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Oats
Cost of Production

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ECONOMICS DEPARTMENT REPORT

OAT CROP COSTINGS, 1952

AVERAGES FOR 50 CROPS

By

J. A. GILCHRIST and GRACE PICKEN

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CROP COSTINGS : OATS, 1952

AVERAGES FOR 50 CROPS

FOREWORD.

The oat crop is of great importance in the area of this College but, on the whole, as a stock feed rather than as a cash crop. It enters into milk production to a considerable extent and for that reason, information on production costs are a necessary part of the milk-costing investigation.

A costing sample of about 60 cost records was obtained for the crop of 1952, but some of these proved to be unsuitable for averaging and only 50 crops are now reported on.

The farming year of 1952 was favourable for all crops and the yields of oat grain were above the average. For this reason the figures presented relate to an unusually good year, with the high yields for many crops lowering the per ton costs of the grain. It is to be noted that none of the crops included in the average was handled by the combine-harvester.

The delay in presenting these figures for the oat crop of 1952 is mainly due to the abundance of the harvest of that year. With grain and straw in ample supply, and with the latter half of the winter unusually mild, threshing was generally much later than normal and some of the costed crops were not threshed out until mid-summer of 1953.

Acknowledgment is made, with thanks, of the assistance given by the co-operating farmers in the costing investigation.

SUMMARY.

1. The average yield of grain per acre, over the 472 costed acres, was 26 cwts.—this yield being obtained from one of the most favourable harvests in recent years.
2. The average cost per ton of grain, threshed out, and after giving credit for straw, was £17 12/- on a yield of 26 cwts. of grain per acre. This cost includes an estimated charge for overhead expenses of £4 14/- per ton.
3. The average cost per acre, threshed out, but before crediting straw, was £26 7/-. This cost includes an estimated charge for overhead expenses of £6 4/- per acre.
4. On the average acre, it took 43 man hours to handle the crop from the preliminary ploughing until the completion of threshing.
5. Labour costs represented one-fifth of the cost of growing and threshing the crop.

COSTING METHODS AND CHARGES.

Method.—The costing figures were obtained, not by full farm costing but by “enterprise” costing. Thus the items included are partly actual costs based on purchase price and partly estimated costs. The former, that is actual costs incurred on each crop, include purchased seeds, manures and materials. Estimated cost items include the value of home-grown seed and the rates used per hour of tractor and of horse work. One other estimate is the rate charged for work done on the crop by the farmer or members of his family. This item is covered by means of the rates per hour given below.

The cost statement, in Table 1 of the Appendix down to and including Cost—Not Adjusted for Manurial, Etc., Residues, takes into account—at actual purchase price or estimated cost—all current expenditure and outlays on the crop costed.

Dung applied is taken at estimated cost. All fertilisers are at net purchase price. At this stage, manurial residues are left out of account. The cost of labour and power in applying fertilisers to the crop is included in the section “Crop in Ground.”

All the sections which relate to “Work” include the cost of man, horse and tractor work and also of any contract work, or casual labour. All work done by family labour or by the farmer and his wife has been charged.

Purchased seeds were charged at cost price, and home grown seeds at about 75% of their market value.

All “Materials” and other expenses were entered at actual cost, for example, spraying, straw bought for thatching, binder twine, contract threshing.

The rent charge is based on the agreed rental value of the field costed.

The quoted figure for Cost—Not Adjusted for Manurial, Etc., Residues, excludes all manurial and other residues from previous, and to future, crops, and also excludes any estimated charge for "overheads."

The calculation of manurial residues "from previous crops" and "to following crops" was based on the Department of Agriculture for Scotland's Advisory Leaflet, No. 24, "Residual Values of Fertilisers and Feeding Stuffs."

The item included as "Turf value" among the residues from previous crops represents a one-year share of the original sow-out cost carried forward against the crop taken out of lea.

The estimated cost of applying dung in the rotation was written off over the same period as the cost of the dung itself and this item appears as "Dung application work."

The placing of an appropriate share of "farm general expenses" ("overhead" expenses) against each costed crop is a matter of great difficulty as in all cases neither the complete financial account for the farm nor information as to the sharing of overheads between the farming branches is available. The "overhead" figure which has been applied is based on a general average obtained from a sample of financial accounts of Scottish farms, and this is applied to the crop costings in proportion to the labour cost, the number of tractor hours, and the acreage used by the crop. The result of this is to give an "overhead" charge based on a national average instead of on the figures for each individual farm. As both the rate of "overhead" and the method by which it is applied are debatable, the main cost statements have been prepared to show the position before making any charge for "overheads," and also after calculations made on the above lines are included.

Charges.—A summary of these is as follows:—

The rates used for **labour** throughout the costing were:—

Hired workers at actual hourly rate paid, plus about 2d. per hour to allow for holiday time, sick time, etc., over the year.

Family labour at rates approximately equivalent to those for similar hired labour. Examples of hourly rates are:—

Farmer	...	...	...	...	2/10	Wife	...	...	...	...	2/1
Sons (over 20)	...	...	...	...	2/9	Daughters (over 21)	...	...	...	...	2/-
Sons (15-16)	...	...	...	...	1/3	Daughters (15-16)...	...	...	...	...	1/1

Horse and Tractor work were charged at hourly rates of:—

Horse work (excluding man)	...	...	...	...	1/6
Wheeled tractor (excluding man)	...	...	...	...	4/6
Tracklaying tractor (excluding man)	...	...	...	...	6/6

The rates used for "overheads" in the 1952 costing year were:—

- 19/3 for **each acre** costed.
- 7/3 for **each £** of farm labour used on the crop.
- 6/6 for "**each tractor-equivalent**" hour, that is, the tractor hours plus one-quarter of the horse hours worked on the crop.

These three charges, added together, give the total of "Overheads."

By means of these "Overheads," estimated charges are brought into the cost for the following (and other) items:—

- The share of the farm bill for wages, fuel, light and power, and for tractor depreciation and repairs which cannot be allocated to any particular crop or department.
- A share of car running expenses and depreciation.
- A share of miscellaneous farm expenses.
- A share of repairs to buildings, fences and drains.
- Shares of implement repairs, rates, insurance and depreciation on tenants fixtures.

The total amount of the "Overhead" charge applied by these methods was, over the 50 crops, £6 4/- per acre or £4 14/- per ton of grain.

A credit of one-eighth of the gross cost is allowed against straw; the cost of the grain being correspondingly reduced.

THE COSTING FIGURES.

Some general points are of interest. Seed is renewed regularly, especially in the high-lying areas, and over 60% of the seed used by this sample of cost records was purchased. "Yielder" was the most common variety of a wide selection grown. The grain produced was mostly used for feeding to stock on the farm, though some was sold as seed and some for milling and feeding.

As regards manuring, lime was applied on five farms. Compound grain and potato manures were most commonly used; superphosphate and potassic superphosphate in a few cases.

Grain Yield.

The yield ranged from 15-38 cwts. of grain per acre, with an average of 26 cwts. per acre. The following table gives the number of crops in the various yield groups:—

Variation in Yield.

Yield of Grain Per Acre (Cwts.)	No. of Crops.
14-18	4
18-22	12
22-26	9
26-30	9
30-34	8
34-38	8

Details of Average Costs.

Table 1 in the Appendix brings together in summary form the average costing figures for the 50 crops.

The fields ranged from 2½ acres to 23 acres, and the rental value per acre from 12/- to 60/-. These figures indicate the widely varying land conditions under which the crops were grown.

As regards field power, 21 of the costing farms used only tractors, and 4 of the farms used only horses—the remaining 25 farms using tractors and horses in varying proportions.

The item "Summer work" in Table 1 relates to the application of top dressings and, in a few cases, to spraying for weed control.

On 5 of the farms, the threshing of the costed crop was done with the farm mill, while 44 crops were handled by the hired mill—the remaining crop using both.

The cost of the average crop at the stage of "Crop in the ground" was just short of £9 per acre—this covering cultivations, seeds and manures. Of this, cultivations—in preparing and sowing the crop—cost an average of 62/- per acre. Harvesting costs averaged 71/- per acre.

The cost before allowing for residues or inserting an "overhead" charge was approximately £19 per acre to produce both grain and straw or, if all costs to this stage are put against grain only—a cost of £14 12/- per ton of grain; this on the high average yield obtained from the 1952 crop.

With manurial residues taken into account and a deduction made for straw, the costs, excluding the "overhead" estimate, were £17 13/- per acre or £13 9/- per ton of grain.

Making a charge for "overhead" by the method already described, brings the cost of grain only to £23 per acre, or £17 12/- per ton.

Variations in Costs.

The costs of grain, including the "overhead" estimate, ranged from just under £12 to almost £33 per ton. Although yield is not the only factor affecting cost per ton, it is an important factor and the cost per ton groups and their yields were as follows:—

Cost of Grain per Ton.	Omitting "Overhead" Estimate.		Including "Overhead" Estimate.	
	No. of Crops.	Average Grain yield for group.	No. of Crops.	Average Grain yield for group.
£8 - 12	20	30 cwts.	1	27½ cwts.
£12 - 16	19	26 "	20	30½ "
£16 - 20	7	21 "	13	26½ "
£20 - 24	3	19½ "	10	21½ "
£24 - 28	1	17 "	4	21 "
Over £28	—	—	2	16 "

If one ton of grain per acre is taken as a commonly accepted average yield of the oat crop in this area, then such a crop cost £16-£20 per ton before charging "overheads," or £20-£24 per ton after including an estimate for "overheads."

Labour and Power Use.

This is given in some detail in Table 2 of the Appendix.

To handle the average acre up to the completion of harvest took 30 man hours and as threshing required an additional 13 man hours, the total was 43 man hours with the crop threshed out.

Over the whole sample of 50 crops, of which only 21 crops did not use horse labour at any stage, the average acre took 6 horse hours plus 10 tractor hours from preparatory cultivations to the completion of threshing.

A clearer picture of the use of labour and power is given by the averages for the 21 crops which used only tractors as field power. For these crops, the average rate of use was 42 man hours and 12½ tractor hours per acre, including threshing.

The types of labour employed over the 50 crops were as follows:—

	Hours per Acre.
Machine operators and attendants on contract work	2.05
Casual workers:—Hired	5.35
Neighbours assisting	4.60
	9.95
Regular farm staff and Family:—	
Farmer	5.21
Male workers	25.58
Wife ... ..	.11
Female workers ... ..	.37
	31.27
	43.27 hours.

The Structure of Gross Cost.

Table 3 in the Appendix shows the main cost items as percentages of the gross cost, that is, with all residues omitted.

With the "overhead" charge omitted, labour costs made up 29.5% of gross cost per acre, seeds 16% and manures (including lime) 14%, followed by tractor work at 11% of the gross cost.

With the "overhead" estimate included, the "overhead" charge was the largest single item, making up 24.5% of gross cost, followed by labour at 22.5%.

Direct and General Costs.

In Appendix Table 4, what have been termed "direct" costs, *i.e.*, those expenditures incurred specially for this particular crop, are shown separately from "general expenditure," *i.e.*, items used for this crop but drawn from the general pool of farm labour and power, "overhead" expenditure, etc., available on the farm.

While the division into these two main groups is approximate, the figures show that direct expenditure on the crop was rather below £10 per acre.

"Return" or "Profit" from the Crop.

As has been pointed out, the costing was done by the "enterprise" method, and this brings in the use of various estimates. Subject to these as they affect the figures stated as cost, the estimated average return was:—

	Per Acre.	
	Including "Overhead"	Excluding "Overhead."
Value of grain at feeding price	£29 9/-	£29 9/-
Add estimated value of straw	3 7/-	3 7/-
	<hr/>	<hr/>
Less estimated cost	£32 16/- 26 7/-	£32 16/- 20 3/-
	<hr/>	<hr/>
"Return" or "Profit"	£6 9/-	£12 13/-

This calculation is based on an average selling price of oats of £22 10/- per ton and of straw at £2 10/- per ton. It has to be noted, in connection with these figures of "Return" that the average grain yield over the 50 crops was 26 cwt. per acre.

Some Operation Costs.

For the average acre the total labour and power costs were £10 os. 11d., and the make-up of these can be illustrated as follows:—

FROM TABLES 1 AND 2:—

Work—Preparation and Sowing	£3 2 3
" Summer	0 4 3
" Harvesting	3 11 7
" Threshing	3 2 10
	<hr/>
Per Acre	£10 0 11

These figures cover the inclusive cost of all contract work, that is the hire of the machine and its crew.

FROM TABLE 3:—

Contract work, inclusive	£1 16 10
Casual workers and neighbours	1 7 5
Regular farm staff and family	4 6 5
Farm Horse Work	0 9 0
Farm Tractor Work	2 1 3
	<hr/>
Per Acre	£10 0 11

Appendix Table 5 illustrates the employment of this labour and power, totalling £10 os. 11d., by operations or jobs. In this table, the column headed "Over total acreage costed" has to be read with the understanding that although this column shows the job cost distribution as an average over the whole 50 crops, the average costs for individual operations are only of use when the job was done on every costed crop. It is the column headed "Only over acreage on which each job was done" which gives an indication of the cost of the individual jobs. Examples from this column show that in these costings, ploughing the average acre cost £1 17/1; rolling cost 3/5; the cutting operation cost 12/6; stooking 12/9, and "Leading and stacking" £1 17/- per acre.

Labour and Power Use by Operations.

Any presentation of these figures in the form of averages over the 50 crops is complicated by the varying use made of horse and tractor power.

To simplify, the statement of labour and power use on operations has been restricted to jobs done only by tractor, that is, all cases involving "horses only" or "horse and tractor" have been omitted from the analysis.

Labour and Tractor Use per Acre.

	No. of Crops.	Acreage Covered.	Man Hours.	Tractor Hours.
Ploughing	35	297	4.1	4.1
Sowing Fertilisers—Machine	15	141	.7	.6
Sowing Seed—Machine	19	184	1.2	.8
Combined Seed and Fertiliser	5	52	2.0	1.0
Rolling	27	241	.5	.5
Cutting (including opening)	44	406	3.0	1.2
Stooking (including restooking)	46	419	4.6	—
Leading and stacking	34	304	9.7	2.3

The inclusive cost of these jobs for the cases given above averaged as :—

	Cost per Acre.
Ploughing	£1 9 9
Sowing Fertiliser—Machine	0 4 6
Sowing Seed—Machine	0 7 0
Combined Seed and Fertiliser	0 9 9
Rolling	0 3 3
Cutting (including opening)	0 13 6
Stooking (including restooking)	0 12 6
Leading and stacking	1 17 9

As already stated, the 50 crops were threshed out partly by hired mills and partly by farm mills. As this complicates a statement of the cost of the threshing operation, a separate analysis was made of the threshing for the 44 crops on which only the hired mill was used. For these crops, the average rate was 26½ cwts. per hour at an inclusive cost of £3 18/5 per hour, this including all materials and sundry expenses. In most cases the mill was drawn alongside the stacks to reduce the horse and tractor work required.

A statement per ton of grain threshed is :—

HOURS PER TON OF GRAIN :—	
Mill crew	1.6
Casual workers and neighbours	6.1
Regular farm staff and family	2.8
	<u>10.5</u>
Farm horses ... ..	.1
Farm and contract tractors	1.0
COST PER TON OF GRAIN :—	
Contract hiring charge	£1 5 9
Casual workers and neighbours	0 17 0
Regular farm staff and family	0 7 9
Horse work	0 0 3
Farm tractor work	0 1 3
Sundries	0 8 0
	<u>£3 0 0</u>

Thus, using the hired mill, the average cost per ton of grain threshed was £3.

TABLE I.

**OAT CROP OF 1952. AVERAGE COSTS PER ACRE AND PER TON.
50 CROPS THRESHED OUT.**

							Averages per Acre.			Averages. per Ton of Grain.					
							Crops Using.	Average on 50 Crops.	£	s.	D.	£	s.	D.	
Acreage of fields							2½-23	acres.							
Total Acreage costed							472¾	acres.							
Average yield per acre							26	cwts. of grain.							
							Averages per Acre.			Averages. per Ton of Grain.					
							Crops Using.	Average on 50 Crops.	£	s.	D.	£	s.	D.	
Dung	...	...	...	...	...	...	—	—	—	—	—	—	—	—
Lime	...	...	...	...	...	...	5	6½ cwts.	£0	8	8			
Slag	...	...	...	...	...	...	1	¼ cwt.	0	1	6			
Mineral Phosphates	...	...	...	...	...	...	—	—	—	—	—
Rotational Manures	...	...	...	...	...	...	40	2½ cwts.	2	6	0			
Seeds, Home-Grown	...	...	...	...	...	...	18	¾ cwts.	0	15	5			
Seeds, Bought	...	...	...	...	...	...	31	1¼ cwts.	2	5	1			
Work—Preparation and Sowing	...	...	...	...	...	...	—	—	3	2	3			
CROP IN GROUND									£8	18	11				
Work—Summer	...	...	...	...	...	...			0	4	3			
Work—Harvesting	...	...	...	...	...	...			3	11	7			
Work—Threshing	...	...	...	...	...	...			3	2	10			
Materials for these stages	...	...	...	...	...	...			1	15	8			
Rent									£17	13	3	£13	9	6	
									1	9	6	1	2	6	
COST (NOT ADJUSTED FOR MANURIAL, ETC., RESIDUES)									£19	2	9	£14	12	0	
Adjusted for residues, etc.															
Add from previous crops:—															
Dung residues	...	...	...	...	...	...			1	4	10	0	18	11
Lime and manure residues	...	...	...	...	...	...			1	19	2	1	9	11
Turf Value	...	...	...	...	...	...			0	9	2	0	7	0
Dung application work	...	...	...	...	...	...			0	10	3	0	7	10
									£23	6	2	£17	15	8	
Deduct to following crops:—															
Dung residues	...	...	...	...	...	...			0	11	0	0	8	4
Lime and manure residues	...	...	...	...	...	...			2	4	9	1	14	2
Dung application work	...	...	...	...	...	...			0	6	10	0	5	3
COST OF GRAIN AND STRAW									£20	3	7	£15	7	11	
Deduct for straw	...	...	...	...	...	...			2	10	5	1	18	6
NET COST OF GRAIN (Excluding "overhead" estimate)									£17	13	2	£13	9	5	
If a share of overheads is included, the cost becomes:—															
COST OF GRAIN AND STRAW—AS ABOVE									£20	3	7	£15	7	11	
Add Overheads:—															
1. Per Acre	...	...	...	...	...	...			0	18	6	0	14	1
2. Per £ of Labour	...	...	...	...	...	...			1	19	10	1	10	5
3. Per "Tractor-Equivalent" Hour	...	...	...	...	...	...			3	5	5	2	9	11
COST OF GRAIN AND STRAW									£26	7	4	£20	2	4	
Deduct for Straw	...	...	...	...	...	...			3	5	9	2	10	2
NET COST OF GRAIN (Including "overhead" estimate)									£23	1	7	£17	12	2	

Note.—The heading "Work" includes man, horse, and tractor work, by farm staff, by casual workers and on contract. Tables 2 and 5 give an analysis of the "Work" item.

TABLE 2.

STRUCTURE AND COST OF LABOUR AND POWER USE PER ACRE.

HOURS OF WORK PER ACRE BY:—		Crop in Ground.	Summer Work.	Harvesting.	Sub- Total.	Threshing.	Total.
Contract:	Man Hours	·17	·09	·01	·27	1·78	2·05
	Horse Hours	—	—	—	—	—	—
	Tractor Hours	·16	·03	·08	·27	·83	1·10
	Other Machine Hours	·16	·04	·02	·22	·86	1·08
Casual Workers and Neighbours	... ..	·28	—	2·75	3·03	6·92	9·95
All Farm Staff and Family	... ..	9·31	·10	17·43	26·84	4·43	31·27
Total:	Man Hours	9·76	·19	20·19	30·14	13·13	43·27
	Horse Hours	4·52	·02	1·33	5·87	·14	6·01
	Tractor Hours	5·73	·06	3·14	8·93	1·31	10·24
	Other Machine Hours	·16	·04	·02	·22	·86	1·08
COST OF WORK PER ACRE:—							
Contract Work, inclusive	... ..	£0 3 5	£0 3 11	£0 0 4	£0 7 8	£1 9 2	£1 16 10
Casual Workers and Neighbours	... ..	0 0 8	0 0 0	0 7 8	0 8 4	0 19 1	1 7 5
All Farm Staff	... ..	1 6 5	0 0 3	2 7 7	3 14 3	0 12 2	4 6 5
Farm Horse	... ..	0 6 9	Neg.	0 2 0	0 8 9	0 0 3	0 9 0
Farm Tractor	... ..	1 5 0	0 0 1	0 14 0	1 19 1	0 2 2	2 1 3
		<u>£3 2 3</u>	<u>£0 4 3</u>	<u>£3 11 7</u>	<u>£6 18 1</u>	<u>£3 2 10</u>	<u>£10 0 11</u>

TABLE 3.

PERCENTAGE STRUCTURE OF GROSS COST PER ACRE.

	Including "Overhead."	Excluding "Overhead."
	%	%
Lime and All Manures	11	14
Seeds	12	16
Rent	6	8
Depreciation on Special Machinery	·5	·5
Sundry Materials	6·5	9
Contract Work—Inclusive	7	9·5
Labour—Casual and Neighbours		7·0
All Farm Staff		22·5
	22·5	29·5
Farm Horse	2	2·5
Farm Tractor	8	11
		<u>100·0%</u>
OVERHEADS:—		
(a) Per Acre		3·5
(b) Per £ Labour used		8·0
(c) Per "Tractor-Equivalent" hour		13·0
		<u>24·5</u>
		<u>100·0%</u>

In this table, all adjustments for residues from previous crops and to following crops are omitted.

TABLE 4.
DIRECT COSTS AND GENERAL COSTS PER ACRE.
 An Average for 50 Crops.

	Per Acre.			Per Acre.		
	£	S.	D.	£	S.	D.
Lime	0	8	8			
Slag	0	1	6			
Other Fertilisers	2	6	0			
				2	16	2
Purchased Seed				2	5	1
Sundry materials (Twine, sprays, etc.)				1	14	0
Contract Hire of Machinery and Operators				1	16	10
Casual Labour				0	14	9
(i) DIRECT EXPENDITURE						
(ii) HOME-GROWN MATERIALS (Seed)						£9 6 10
Work by Farm Horses				£0	9	0
Work by Farm Tractors				2	1	3
Manual Work—Mainly Farm Staff				4	19	1
FARM LABOUR AND POWER				£7	9	4
RENT OF LAND				£1	9	6
Depreciation of Special Farm Machinery				£0	1	7
Estimated Overhead Charge				6	3	9
SUNDRY CHARGES				£6	5	4
(iii) TOTAL GENERAL EXPENDITURE						15 4 2
TOTAL COST						£25 6 6

In this table, all adjustments for residues from previous crops and to following crops are omitted.

TABLE 5.

LABOUR AND POWER COST DISTRIBUTION AND OPERATION COSTS.

472 $\frac{3}{4}$ acres with an average yield of 26 cwts. grain.

	Over total acreage costed.	Only over acreage on which each job was done.
Sowing Lime	£0 1 9	£0 14 1
Ploughing	1 17 1	1 17 1
Discing and/or harrowing	0 10 9	0 10 9
Sowing Grain: Hand	0 0 7	0 2 9
Machine	0 1 9	0 4 0
Sowing Manure: Hand	0 1 2	0 3 5
Machine	0 3 5	0 6 7
Sowing Grain and Manure: Combine	0 1 5	0 10 4
Rolling	0 3 4	0 3 5
Miscellaneous	0 1 0	—
CROP IN GROUND	£3 2 3	
Summer Work: Spraying, etc.	£0 4 3	
Cutting Roads	£0 1 3	£0 4 0
Cutting Grain	0 12 6	0 12 6
Stooking	0 12 9	0 12 9
Leading and Stacking	1 17 0	1 17 0
Thatching	0 8 1	0 9 4
HARVESTING	£3 11 7	
Threshing: Hired Mill	£3 0 0	£3 5 6
Threshing: Own Mill	0 2 10	1 13 9
THRESHING	£3 2 10	
TOTAL	£10 0 11	

The term "Cost of Operations" is inclusive of man, horse and tractor work, by farm staff, by casual workers and on contract. Depreciation on farm implements or the cost of materials (seeds, fertilisers, twine, etc.) are not included.

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