Oats - Cost of production

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EDINBURGH AND EAST OF SCOTLAND COLLEGE OF AGRICULTURE.

(Economics Department)

1946 CROP COSTS STUDIES (contd.).

II. - OATS by H. Christine McIver.
III. - POTATOES by D.M.R. Leask.

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RECENT PUBLICATIONS.

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FINANCIAL RESULTS OF 46 EAST OF SCOTLAND FARMS 1945-46,
(I 26 Hill Sheep Farms II 20 Stock Rearing Farms).
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(III 35 Stock Raising and Feeding Farms IV 82 Arable Farms
V 37 Dairy Farms).
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INTERIM REPORT ON COST OF MILK PRODUCTION, WINTER 1946-47.

II. - 1946 OAT COSTS.

Oats are the most widely grown grain crop in the East and South-East of Scotland. In 1946 they formed 57% of the total grain acreage grown. Not only did they cover 253, 302 acres in the area, but they were grown on all types of farms with very variable soil conditions, and at altitudes ranging from sea level to a thousand feet above sea level.

The investigation into the costs of growing oats, which commenced in 1945, was continued during 1946, when records for 29 oat crops grown on 28 farms were completed. These farms which varied in type from hill sheep farms to intensive arable farms, were scattered throughout the area, five being situated in Fife, whilst Roxburgh, Perth and Angus were represented by four farms each; East Lothian and Berwick each had three farms, Peebles and Selkirk each had two, and Midlothian had one. The average acreage of arable crops on these 28 farms was 276 acres, although it varied between the wide limits of 42½ acres and 903 acres. Approximately 1,600 acres on the 28 farms i.e. 21% of the total arable acreage was used for growing oats. This was quite close to the average for the area of 24% of the acreage of arable land covered by oats. The 29 costed crops occupied a total of 527 acres, the average acreage of 18 acres per crop studied being exactly the same as in 1945. Most of the fields were between 11 and 20 acres in extent, varying between extremes of 6½ and 86½ acres.

Differences in altitude have been referred to and the following table shows the wide range of elevations at which the 29 fields were situated.

RANGE OF ELEVATIONS ABOVE SEA LEVEL.

Feet above sea level	Under 200	201 to 400	401 to 600	Over 600
No. of Crops costed	7	7	6	9

Just over one half of the costed fields were over 500 ft. above sea level, although they varied between 30 ft. and 1,000 ft. above sea level.

More than half the fields costed were on soils classified as medium loam; the remainder were on soils which varied from sandy loam to heavy clay. This wide variation in the soil types illustrates the differences in the conditions under which oats are grown. These differences are still more emphasised by the range in the rental value per acre which may be said to sum up all the differences of soil, position, altitude, etc. The average rental value per acre was slightly lower in 1946 than in 1945, i.e. 25/3d. as compared with 27/5d. per acre. The classification of the costed crops by their rental values is as follows:-

RANGE OF RENTAL VALUES PER ACRE.

	Under 10/-	10/1-20/-	20/1-30/-	30/1-40/-	40/1-50/-	Over 50/-
No. of Crops	2	10	9	5	2	1

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The majority of the rental values per acre were between 10/1 and 30/-, although the lowest rent was 6/- per acre, and the highest 60/- per acre.

The place of the oat crop in the rotation varied considerably; in 15 cases it came directly after grass, mainly rotation hay, or old lea. It often came after a cleaning crop; in six cases the previous crop was turnips, in one case potatoes, and in one case potatoes and turnips. Oats grown after wheat occurred once, while in three fields oats followed oats. The remaining oat crop was grown after flax.

As might be expected, no dung was applied to any of the oat fields, although surprisingly enough, dressings of lime were given in two cases. In nineteen cases, dressings of from 1½ to 5 cwts. per acre of mixed grain manures were applied. In one case 3 cwts. of superphosphates were used per acre, and in another case a top dressing of sulphate of ammonia was given. Eight fields of oats received no manurial dressings, but in every case grass or turnips were the previous crop.

Costs of Production.

On the following page are given figures for the 1946 crop costs per acre, yields per acre and costs per cwt. of grain - 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 average cost of growing an acre of oats in 1946 was £14.9.1d. or 4% higher than in 1945. Due to the higher average yield of grain per acre, 25½ cwts. instead of 23¾ cwts. the cost per cwt. in 1946 was 3% lower than the cost per cwt. in 1945, and worked out at 9/9d. per cwt. Owing to the mild early part of the spring and the dry weather conditions later in 1946, the cultivations were performed more rapidly, and despite the slightly shorter working week after the 5th April,1946 by reason of changes under the Agricultural Wages (Regulation) Acts, the average cost of the cultivations was lower than in 1945. The deplorably wet and long drawn out harvest of 1946 entailed very protracted harvesting operations to cope with the heavy yields of grain. The large increase in wages on the 7th October also affected the costs of harvesting somewhat, although they affected the average threshing costs per acre considerably more. Because of these two factors, the average costs of harvesting per acre rose in 1946 by 16.5%, from £2.6/- to £2.13.8d. Because of the decrease in the average costs per acre of cultivation, the total average costs per acre of labour and power up to the "in the stack" stage were only 5% higher in 1946 than in 1945, £4.15.2d. instead of £4.10.9d.

The cost of seed was taken either at the purchase price, where purchased, or, where the seed was home grown, at the cost of production on that farm, if known, or at the average cost of production for the 1945 crop. The average cost per acre of seed worked out at 1/9d. below the 1945 figure. This was exactly equalled by the increase in the cost of manures in 1946. These differences are so small that it may/

COSTS OF PRODUCTION PER ACRE.

	1945 Average Cost	1946 Average Cost	1946 Highest Cost	1946 Lowest Cost
Size of field - acres	18	18	20	86½
A. Net Cost in Stack	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1. Labour and Power				
(a) Cultivations:				
Man (Including women and boys)	-.14. 4	-.13. 5	-.12. 5	-. -. 4
Horse	-.10. 7	-. 7. 5	-. -. 6	-. -. -
Tractor	-.11. 3	-.11.11	-.18.11	-. -. -
Contract	-. 3. 9	-. 5. 4	-. -. -	2. 7. 2
Cleaning Costs brought forward	-. 4.10	-. 3. 5	-. -. -	-2. 7. 2
NET CULTIVATIONS	2. 4. 9	2. 1. 6	1.11.10	2. 7. 6
(b) Harvesting:				
Man (Including women and boys)	1.12. 6	1.17. 8	1. 9. 5	-.16.11
Horse	-. 3. 9	-. 3.11	-. -. -	-. -. -
Tractor	-. 6. 3	-. 6. 5	-. 6.11	-. -. -
Contract	-. 3. 6	-. 5. 8	-.12. 8	-.18. 5
HARVESTING	2. 6. -	2.13. 8	2. 9. -	1.15. 4
TOTAL LABOUR AND POWER	4.10. 9	4.15. 2	4. -.10	4. 2.10
2. Seed	1.14. -	1.12. 3	3.12. 4	1. 3.11
3. Manures (adjusted)	2. 3. 8	2. 4. 5	4.16. -	1. 4. 6
4. Other Crop Costs - Binder twine, spraying etc.	-. 7.11	-.10. 7	-. 4. 1	-. 9. 4
5. Rent	1. 7. 5	1. 5. 3	1. 5. -	-.15. -
NET DIRECT COSTS	10. 3. 9	10. 7. 8	13.18. 3	7.15. 7
6. Overheads	2. 4. 7	2. 7. 6	2.12. -	-.14. 8
NET COST IN STACK	12. 8. 4	12.15. 2	16.10. 3	8.10. 3
B. Threshing Costs	1. 9. 6	1.13.11	3. 8. 7	1. 8. 6
FINAL NET COSTS (A. + B.)	£13.17.10	£14. 9. 1	£19.18.10	£9.18. 9
	T. c.	T. c.	T. c.	T. c.
Yield per acre — Grain	1 3¾	1 5½	1 18¾	- 14½
Straw	1 4	1 2	1 7	- 15
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Net Cost per acre — Grain 6/7 ths.	11.18. 2	12. 7. 9	17. 1.10	8.10. 4
Straw 1/7 th.	1.19. 8	2. 1. 4	2.17. -	1. 8. 5
Net Cost per cwt. — Grain	-.10. -	-. 9. 9	-. 8.10	-.11.11

may be said that there was very little change in the costs of either seed or manures.

The miscellaneous costs were higher in 1946 by two or three shillings per acre; this was mainly due to the heavy cost of spraying two oat fields to kill charlock. Overheads, which are based on the cost of labour, horse and tractor work and the acreage grown, naturally show an increase over the 1945 figure. The threshing costs per acre are also higher in the later year owing to the heavier yields of oats and the increased wages.

The extremely high yield of the highest cost field has justified the heavy outlay on seed and manures, and is, of course, the cause of the high threshing costs. The cost per cwt. is below the average figure and considerably lower than that of the lowest cost field which has a very low yield.

There was a wide range in both the costs and yields per acre in 1946 and, since both these factors affect the cost per cwt., there was a considerable range in the cost from 6/3d. to 18/3d. The wide range in costs per acre is illustrated by the figures for both 1945 and 1946 which are given in the following table.

RANGE OF COSTS PER ACRE (Threshed Grain).

	Under £10	£10 - £12.10/-	£12.10/- £15 -	£15 - £17.10/-	£17.10/- £20 -	Over £20
No. of crops 1945	2	16	18	13	4	1
" " " 1946	1	7	11	6	4	-

The range in yields per acre in 1946 was, if anything, rather greater than in 1945, the lowest yield being 12 cwts. per acre while the highest yield was 38¾ cwts. In 1945 the highest yield was 36 cwts. The table below gives the range of yields per acre for both years.

RANGE OF GRAIN YIELDS PER ACRE.

	Under 15 cwts.	15-18 cwts.	18-21 cwts.	21-24 cwts.	24-27 cwts.	27-30 cwts.	30-33 cwts.	33-36 cwts.	Over 36 cwts.
No. of crops 1945	2	6	13	9	11	5	5	3	-
" " " 1946	3	5	3	1	3	2	7	4	1

In 1945 the majority of the yields were grouped between 18 and 27 cwts. per acre, but during the following year the yields were more frequent at either end of the scale, between 15 and 21 cwts., and between 30 and 36 cwts. This suggests that the conditions experienced in 1946 had the effect of producing either poorer or better crops than in 1945 depending on how the farmer's operations fitted in with the climatic conditions.

Eleven different varieties of oats were grown on the fields costed in 1946, these being in order of popularity Marvellous (17½%), Star (17%), Victory (14%), Yielder/

Yielder (11½%), Ayr Bounty (9½%), Onward (9%), Early Miller (7%), Ayr Commando (5½%), Castleton Potato (4½%), Harvester (2½%), and Golden Rain (2%). It is interesting to note that the order of popularity for the first eight varieties was almost the same as in 1945, the only differences being that Star changed places with Marvellous, and Early Miller with Onward.

Despite the greater expenses per acre of growing oats in 1946 due to the wet harvest weather and the increased wages, the average cost per cwt. was reduced on account of the high average yields. In this area of Scotland oats are mainly grown for home consumption and are not sold to the same extent. Our evidence suggests that, at least on better class land, the crop is reasonably remunerative when a good crop is secured.

ACKNOWLEDGMENT.

Greteful 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.

H.C.McI.

III. - 1946 POTATO COSTS.

This investigation is a continuation of that begun with the 1945 Crop and deals with 24 crops widely dispersed over the east and south-east of Scotland.

As the area served by this college contains the main potato growing districts of Scotland, about one half of the total acreage of the country as a whole is grown in this region. The counties of Angus, East Perth, Fife and the Lothians are well known potato growing districts and a great part of the farm economy on the more intensely arable areas of these counties is dependent on the success of this crop. Furthermore, in the higher lying districts in the more northern parts of the area considerable quantities of high-grade seed potatoes are grown for sale to the more intensive arable areas. The conditions in these districts are more favourable to the growth of healthy seed than are the lower districts, and although their tonnage grown per acre may be less they gain through the higher price per ton for their produce.

It had been hoped that a larger number of costs records could have been completed but various setbacks throughout the season compelled a number of costs records to be abandoned. Included in these setbacks were the very severe frosts and snow in spring; even flooding, when the thaw set in, did so much damage to potato pits in the more exposed areas the yields and dressing costs of some crops could not be ascertained.

The 24 records eventually completed covered 342½ acres of the 787 acres grown on the farms co-operating. These crops were grown under a wide range of differing conditions and give as good a picture as is possible of the varying circumstances under which this crop is grown in the area.

The following tables serve to illustrate the different elevations at which the crops were grown, the immediately preceding crops, the rental value per acre of the fields and the size of the fields on which the crops were grown.

RANGE OF ELEVATIONS.

	Under 200 ft.	201 ft. - 400 ft.	401 ft. - 600 ft.	Over 600 ft.
Number of Crops 24	8	6	4	6

15 of the fields were under 500 feet and 9 over 500 feet, the highest being at 900 feet above sea level.

SUMMARY/

SUMMARY OF PRECEDING CROPS.

	Wheat	Barley and Oats	Oats	Potatoes	Turnips	Grass
Number of Crops 24	2	1	14	1	1	5

The greater number of crops costed followed oats in the rotation.

RANGE OF RENTAL VALUES PER ACRE.

	Under 20/-	20/1 - 30/-	30/1 - 40/-	Over 40/-
Number of Crops 24	7	9	7	1

The average rent per acre for the 24 fields was 27/- the range being from 12/- to 42/-

RANGE OF FIELD SIZES.

ACRES	Under 10	11 - 20	21 - 30	Over 30
Number of Crops 24	9	12	2	1

Three fields were 5 acres or under in size, and one field was 48 acres, the average size was 14¼ acres.

The above tables emphasise the widely differing conditions under which this crop is grown throughout the area.

A further complication has arisen this year due to four of the crops never being pitted. Of these some were sold directly out of the field while part was put into sheds and dressed and disposed of almost immediately.

The 20 crops which were pitted included 14 different varieties, some of which were only grown on very limited areas. The four principal varieties studied, the acreages shown in brackets, were:- King Edward (63½), Majestic (60), Great Scot (27), Redskin (25), the remainder of the acreage was made up of varying amounts of 10 other varieties, Dunbar Rover, Gladstone and Kerr's Pink being the more popular.

The four crops which were not pitted included Epicure, Catriona and Arran Peak.

Separate tables showing the average cost of growing one acre of potatoes and dressing for disposal, firstly for the twenty crops which were pitted and secondly for the four crops not pitted are shown below, together with the average cost for thirty crops costed in 1945.

COSTS/

COSTS OF PRODUCTION PER ACRE.

	1945 Average Cost	1946 Average Cost 20 Crops Pitted	1946 Average Cost 4 Crops not Pitted
Total Acreage Costed	431¼ Acres	290	52½
Size of Field	14½ Acres	14½	13
A. Net Cost up to Dressing	£ s. d.	£ s. d.	£ s. d.
1. Labour and Power:-			
(a) Cultivations:			
Man (Including women and boys)	4.10. 5	5.14.11	4.19. 9
Horse	1.15.10	1.11. 5	1.19. 1
Tractor	1. 7. 9	1.16. 7	1. 4. 8
Contract	-. 6. -	-. 5. 1	-. -. -
Less cleaning residues carried forward	-1. -. -	-1. -. -	-1. -. -
NET CULTIVATIONS	7. -. -	8. 8. -	7. 3. 6
(b) Harvesting:			
Man (Including women and boys)	6.16. 6	6.19.11	5. 5. 7
Horse	-.13. 3	-.12. 2	-. 7.10
Tractor	-.11. 9	-.13. 2	-.13. 9
Contract	-. 2. -	-. 2. -	-. -. -
HARVESTING	8. 3. 6	8. 7. 3	6. 7. 2
TOTAL LABOUR AND POWER	15. 3. 6	16.15. 3	13.10. 8
2. Seed	10.17. 6	11. 7. 8	11. 3. 6
3. Manures (adjusted)	8. 4. 5	7.17. 1	9. 5.11
4. Other Crop Costs - Baskets, straw, spraying etc.	1.13. 6	2.11.11	-.11. 5
5. Rent	1. 9. 5	1. 7. 7	1. 3. 9
NET DIRECT COST	37. 8. 4	39.19. 6	35.15. 3
6. Overheads	6.11. 5	8. 3.11	6. -.11
NET COST UP TO DRESSING	43.19. 9	48. 3. 5	41.16. 2
B. Dressing Costs	3. 7. 3	5.11. 1	2. 3. -
FINAL NET COSTS (A. + B.)	£47. 7. -	£53.14. 6	£43.19. 2
	T. c.	T. c.	T. c.
Yield per acre	7.15½	9. 8	7.17½
	£ s. d.	£ s. d.	£ s. d.
Net Cost per ton	6. 2. 2	5.14. 4	5.11. 8

From the foregoing table it will be seen that on the whole costs have increased in 1946 as compared with 1945. The range of costs for the twenty crops pitted in 1946 was from £37. 2. 4d. to £76. 3.10d. per acre, with an average cost of £53.14. 6d. Of the four crops not pitted, three cost almost £48 per acre each and one crop £32. 2. 3d. per acre. In 1945 the average cost was £47. 7/- per acre for the 30 crops investigated.

Talking the crops which were pitted in 1946 and comparing them with the 1945 average it is noticeable that there has been an upward tendency in the cost of man labour and tractor work in 1946 and a decrease in horse labour, this latter reflecting the gradual decline in the employment of horses on farms in the area.

Seed cost rather more per acre in 1946, the highest cost being £26. 2. 9d. per acre.

Manurial dressings were very varied. All the crops received artificials in varying amounts, from 2½ cwts. per acre to 14 cwts. per acre; sixteen of the crops received dressings of dung applied at rates between 9 and 20 tons per acre. The average cost of manures applied to the 1946 crop, after adjustment for unexhausted manurial residues, was rather less than in 1945.

Other crop costs, which include such items as spraying, inspection etc. varied from nil to a maximum of £5. 5. 2d. per acre.

Overheads varied considerably according to the amount of labour and machinery employed. The average on the twenty pitted crops was £8. 3.11d. per acre, which was considerably higher than in 1945.

Dressing costs this season rose appreciably from 1945 due in part to the difficulties imposed by the bad weather after the New Year.

Comparing the four crops not pitted with the twenty crops pitted in the usual way, it is seen that the lower costs per acre for the unpitted crops are due mainly to the following causes:-

1) Cheaper harvesting - no pitting and covering labour being employed.
2) Other costs were cheaper because no spraying was required, the crops, with the exception of 2½ acres, being early varieties which were lifted before any blight attack was likely.
3) Dressing costs were very low as the greater part of these crops was sold straight off the field as ware. Dressing therefore was a much simpler operation than it usually is where pits have to be opened and the work carried out in the open during the winter months.

Yields varied within very wide limits for the twenty crops pitted; the range was from 4T. 3c. 2q. per acre on a poorish highlying field after rough old grass to 13T.11c. 1q. on a good type loam in an arable district.

The former crop cost £37. 2. 4d. per acre to grow, the variety being Great Scot; the latter cost £53.12.11d. per acre to grow, the variety being Majestic.

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These tonnages are the amounts of marketable potatoes taken out of the pits, and in the former case a considerable wastage had taken place owing to the abnormally unfavourable weather in spring.

The four crops which were not pitted, being earlies with one exception, did not show such a diversity in yields, the range being from 6 tons costing £32. 2. 3d. per acre to 9T. 12c. costing £47.16. 3d. per acre to grow.

Details of the returns obtained from the crops were not available for all the crops, although the investigation did not set out to find out the profitability or otherwise of the crop. It was pointed out in 1945 that the cost per acre does not give any indication as to the profitability of the crop.

The 1946 investigation again illustrates the very great variations in costs and the great complexity of the factors affecting these costs in this area alone.

ACKNOWLEDGMENT.

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.

D.M.R.L.

APPENDIX - Basis of 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 1/3d. 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 - 4/6d. per hour.

Seed, purchased - charged at cost delivered to the farm.
do. home grown - charged at 1945 cost of production on the same farm, or average 1945 cost of production in this area.

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 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 Scottish Agricultural Economists' Conference, 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 - The average costs have been obtained by taking the costs per acre, per cwt. or per ton for each crop costed; these figures have then been totalled and divided by the number of crops, e.g. Oats, 29. This method assigns equal weight to each crop costed 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 or the total yields, the "average" may be unduly influenced by exceptional costs relating to a single crop of large acreage or exceptional yield.