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ENTERPRISE COSTS STUDIES

1953 WHEAT AND BARLEY COSTS

by

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RECENT PUBLICATIONS

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GROUP	1947- 1948	1948- 1949	1949- 1950	1950- 1951	1951- 1952	1952 1953
	----- No. of Farms -----					
1. Hill Sheep Farms)	48	54	52	53	57	58
2. Stock Rearing Farms)						
3. Stock Raising and Feeding Farms)	143	184	175	178	173	183
4. Arable Farms)						
5. Dairy Farms)						
	191	238	227	231	230	241

COSTS OF MILK PRODUCTION - 1947-48, 1948-49, 1949-50, 1950-51, 1951-52, 1952-53, 1953-54.

ECONOMICS OF LIVESTOCK PRODUCTION:-

- (a) Winter Fattening of Sheep : 1947-48, 1948-49, 1949-50.
- (b) Winter Fattening of Cattle : 1947-48, 1948-49, 1949-50.
- (c) Commercial Egg Production : 1949-50, 1950-51, 1951-52.
- (d) Cattle Rearing : 1951-52, 1952-53.

ENTERPRISE COSTS:- Economics of Silage Making in East of Scotland, 1950, 1951, 1952, 1953.

Wheat Costs - 1952 Crop.

Barley Costs - 1952 Crop.

DAIRY LABOUR IN THE EAST OF SCOTLAND.

ECONOMICS OF BRACKEN ERADICATION, 1951, 1952, 1953.

TEAM WORK IN GRASS SILAGE MAKING.

Inquiries regarding the above publications should be addressed to either the Secretary of the College or the Provincial Agricultural Economist

WHEAT COSTS - 1953 CROP

This survey deals with the results of the second year's investigation into the cost of growing wheat in the East of Scotland. In the sample, 19 co-operating farmers supplied 23 records (four supplying two each) which is to be compared with 34 records supplied by 28 co-operating farmers last year. Seventeen farmers, supplying 21 records, co-operated for two years.

It is a small sample but contains representatives from nine counties in the East of Scotland, five being from Roxburgh, four from Midlothian, three each from Angus, Peeblesshire and Berwickshire, two from Fife, while East Lothian, Perthshire and Selkirkshire had one each. The total acreage costed was 381 acres giving an average cost size of $16\frac{1}{2}$ acres.

FARM TYPES

Sixteen of the costs were from fifteen arable farms with either stock feeding or stock feeding and rearing as a major enterprise, and seven costs were from four dairy farms on which crop sales were important. The average farm size was 44.7 acres in extent, 33.3 acres being arable land, 6.8 acres permanent grass and 4.6 acres rough grass.

SOIL CONDITIONS

Nearly all the crops in the sample were grown below the 500 feet level. Since wheat grows best on the heavier soils, in nine cases the soils were medium heavy, in eleven medium, in two sandy, and in one light and stony. Rents, mainly in the 25s. to 35s. per acre group averaged 31s. 3d. per acre, indicative of good arable land.

WEATHER CONDITIONS

The autumn of 1952 was favourable for cultivating and sowing (only two of the crops studied were spring sown) but the harvesting was often carried out under wet and windy conditions, and many of the crops were lodged. In two cases it was only possible to harvest about half the crop.

YIELDS

Although not so favourable a harvest year as in 1952, yields were surprisingly good, the average yield per acre being 31.5 cwt. as compared with 33.7 cwt. in 1952.

Table I. below shows the distribution of yields per acre for the two years.

TABLE I. 1953 WHEAT COSTS : RANGE OF CROP YIELDS

	Under 20 cwt.	20-29 cwt.	30-39 cwt.	40 cwt. and over	Total Costs
No. of Crops Costed 1952	1	9	20	4	34
No. of Crops Costed 1953	2	7	9	5	23

It is seen that in the 1953 crop year there was a drop in the proportion of crops costed which yielded 30-39 cwt. per acre, and an increased proportion of those which yielded from 20-29 cwt. per acre.

SEEDS

Various varieties of wheat were sown the most popular being N/59 and Hybrid 46 with four each, followed by Eclipse and Als with three each; Scandia, Fylgia and Atle were sown in two cases and Cappell and Redman and Bersee in one each. A little less than half of the farmers used home grown seed compared with last year when the proportion was about one-seventh.

COSTS AND RETURNS

A comparison of the costs per acre for the two years 1952 and 1953 is shown in Table II below.

TABLE II. WHEAT COSTS AND RETURNS²² PER ACRE
1952 AND 1953 CROPS COMPARED

	1952 CROP			1953 CROP		
No. of Crops	34			23		
Size of Field	15 acres			16½ acres		
Yield per Acre	33.7 cwt.			31.5 cwt.		
	Hours per acre	Average Cost per Acre	Per Cent	Hours per Acre	Average Cost per Acre	Per Cent
		£ s. d.			£ s. d.	
<u>Labour and Power</u>						
1. <u>Cultivations</u>						
Manual	6.2	-.17. 6	4	6.5	-.17. 1	4
Horse	2.5	-. 3. 7	-	1.4	-. 2. 2	-
Tractor	4.2	-.18. 9	4	4.7	-.18. 6	4
Contract		-. -. 4			-. -. -	
TOTAL CULTIVATIONS		£2. 0. 2	8½		£1.17. 9	8½
2. <u>Harvesting and Threshing</u>						
Manual	27.5	3.18. -	16	31.8	4. 2. 3	17
Horse	.9	-. 1. 4	-	0.2	-. -. 4	-
Tractor	4.9	1. 2. -	4	5.0	1. 0. 1	4½
Combine Costs (owned)		-. 4. -	-		-. 7. 4	1½
Contract (Combine and Threshing)		-. 9. 8	2		-. 6. 9	1½
TOTAL HARVESTING AND THRESHING		£5.15. -	22½		£5.16. 9	24½
TOTAL LABOUR AND POWER		£7.15. 2	30½		£7.14. 6	32½
<u>Seeds</u>		£3.16. -	15½		£3. 3. 1	13
<u>Manures (Net)</u>		6.14. -	28		6. 8. -	27
<u>Rent</u>		1.10. -	6		1.11. 3	6½
<u>Other Costs</u>		1. 3. -	5		-.15. 9	3
<u>Overheads</u>		4. 1. -	16		4. 4.11	18
TOTAL OTHER COSTS		£17. 4. -	70½		£16. 3. -	67½
TOTAL NET COSTS		£24.19. 2	100%		£23.17. 6	100%
<u>TOTAL GRAIN COST (6/7 to Grain)</u>		£21. 8. -			£20. 9. 6	
<u>RETURNS PER ACRE</u>		£50. 5. 5			£51. 1. 3	
<u>PROFIT PER ACRE</u>		£28.17. 5			£30.11. 9	
<u>COST PER CWT. (Grain)</u>		£ -.12. 9			£ -.13. -	
<u>SELLING PRICE PER CWT.</u>		£ 1. 9.10			£ 1.12. 5	

It /

²² For Costing Procedure see APPENDIX

It will be seen that the average cost of growing, harvesting and threshing an acre of wheat in 1953, yielding $31\frac{1}{2}$ cwt. (7 qtrs.) of grain, worked out at £23.17. 6d., fully £1 an acre less than the cost of producing the very heavy crop harvested in 1952. Because of the somewhat lower yields in 1953, however, costs per unit of production - 13s. per cwt. of wheat - were very slightly higher than in the previous year.

It will be noted that compared with 1952 the revenue rose slightly by 15s. 10d. per acre. This was mainly due to the increased grain selling prices which, being higher by 2s. 7d. per cwt., more than compensated for the reduction in the average yield. With total costs chargeable to grain being lower by 18s. 6d. per acre, due mainly to a reduction of 12s. 11d. per acre in seed costs, 7s. 3d. per acre in "other costs" and 6s. per acre in manure costs, profits showed an increase of £1.14. 4d. per acre.

This year a larger number of farmers used their own seed, which, being charged at 18s. per cwt. compared with the much higher price of purchased seed, accounts for this year's reduced seed costs. The incidence of increased fertiliser subsidies and a reduction in binder twine prices largely explains the reductions in manure and miscellaneous costs.

In last year's report dealing with the 1952 crop, it was stated that it was an exceptional year and that figures of average costs should be treated with some reserve. The above table shows, however, that the variations in harvesting conditions mentioned above did not appreciably affect the harvesting costs per acre, and only increased the labour requirement per acre by about $4\frac{1}{4}$ man hours.

The distribution of total costs per acre is given in Table III. below.

TABLE III. 1953 WHEAT COSTS ; RANGE OF COSTS PER ACRE

	Up to £20	£20-£25	£25-£30	£30-£35	Total
No. of Crops Costed	5	7	10	1	23

HARVESTING

Twenty of the crops were harvested by binder and three by combine, two of the farmers using their own combines, and one of them hiring a contractor. Although in both years the number using combines was small, it was thought worthwhile to show a comparison between combine costs and binder costs. These are set out in Table IV. below.

TABLE IV. 1953 WHEAT HARVESTING COSTS
COMBINES AND BINDERS COMPARED

	Contractors' Combines		Farmer-Owned Combines		Binder (Farmer's Own Machines)	
	1952	1953	1952	1953	1952	1953
No. of Fields		1	2	2	32	20
Total Acreage		12	29	44	463	325
Average Size of Field						
- Acres		12	$14\frac{1}{2}$	22	$14\frac{1}{2}$	$16\frac{1}{4}$
Harvesting Cost per Acre		£5.11s.	£3.11s.	£3.1s.	£5.18s.	£6.2s.

In 1953 harvesting by binder was twice as costly as harvesting by farmer-owned combine and 11s. per acre dearer than combining by contract. Costs of harvesting by binder - the traditional method - were 4s. per acre higher in 1953, due to many crops being lodged by the wet harvest weather. The noticeable drop in the cost of operating farmer-owned combines was not due /

due to any marked economy in average operating costs but to a change in the very small sample. Although the above table shows the cheapness of combining by farmer-owned combine, it should be pointed out that in order to reduce the cost of depreciation per acre to economic levels it is necessary to combine large acreages each year. Thus a capital cost of £1000 for a combine and £700 for a baler entails a charge for depreciation alone (calculated at 20 per cent. per annum) of equal to £2 per acre for 170 acres combined. In addition, at least another £1 per acre will be necessary for other costs of fuel, labour, overheads and bagging.*

MANURING COSTS

In the East of Scotland wheat does best after a crop that has had fairly liberal dressings of both farmyard and artificial manure. In this investigation fifteen of the crops costed were grown after potatoes which had received dressings of farmyard manure and compound manure, two were grown on land that had been ploughed up after grass, three followed oats, one mashlum and two a crop of roots.

Most of the crops were sown in the autumn and received 3-4 cwt. of compound manure. In addition, about half of them received an additional top dressing of 1-2 cwt. of a nitrogenous fertiliser in the spring. The average charge of £6. 8s. per acre for manures is made up of (a) direct manures applied in the crop year and (b) indirect manures i.e. manurial residues brought forward from previous years. Details are given in Table V. below.

TABLE V.* 1953 WHEAT COSTS : NET COSTS OF
MANURES PER ACRE

	£ s. d.
<u>DIRECT MANURING</u>	
Artificial Manures (<u>Net</u>)	1.16. 4
<u>INDIRECT MANURING</u>	
Artificial Residues	
Brought Forward	1. 7. 8
Farmyard Manure Residues	
Brought Forward	3. 4. -
TOTAL MANURIAL CHARGE PER ACRE	£6. 8. -

(For Allocation of Residues see APPENDIX.)

It will be seen that the largest cost item is a residual charge arising from farmyard manure applied to earlier crops in the rotation; curiously enough, this was equal to the value of artificial manure residues brought forward plus the net cost of artificial manures applied direct to the wheat crop itself.†

In order to show if there is any relation between rotational and manurial policy and crop yields Table VI. overleaf shows the crop costs divided into five groups according to the manures used in the crop year.

Group A. used a compound manure sown with the seed wheat, and a nitrogenous top dressing applied in spring; Group B. used a compound manure sown with the seed wheat but no nitrogenous top dressing; Group C. used a /

* Edinburgh and East of Scotland College of Agriculture, Bulletin No. 16. Combine Harvesters in the East of Scotland, 1947, by H.C. McIver.

† See APPENDIX.

‡ In calculating the residual value of farmyard manure any previous grass crops are given residual values according to the length of ley and charged as farmyard manure residues.

TABLE VI. 1953 WHEAT COSTS: MANURIAL DRESSINGS PER ACRE

1953 Wheat Harvest						1952 Harvest				1951 Harvest		
Groups	No. of Costs	Yield per Acre	Manures		Crop	No. of Costs	Manures		Crop	No. of Costs	Manures	
			Weight	Type			Weight	Type			Weight	Type
A.	6	36 cwt.	3 $\frac{1}{4}$ cwt.	Compound	Potatoes	3	(9 $\frac{1}{2}$ cwt. (4 Ton	Compound F.Y. Manure	Grass (Down over 4 yrs.)	4	(2 cwt. (1 $\frac{1}{2}$ cwt. (1 $\frac{1}{4}$ cwt.	Compound Nitrogenous Phosphatic
			1 $\frac{3}{4}$ cwt.	Nitrogenous	Roots	1	(5 cwt. (10 cwt. 3 $\frac{1}{2}$ cwt.	Compound Phosphatic Compound			Nil	Nil
					Oats	2					3 cwt.	Compound
B.	9	31 cwt.	4 cwt.	Compound	Potatoes	7	(3 $\frac{1}{2}$ cwt. (12 Ton	Compound F.Y. Manure	Grass (2-3 yrs.)	5	(1 cwt. (1 cwt.	Compound Nitrogenous
					Mashlum	1	4 cwt.	Compound	Hay	1	3 cwt.	Compound
					Grass	1	3 cwt.	Compound	Oats	2	2 cwt.	Compound
C.	2	27 $\frac{1}{2}$ cwt.	2 $\frac{3}{4}$ cwt.	Phosphatic	Potatoes	2	(6 $\frac{1}{2}$ cwt. (8 Ton	Compound F.Y. Manure	Grass (2-3 yrs.)	1	1 $\frac{1}{2}$ cwt.	Nitrogenous
									Oats	1	10 cwt.	Compound
D.	4	29 cwt.	1 $\frac{1}{2}$ cwt.	Nitrogenous	Potatoes	3	(10 cwt. (11 Ton	Compound F.Y. Manure	Grass (2-3 yrs.)	1	2 cwt.	Nitrogenous
					Oats	1	Nil	Nil	Oats	3	2 $\frac{1}{2}$ cwt.	Compound
E.	2	32 cwt.	Nil	Nil	Roots	1	(6 cwt. (10 Ton	Compound F.Y. Manure	Grass (3 yrs.)	1	1 $\frac{1}{2}$ cwt.	Phosphatic
					Grass	1	3 cwt.	Compound	Grass (Down over 4 yrs.)	1	1 $\frac{1}{2}$ cwt.	Phosphatic

a phosphatic manure only, sown with the seed; Group D. a nitrogenous fertiliser applied as a top dressing only; and Group E. used no manures at all. As was pointed out in the previous paragraph, the value of the manurial residues brought forward exceeds the cost of the manures applied direct to the wheat crop itself, so the cropping and manurial treatment for the two previous years have been set out alongside.

It will be seen that by far the highest yield of wheat, 36 cwt. per acre, was obtained from wheat crops included in Group A., which used a compound manure plus a nitrogenous top dressing. Wheat crops included in Groups E. and B. had much lower yields of 32 cwt. and 31 cwt. per acre respectively (it should be pointed out, however, that in Group B. some of the wheat crops costed were so badly lodged by the weather that only about half the crops were harvested). Crops in Group D. yielded 29 cwt. wheat per acre and the lowest of all were those in Group C. with $27\frac{1}{2}$ cwt. wheat per acre.

In 1952 potatoes most commonly preceded wheat, and as to the manuring of this crop for the different groups, it will be seen that those falling in Group A. used dressings of over 9 cwt. per acre of compound manure and 4 tons per acre of farmyard manure after a crop of grass which in 1951 had been down for over four years. Of the crops in Group E., the next highest yielding group, 6 cwt. per acre of compound manure and 10 tons per acre of farmyard manure were applied to a crop of roots, which followed grass that had been down for three years. On potato crops in Group B., $3\frac{1}{2}$ cwt. per acre of compound manure and 12 tons of farmyard manure were applied in 1952 after grass that had been down for 2-3 years and 1952 potato crops in Groups C. and D., which also followed grass that had been down from 2-3 years, had applications of either $6\frac{1}{2}$ cwt. per acre of compound manure plus 8 tons per acre of farmyard manure, or else 10 cwt. compound manure and 11 tons of farmyard manure respectively.

It will be noted that where grass had been down for more than 4 years there was a tendency to reduce the amount of farmyard manure applied in the following year, and that the best yields usually follow liberal manurial treatments applied in the crop year. A further analysis of the relation between crop yields and manurial dressings is given in the next section dealing with costs, returns and profits.

COSTS, RETURNS AND PROFITS

How do yields vary with total costs, profits and returns? The relationship is shown in Table VII. below.

TABLE VII. 1953 WHEAT CROP : YIELDS, COSTS,
RETURNS AND PROFITS

Yields per acre	No. of Crops Costed	Average Yields per Acre	Average* Net Cost per Acre	Average Return per Acre	Average Profit per Acre
Under 20 cwt.	2	$17\frac{1}{2}$ cwt.	£20. 1s.	£29. 9s.	£ 9. 8s.
20-24 "	3	$22\frac{3}{4}$ "	£19. 9s.	£36. 3s.	£16. 14s.
25-29 "	4	$26\frac{1}{2}$ "	£21. 15s.	£42. 12s.	£20. 17s.
30-34 "	4	33 "	£18. 19s.	£53. 12s.	£34. 13s.
35-39 "	5	37 "	£21. 1s.	£60. 7s.	£39. 6s.
40 cwt. and over	5	$40\frac{1}{2}$ "	£20. 16s.	£64. 1s.	£43. 5s.

* Charging 6/7ths of the costs to the grain.

It will be seen that, from the 23 crops costed, yields varied between wide limits from under 20 cwt. to well over 40 cwt. per acre; 18 of the crops costed, however, i.e. fully three out of five, had yields of 30 cwt. per acre or more. While profits per acre increased with yields, costs per acre did not do so. It is noticeable that wheat crops yielding over 30 cwt. grain /

grain per acre showed a high margin, the returns being more than double - in some cases treble - the costs of production. A further analysis of costs per acre of the sub-groups listed in Table VII., showing how the various items of cost vary with yields, is given in Table VIII.

TABLE VIII. 1953 WHEAT CROP : YIELDS AND COSTS PER ACRE

Yields per acre	No. of Crops Costed	Cultivns. per acre	Harvest'g and Thresh'g	Seeds	Manures (Net)	Miscel- laneous	Rent	Over- heads	TOTAL
		£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.
Under 20 cwt.	2	1. 9.	5. 5.	2.12.	4.16.	-.18.	1.15.	3. 6.	20. 1.
20-24 cwt.	3	1.16.	4.12.	2. -	5. 1.	1. 1.	1. 6.	3.13.	19. 9.
25-29 "	4	1.16.	6. 3.	2.18.	4. 7.	-.13.	1.17.	4. 1.	21.15.
30-34 "	4	1. 9.	5. -.	2. 7.	4.17.	-.11.	1. 3.	3.12.	18.19.
35-39 "	5	1.15.	4.14 [‡]	2.11.	6.16.	-.11.	1. 1.	3.13.	21. 1.
40 cwt. and over	5	1.12.	4.10 [‡]	3.10.	6. -.	-.11.	1. 5.	3. 8.	20.16.

‡ Includes one combine cost

* Includes two combine costs.

It would be normal to expect that harvesting and threshing costs would increase with yields, yet it will be seen that this was not so. Two of the main reasons for this were the much better harvesting conditions and the use of combine harvesters in the higher yield groups. It will also be noted that manure costs for the two highest yield groups and the seed cost for the highest yield group were much higher than for the remaining groups. The increased costs of manures for the two highest yield groups confirms the relationship already brought out between yields and manurial dressings. The higher seed costs for the highest yield group (the majority of the cases in the group used purchased seeds), shows the importance of purchasing good seed, if high yields are to be obtained.

SUMMARY AND CONCLUSION

1. The average cost of producing 23 wheat crops in 1953 (including the cost of straw) was £23.17. 6d. per acre, for an average yield of 31½ cwt. per acre. Returns averaged £51. 1. 3d. per acre giving a net profit of £30.11. 9d.
2. Compared with 1952, costs chargeable to grain alone fell by 18s.6d. per acre, and returns were 15s.10d. higher, hence average net profits on the 1953 crop were £1.14. 4d. better than in the previous year.
3. As last year, manures and labour were the highest individual items of cost, being respectively 27 per cent. and 21 per cent. of total net costs.
4. Harvesting costs by binder were twice as high as those for farmer-owned combines and 10 per cent. higher than the cost of combining by contract.
5. Profits varied directly with yields, but costs per acre did not do so.

Despite unfavourable weather, profits per acre were higher than they were in the previous year when the weather was favourable, higher grain prices and lower costs per acre more than compensating for lower yields per acre. What does the future hold now that standard prices and deficiency payments are in operation? How far can market prices fall before production becomes uneconomic? Costs data from the two harvest years, 1952 and 1953, make it clear that on well-managed farms able to secure yields averaging about 32 cwt. wheat per acre (say 7 qtrs.) even a reduction of as much as 5s. per cwt. in the selling price would still enable growers to show a useful margin of profit.

BARLEY COSTS - 1953 CROP

The area served by the College is the largest barley growing area in Scotland. The importance of the crop in this locality can be judged from the fact that in 1953 about 65 per cent. of the total Scottish barley crop was grown in this area. In this sample, 32 farmers supplied 39 records, 10 being from Berwickshire, 7 from Fife, 6 each from Midlothian and Roxburghshire, 5 from East Lothian, 4 from Angus and 1 from Perthshire. The total acreage costed was 904 acres which gives an average size of crop costed of 23 acres as compared with 55 records averaging 22 acres in 1952. Thirty of the farmers supplied 38 records for the second year in succession.

FARM TYPES

Thirty-one of the crops costed were from 27 farms that were either arable farms or stock raising and feeding farms. Six records came from four dairy farms, and two records were from a small holding. The average farm size was 430 acres, 341 acres being arable, 49 acres permanent grass and 40 acres rough grazing.

SOIL CONDITIONS

Thirty-six of the costed crops were grown on soils that were described as being either medium or medium heavy. Three had light, sandy or stony soils.

WEATHER CONDITIONS

In many districts the weather at harvest time was very wet and windy, resulting either in losses due to lodging or in losses from the shaking of ripe corn just prior to combining.

YIELDS

The average yield per acre in 1953 was 30 cwt. compared with 33 cwt. per acre in 1952. It will be seen from the percentage distribution of yields per acre for the two years, shown in Table I. below, that the proportion with yields between 26 cwt. and 40 cwt. per acre actually increased slightly, being 67 per cent. and 72 per cent. for 1952 and 1953 respectively. The main reason for the decreased average yield was the increased proportion in the under 25 cwt. per acre group which increased from 19 per cent. to 25 per cent. and the decrease in the 41 cwt. per acre and over groups which fell from 14 per cent to 3 per cent.

TABLE I. PERCENTAGE DISTRIBUTION OF BARLEY YIELDS PER ACRE
1952 AND 1953 COMPARED

Yields per Acre	20 cwt. and Under	21 - 25 cwt.	26 - 30 cwt.	31 - 35 cwt.	36 - 40 cwt.	41 - 45 cwt.	45 cwt. and Over	TOTAL
Percentage of Costs 1952	4	15	18	25	24	9	5	100%
Percentage of Costs 1953	15	10	23	23	26	3	-	100%

SEED VARIETIES

In 1953, as in 1952, by far the most popular variety was Ymer of which there were 19 crops costed, followed by Carlsburg with 6, Herta 4, Freja and Spratt Archer 3 each, Earl 2 and Plumage Archer and No. 19 one each. In both years farmers preferred these new strains to the older long-strawed varieties.

COSTS AND RETURNS

In order to make a comparison, the costs per acre for the 1952 crop year and the 1953 crop year have been set out alongside each other in Table II. below.

TABLE II. /

TABLE II. BARLEY COSTS AND RETURNS PER ACRE

1952 AND 1953 CROPS COMPARED

	1952 CROP			1953 CROP		
No. of Crops	55			39		
Size of Field	22 acres			23 acres		
Yield per Acre	33 cwt.			30 $\frac{1}{4}$ cwt.		
	Hours per Acre	Average Cost per Acre	Per Cent	Hours per Acre	Average Cost per Acre	Per Cent
		£ s. d.			£ s. d.	
<u>Labour and Power</u>						
<u>1. Cultivations</u>						
Manual	5.6	-.16. 5	3 $\frac{1}{2}$	5.6	-.16. 3	4
Horse	.8	-. 1. 2	-	.4	-. -. 8	-
Tractor	4.9	1. 2. 1	5	5.4	1. 1. 6	5
Contract		-. 2. 2	$\frac{1}{2}$			
TOTAL CULTIVATIONS		£2. 1.10	9%		£1.18. 5	9%
<u>2. Harvesting and Threshing</u>						
Manual	16.6	2.12. 6	11	12.7	2. 2. 3	9 $\frac{1}{2}$
Horse	.7	-. 1. 1	-	.4	-. -. 7	-
Tractor	3.5	-.15. 7	3	3.3	-.12. 8	3
Combine Costs	18.0	1. -. 7	4	1.0	1. 4.11	6
Contract Costs (Combine and Threshing)	.3	1. 7. 9	6	.2	1. 1. 3	4 $\frac{1}{2}$
TOTAL HARVESTING AND THRESHING		£5.17. 7	24%		£5. 1. 8	23%
TOTAL LABOUR AND POWER		£7.19. 4	33%		£7. 0. 1	32%
<u>Seeds</u>		£3.17. 1	16		£3. 5. 9	15
<u>Manures (Net)</u>		6. 1. 9	25		5.14. 6	26
<u>Rent</u>		1.11. -	6		1.13. 5	7 $\frac{1}{2}$
<u>Other Costs</u>		1. 3.10	5		-.17. 1	4
<u>Overheads</u>		3.10. 7	15		3. 9. 8	15 $\frac{1}{2}$
TOTAL OTHER COSTS		£16. 4. 3	67%		£15. 0. 5	68%
TOTAL NET COSTS		£24. 3. 7	100%		£22. 0. 6	100%
<u>TOTAL GRAIN COST</u> (6/7 to Grain)		£20.14. 6			£18.17. 6	
<u>RETURNS PER ACRE</u>		45.10.11			38.10.10	
<u>PROFIT PER ACRE</u>		24.16. 5			19.13. 4	
<u>COST PER CWT. (Grain)</u>		-.12. 7			-.12. 7	
<u>SELLING PRICE PER CWT.</u>		1. 7. 5			1. 5. 5	

Whilst /

Whilst the average yield per acre, as previously stated, has dropped from a little over 33 cwt. in 1952 to 30 cwt. in 1953, average selling prices have fallen from £1. 7. 5d. per cwt. to £1. 5. 5d. per cwt. This has been responsible for a reduction in the returns per acre of £7. -. 1d. However, costs per acre, chargeable to grain, also show a drop of £1.17s. due largely to reduced costs of harvesting, and to lower costs of seeds and manures, so that profits have fallen by £5. 3. 1d. per acre. The reduced manure costs were mainly due to increased subsidies, whilst lower harvesting costs were largely due to the greater proportion of combine harvested crops in the sample. In 1952 this was 55 per cent.: in 1953 it had risen to 64 per cent. It will be seen that the labour requirement at harvest was reduced by 3.9 man hours per acre - a very considerable economy in the use of labour.

In order to show the relative cheapness of combining by farmer-owned combines, a comparison between farmer-owned combining costs per acre and the costs per acre of the other two systems, viz. combining by contract and binders is given in Table III. below.

TABLE III. 1953 BARLEY HARVESTING COSTS PER ACRE
COMBINES AND BINDERS COMPARED

Item of Cost	Contractors' Combines 7 Crops (2 baled)	Farmer-owned Combines 18 Crops (10 baled)	Harvested by Binder Farmer-owned Machines 14 Crops
	£ s. d.	£ s. d.	£ s. d.
Labour	-. 8.11	1. -. 8	4. 6. 7
Horse	-	-. -. 7	-. -.11
Tractor	-. 5. 1	-. 8. 4	1. 2. -
Combine	4.18. -	2.14. -	-
Hire of Thresher	-	-	-.10. 2
TOTAL HARVESTING COST	£5.12. -	£4. 3. 7	£5.19. 8

Although the crops combined by farmer-owned machines includes a much higher proportion of crops for which the straw was baled than do crops combined by contract, yet their total harvesting cost is £1. 8. 5d. per acre cheaper, and is £1.16. 1d. per acre cheaper than the cost of harvesting by binder.

Table IV. below shows that compared with last year the percentage distribution of costs per acre showed a decided drop in the proportion of crops whose total costs of production were between £17 and £29 per acre. In 1952 this was 71 per cent., in 1953 it had dropped to 62 per cent. At the same time the lowest-cost group, £17 per acre and under, had increased from 9 per cent. to 25 per cent. and those over £29 per acre had dropped from 20 per cent. to 13 per cent.

TABLE IV. RANGE IN 1953 BARLEY COSTS PER ACRE

Average Cost per Acre	£17 and under	£17-£20	£20-£23	£23-£26	£26-£29	£29-£32	£32-£35	Over £35	TOTAL
Percentage of Costs 1952	9	18	24	13	16	9	7	4	100%
Percentage of Costs 1953	25	23	21	18	-	8	5	-	100%

LONG- AND SHORT-STRAWED VARIETIES

As was the case last year, short-strawed varieties made up by far the greater proportion of the sample costed. In all, 33 crops studied were of short-strawed varieties and 6 were of the long-strawed varieties. A comparison of the yields and selling prices for the two types shows that the short-strawed, high-yielding varieties of relatively poor malting quality, averaged $32\frac{1}{2}$ cwt. per acre whereas the long-strawed varieties of relatively high malting quality yielded only $19\frac{1}{4}$ cwt. per acre. As will be seen from Table V. /

Table V. the average selling price for short-strawed varieties was 25s. 5d. per cwt. and for long-strawed varieties 25s. 6d. per cwt., giving a selling price per acre of £41. 1. 9d. and £24.10.10d. respectively. This difference of £16.10.11d. per acre in favour of the short-strawed varieties is to be compared with £9.10s. per acre in their favour in 1952.

TABLE V. LONG- AND SHORT-STRAWED BARLEY VARIETIES :
1953 YIELDS AND RETURNS PER ACRE COMPARED

	Short-Strawed Varieties	Long-Strawed Varieties
No. of Costs	33	6
Average Yield	32½ cwt.	19¼ cwt.
Range of Selling Prices	23s. - 32s. 6d.	22s. - 30s. 6d.
Average Selling Price per Cwt.	25s. 5d.	25s. 6d.
Selling Price per Acre	£41. 1. 9d.	£24.10.10d.

Although the sample of long-strawed varieties is small these figures show fairly conclusively that with the present maximum prices for high quality barley it was more profitable in both 1952 and 1953 to grow the lower quality short-strawed varieties which are less susceptible to lodging, whilst they also yield better and are more easily harvested by combines.

MANURES AND MANURING

About half the crops costed were grown after a crop of turnips, beet or potatoes, the remainder being grown after a cereal crop. As was to be expected, barley crops which followed potatoes, roots or beet were, therefore, sown on a more fertile seed bed, and in general received smaller dressings of grain fertiliser in the growing year than those following a grain crop. Thus the average amount of grain manure applied in the growing year to crops following another cereal crop was about 3½ cwt. per acre of compound grain manure, compared with about 1¼ cwt. per acre for those following a root crop, potatoes or ley. Table VI. below shows the total net cost of artificial manures per acre applied in the growing year, as well as the total indirect manurial residues brought forward, dependent on whether the barley crop followed cereals or some other crop.

TABLE VI. 1953 BARLEY COSTS : NET COST OF MANURES PER ACRE

	Previous Crop Cereal	Previous Crop Roots, Lea or Potatoes
	£ s. d.	£ s. d.
<u>DIRECT MANURING</u>		
Artificial Manures (Net)*	2.17. -	-.17. 5
<u>INDIRECT MANURING</u>		
Artificial Residues brought forward	1. 5. 1	1.19.10
Farmyard Manure Residues brought forward	1. -. 6	3. 2.11
TOTAL MANURIAL CHARGE PER ACRE	£5. 2. 7	£6. -. 2

* For allocation of manurial residues see APPENDIX.

It will be seen that the total average manurial charge per acre for a crop immediately following a cereal was 17s. 7d. per acre less than one after a root crop, lea or potatoes, the greater amount of net manures applied in the growing year being more than compensated for by the very much smaller residues carried forward from the previous year.

COSTS, RETURNS AND PROFITS

How are costs, yields and returns related to each other? To show the relationship the yields per acre ranging from under 20 cwt. per acre to over 40 cwt. per acre have been set out in Table VII. below.

TABLE VII. 1953 BARLEY CROP : YIELDS, COSTS, RETURNS AND PROFITS

Yield per Acre	No. of Crops Costed	Average Yield Per Acre	Average Net Cost Per Acre	Average Return Per Acre	Average Margin Per Acre
20 cwt. and Under	6	19	£16. 5s.	£24. 8s.	£ 8. 3s.
21-25 cwt.	4	23	£14. 10s.	£28. 14s.	£14. 4s.
26-30 "	9	29	£18. 7s.	£33. 9s.	£15. 2s.
31-35 "	9	33	£18. 18s.	£39. 9s.	£20. 11s.
36 cwt. and Over	11	38	£22. 4s.	£50. 3s.	£27. 19s.

= Charging 6/7ths of the Costs to Grain.

It will be seen that apart from the small group with yields from 21-25 cwt. per acre, costs per acre varied with yields. However, as increased returns more than compensated for increased costs, profits per acre also varied with yields. How do the various items of cost vary with yields? Table VIII. below shows a subdivision of the average costs per acre into the various components of cost.

TABLE VIII. 1953 BARLEY CROP : YIELDS AND COSTS PER ACRE

Yield per Acre	No. of Crops Costed	Cultivations per Acre	Harvest'g and Thresh'g	Seeds	Net Manures	Other Costs	Rent	Over-heads	Total Cost per Acre
		£ s.	£ s.	£ s.	£ s. d	£ s. d	£ s.	£ s.	£ s.
20 cwt. and under	6	1. 5.	4. 5.	1. 18.	4. 14. -	- . 12. -	1. 2.	2. 9.	16. 5.
21-25 cwt.	4	1. 9.	3. 11.	2. 7.	3. 14. 6	- . 2. 6	1. 3.	2. 3.	14. 10.
26-30 "	9	1. 9.	4. 6.	2. 13.	4. 18. -	- . 11. -	1. 6.	3. 4.	18. 7.
31-35 "	9	1. 12.	4. 12.	2. 16.	4. 18. -	- . 14. -	1. 10.	2. 16.	18. 18.
36 cwt. and over	11	2. 2.	4. 12.	3. 13.	5. 8. -	1. 3. -	1. 15.	3. 11.	22. 4.

It will be seen that the only items of cost that increased with yields were seed and rent. In the case of fields showing yields of 36 cwt. per acre or more, it is noteworthy that all items of cost (except harvesting costs) ruled high, well above the general level. Assuming that rent is a measure of the quality of the land, then for all groups, yields tended to vary with the quality of the land and perhaps with the quality of the seed sown.

SUMMARY AND CONCLUSION

1. The average cost of producing 39 barley crops in the East of Scotland in 1953 (including the cost of straw) was £22. -. 6d. per acre, for an average yield of 30 $\frac{1}{4}$ cwt. per acre. Due to reduced costs of harvesting and of manures, this marks a reduction of £2. 3. 1d. in costs per acre as compared with 1952.
2. Yields were about 3 cwt. per acre less than in 1952, and selling prices of barley 2s. per cwt. less. Hence, in spite of lower costs of production, profits per acre were £5. 3. 1d. less than last year.
3. Short-strawed varieties were very much more popular than long-strawed varieties. They also gave better yields - better by 13 cwt. per acre - and showed a gross return of £16. 10. 11d. per acre more.

4. /

4. As to the cost of harvesting, crops harvested by farmer-owned combines and by contractors' combines were £1.16. 1d. per acre and 7s. 8d. per acre cheaper respectively than those cut by binder, stacked and then threshed by the mill.
5. There is a well defined relationship between costs, yields and profits; and increased costs per acre, which varied positively with yields, are more than compensated by increased returns.

Barley, unlike wheat, showed a marked drop in the profits per acre in 1953 as compared with 1952. Undoubtedly, the strong demand for millable wheat has maintained selling prices at a level fully as profitable as that shown in 1952, rather above the standard prices fixed. The relatively small demand for barley for human consumption, however, coupled with the surplus of malting barley on the market in the early months of 1954, has depressed selling prices to about the level of the standard prices fixed, thus resulting in a marked fall in the profit derived from growing barley.

In the very last year before decontrol, therefore, there has been a very noticeable widening of the gap between the profits earned on these two cereals in the arable East: in the case of wheat, profit per acre rose from £28.17. 5d. in 1952 to £30.11. 9d. in 1953; in the case of barley, it fell from £24.16. 5d. to £19.13. 4d. In view of this the need to focus attention on relative costs, yields and returns is now more than ever necessary.

ACKNOWLEDGMENT

Grateful acknowledgment is made of the help given by the farmers who took part in this investigation and supplied the necessary records and for the unfailing courtesy shown on the occasion of our visits. As each co-operating farmer has already received a copy of his own costs the average results provided should afford a useful basis of comparison and analysis.

A P P E N D I X

COSTING PROCEDURE: WHEAT AND BARLEY COSTS

Manual Labour

This was charged at hourly rates ruling on the farm, adjusted to include holidays; any overtime worked was charged at the rates paid. A charge was made for work done by the farmer.

Horse Work

Charged at 1/6d. per hour.

Tractor Work

Wheeled tractors - 4/- per hour
Track-laying tractors - 5/9d. per hour

Seeds

Purchased - at cost
Home Grown - 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 and carried forward.

Proportion Chargeable to:-

	<u>1st Crop</u>	<u>2nd Crop</u>	<u>3rd Crop</u>	<u>4th Crop</u>
1. Dung	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$
2. Compound Manures	2/3	1/6	1/6	-
3. Phosphates	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$
4. Lime	1/7 of net cost for 7 years			
5. After Lea -	After 1 year lea	.	.	36s.
	" 2 "	"	.	55s.
	" 3 "	"	.	63s.
	" 4 "	"	.	76s.
	" 5 "	"	.	86s.
	" 6 "	"	.	98s.

Where wheat or barley was sown after lea a value was put on the lea according to the following scale:-

Other Costs

This included binder or baler twine and any spraying material used.

Contract Work

This includes both labour and machine costs.

Rent

Charged at the average rental for the arable land on the farm.

Overheads

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

EDINBURGH AND EAST OF SCOTLAND COLLEGE OF AGRICULTURE
Department of Economics

22 Rose Street,
EDINBURGH, 2.

DW/AE.

10th December, 1954.

Dear Sir,

1953 Wheat and Barley Costs - Report No. 33

In following our usual practice of publishing the results of our enterprise costs studies as soon as they are available, we feel that the accompanying report comes at a time when the memories of a most difficult and frustrating harvest are still fresh in mind; indeed, even yet, some of the grain may still be out in the fields.

The level of costs and returns shown in this report are most unlikely to be repeated in a season such as has just been experienced - costs will be much higher and it is more than likely that both yield and quality will, generally, be lower, whilst a good deal of the grain may have been lost on the ground. There is also a further factor in the present situation which may have an important bearing on the economics of grain production, namely the change-over from a regulated price system to open market pricing supplemented by a system of deficiency payments. Here the quality factor will have a very considerable bearing on returns to individual farmers but it is hoped that the deficiency payments will, when they materialise, go a long way to improving the present feeling about returns from the cereal crops. Nevertheless, 1953 may well stand out as the last year of an era.

We are fully alive to the differences which abnormal conditions on the farm may cause in the costs and returns of any farm product and we are hoping that it will be possible to continue our costings investigations to ensure that a balanced picture is obtained, taking the rough with the smooth. May better conditions prevail in 1955. They certainly could not be worse than 1954.

Yours sincerely,

D. WITNEY.

Provincial Agricultural Economist.