AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Oats
Cost of production

GIANNINI FOUNDATION OF
AGRICULTURAL ECONOMICS
LIBRARY

Farmers' Leaflet No.1

EDINBURGH AND EAST OF SCOTLAND COLLEGE OF AGRICULTURE.

(Economics Department)

1945 CROP COSTS STUDIES.

I. - OATS
II. - POTATOES
III. - SUGAR BEET

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.
September, 1946.

INTRODUCTORY.

With a view to providing up-to-date data on the cost of production of some of the principal farm crops in Scotland, an investigation was commenced by the College in 1945 in close collaboration with the Advisory Economics Departments of the other two Scottish agricultural colleges. For the area served by this college, the crops selected for investigation in the first instance were:-

I. - OATS - the most extensive and widely grown grain crop in the east and south-east of Scotland;
II. - POTATOES - long recognised as the most important cash crop in the area; and
III. - SUGAR BEET - a crop of considerable significance, since almost the whole of the Scottish crop is grown in this area.

It is hoped that we may be able to continue to count upon the collaboration of interested farmers so that our investigation into the costs of the above-named major crops may be conducted for the three seasons 1945, 1946 and 1947; it is also our intention to extend our inquiries to other crops at the first suitable opportunity.

In the absence of full farm cost accounts from a number of representative farms, our investigations have been conducted as Enterprise Studies, for which purpose all collaborating farmers have kept the necessary ad hoc Field Records relating to one or more fields of oats, and/or potatoes and/or sugar beet, noting down from day to day all cultivations and other costs incurred on those particular fields, and furnishing such other supplementary data as were required. In order to ensure the comparability of all such costs collected throughout Scotland, uniform principles have been agreed upon by the Scottish Agricultural Economists' Conference on both the compilation of the costs structure and matters incidental thereto, and the treatment of overhead costs. Our accounting procedure has been as follows:-

Manual Labour - charged at the actual rates ruling on the farm, both for regular and casual workers, overtime being carefully noted. Allowance has been made for any manual work undertaken by the farmer, and for any unpaid work undertaken by members of his family.

Horse work - usually charged at 1/3 per hour (exclusive of the driver), unless particular conditions appeared to warrant an alteration.

Tractor and haulage work - charged at the following rates (exclusive of the driver) viz.,
Wheeled tractors (or lorries) - 3/- per hour.
Track-laying tractors - 4/6 per hour.

Seed, purchased - charged at cost delivered to the farm.
do. home grown - charged at estimated cost of production.

Dung - charged at 10/- per ton at the steading, the additional cost of carting and spreading being included with other working costs.

Manurial residues - treated in accordance with the following scale:-

Proportion/

	Proportion of cost chargeable to 1st Crop	2nd Crop	3rd Crop	4th Crop
Phosphates	1/3rd	1/3rd	1/6th	1/6th
Dung	$\frac{1}{2}$	$\frac{1}{4}$	1/8th	1/8th
Lime	Deduct net cost of 4 cwt. of oxide of lime or of 7 cwt. of carbonate of lime per acre per annum.			

The value of ploughed-out grass has been treated according to the circumstances of the farm.

Cleaning Costs - a suitable allowance has been made where necessary.

Overhead Costs - have been based on certain recommendations made by the Conference above referred to, and have been calculated by a method which allows for variations in conditions from farm to farm.

No charge has been made for either interest on capital, or for any managerial work undertaken by the farmer.

Ascertainment of "average" costs - In the case of all three crops, the average cost per acre given in the costs tables has been obtained by taking the figures for each crop costed, reduced to 1-acre; all these per-acre figures have then been totalled and divided by the number of fields, e.g. Oats, 54. This method assigns equal weight to each crop costed, regardless of its actual acreage, and is considered preferable to a "weighted average"; under the latter method, since the total costs of all fields are added together and divided by the total acreage costed, the "average" may be unduly influenced by exceptional costs relating to a single crop of large acreage.

I. - 1945 OAT COSTS.

Although oats cannot be regarded as the principal sales crop in the east and south-east of Scotland, they are undoubtedly the most extensive of our arable crops, covering almost 300,000 acres in 1945; this was nearly 30 per cent of the total acreage of oats grown in Scotland that year. Moreover, this crop is grown on every kind of soil capable of being cropped, and at all altitudes from sea level to over 1000 feet above sea level.

The report concerns 54 oat fields widely scattered throughout the area, including a representative selection drawn from farms working under varied types of management, with diverse soil conditions, and at different altitudes. The farm types indeed vary from the intensive arable farms of the coastal areas of the Lothians, Fife and Angus to the high-lying extensive hill-farming areas of the Border counties and the glens of Angus. All told, the 54 costed fields comprised 976½ acres, an average of 18 acres per field. The following table illustrates the wide range of elevations covered by these 54 fields.

Range of Elevations above Sea Level.

Feet above sea level	Under 200	201 to 400	401 to 600	Over 600
No. of Fields costed	12	18	13	11

21 of the costed fields were over 500 ft. above sea level; the range in elevation was from as low as 20 ft. to as high as 1000 ft. above sea level. At the higher elevations, as might be expected, oats are almost the only grain crop grown.

Any accurate description of soil quality is practically impossible, the fields costed varying from heavy clay soils to light gravelly loams. It is, however, possible to classify the fields according to their rental values.

Range of Rental Values per acre.

	Under 10/-	10/1-20/-	20/1-30/-	30/1-40/-	40/1-50/-	Over 50/-
Number of Fields	2	18	15	15	3	1

The lowest rent was 6/- per acre on a farm at the 1000 ft. level, and the highest was 65/- per acre for land at 200 ft. above sea level on an intensive arable farm near the sea coast. The average rent per acre worked out at 27/5d; more than half the costed fields were rented at 20/- to 40/- per acre.

Field/

Field sizes are also very variable, and it is not unlikely that the size of fields may have some effect on the costs, since large fields on highly mechanised farms might be expected to show lower costs per acre than small fields on farms not so highly mechanised.

Range of Field Sizes.

	Under 10 acres.	11-20 acres.	21-30 acres.	Over 30 acres.
Number of Fields	10	31	7	6

Two of the fields were rather under 8 acres in extent and two were over 40 acres; the great majority of the fields costed varied in size between 11 and 20 acres, the average size being 18 acres. All told, there are good grounds for believing that the sample of fields dealt with were, as shown above, a reasonably representative cross-section of the crop for this area.

In the table on p.5 the average cost of growing, harvesting and threshing one acre of oats is shown, together with the highest and lowest cost per acre. Incidentally, it may be stated that, although it had been agreed that these costs should be carried up to the point where the crop is in the stack or the pit, it was considered desirable to carry the investigations a stage further, so as to show also the final costs, including the cost of threshing or dressing, and the average yields.

From the table it will be seen that the final costs per acre, up to and including dressing, averaged £13.17.10d., varying between expenses of £23.3.-, and £9.16.3d. The average costs per cwt. of grain were 10/- ranging between 16/- and 6/-, provided one accepts the old formula of charging 6/7th of the total costs to the grain and 1/7th to the straw. As illustrating the influence of yield per acre on cost per cwt. it may be pointed out that the field with the highest cost per acre had the comparatively low cost per cwt. of 12/1d., due to its high yield of 33 cwt. grain per acre.

The following particulars show the general run of costs:-

Range of Costs per acre (Threshed Grain).

	Under £10	£10 - £12.10s.	£12.10s. - £15	£15 - £17.10s.	£17.10s. - £20	Over £20
No. of Fields	2	16	18	13	4	1

It will be seen that the costs are fairly evenly grouped around the average figure of £13.17.10d. The great majority of the fields cost between £10 and £17.10s. per acre.

Field/

1945 OATS : COST OF PRODUCTION PER ACRE.

(976½ acres - 54 crops)

	AVERAGE COST	HIGHEST COST	LOWEST COST
Size of field - acres	18	13¾	17
A. Net Cost in Stack	£ s. d.	£ s. d.	£ s. d.
1. Labour and Power:-			
(a) Cultivations:			
Man (Including women and boys)	- 14 4	1 16 -	- 10 1
Horse	- 10 7	2 6 9	- 3 10
Tractor	- 11 3	- 4 -	- 14 9
Contract	- 3 9		
Cleaning Costs brought forward	- 4 10	- 5 -	- 5 -
	2 4 9	4 11 9	1 13 8
(b) Harvesting:			
Man (Including women and boys)	1 12 6	3 15 4	1 13 11
Horse	- 3 9	- 4 5	
Tractor	- 6 3	- 13 8	- 5 8
Contract	- 3 6		
	2 6 -	4 13 5	1 19 7
Labour and Power	4 10 9	9 5 2	3 13 3
2. Seed	1 14 -	1 10 1	1 8 6
3. Manures (adjusted)	2 3 8	3 11 2	- 5 3
4. Other Crop Costs - Binder twine, spraying etc.	- 7 11	- 13 2	- 12 5
5. Rent	1 7 5	1 15 -	1 - -
Net Direct Costs	10 3 9	16 14 7	6 19 5
6. Overheads	2 4 7	4 6 4	1 16 6
NET COST IN STACK	12 8 4	21 - 11	8 15 11
B. Threshing Costs	1 9 6	2 2 1	1 - 4
FINAL NET COSTS (A + B)	£13 17 10	£23 3 -	£9 16 3
	T. C.	T. C.	T. C.
Yield per acre — Grain	1 ¾	1 13	1 8½
Straw	1 4	1 15	1 -
	£ s. d.	£ s. d.	£ s. d.
Net Cost per acre — Grain 6/7ths	11 18 2	19 19 9	8 8 2
Straw 1/7th	1 19 8	3 3 3	1 8 1
Net Cost per cwt. — Grain	- 10 -	-	-

Field yields per acre are shown below.

Range of Grain Yields per acre.

	Under 15 cwt.	15-18 cwt.	18-21 cwt.	21-24 cwt.	24-27 cwt.	27-30 cwt.	30-33 cwt.	33-36 cwt.
No. of Fields	2	6	13	9	11	5	5	3

Yields were mainly grouped between 18 cwts. and 30 cwts. per acre, 38 of the fields having yields between these two points. 8 fields had yields not exceeding 18 cwts., and 8 fields had yields above 30 cwts. per acre. The lowest yield recorded was 13 cwts. per acre, the highest was 36 cwts. costing 14/3d. and 7/5d. per cwt. respectively.

Twelve different varieties were grown on the fields costed, these being in order of popularity, Star (12), Marvellous (11), Victory (6), Yielder (6), Ayr Bounty (5), Early Miller (4), Onward (3), Ayr Commando (2), Sun (2), Resistance, Black Tartarian and Golden Rain (1) each. There appeared to be no relationship between variety grown and the cost per cwt. of grain produced, for there were wide variations in the costs of different fields of the same variety.

Manuring was also very varied both in quantity and variety; 29 fields received dressings of artificial manures, three of these receiving a dressing of lime in addition, while two fields had lime alone. None of the fields received any dung. The artificials applied were mainly of the compound grain fertiliser type, applied at rates ranging from 2 to 5 cwts. per acre; two fields had dressings of superphosphates only, and one field had twelve cwts. of slag per acre. The fields receiving manurial dressings had a very wide range of costs both per acre and per cwt., which precludes any definite statement as to the profitability or otherwise of such applications.

Crops grown in the previous year, on the fields costed were as diverse as any of the factors already mentioned. Briefly these were grass (26), turnips (14), potatoes (4), wheat (3), oats (3), beans (2), sugar beet (1), rape and kale (1). The effect of the previous crop on the cost per cwt. was also very inconclusive.

One rather interesting feature was that none of the fields was entirely worked by horse labour. On the other hand, four fields were worked without any horse labour whatsoever, one of these fields of oats being grown, harvested and threshed entirely by contract labour.

Our inquiries have served to emphasise the difficulties underlying any attempt to obtain a satisfactory cost of production figure for a crop such as oats, which is grown on so many farms both large and small, under such varying conditions of management, soil, altitude and climate. Even so, the figures obtained in an investigation such as this, based on a comparatively small random sample of farms voluntarily recruited, may at least be regarded as useful pointers to representative costs for the whole area.

II. - 1945 POTATO COSTS.

Potatoes have long been regarded as the main sales crop of the arable farmer in the east and south-east of Scotland, where over 114,000 acres are grown; this is more than one-half of the total acreage of potatoes grown in Scotland. The greater part of the crop is concentrated in the more intensively arable districts of the Lothians, Fife, Perthshire and Angus. There is however, a very considerable acreage of potatoes grown, mainly for seed, on the higher lying farms, particularly in the more northern parts of the College area, where the conditions are favourable for the production of healthy seed. Potatoes are an expensive crop to grow and require a great deal of labour throughout the whole growing season, and the harvesting of the crop is becoming one of the major problems of potato growers in the area.

This report deals with 30 fields grown in 1945, covering a total area of 431¼ acres, on farms well scattered over the main potato-growing areas, giving as wide a distribution of types of farms and systems of management as possible. Some idea of the differing conditions under which the potatoes were grown can be gained by looking at the different crops which preceded the costed potatoes, at the range of elevations above sea level at which the potatoes were grown, and also at the range of rental values and at the size of the fields.

Summary of preceding Crops.

	Wheat	Barley	Oats	Potatoes	Turnips	Beans	Grass
No. of Fields	2	2	16	2	1	1	6

More than one-half of the costed potatoes followed oats in the rotation.

Range of Elevations above Sea Level.

Feet above sea level	Under 200	201-400	401-600	Over 600
No. of Fields	7	11	6	6

20 of the fields were below 500 feet and 10 over 500 feet, the highest being at 800 feet above sea level.

Range of Rental Values per acre.

	Under 20/-	20/1 - 30/-	30/1 - 40/-	Over 40/-
No. of Fields	7	9	11	3

The average rent per acre for the 30 fields was 27/5d., the range being from 12/- to 50/-.

Range/

Range of Field Sizes.

	Under 10 acres	11 - 20 acres	21 - 30 acres	Over 30 acres
No. of Fields	10	16	3	1

Four of the fields were 5 acres or under in size, and one field was 51 acres in extent; the average size of field costed was 14½ acres.

From the above tables it will be seen that these fields covered a fairly comprehensive sample of the conditions under which the crop is grown in the area.

Twenty different varieties were included in the survey, although one or two varieties covered a very limited acreage. The four principal varieties studied, the acreages indicated in brackets, were:- Majestic (82 acres), Arran Pilot (58), King Edward (51), and Great Scot (48). If to those varieties we add Kerr's Pink, Redskin, Golden Wonder and Epicure, we cover well over three-fourths of the total acreage costed.

The following table set out on p.10, shows the average cost of one acre of potatoes (including pitting) and then the cost of dressing, thus giving a final net cost per acre for the potatoes ready for disposal.

After the average costs per acre, the highest and lowest costs per acre are set out. Final costs per acre (including dressing) ranged from £24.10/- to £63.17.7d., and averaged £47.7/- per acre. As an instance of the influence of yields on costs per ton, it may be stated that the field showing the highest cost per ton had a yield of 4½ tons per acre, costing nearly £11 a ton to produce.

Seed cost up to £21 per acre. Manurial dressings were very varied in character and quantity, and after adjustment for residual values the cost varied between £4.5/- and £13.4/- per acre. All the fields received some form of artificial manure, mainly ready mixed compounds, the heaviest dressing being 16½ cwts. per acre. 17 of the fields, i.e. rather more than one-half, received dung, the dressings varying from 8 to 25 tons per acre.

Other crop costs, which include items such as potato inspection, spraying etc., varied from nil to £4.19. 6d. per acre, the most expensive item being spraying. This treatment was intended either to prevent blight or to serve the two-fold purpose of burning down the shaws to prevent growth of the tubers to a size unsuitable for seed purposes and of facilitating harvesting.

Overheads, on a crop such as potatoes which entails the employment of labour and machinery on a large scale, are naturally heavy and averaged £6.11. 5d. per acre over all the fields costed, the minimum and maximum costs under this heading being £4.2/- and £8.15. 9d. per acre.

Dressing costs varied a good deal on the per-acre basis, as these are more closely related to yield; they averaged £3. 7.3d. per acre; in one case they amounted to as much as £6. 1. 1d. per acre; on an average, dressing cost approximately/

approximately 10/- per ton.

Field yields varied very considerably, the lowest yield was 4T. 6c. 2q. per acre costing £42. 8. 9d. to grow; the highest yield was 11T. 6c. 2q. costing £58. 3. 4d. per acre. The gross returns for these two fields were £29.15. 6d. and £96.19. 6d. respectively, including the £10 per acre Acreage Payment in each case.

The investigation did not set out to show the profitability or otherwise of the crop and complete details of returns received are not available for all fields costed; but the two fields just referred to above tend to illustrate the fact that although cost per acre may not be unduly high the profit or loss on the field depends much more on the yield of saleable potatoes. On the whole the investigation shows that costs are very varied, and dependent on many factors including the purpose for which the crop is grown. To secure more detailed and informative results, it would be necessary to obtain fuller particulars from a much larger number of potato growers, so as to render possible the classification of separate sub-groups for early potatoes, maincrop ware potatoes and seed potatoes, thus covering the greater part of the saleable potato crop grown in the area.

1945 POTATOES : COST OF PRODUCTION PER ACRE.

(431¼ acres - 30 crops)

	AVERAGE COST	HIGHEST COST	LOWEST COST
Size of Field - acres	14½	16	2½
A. Net Cost in Pit	£ s. d.	£ s. d.	£ s. d.
1. Labour and Power:-			
(a) Cultivations:			
Man (Including women and boys)	4 10 5	8 8 8	1 18 11
Horse	1 15 10	2 1 2	- 8 6
Tractor	1 7 9	2 9 10	2 - 11
Contract	- 6 -		
Less cleaning residues carried forward	-1 - -	-1 - -	-1 - -
Net Cultivations	7 - -	11 19 8	3 8 4
(b) Harvesting:			
Man (Including women and boys)	6 16 6	7 11 5	3 13 11
Horse	- 13 3	- 15 6	
Tractor	- 11 9	1 5 4	- 19 3
Contract	- 2 -		
Harvesting	8 3 6	9 12 3	4 13 2
Labour and Power	15 3 6	21 11 11	8 1 6
2. Seed	10 17 6	15 - 8	4 3 6
3. Manures (adjusted)	8 4 5	9 17 10	5 4 -
4. Other Crop Costs - Baskets, straw, spraying etc.	1 13 6	3 15 6	
5. Rent	1 9 5	1 5 -	- 15 -
Net Direct Costs	37 8 4	51 10 11	18 4 -
6. Overheads	6 11 5	8 10 9	4 2 -
NET COST IN PIT	43 19 9	60 1 8	22 6 -
B. Dressing Costs	3 7 3	3 15 11	2 4 -
FINAL NET COSTS (A + B)	£47 7 -	£63 17 7	£24 10 -
	T. C.	T. C.	T. C.
Yield per acre	7 15½	6 18¼	8 13¾
	£ s. d.	£ s. d.	£ s. d.
Net Cost per ton	6 2 2	-	-

III. - 1945 SUGAR BEET COSTS.

Ever since the establishment of the beet sugar industry in Scotland approximately 20 years ago, a very large proportion of Scotland's somewhat limited sugar beet crop has been grown in the east and south-east of Scotland, more particularly in Fife, within easy reach of Scotland's only factory at Cupar, Fife. During the later war years, national necessity led to a very considerable expansion of the beet acreage in Scotland, which by virtue of compulsory directions served on growers in some counties, very nearly doubled after 1941. Of the 1945 crop of some 12,000 acres,# nine-tenths were grown in the area served by this college. Fife alone has about one-third of this acreage, but, as compared with pre-war days, there has been a substantial increase in the beet acreage in other counties, particularly Angus, East Lothian, Berwick and Perth.

This report covers 22 sugar beet fields costed in 1945, 13 of which were in Fife, 3 in East Lothian, 2 each in Berwick and Perth and 1 each in West Lothian and Roxburgh. Most of the 22 farms keeping sugar beet records were predominantly arable in character, though some also fed stock and reared sheep; three of those in Fife combined milk production with arable farming.

Elevation and Soil Type. The elevations at which the sugar beet was grown were fairly low, varying between 40' and 550' above sea level.

Range of Elevations above Sea Level.

Feet above sea level	0-100	101-200	201-300	301-400	401-500	Over 500
No. of Fields	7	5	4	2	2	2

A third of the costed fields were below the 100 ft. contour, but as the elevations rose, the number of records in each group decreased. The soil type varied from heavy clay to sand, though it was mainly medium to light loam.

Rental Value. The rental value varied between 20/- and 65/- an acre, though most of the farms had rentals between 20/- and 40/- an acre, the average figure being 32/10d. an acre.

Range of Rental Values per Acre.

	20/-	20/1 - 30/-	30/1 - 40/-	40/1 - 50/-	Over 50/-
No. of Fields	2	9	8	2	1

Varieties/

Official statistics were kindly furnished by the Department of Agriculture for Scotland.

Varieites Grown. Three varieties were grown, viz., Sharpe's Klein E. & Johnson's Kuhn P., which were almost equally popular and Garton's C., which was less popular than the others.

Acreages Grown and Acreages Costed. The total acreage of sugar beet grown on all the farms where sugar beet was costed was 224¾ of which 195¾ acres were costed. The highest acreage grown on any particular farm was 25 acres, of which only 5 acres were costed. Two farms, one in Perth and one in Fife both grew and costed 20 acres of sugar beet. The lowest acreage was on two farms, one in Perth and one in Fife which both grew and costed 2 acres.

Range of Field Sizes.

	Under 5 acres.	6 - 10 acres.	11 - 15 acres.	16 - 20 acres.
No. of Fields	8	7	4	3

As will be seen from the above figures two-thirds of all the fields costed were 10 acres or less, and only three were more than 15 acres. The average field costed was about 9 acres in extent.

Previous Crop. As sugar beet is a "cleaning crop", the previous crop was usually grain, but in one case sugar beet was grown two years in succession. One of the costed beet crops was taken after grass, and two after potatoes, though one of these was first earlies, which could not be expected to leave the land as clean as maincrop potatoes.

Summary of Preceding Crops.

	Wheat	Barley	Oats	Potatoes	Sugar Beet	Grass
No. of Fields	7	4	7	2	1	1

Manuring. Half of the sugar beet fields costed were dunged, the quantity applied ranging up to 20 tons per acre. Every field received artificial manure, the dressings varying from 10 to 20 cwts. per acre. Compound manures were most commonly used, but the manures were very varied. Four fields had salt applied; three were slagged, and three had lime applied.

The costs per acre range from £25. 5. 2d. to £50. 12. 1d. The field showing the highest costs per acre covered only 5¾ acres, a much smaller acreage than the field with the lowest costs, which was 15 acres in extent. It is interesting to note that the field with the highest cost incurred heavy expenditure on manures, and also used a great deal of horse labour but very little tractor labour; as to the latter point, the reverse is true of the field with the lowest cost, the expense on tractor labour especially at harvest time working out more cheaply than that on horse labour.

Range/

Range of Costs of Production per Acre.

	£25 - £30	£30 - £35	£35 - £40	£40 - £45	Over £45
No. of Fields	4	6	8	2	2

The majority of the records had costs of production per acre of between £30 - £40. The average cost of production per ton was £3.18. 4d., and varied between £2. 1.10d., and £7. 4. 5d.

Yields, Returns and Profits. The average yield of clean beet per acre for the 22 fields costed was 9 tons 15½ cwts. as compared with an average yield of 8 tons 4 cwts. for the whole of Scotland in 1945. The average returns and profits per acre set out in this report therefore relate to a "better than average sample" for Scotland as a whole.

Range of Yields of Clean Beet per Acre.

	5-7½ tons	7½-10 tons	10-12½ tons	Over 12½ tons
No. of Fields	4	8	8	2

Most of the fields had a yield of between 7½ and 12½ tons per acre. The sample of fields costed was much too small for any attempt to draw conclusions as to the connection between yields and say, date of sowing, or elevation, or sugar content. Drought after the sowing, resulting in a poor "take of seed", might of course lower the yield. All the fields costed in 1945 were sown in April, except one field sown on an East Lothian farm as late as May 11th; in this case, the yield was an average one with a good sugar content.

Even with this small sample, it was rather noticeable that the higher elevations produced lower yields. The costed field at the highest elevation of 550 ft. had the lowest yield of 5½ tons per acre, while the highest yield of 13 tons 2 cwts. 3 qrs. was on a field at 100 ft. Most of the yields above the average were on land between 40 ft. and 200 ft. above sea level.

The average sugar content of all fields costed was 15.6%. Due to the proximity of the sugar beet factory, sugar beet may perhaps be grown on some less suitable land in Fife than in other counties, but all the Fife fields costed had average sugar contents of under 16%, whilst the lowest average sugar content observed viz., 14.8% was also on a Fife farm. The highest average sugar content of 17.2% sugar was on a farm in Berwickshire which had a heavy yield of nearly 12½ tons per acre. Four other farms showed sugar contents of over 16% for their costed fields.

In setting out the financial returns from sugar beet, it has been thought advisable/

advisable to include a credit for the value of the beet tops. Varying between the limits of £1 and £3 an acre, the amount in each case has depended partly on the yield of clean beet and partly on the use made of the tops, in accordance with the following scale:-

	Yield of Clean Beet per acre		
	Under 7 tons	7 - 10 tons	Over 10 tons
Tops folded, or ploughed in...value	£2 per acre	£2.10/- per acre.	£3 per acre
" carted off ...value	£1 "	£1.5/- "	£1.10/- "

The range of total returns per acre was wide, varying from £24.15. 9d. for a yield of 5½ tons per acre with an average sugar content of 15.7%, to £59.10/- for a yield of nearly 12½ tons per acre with an average sugar content of 17.2%. The average returns per acre were £43.12. 3d.

Range of Total Returns per Acre (including allowance for beet tops)

	Under £25	£25-£35	£35-£45	£45-£55	Over £55
No. of Fields	1	4	7	5	5

The average profit was £7.12.11d. per acre, but the range as might be expected was very great, varying from a loss of £19.12.11d. to a profit of £30.17. 1d. an acre.

Range of Profits or Losses per Acre.

	Losses		Profits			
	£10-£20	NIL to £10	NIL to £10	£10-£20	£20-£30	Over £30
No. of Fields	3	1	8	6	3	1

The majority of the fields costed showed a profit.

In so far as it is possible to ascertain, an average yield of 8 tons of clean beet with an average sugar content of 15.6% (the average sugar percentage of the 22 fields costed) would bring in a return of £36 approximately, allowing 32/6d. for the beet tops, while the average cost of production per acre for the 22 fields recorded was £35.19. 4d. On the level of costs ruling in 1945 - a year which, judging by official records of yields, was better than average - an 8 ton crop would apparently just about cover the costs of production, without allowing any profit, any management salary to the farmer, any interest on capital, or any margin for contingencies.

ACKNOWLEDGMENT.

Grateful/

1945 SUGAR BEET : COST OF PRODUCTION PER ACRE.

(195¾ acres - 22 crops)

	AVERAGE COST	HIGHEST COST	LOWEST COST
Size of Field - acres	9	5¾	15
1. Labour and Power	£ s. d.	£ s. d.	£ s. d.
(a) Cultivations:			
Man (Including women and boys)	7 1 9	8 5 4	5 6 6
Horse	1 5 1	1 12 -	- 4 3
Tractor	1 6 5	1 11 -	2 15 2
Contract	- - 1		
Less cleaning residues carried forward	-1 - -	-1 - -	-1 - -
NET CULTIVATIONS	8 13 4	10 8 4	7 5 11
(b) Harvesting:			
Man (Including women and boys)	7 8 5	11 6 3	5 10 6
Horse	1 4 1	4 7 9	
Tractor	- 12 4	- 2 1	1 13 2
Contract	- 3 11		
Carriage (less freight credit)	- 3 1		
HARVESTING AND DELIVERY	9 11 10	15 16 1	7 3 8
LABOUR & POWER	18 5 2	26 4 5	14 9 7
2. Seed	1 - -	1 1 9	1 - -
3. Manures (adjusted)	8 10 7	11 16 5	1 8 6
4. Rent	1 12 10	1 19 -	2 5 -
NET DIRECT COSTS	29 8 7	41 1 7	19 3 1
5. Overheads	6 10 9	9 10 6	6 2 1
NET COST	£35 19 4	£50 12 1	£25 5 2

YIELDS, RETURNS, & PROFITS.

	T. C. Q.	T. C. Q.	T. C. Q.
Yield per acre (clean beet)	9 15 2	8 6 3	12 1 1
Sugar content	15.6%	###	16.2%
	£ s. d.	£ s. d.	£ s. d.
Cost per ton	3 18 4	-	-
Returns per acre Beet	41 12 6	29 1 8	53 2 3
Tops, value	1 19 9	1 17 6	3 - -
Total Value of Crop	£43 12 3	£30 19 2	£56 2 3
Profit per acre	£7 12 11	-	£30 17 1
Loss per acre	-	£19 12 11	-

###Not available.

Grateful acknowledgment is made of the valuable help given by farmers taking part in this investigation, who have kept the necessary records and furnished us with all the other information needed, and of the courtesy unfailingly shown us on the occasion of our visits. Each collaborating farmer receives a summary of his own costs. As previously stated, this investigation is continuing, and should furnish useful data both for advisory work in farm management and for the Annual Review of Agricultural Prices. It is therefore hoped that, wherever possible, those farmers who have so far participated in this work will continue to give us their generous help, but names and addresses of other interested farmers would be welcomed.

D.W.
D.M.R.L.
H.C.McI.

September, 1946.