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*Oats
cost of production*

MAY 1958

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ECONOMIC REPORT No. 49

THE 1956 OAT CROP

by

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(Department of Economics)

22 ROSE STREET, EDINBURGH, 2.

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PUBLICATIONS

A. Annual Reports on Financial Results of East of Scotland Farms :-

Hill Sheep Farms)	Reports for the years 1948-49 to 1955-56.
Stock-Rearing Farms		
Stock-Raising and)	Reports for the years 1948-49 to 1955-56.
Feeding Farms		
Arable Farms		
Dairy Farms		

B. Enterprise Studies :-

Milk Production (Annual Reports).
Commercial Egg Production.
Cattle Rearing.
Silage Making.
Wheat, Barley, Oats and Potato Costs.
Etc.

C. Miscellaneous :-

Dairy Labour in the East of Scotland.
Team Work in Grass Silage Making.
Economics of Small-Scale Farming.
Piece-Work Potato Gathering.
Blackface or Cheviot? 1946-53.
Hill Farming in the East and South-East of Scotland During
the Post-War Period.
Some Notes on Reseeding Old Grassland on Hill and Upland Farms, 1955-57.

Inquiries regarding the above publications
should be addressed to either the Secretary of the College
or the Advisory Economist.

THE 1956 OAT CROP

INTRODUCTION

The oat crop is one of the most important arable crops grown in Scotland, occupying a greater proportion of the arable area than any other crop except rotation grass. The total area of oats grown in Scotland during 1956 - 818,935 acres - almost equalled the combined total of all the other arable crops excluding grass. Approximately 208,000 acres, or just over one-fourth of the total acreage, were grown within the East of Scotland College area.

This report deals with the cost of producing 62 crops of oats in 1956. The records were obtained from 42 farms scattered widely over the College area and included crops grown under very varying conditions as regards situation, place in the rotation and cultural treatment. The average size of the costed crops was 21.5 acres; more than one-half of the crops were between 10 and 30 acres in size. The average figures for these costs should give a reasonable picture of the general run of costs involved in growing this crop.

The most interesting change which has affected the costs of growing all cereal crops in recent years has been the increasing use of the "combine harvester" to replace the established sequence of cutting, stooking, stacking and threshing. Forty-five of the crops were harvested by the "binder" method and 17 were "combined". Records covered 841 acres for the former method and 495 acres for the latter.

TABLE I. /

TABLE I. AVERAGE COST OF GROWING OATS PER ACRE - 1956 CROP

<u>DIRECT COSTS</u>	£ s. d.	%
<u>Preharvest Costs :</u>		
Seed 4.875 bushels	2: 3:11	9
Manures (net)	1: 5:10	6
Manurial Residues (B/F.)	3: 8: 1	15
Other Crop Costs	-:19: 9	4
Labour 5.66 hours	-:19: 6	4
Tractor Work 5 hours	-:19: -	4
Horse Work 0.16 hours	-: -: 3	-
Contract Work	-: 4: 5	1
	£10: -: 9	43%
<u>Harvesting (Including Threshing) Costs</u>		
Labour 21.82 hours	3:18: 7	17
Tractor Work 4.6 hours	-:17: 8	4
Horse Work 0.13 hours	-: -: 2	-
Contract Work	1: 7: 5	6
Specialised Equipment	-:12: 3	3
	£ 6:16: 1	30%
<u>INDIRECT COSTS</u>		
Rent	1: 9: 5	6
Overheads	4:19: 7	21
	£ 6: 9: -	27%
TOTAL COST	£23: 5:10	100%
Number of Crops	62	
Total Acreage	1336	
Average Yield per Acre (Grain)	26.33 cwts.	
Total Labour Hours per Acre	27.48	
Total Tractor Hours per Acre	9.6	
Cost per Cwt. Grain (Including Straw)	17s.8d.	
Net Cost per Cwt. - 6/7ths. of above	15s.2d.	

The above table shows the average cost per acre and per cent for the 62 crops recorded.

From /

From the records available no appreciable difference was brought out in the pre-harvest treatment of these crops whether intended for "binder" or "combine" harvesting. Indeed, the decision to combine was in some cases only made when conditions at harvest time made it too difficult to secure the crop by the "binder" method.

PRE-HARVEST COSTS

In Table I on page 2 the pre-harvest costs for the 62 crops totalled £10:-9d. per acre.

Seed : The average quantity of seed sown amounted to $4\frac{7}{8}$ ths bushels per acre, the great majority of the crops being seeded at rates varying between $4\frac{2}{3}$ rds bushels and 5 bushels per acre. Home-grown seed was charged at 18s. per cwt. while bought-in seed, charged at the cost on the farm to the farmer, varied in price from £1:2s. to £1:18:9d. per cwt.

Manures : Artificial manures were applied to 46 crops. On one crop the dressing consisted of 3 cwts. per acre of superphosphates but, on all the others compounds supplying nitrogen, phosphates and potash were sown at rates varying from $1\frac{1}{2}$ cwts. highly concentrated to 4 cwts. of ordinary compound fertiliser per acre. The majority of these dressings of "artificials" were applied along with the seed grain by means of the "combine driller". Lime was applied to one field only. The net cost of manures including lime shown on the table was the balance remaining after deducting the value of the residues carried forward. The manurial residues from previous applications have been brought in and appear as a net figure after deducting any balances to be carried forward to following crops. It is notable that the net value of the manurial residues brought forward from previous crops was more than $2\frac{1}{2}$ times greater than the net value of the manures applied directly to the crop itself. This follows from the place oats occupy in the rotation, usually following a heavily manured crop or grass.

Other Crop Costs : These include seed dressings, spraying the crop against weeds and plant diseases, binder twine or baler twine and wire.

The dressing of seed oats with some form of disease-inhibiting powder is now standard practice, but spraying of the growing crop, which appears to be almost as universal a process nowadays, was only carried out on about 25 per cent of the crops recorded.

The cost of binder twine, baler twine and wire have been included in this figure, though strictly speaking it should come under harvesting costs. As however, the cost of binder twine was practically equalled by the cost of baler twine and wire on the combined crops the difference in the /

the cost of harvesting by these different methods was not affected.

Labour and Power : It required 5.50 man hours plus 0.16 woman hours per acre to carry out the pre-harvest manual operations on these crops, including tractor and horse-driving. Tractors were employed for 5 hours per acre and the time for horses, which were only employed on 3 crops for very short periods, averaged out at 0.16 hours per acre.

Contract work, i.e. work done by hired contractors including the wages of the operator for such items as ploughing, discing, seeding, manure sowing and spraying etc., averaged out at less than one half-hour per acre over the 62 costs in the pre-harvest period.

Over all the costs 43 per cent of the total was incurred during the pre-harvest stage.

HARVESTING COSTS

Harvesting (including threshing) costs accounted for 30 per cent of the total costs incurred in the production of these crops. It was at this stage that the greatest demands were made on manpower; the average requirement for labour was 21.82 hours per acre, accounting for more than one-half of the total cost at this stage. Tractors were employed for 4.6 hours per acre; the practically negligible amount of horse work employed on these crops, in this section, averaged out at 0.13 hours per acre.

Contract work, which included the charges for the hire of "combines", pick-up balers, binders and threshing machines, together with the wages of their direct operators, was the second most expensive item and together with the charge for "specialised equipment" accounted for almost one-third of the total cost in this section.

INDIRECT COSTS

These included rent which, over the 62 costs, averaged out at £1:9:5d. per acre and overheads £4:19:7d. per acre, charged in proportion to the amounts of labour and tractor work plus a fixed charge per acre, to cover the crop's share of the general expenses of the farm. Together these indirect costs amounted to 27 per cent of the total cost of production per acre.

COMPARISON OF THE COST OF HARVESTING BY BINDER AND BY COMBINE

In the following table, the average pre-harvest costs together with the average rent have been taken as applicable to both "binder" and "combine" harvested crops; the harvesting costs including threshing have, however, been separated /

separated to distinguish those pertaining to the crops harvested by the binder, then stacked and threshed, from those crops which were combined, the grain either disposed of immediately or dried and stored and the straw picked up and baled off the field.

TABLE II. AVERAGE COST OF GROWING OATS PER ACRE - 1956 CROP
COMPARISON BETWEEN BINDER AND COMBINE HARVESTED CROPS

	Binder		Combine			
	£ s. d.	%	£ s. d.	%		
Pre-Harvesting Costs	10: -: 9	42	10: -: 9	47		
Rent	1: 9: 5	6	1: 9: 5	7		
	£11:10: 2	48%	£11:10: 2	54%		
<u>Harvesting (including Threshing) Costs</u>						
	Hours		Hours			
Labour	27.75	4:18: 3	20	7.44	1: 6: 4	6
Tractor	5.30	1: -: 1	4	3.00	-:11: 4	3
Horse Work		-: -: 3	-		-: -: -	-
Contract Work		1: 2: 4	5		2: -: 5	10
Specialised Equipment		-: -:10	-		2: 1: 9	10
Overheads		5: 9: 4	23		3:14: 4	17
		£12:11: 1	52%		£ 9:14: 2	46%
		£24: 1: 3	100%		£21: 4: 4	100%
TOTAL COST						
Number of Costs		45			17	
Acreage		841			495	
Average Yield of Grain per Acre (cwts.)		25.93			27.00	
Total Labour Hours per Acre		33.41			13.10	
Total Tractor Hours per Acre		10.30			8.00	
Cost per cwt. Grain (incl. Straw)		18s. 7d.			15s. 9d.	
Net Cost of Grain ⁶ / ₇ ths of above		15s.11d.			13s. 6d.	

From the above table it may be seen that the total harvesting costs on the "combined" crops were no more than 77 per cent of those incurred on the "binder" harvested crops. This table also shows considerable differences in the structure of the respective costs because of the different methods of harvesting. /

harvesting. The most outstanding of these differences were the much reduced costs of manual and tractor work and also the lower charge for overheads on the "combined" crops but, against these, there were heavier charges for contract work and specialised equipment. On the combined crops farm labour was employed for little more than one-quarter of the time required by the binder harvested crops and tractor work was reduced on the "combined" crops to about one-half of that required by the "bindered" crops. A practically negligible amount of horse labour was employed on the binder harvested crops only.

Contract work, carried out by outside hirers of equipment, cost almost twice as much on the combined crops due to the greater proportion of these which were harvested by this means and the higher charges for combines and pick-up balers compared with the charges for binders.

Specialised equipment charges have been calculated on the prospective useful life of such expensive items as combine harvesters, pick-up balers, grain cleaning, drying and storage equipment owned by the farmers themselves. These charges form a substantial item in the costs of the combined crops; on the binder harvested crops there was very little of such equipment and the charge was relatively very small.

Overhead charges calculated on the farm labour and tractors used plus a level charge per acre were much lower on the combined farms corresponding to the lower labour and tractor costs incurred on these crops.

Taken together, the total charge for specialised equipment and overheads is higher for the combined crops than the "bindered" crops.

Yields Per Acre : It is generally assumed that the yields of grain from combined crops are higher than from those which have been harvested by binder. Of the crops included in this report, those which were combined yielded an average of 27 cwts. dry grain per acre compared with 25.93 cwts. from the bindered crops. This was a small but scarcely significant difference of 4 per cent in favour of the combine.

Costs Per Acre Grown and Per Cwt. of Grain Harvested : The average total cost per acre of the binder harvested crops was £24:1:3d. which, with an average yield of 25.93 cwts. grain per acre, gave a cost, allowing nothing for the straw, of 18s.7d. per cwt. or, after deducting the customary $\frac{1}{7}$ th of the total cost as chargeable to the straw, a net figure of 15s.11d. per cwt. grain.

On the combined crops the average total cost per acre amounted to £21:4:4d., the average yield was 27 cwts. per acre and the cost per cwt. grain, allowing nothing for straw, was 15s.9d., or after deducting $\frac{1}{7}$ th of the cost, as above, the net cost of the grain was 13s.6d. per cwt.

Straw /

Straw which has been combined may be less valuable than straw which has been cut, stoked and stacked but, even if its value is greatly diminished, the net cost of combining would still be less per cwt. of grain than binder harvesting. Apart from the difference in cost, harvesting by the combine, even after allowing for the time of men employed on contract work, required less than one-third of the man labour hours needed on the binder harvested crops. As there are very few workers available for temporary employment at harvest-time, the use of the combine appears to be the best method of making use of the available labour and ensuring that the grain, at least, is secured.

With so many different varieties of oats grown (17) under varying conditions of soil fertility, altitude, aspect etc., yields per acre are liable to be variable with consequent differences in the costs per cwt. of grain harvested. Costs per acre grown are not affected to the same extent by differences in yield and may be taken as a more reliable guide to the cost of growing the crop.

As an illustration of the differences between the cost per acre and the cost per cwt. of grain harvested, the following table shows the 45 binder harvested crops divided into two groups, one consisting of 17 crops grown on upland farms and 28 crops grown on low ground farms.

Differences in the amounts of labour and power (including tractor and horse work) required for the cultivation and harvesting of these crops were negligible and these charges, together with overheads which are directly proportional to them, have been averaged for the whole of these 45 crops and appear as equal charges for both groups. The remaining items of cost have been dealt with separately for the 17 upland crops and the 28 low ground crops as it is in these costs that the principal differences arise.

On the assumption that the labour, power and overhead costs of these two groups were similar, the additional cost per acre of £1:9:4d. on the low ground farms was due to higher rent, higher costs of both manures applied and manurial residues brought forward from previous applications and higher "other costs" which included binder twine and spraying; seed costs were practically the same in both cases. On the low ground farms the higher cost of rent followed from the better situations and soil conditions of these farms which allowed them to carry out more intensive systems of farming involving heavier manurial dressings. These low ground farms also did more crop spraying and the higher yields obtained required more binder twine.

TABLE III. /

TABLE III. COMPARISON OF THE AVERAGE PER ACRE COSTS OF
GROWING OATS IN 1956 ON (a) UPLAND FARMS,
(b) LOW GROUND FARMS

	Upland Farms		Low Ground Farms	
	17		28	
Number of Crops	20.42		16.26	
Average Acreage				
	£ s. d.	%	£ s. d.	%
Manual Labour	5:18: 1	25	5:18: 1	24
Power	3: 8: 2	15	3: 8: 2	14
Overheads	5: 9: 2	23	5: 9: 2	22
	£14:15: 5	63%	£14:15: 5	60%
Rent	1: 4: 5	5	1:11:10	6
Seed	2: 6: 9	10	2: 6: 1	9
Manures	1: 3:10	5	1: 7: 6	6
Manurial Residues	3: 1: 9	14	3:10: 2	14
Other Crop Costs	-:14:11	3	1: 5: 5	5
	£ 8:11: 8	37%	£10: 1: -	40%
TOTAL	£23: 7: 1	100%	£24:16: 5	100%
Yield of Grain per Acre	20.21 cwts.		29.4 cwts.	
Cost per Cwt. Grain (incl. Straw)	£1: 3: 2		£-:16:11	
Net Cost of Grain ⁶ / ₇ ths of above	£-:19:10		£-:14: 6	

The cost per cwt. of grain, however, on the low ground crops with an average yield of 29.4 cwts. per acre was 14s.6d. without taking the straw into account, while on the upland farms it was 19s.10d.

Thus, although the low ground crops cost on the average £1:9:4d. per acre more to grow, due to their higher yields, the net cost of their grain was 5s.4d. per cwt. less.

PLACE /

PLACE IN THE ROTATION

The following table shows the 62 crops grouped according to whether they were grown after lea, a grain crop or a root crop.

TABLE IV. COMPARISON OF THE PER ACRE COSTS OF GROWING OATS
IN 1956 WHERE THE PRECEDING CROP WAS (a) GRASS,
(b) GRAIN, (c) A ROOT CROP

	(a) 30 Crops After Grass		(b) 17 Crops After Grain		(c) 15 Crops After a Root Crop	
	Average Cost Per Acre	Per Cent	Average Cost Per Acre	Per Cent	Average Cost Per Acre	Per Cent
	£ s. d.	%	£ s. d.	%	£ s. d.	%
Seed	2: 3:11	9 $\frac{1}{2}$	2: 3:11	9 $\frac{1}{2}$	2: 3:11	9
Other Crop Costs	-:19: 9	4 $\frac{1}{2}$	-:19: 9	4	-:19: 9	4
Rent	1: 9: 6	6 $\frac{1}{2}$	1: 9: 6	6	1: 9: 6	6
Specialised Equipment	-:12: 3	2 $\frac{1}{2}$	-:12: 3	2 $\frac{1}{2}$	-:12: 3	2 $\frac{1}{2}$
SUB-TOTAL	£ 5: 5: 5	23%	£ 5: 5: 5	22%	£ 5: 5: 5	21 $\frac{1}{2}$ %
Manures	1: 1: 2	4 $\frac{1}{2}$	1:14: -	7	1: 6: 1	5 $\frac{1}{2}$
Manurial Residues	2:13: 6	12	3: 9: 5	15	4:15: 8	20
Cultivations	2: 6: -	10	2: 2: 6	9	1:18: 5	8
Harvesting	6: 5: 6	27 $\frac{1}{2}$	6: 4: 1	26 $\frac{1}{2}$	5:19:11	25
Overheads	5: 2: 8	23	4:16: 7	20 $\frac{1}{2}$	4:16:11	20
SUB-TOTAL	£17: 8:10	77%	£18: 6: 7	78%	£18:17: -	78 $\frac{1}{2}$ %
TOTAL	£22:14: 3	100%	£23:12: -	100%	£24: 2: 5	100%
Yields Per Acre	26.74 cwts.		27.12 cwts.		24.6 cwts.	
Cost Per Cwt. (incl. Straw)	17s. -d.		17s. 5d.		19s. 7d.	
Net Cost of Grain $\frac{6}{7}$ ths	14s. 7d.		14s. 11d.		16s. 9d.	

In /

In the foregoing table items of cost which may be regarded as common to all these crops - viz. seed, rent and specialised equipment costs - have been grouped together and the averages, thus obtained, taken as applicable to all.

Items of cost which are variable because of the nature of the preceding crops, viz. manurial treatment and cultivations, have been averaged separately for each of these three groups, together with harvesting costs, which depend to some extent on size of crop, and overheads, which vary directly with the amount of labour and tractor work employed. The total average cost per acre for each group, thus obtained, is shown in Table IV.

The most obvious differences in the structure of the costs of these three groups are seen in the charges for manures directly applied and the values of the manurial residues charged in each of the three sub-groups.

Crops grown after grass received the smallest applications of fertilisers and the value of the manurial residues charged against them were also the lowest.

Oats, grown after a previous grain crop, usually on the more intensively cropped farms where heavy applications of manures are normal, received the heaviest direct dressings of fertilisers and, in consequence of the heavy manuring policies carried out on the farms where these crops were grown, the charge for manurial residues was considerably higher than that for the crops grown after grass.

Oats grown after root crops, either potatoes, sugar beet or turnips, had heavier dressings of fertilisers than those applied to the crops grown after grass but rather lighter than those applied to the crops grown after grain.

In this group, because of the heavy dressings of manures applied to the previous root crop, the charge for manurial residues was much higher than for either of the other two groups.

Cultivation costs showed only small differences but, as normally expected, were highest on the crops after grass and lowest on those following root crops. Similarly, harvesting costs did not vary a great deal but were also highest on the crops after grass and lowest on those after roots.

Overheads, because of the greater amount of labour and tractor work involved, were highest on the crops after grass and practically equal on the other two groups. Total costs were lowest, however, on the crops after grass because of the much lower charges for manures and manurial residues, on the crops after roots the much higher charges for these outweighed the lower total of the other items, as shown in the table, so that these crops were the most costly per acre. As the average yield of grain off the crops following roots was lower by over 2 cwts. per acre than the crops after grass or grain, the net cost per cwt. of grain was 16s.9d. compared with 14s.7d. per cwt. and 14s.11d. per cwt. for the crops after grass and grain respectively.

DISPOSAL

Considerable proportions of these 62 crops of oats were retained on the farms where grown, either for feeding to livestock or as seed for the 1957 crop. Prices obtained for those oats which were sold varied widely due partly to differences in quality but also to the time of selling. Prices received for lots sold directly off the combine, undried, varied from 22s.2d. per cwt. to 17s.10 $\frac{1}{2}$ d. per cwt. One lot threshed out of the stook in October 1956 realised 22s.6d. per cwt. The highest prices received were 26s.8d. per cwt. for two lots and 25s. per cwt. for one lot, all of top quality sold for seed and threshed out of stack in December 1956. To illustrate the fluctuations in the price of oats during the winter and spring of 1956/57, one crop of good quality was threshed out in four lots throughout the season; the first threshing in November 1956 realised 24s.8d. and 24s.2d. per cwt. For the December threshing the price received was 25s. per cwt. The third threshing took place in March 1957 when the price obtained was reduced to 21s.8d. per cwt. and in April 1957 the final lot threshed only realised 18s.4d. per cwt. Another crop was partly sold off the combine at 22s. per cwt. in October but the remainder, after drying, had to be stored until the following July and only realised 21s. per cwt.

Of the oats sold, a small proportion only of the total grown, a considerable quantity did not realise the "guaranteed" price of 25s. per cwt. even after including the acreage payment of £1:15:11d. As, however, the yields per acre were good the returns per acre, even where sold at the lowest of the recorded prices, would leave a margin, albeit a small one in some cases, over the cost of production.

ACKNOWLEDGMENT

Grateful thanks is hereby made for the valuable help given by the farmers who co-operated in this investigation. Their courtesy on the occasion of the visits paid to them and their willingness to provide the accurate data required was much appreciated.

D.M.R.L.

APPENDIX

COSTING PROCEDURE

Manual Labour

All labour, including farmer's own, was charged at the hourly rates ruling on each farm.

Horse Work

Charged at 1s.6d. per hour.

Tractor Work

Charged at 3s.9d. per hour for wheeled tractors and 5s.9d. per hour for track-laying.

Seed

Purchased seed was charged at cost on the farm.

Home-grown seed was charged at 18s. per cwt.

Manures and Manurial Residues

- (a) Dung was charged at 17s.6d. per ton plus cost of application.
- (b) Artificials were charged at cost plus cost of application.
- (c) Residual Values brought forward and carried forward were calculated at standard rates.

Other Crop Costs

These include seed dressing, spraying material etc.

Rent

This is charged at the average rental for arable land on the farm.

Overheads

These were charged at rates agreed by the Scottish Conference of Agricultural Economists. No charge has been included for interest on capital or for the managerial work of the farmer.

