Sugar beets - Cost of production

Farmers' Leaflet No. 2

EDINBURGH AND EAST OF SCOTLAND COLLEGE OF AGRICULTURE.

(Economics Department)

1946 CROP COSTS STUDIES.

I. - SUGAR BEET

by

J.D. NUTT.

Department of Economics.

D. Witney, B.Com.
J.D. Nutt, B.A., N.D.A.
D.M.R. Leask, B.Sc.
W.B. Duthie, B.Sc.
J.R. Phillips, N.D.A.
H.C. McIver (Miss), B.Sc., N.D.A., N.D.D.
J.A. Maclennan, B.Sc.

13 George Square, EDINBURGH, 8.
July, 1947.

INTRODUCTION.

The investigation into the costs of growing sugar beet which was commenced with the 1945 crop, was continued with the 1946 crop, and the present report deals with the costs for that year. Complete records were obtained for 22 beet crops grown on 20 farms (on 2 farms records were kept for two separate crops) and, as might be expected from the fact that Scotland's only beet factory is situated at Cupar, Fife, the majority of the records come from that county. Fourteen of the costed crops were grown in Fife, four were grown in Berwickshire, two in Perth and one each in Roxburgh and East Lothian. The farms on which the costed crops were grown were, with two exceptions, between 200 and 700 acres in extent. The two exceptions were a holding of 67 acres and a farm of 947 acres. These twenty farms grew a total of 293 acres of which 215 were costed giving an average area costed of approximately 10 acres per farm. The actual acreages varied from 1 to 21 acres. The location of the farms gives the key to the general type into which they may be classified. Arable cropping predominated in all cases and only on one or two farms, e.g. two of the Berwick farms, was stock rearing, mainly sheep, stated to be an important part of the farm economy. The types of soil on which these crops of beet were grown varied from "light loam or sand" to "heavy", but the majority of them, thirteen, were grown on "medium" loam. Six were grown on the lighter soils and only three on soils classed as heavy.

One other aspect of the conditions under which these crops were grown, the height above sea level, may be considered. Twelve of the crops were grown at elevations not exceeding 200 ft. above sea-level, eight were grown at elevations varying from 200 ft. to 400 ft. and only two crops were grown above the 400 ft. level.

Thus the general conditions under which these costed crops were grown may be taken as representative of the conditions under which sugar beet is normally produced, i.e. on a useful type of soil situated on predominantly arable farms at low elevations. This view is strengthened when the rental values of the land cropped with beet are examined. Twelve of the crops were grown on land rented at between 20/- and 30/- per acre; nine were grown on land rented at between 30/- and 40/- per acre. The remaining crop was on land rented at less than 20/- per acre.

The place which sugar beet takes in the farm rotation and the type of manurial treatment which is given are two further points which are worth while noting. In the report on the costs of growing sugar beet in 1945+ it was pointed out that sugar beet is regarded as a "cleaning crop" which usually followed a white straw crop as part of the root break. The crops included in the present report again show this feature. Nine of the crops followed wheat, five followed oats, one followed barley, and one part mashlum and part barley. Of the remainder four followed potatoes, one followed grass and one part potatoes and part oats.

One feature of the manurial treatment was the number of crops which received dressings of dung. In all, ten crops received dung, the estimated dressings of which ranged from 5 tons to 25 tons per acre and in addition every one of these crops was given an application of compound fertilizers of from $4\frac{1}{2}$ cwts. to 12 cwts. per acre. Several of these ten crops also received lime and/or nitrogenous manures. Of the other twelve/

+ Farmers' Leaflet No. 1. 1945 Crop Cost Studies.

twelve crops eleven received applications of compound manure ranging from 2 cwts. to 12 cwts. per acre together with varying quantities of other fertilizers, nitrogenous, potassic or phosphatic. Several of these crops also were given lime. The remaining crop received 7 cwts. slag to the acre plus 4 cwts. of agricultural salt. The latter form of treatment was met with on five other crops. It is apparent that sugar beet is generally regarded as a crop requiring heavy manuring having regard to its place in the rotation, type of soil and other conditions.

Before turning to any consideration of the costs for the 1946 crop a brief reference must be made to the weather conditions under which the crop was grown. The spring of 1946 was notable for the earliness and ease with which the sowing of all crops was carried out. This was, however, followed by an unusually prolonged period of cold, dry conditions which made it extremely difficult for the sugar beet crops, in particular, to become established with consequently unfavourable results on the yields of the mature crop. Neither can it be said that conditions throughout the growing and harvesting seasons were particularly favourable to this crop.

COSTS OF PRODUCTION.

On the following page are given figures for the 1946 crop costs per acre, yields, returns and profits - the average figures being set out alongside those for the highest-cost crop and the lowest-cost crop. The average figures for the 1945 crop are given also for the sake of comparison.

The figures in the Table for the crops grown at the highest and lowest costs per acre are of interest as they illustrate some of the difficulties in the production, not only of sugar beet, but of any agricultural product. The highest-cost crop is an example of what may happen when production methods are over-intensified and excessive costs are incurred in cultivating, manuring and harvesting the crop. The yield per acre for this crop was much higher than the average and, with a better than average sugar content, resulted in a high return per acre. This, however, was insufficient to meet the heavy costs incurred and the result was a severe loss. This rather points the moral that, in agriculture, there is an upper limit to economic expenditure which may soon be reached in even a favourable season and, possibly, more quickly passed in an unfavourable one.

The lowest-cost crop, on land of approximately the same rental value, is an example of what may take place at the other end of the scale where good results may be obtained for only a low cost. Cultivations and harvesting costs were both much below, and the cost of manures slightly below, the average. Even so, the yield per acre was higher though the sugar content was not quite so good. The final result was that the net return per acre was almost as good as the average and there was a profit of £9.11.8d. per acre. It is not to be inferred from this that low costs are the golden rule, or that high costs must be condemned in the production of this or any other crop, as/

COSTS OF PRODUCTION PER ACRE.

	1945 Average Cost	1946 Average Cost	1946 Highest Cost	1946 Lowest Cost
Size of field - acres	9	10	7	15
1. Labour and Power	£ s. d.	£ s. d.	£ s. d.	£ s. d.
(a) Cultivations:				
Manual Labour	7. 1. 9	7.12. 6	14.15.11	3. 1. 1
Horse	1. 5. 1	1. 1.10	1. 7. 8	-. 6. 2
Tractor	1. 6. 5	1.10. 6	2. 7. 7	-.19. -
Contract	-. -. 1	-.19.10	-. -. -	-.17. 4
Less cleaning residues	-1. -. -	-1. -. -	-1. -. -	-1. -. -
NET CULTIVATIONS	8.13. 4	10. 4. 8	17.11. 2	4. 3. 7
(b) Harvesting:				
Manual Labour	7. 8. 5	4.13. 9	4.17. 2	-. 6. 9
Horse	1. 4. 1	-.14. 5	2. 5. 9	-. 9. 7
Tractor	-.12. 4	-.13. 8	2. 1. 2	-. -. -
Contract	-. 3.11	2.14. -	8.15. 6	4.19. 1
Carriage (less freight credit)	-. 3. 1	-.17.10	-. -. -	-. -. -
HARVESTING AND DELIVERY	9.11.10	9.13. 8	17.19. 7	5.15. 5
TOTAL LABOUR & POWER	18. 5. 2	19.18. 4	35.10. 9	9.19. -
2. Seed	1. -. -	1. 1. 7	-.18. 9	-.19. 7
3. Manures (adjusted)	8.10. 7	8.17. 1	11.11. 3	6.19. 4
4. Rent	1.12.10	1. 9. 2	1. 5. -	1. 3. 6
NET DIRECT COSTS	29. 8. 7	31. 6. 2	49. 5. 9	19. 1. 5
5. Overheads	6.10. 9	7. 5.10	12.19. 6	4.11.10
NET COST	£35.19. 4	£38.12. -	£62. 5. 3	£23.13. 3

YIELDS, RETURNS AND PROFITS.

	T. c. q.	T. c. q.	T. c. q.	T. c. q.
Yield per acre (clean beet)	9 15 2	7 3 3	10 5 -	7 6 1
Sugar Content	15.6%	15.75%	16.1%	15.4%
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Cost per ton	3.18. 4	6.10. 5	6. 1. 6	3. 4.10
Returns per acre:-				
Beet	41.12. 6	31.19. 6	46. 3. 1	31.19.11
Value of Tops	1.19. 9	2. 2. 4	3. 1. 7	1. 5. -
Total Value of Crop	43.12. 3	34. 1.10	49. 4. 8	33. 4.11
Profit per acre	7.12.11	-. -. -	-. -. -	9.11. 8
Loss per acre	-. -. -	4.10. 2	13. -. 7	-. -. -

as the figures quoted do not tell the whole story in either case. To do this would involve a detailed case study of both crops involving all the conditions affecting them when it might well be found that some at least of the high costs were justified and that good fortune may have had some share in stepping up the returns from the lowest-cost crop

The average cost of growing an acre of sugar beet worked out at £38.12/- which is 7.5% higher than in the previous year. The tendency for costs to be higher in 1946 is noticeable in every section except rent, the figure for which is slightly lower; this is due to differences in the samples of farms for the two years and the difference is so small that no significance need be attached to it. The net cost of cultivations at £10.4.8d. per acre is 18% higher than in 1945, and although a small part of this increase may be attributed to the increases in wage rates which took place in 1946, it appears that the growing conditions in the latter year were such as to require more work on the crop than in 1945 in spite of the initial favourable conditions. The cost of harvesting also increased in spite of the fact that the average yield of clean beet was down from 9 tons 15½ cwts. per acre in the previous year to 7 tons 3¾ cwts. - a figure which is higher than the average of all beet crops grown in Scotland in 1946, which was 6.56 tons per acre. One interesting suggestion may be drawn from this, even after allowing for the increases in wage rates. A reduction in the yield, i.e. the actual quantity of crop to be handled, will not lead to a corresponding decrease in handling costs. The same operations have to be carried out whether the yield is good or bad and no significant saving in cost may be anticipated to offset the lower returns from poor yields.

The average costs of seed and manures at £1.1.7d. and £8.17.1d. were both slightly up on the previous year and indicate that there has been little change in the general levels of these costs. The cost of overheads, which is based on the cost of labour, horse and tractor work and the acreage grown, has shown an increase over the 1945 level.

The net result of all these factors in growing the 1946 crop is clearly shown in the figures for the cost per ton. This cost has increased from £3.18.4d. to £6.10.5d., an increase of 66%. An increase in cost of this magnitude must have had serious effects on the returns which the beet grower obtained from the 1946 crop. The average total return from one acre worked out at £31.19.6d. for clean beet to which has been added a credit for the value of the tops of £2.2.4d., making a total of £34.1.10d. per acre. This return was not big enough to meet the average cost of £38.12.-d. per acre and the result was a net loss of £4.10.2d. for the crops being costed. If, as has already been suggested, these crops were better than the average of all the beet crops grown in this area in 1946, the probability is that the loss of £4.10.2d. per acre does, in fact, give a more favourable picture of the results of the 1946 crop than was actually the case.

VARIATIONS IN COSTS, YIELDS, RETURNS AND PROFITS.

The two crops which have been discussed in the preceding section represent the extremes of costs per acre in the sample costed. There were, however, considerable variations in the sample, both of costs per acre and other important factors. The 1945 figures are shown for purposes of comparison.

RANGE/

RANGE OF COST OF PRODUCTION PER ACRE.

	£20 - £25	£25 - £30	£30 - £35	£35 - £40	£40 - £45	Over £45	Total
No. of crops 1945	-	4	6	8	2	2	22
" " " 1946	1	5	4	2	4	6	22

There has been little change in the distribution of the costs per acre at the lower end of the range but at the higher end the costs per acre in 1946 tended to be concentrated at much higher levels than in 1945. In view of the much poorer average returns in 1946 it is hardly possible to escape the conclusion that, under the conditions experienced in that year, it was not possible to increase or even maintain the returns from beet by stepping up the level of costs.

RANGE OF YIELDS OF CLEAN BEET PER ACRE.

	Under 5 tons	5 - 7½ tons	7½ - 10 tons	10 - 12½ tons	Over 12½ tons	Total
No. of crops 1945	-	4	8	8	2	22
" " " 1946	5	6	10	1	-	22

In 1946 the distribution of the yield per acre, which varied from 1 ton 11 cwts. i.e. almost a complete failure, to a maximum of 10 tons 5 cwts. per acre, clearly shows the effect of the adverse conditions in that year. Only one crop produced (at a very high cost) a yield of just over 10 tons to the acre; just under half the crops produced yields of between 7½ tons and 10 tons and there were six crops with yields between 5 tons and 7½ tons and five crops which did not produce even 5 tons to the acre. In the previous year ten out of twenty-two crops had yields of over 10 tons to the acre and not one crop had a yield of less than 5 tons.

The average sugar content was, however, slightly better at 15.75% in 1946 than in 1945, 15.6%. Comparing the two years the range in the average sugar content was from 14.8% to 17.2% in 1945 and from 14.7% to 16.9% in the following year.

RANGE OF TOTAL RETURNS (INCLUDING ALLOWANCE FOR BEET TOPS).

	Under £25	£25 - £35	£35 - £45	£45 - £55	Over £55	Total
No. of crops 1945	1	4	7	5	5	22
" " " 1946	5	5	9	3	-	22

The above figures clearly show the extent to which there was a general falling off in the total returns per acre from growing sugar beet in 1946. Only three crops managed to show a gross return of over £45 per acre (the highest was £49.4.8d.) compared with ten out of twenty-two in 1945, while ten crops failed to produce as much as £35 to the acre compared with only half that number in the previous year. The lowest return in 1946/

1946 was £7.5/-.

The distribution of the losses and profits on growing the twenty-two crops of beet emphasises the radical difference between growing the crop in 1945 and in 1946.

RANGE OF LOSSES OR PROFITS PER ACRE.

	Losses			Profits.			
	Over £20	£20 - £10	£10 - £0	£0 - £10	£10 - £20	£20 - £30	Over £30
No. of crops 1945	'-	3	1	8	6	3	1
" " " 1946	2	6	5	7	2	-	-

As a potential source of profit to the farmer, the sugar beet crop showed up badly in 1946. Compared with the profits of the previous year there has been a wholesale falling off. Only two crops managed to show profits of more than £10 per acre (the highest was £14.1.2d.) while more than half the crops showed losses ranging from £1.9.9d. to £30.2.2d. per acre.

If the financial results of the 1945 sugar beet crop - which showed an average profit of £7.12.11d. per acre - were good enough to justify a feeling of guarded optimism, those of the 1946 crop are such as to justify the forebodings of the confirmed pessimist. With present high-level costs, sugar beet growers are in a most unenviable position with a yield of less than 8 tons of clean beet per acre even in an ordinary season: still worse is their plight when they have to contend with such a difficult season as 1946 proved to be. The investigation into the costs of growing this crop is being continued for the 1947 crop and it remains to be seen how far the results of the third year will go towards confirming an optimistic or pessimistic attitude to the place of sugar beet in our farm economy.

Grateful acknowledgment is made of the valuable help given by the farmers taking part in this investigation, who have kept the necessary records and furnished all the other information needed, and of the courtesy unfailingly shown on the occasions of our visits. Each collaborating farmer receives a summary of his own costs. As previously stated this investigation is continuing and it is hoped that, wherever possible, these farmers who have participated in this work will continue to give us their generous help.