	
	1961	1962	1961	1962	1961	1962	1961	1962	1961	1962	1961	1962
Average yield of sugar (cwt. per acre)	40.3	40.8	45.8	36.3	41.7	39.2	49.2	50.3	54.6	51.3	45.7	42.9
Average yield of clean beet (tons per acre)	13.7	13.1	14.3	11.3	13.6	13.0	16.8	16.5	17.8	16.7	15.0	13.9
Average sugar percentage	14.8	15.5	16.0	16.1	15.3	15.1	14.6	15.2	15.3	15.4	15.2	15.4
Average dirt tare (lbs. per cwt.)	11.8	13.6	13.4	14.8	15.1	14.9	11.3	12.6	15.8	16.3	13.7	14.5
Percentage of costed acreage lifted	100	100	100	88	100	96	100	95	100	99	100	95

Range in yields of clean beet per acre (no. of farms)

	1961	1962	1961	1962	1961	1962	1961	1962	1961	1962	1961	1962
20 tons and over	-	-	-	-	-	-	1	2	3	-	4	2
15.0 - 19.9 tons	5	2	5	1	8	6	10	4	6	8	34	21
10.0 - 14.9 tons	4	7	7	8	9	11	-	5	1	1	21	32
5.0 - 9.9 tons	1	1	-	2	4	1	1	-	-	-	6	4
Below 5 tons	-	-	-	-	-	1*	-	-	-	-	-	1

* no yield

(a) Returns

The gross return per acre from sugar beet corresponds closely but not exactly to the weight of sugar per acre.¹ The average cash receipts per acre as found in the survey are shown in Table 2.2. These figures do not include any allowance for the value of tops, because of the difficulty of estimating such an allowance. Although beet tops may be considered useful for their manurial or feeding value, it is unlikely that these considerations will affect a farmer's decision to grow the crop. Therefore in the present report little emphasis is placed on their value. However, for reference and for comparison with other reports, the value of tops, estimated according to conventional methods, are included in Table 2.2.

1 In the two years considered here, the guaranteed price was 128s. per ton of clean beet, at 16.5 per cent sugar, with a bonus or penalty of 7s. 6d. per ton for each one per cent sugar above or below 16.5. There is also an industry levy of 4½d. per ton of clean beet, for research and education.

Table 2.2 Average gross margin per acre

	Upland		Fen		All Districts	
	1961	1962	1961	1962	1961	1962
Direct Costs	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.
Seed	1 10	1 13	1 12	2 1	1 10	1 16
Fertiliser*	10 8	10 10	8 11	9 16	9 13	10 4
Sprays	1 8	14	2 2	14	1 15	14
Contract (exc. haulage)	1 6	1 6	2 12	1 2	1 13	1 3
Casual labour	3 16	3 14	3 16	5 0	3 19	4 4
Haulage	9 6	8 8	7 7	6 15	8 6	7 13
Total	27 14	26 5	26 0	25 8	26 16	25 14
GROSS MARGIN	55 18	50 13	75 17	73 10	62 14	59 0
Cash receipts	83 12	76 18	101 17	98 18	89 10	84 14
Credit for tops	5 2	3 8	3 19	3 6	4 11	3 7

Range in gross margin per acre (no. of farms)

£90 & over	2	1	4	4	6	5
£70 - 89	7	7	13	8	20	15
£50 - 69	18	16	4	5	22	21
£30 - 49	12	11	-	2	12	13
Less than £30	4	5 ⁺	1	1	5	6

* excludes F. Y. M.

+ one farm had no harvest

(b) Gross margins

There are various methods of assessing the "profitability" of particular farm enterprises. One of the more useful is to calculate the "gross margin" obtained. This is defined as the difference between gross output and the direct costs incurred by that enterprise. It therefore represents the contribution made by the enterprise towards recovering the common costs of the farm.¹ The gross margin has the advantage that it does not attempt to allocate common costs to individual enterprises, irrespective of the opportunity costs involved. However carefully such an allocation is made, the usefulness of the results for farm management purposes is unlikely to repay the effort involved in the calculation.

The average gross margins from sugar beet as found in the present survey, are shown in Table 2.2. Differences were principally between fen and non-fen, but the corresponding figures for individual districts are shown in Appendix B (Table B.3).

(c) Margin over materials costs, and standardised gross margin

Some of the variation between districts, shown in Table 2.2, is caused by differences in farm location and system. For example, on an individual farm contract work and casual labour are both direct costs, which must reduce the gross margin from sugar beet. On the other hand the use of such services should enable the farmer to manage his farm with a smaller regular labour force and less machinery, thereby reducing the fixed costs of the farm. Another source of variation in direct costs is the distance from the farm to the nearest factory. Thus although the inclusion of contract work and casual labour as direct costs is realistic for an individual farm, it tends to confuse comparisons between farms, by combining together farms using different systems. In particular, the costs shown for contract work and casual labour are the average over all farms, even though some did not make use of these services. Thus the figures are too low for farms using these services, but too high for farms not using them.

To assist comparison between the results from this survey, and other farms, Table 2.3 shows the average margin over materials costs, and a standardised gross margin, based on the assumption that casual labour was used for thinning, and a contractor for haulage to the factory. The spray costs under the heading 'materials' refer to insecticides and are the average for those farms which actually sprayed.² Contract spraying has been included at two-thirds of the actual cost, to cover only the materials used. Similarly, the costs shown for casual labour and contract haulage are the averages for those farms which employed them. The haulage cost is of course dependent on the yield of dirty beet, and the distance from the factory. For this reason, the cost per ton-mile is included in Table 2.4, which shows some representative costs for the three operations most likely to be undertaken by casual labour or contractors (i.e. be chargeable as direct costs of the beet crop). These are spreading kainit, hand thinning and contract haulage.

¹ This procedure differs slightly from that used to show average labour requirements, in Chapter 4. There, the labour requirements for operations not typical are bracketed and are not included in the totals.

² The direct costs of a crop are here defined as seed, fertiliser, sprays, casual labour and contract work. Conversely the common costs are rent, regular labour, machinery costs, and general overheads. For machinery specific to one enterprise (e.g. a sugar beet harvester) there is a good case for charging its whole cost to the particular enterprise, but since the cost does not vary in direct proportion to the acreage, it is different in principle from the direct costs listed above.

It is reasonable to expect that the cost per acre for thinning should be lower when a precision drill has been used, by comparison with an ordinary drill. (Differences in these labour requirements are discussed in Chapter 4). In fact, the average rate paid to casuals in 1962 for thinning was higher on those farms using a precision drill. For both types of drill, however, the range of piece work rates for casuals was substantial, as shown in Table 2.4. Piece work rates for regular workers also varied considerably. Although the rates paid will depend on local labour conditions, it should be realised that if the same rate is paid for thinning, irrespective of the type of drill, hourly earnings will be substantially higher after a precision drill.

Table 2.3 Average margins over materials costs, and standardised gross margins, per acre

District \ Cost	South Cambridge		West Norfolk		North Essex & West Suffolk		Isle of Ely		Holland		All Districts	
	1961	1962	1961	1962	1961	1962	1961	1962	1961	1962	1961	1962
Materials	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.
Seed	1 11	1 12	1 12	1 13	1 7	1 14	1 6	2 2	1 17	2 0	1 10	1 16
Fertilisers*	10 11	9 14	11 1	11 2	9 13	10 13	7 10	9 6	9 12	9 19	9 13	10 4
Spray materials	1 17	2 13	1 15	1 7	2 8	1 10	2 12	1 0	1 17	1 7	2 4	1 9
Total	13 19	13 19	14 8	14 2	13 8	13 17	11 8	12 8	13 6	13 6	13 7	13 9
MARGIN OVER MATERIALS COST	65 2	65 10	75 2	56 6	68 4	67 1	85 18	85 16	93 2	86 6	76 3	71 5
Casual labour (thinning)	11 8	10 10	9 2	9 4	10 10	11 15	9 13	11 6	9 18	11 14	10 2	10 18
Contract Haulage	9 19	8 7	8 16	7 3	8 7	8 3	9 10	10 11	11 3	10 7	9 11	8 18
STANDARDISED GROSS MARGIN	43 15	46 13	57 4	39 19	49 7	47 3	66 15	63 19	72 1	64 5	56 10	51 9
Cash receipts	79 1	79 9	90 0	70 8	81 12	80 18	97 6	98 4	106 8	99 12	89 10	84 14

* excludes F. Y. M.

Table 2.4

Representative piece-work and contract rates (based on 1962 figures)

Spreading kainit	10s. per acre (for 6 cwts. per acre)	
Thinning:	Ranges in piece work rates (per acre)	
	Casuals	Regulars
Ordinary drill	£9.6s. to £12.10s.	£9.0s. to £13.18s.
Precision drill	£10.18s. to £15.0s.	£9.0s. to £13.8s.
Contract transport to factory (lorry & driver)	8d. per mile from farm to factory, per ton dirty beet. For hire of cleaner-loader (where available) add at least 1s. per ton dirty beet.	

CHAPTER 3 PRODUCTION COSTS

In addition to the direct costs mentioned in Chapter 2, the sugar beet crop makes substantial claims on regular labour and on machinery. The actual amounts will depend on the system followed, for example, the amount of casual labour employed. An estimate of the proportion of the total regular labour bill chargeable to the sugar beet can be made by charging for labour time according to the appropriate hourly wage rate. Similar estimates can be made for machinery and implements, using hourly or per acre rates. Other common costs such as rent and overheads can also be allocated, for example on an acreage basis. In this way it is possible to arrive at a figure for the total cost of growing sugar beet. However, such a figure is unlikely to be of much help in deciding whether to expand or contract the beet acreage, because it does not take account of the fact that much of the cost of regular labour and farm machinery is a fixed item. For example, if the beet yield is low, and harvesting requires less labour than usual, this saving is apparent rather than real, since the men must be paid anyway. Thus the average production costs shown in Table 3.1 should be interpreted with care. Similar figures for individual districts are shown in the Appendix (Table B.4).

The average costs given in Table 3.1 include any work done by contractors, under the appropriate heading, and there is no separate item for contract work. Harvester depreciation has been charged at 10 percent per annum for new machines and 20 percent for second-hand machines. Further details of the costing method are given in Appendix C.

(a) Net Profit

Net profit is the difference between cash receipts and total production costs. This is summarised in Table 3.2, for all districts. Corresponding figures for individual districts are shown in Appendix B, Table B.4. There was a good deal of variation between districts and between years. For example, the average net profit for the survey farms in the Isle of Ely was four times that for west Norfolk. Most of this variation can be attributed to yield differences.

(b) Factor Costs

Costs of production classified according to the factors of production used, are shown in Table 3.3 for all districts together. Similar figures for individual districts are listed in the Appendix (Table B.6). Factor costs are also shown in greater detail in the standard presentation of results (Appendix D), although there is no breakdown into districts.

Table 3.1 Average production costs per acre

	All Districts	
	1961	1962
	£ s.	£ s.
Stubble cultivations	8	11
F. Y. M.	1 6	1 16
Applying F. Y. M.	1 5	1 5
Ploughing	1 18	1 15
Seedbed cultivations	1 15	1 7
Fertilizer	9 13	10 4
Applying fertilizer	16	17
Seed	1 10	1 16
Drilling	18	19
Thinning	9 17	10 7
Tractor-hoeing (inc. D. R. T.)	2 17	2 16
Other post-drilling cultivations	4	4
Hand weeding	7	4
Spraying	2 11	1 1
Irrigation	1	3
Total pre-harvest costs	35 6	35 5
Harvesting	13 10	11 11
Transport	8 6	7 13
Rent (inc. drainage rate)	4 16	4 19
General overheads	8 0	8 0
Cash costs	69 18	67 8
Add residues b/f	2 0	1 17
Deduct residues c/f	3 10	3 19
TOTAL COSTS	68 8	65 6