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Turnips - Cost of prod. O.S.

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TURNIP COSTINGS, CROP 1959

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TURNIP COSTINGS, CROP 1959

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## TURNIP COSTINGS, CROP 1959

### FOREWORD

The acreage of turnips and swedes grown in this College area has been steadily declining from the high war-time figures and is now smaller than in 1939. Silage making on the other hand continues to increase. And while there is more to choosing between turnips and silage than a straight comparison of costs, the question of how much turnips cost to grow and how this compares with silage costs is often asked.

With over 44,000 acres grown in the West College area in 1959, turnips and swedes are still an important crop. This report deals with costing information from the 1959 turnip crop on thirty-two farms and continues the crop cost series - last year's costing was of silage.<sup>xx</sup> Eight of these farms were in Ayrshire, seven in Dumfries-shire, six in Lanarkshire, four each in Kirkcudbrightshire and Wigtownshire, two in Renfrewshire and the remaining one in Dunbartonshire.

Last year will be remembered as one of the driest on record and at first it appeared that the turnip crop would be very light. Shaws were stunted and mildewed, but growth went on well into the autumn and the roots continued to fill out so that in the end, yields and quality were quite good.

The trend of increasing mechanisation continues and although no figures were available for mechanical shawing, there is a section giving information on precision seeding costs along with the costs of other operations.

The "enterprise" method has been used in the preparation of these costings, that is to say, items such as the cost per hour of tractor and horse work, and also of farmer and family were not fully worked out on each farm but were estimated. These various estimated rates per hour are shown in another part of the report.

It should also be noted that the "overhead" charge (or share of farm general expenses) is based on a national average, since without a full farm costing it would have been impossible to determine and allocate accurately these charges on each farm. On average the estimated charge made for overheads amounted to one third of the cost. Thus the average net cost per acre was £61 and the "overhead" charge was £21. Expressed per ton, these were £2.19s. and £1.

Grateful acknowledgement is made of the help received from the farmers who took part in this investigation.

J.A.R. Mitchell was responsible for the preparation of the tables.

F. McIntosh

J.F. Macpherson

<sup>xx</sup> Grass Silage in South-West Scotland, P.G. Smith, Economics Department Report No.59, West of Scotland Agricultural College, 1959.

SUMMARY

The main results from the costing study are shown below. The records have been divided into two main groups - crops dunged and crops not dunged.

	<u>No Dung Applied</u>	<u>Dung Applied</u>	<u>All Crops</u>
Number of cost records	18	14	32
Total acreage costed	105 $\frac{3}{4}$	73	178 $\frac{3}{4}$
Average yield per acre - tons	23	23 $\frac{1}{2}$	23 $\frac{1}{4}$
Number using precision seeder	9	4	13
Number using mechanical shaver	1	-	1

(Figures are in £'s & decimal parts of £'s)

	£	£	£
Cost per acre (a)	59.20	63.43	61.05
Cost per ton (a)	2.73	3.22	2.94

PER ACRE

Average number of hours (b)

	<u>Hours</u>	<u>Hours</u>	<u>Hours</u>
(i) Excluding dung work:-			
Man	95.85	98.75	97.13
Horse	2.42	-	1.36
Tractor	31.45	28.58	30.19
Lorry	-	.02	.01
(ii) Including 1959 dung work:-			
Man	95.85	106.79	100.65
Horse	2.42	-	1.36
Tractor	31.45	34.50	32.78
Lorry	-	.02	.01

(a) These costs include a charge for "Share of Farm General Expenses" and are adjusted for manurial residues.

(b) Includes all farm man, horse and tractor hours and men and tractors on contract work with the exception of contract spreading of lime, slag and fertilisers.

For the thirty-two records, the average cost was £61 per acre or almost £3 per ton, after including a charge for overheads.

YIELDS

As mentioned in the Foreword, last year was a somewhat dry year for turnips. The official estimates of yields per acre as given by the Department of Agriculture for Scotland show that, apart from the counties of Dumfries and Wigtown, yields were on average slightly lower than in previous years.

The average estimated yields per acre for the main dairying counties in the West College area are shown below:-

	<u>Crop Yields - Tons per Acre</u>		
	<u>1959</u>	<u>1958</u>	<u>10 Year Average 1948 - 57</u>
Ayr	15.4	16.3	16.2
Dumfries	22.6	22.0	16.5
Kirkcudbright	15.3	17.3	15.6
Ianark	17.9	18.9	18.8
Renfrew	14.3	14.9	15.1
Wigtown	20.5	17.8	20.4

The average yield for the thirty-two crops costed was 23 tons per acre, ranging from two crops with under 10 tons per acre to two with over 30 tons per acre. Table 1 below gives the average and range of yields.

TABLE 1

	<u>AVERAGE AND RANGE OF YIELDS</u>		
	<u>No Dung Applied</u>	<u>Dung Applied</u>	<u>All Crops</u>
Number of cost records	18	14	32
Average yield per acre - Tons	23	23½	23¼
Yield & range per acre:-			
Under 10 tons	1	1	2
11 - 15 tons	-	1	1
16 - 20 tons	4	4	8
21 - 25 tons	8	3	11
26 - 30 tons	5	3	8
Over 30 tons	-	2	2

COSTS

The cost per acre varied from £35 to an exceptionally high £106. The largest group of costs, however, fell within £50 to £70 per acre. The average cost for the sample was £61 per acre. For those crops with no dung applied the cost was slightly less - £59 per acre, while for those which had dung applied, the cost was £63 per acre.

It should be noted that these costs include "overheads" which on average amounted to about one-third of the cost.

Table 2 below shows the average and range of cost per acre.

TABLE 2

	<u>AVERAGE AND RANGE OF COST PER ACRE</u>		
	<u>No Dung Applied</u>	<u>Dung Applied</u>	<u>All Crops</u>
Number of cost records	18	14	32
Average cost per acre	£59. 4s.	£63. 9s.	£61. 1s.
Cost ranges per acre:-			
£35 - £40	3	-	3
£40 - £50	3	2	5
£50 - £60	4	4	8
£60 - £70	6	5	11
£70 - £80	-	2	2
Over £80	2	1	3

When the cost per acre is related to the yield per acre, the cost per ton can be calculated. Thus on an average yield of 23¼ tons per acre, the cost per ton was £2.19s.

Table 3 below gives the average and range of cost per ton.

TABLE 3

	<u>AVERAGE AND RANGE OF COST PER TON</u>		
	<u>No Dung Applied</u>	<u>Dung Applied</u>	<u>All Crops</u>
Number of cost records	18	14	32
Average cost per ton	£2.15s.	£3. 4s.	£2.19s.
Cost ranges per tons:-			
£1.10s. to £2. 0s.	4	2	6
£2. 0s. to £2.10s.	5	6	11
£2.10s. to £3. 0s.	4	2	6
£3. 0s. to £3.10s.	2	1	3
£3.10s. to £4. 0s.	-	1	1
£4. 0s. to £4.10s.	2	-	2
Over £4.10s.	1	2	3

COST STRUCTURES

The cost structure of growing a turnip crop may be shown for the natural stages of the work: preparing the land and sowing the seed, summer field work and finally harvesting. The first of these stages cost on average just over £15.10s. per acre, made up of lime, slag and fertilisers £9, labour and power £6 with the turnip seed averaging 10s. per acre. The summer field work cost on average just over £7 per acre and harvesting came to nearly £13.10s. per acre.

A summary of the cost structure taken from Tables I and IV in the Appendix is given below.

TABLE 4

(Figures are in £'s and decimal parts of £'s)

	<u>No Dung Applied</u>	<u>Dung Applied</u>	<u>All Crops</u>
Number of cost records	18	14	32
	£	£	£
Land preparation and sowing	16.74	14.19	15.63
Crop sown until start of harvest	6.96	8.00	7.41
Harvesting	<u>14.68</u>	<u>11.96</u>	<u>13.49</u>
	<u>38.38</u>	<u>34.15</u>	<u>36.53</u>
Rent charge	1.60	1.44	1.53
Share of Farm General Expenses	<u>20.46</u>	<u>21.77</u>	<u>21.04</u>
	<u>60.44</u>	<u>57.36</u>	<u>59.10</u>
Dung: cost and application	-	<u>15.84</u>	<u>6.93</u>
	<u>60.44</u>	<u>73.20</u>	<u>66.03</u>
Adjustment for grass and manurial residues	<u>(-)1.24</u>	<u>(-)9.77</u>	<u>(-)4.98</u>
	<u>59.20</u>	<u>63.43</u>	<u>61.05</u>

Because of the heavy manuring there is a considerable residue of manure which will benefit following crops.

If the items of costs are arranged according to type as in the table below, it will be seen that, of the direct costs, labour and power is the highest followed by fertilisers and manures.

TABLE 5

(Figures are in £'s and decimal parts of £'s)

	<u>No Dung Applied</u>	<u>Dung Applied</u>	<u>All Crops</u>
Number of cost records	18	14	32
	£	£	£
Seeds	.50	.49	.50
Fertilisers and manures	9.99	23.39 <sup>≠</sup>	15.86 <sup>≠</sup>
Sundries	.16	.12	.14
Labour and power (incl.deprec.)	<u>27.73</u>	<u>25.99</u>	<u>20.96</u>
DIRECT COST	<u>38.38</u>	<u>49.99</u>	<u>43.46</u>
Rent	1.60	1.44	1.53
Share of Farm General Expenses	<u>20.46</u>	<u>21.77</u>	<u>21.04</u>
	<u>60.44</u>	<u>73.20</u>	<u>66.03</u>
Adjustment for grass and manurial residues	<u>(-)1.24</u>	<u>(-)9.77</u>	<u>(-)4.98</u>
NET COST	<u>59.20</u>	<u>63.43</u>	<u>61.05</u>

≠ Including dung and dung work.

COST OF STARCH EQUIVALENT

On the basis of the figures in Bulletin No.48, Rations for Livestock, (Ministry of Agriculture, Fisheries and Food), giving a Dry Matter (D.M.) content of 11.5% for turnips and swedes, and a Starch Equivalent (S.E.) of 7.3, the average yield of dry matter worked out at 2.674 tons per acre and of starch equivalent at 1.697 tons per acre. This was from the average yield of 23.25 tons per acre.

The average cost of starch equivalent per cwt. for the sample was £2.0s.3d. when overheads are included, and £1.6s.8d. when they are excluded.

The cost per cwt. for the turnips and swedes in the sample and the cost per cwt. of S.E. are compared with those of other feeding stuffs at November prices, 1959.

	Cost per cwt.			Cost per cwt.S.E.		
	£	s.	d.	£	s.	d.
Turnips 1959		2	11	2	0	3
Sugar beet pulp (molassed)	1	7	6	2	7	6
Dried grains (distillers)	1	5	9	2	5	1
Brock potatoes (say)		6	0	1	12	5
Silage 1st quality (say)		3	0	1	4	7
Barley	1	1	3	1	9	11
Oats	1	0	6	1	14	5

PRECISION SEEDING

Some additional records which could not be used for the costing part of this report, as the crops were not harvested in the usual way but eaten off by sheep etc., have been included for the information they give on some of the field operation costs. Thus for a comparison of precision seeding with the conventional seed drill or seed barrow method thirty-five records were available. Thirteen of these related to precision seeded crops and twenty-two to the conventional method of sowing. A comparison shows that the use of the precision seeder meant a saving of about 30/- per acre, largely due to easier thinning.

Table 6 below gives the cost comparisons.

TABLE 6  
COST INFORMATION ON CROPS SOWN BY PRECISION SEEDER  
AND BY CONVENTIONAL METHODS

(Figures are in £'s and decimal parts of £'s)

	<u>Precision Seeder</u>	<u>Conventional</u>
Number of cost records	13	22
Total acreage costed	120	119½
	<u>Per Acre</u>	<u>Per Acre</u>
	£	£
Seed	<u>.25</u>	<u>.62</u>
Operations:		
Sowing Seed	.63	.48
Row cultivations before thinning	.50	.57
Thinning (singling)	4.21	5.71
Row cultivations after thinning	.66	.50
Other cultivations	<u>.49</u>	<u>.74</u>
Total cultivation costs	<u>6.49</u>	<u>8.00</u>
Depreciation etc. on precision seeder	<u>.31</u>	-
Total	<u>£7.05</u>	<u>£8.62</u>



Comparisons of labour and power are shown below in Table 7.

The time saved by using precision seeding instead of the conventional method amounted approximately per acre to a day's thinning - 8 man hours, but an extra tractor hour per acre was required.

TABLE 7  
QUANTITY INFORMATION ON CROPS SOWN BY PRECISION SEEDER  
AND BY CONVENTIONAL METHODS

Seed	<u>Precision Seeder</u>			<u>Conventional</u>		
	<u>Per Acre</u>			<u>Per Acre</u>		
	.68 lb.			2.79 lb.		
<u>Operations</u>	<u>Hours</u>			<u>Hours</u>		
	<u>Man</u>	<u>Horse</u>	<u>Tractor</u>	<u>Man</u>	<u>Horse</u>	<u>Tractor</u>
Sowing seed	1.36	-	1.29	1.30	.52	.77
Row cultivations before thinning	1.16	-	1.15	1.43	.36	1.07
Thinning (singling)	20.07	-	-	28.02	-	-
Row cultivations after thinning	1.49	-	1.48	1.20	.05	1.15
Other cultivations	2.40	-	-	3.78	-	-
	<u>26.48</u>	<u>-</u>	<u>3.92</u>	<u>35.73</u>	<u>.93</u>	<u>2.99</u>

With the precision seeder there is a certain saving in the amount of seed used, although the dressed seed cost about 7/6d per lb. instead of the ordinary seed price of 3/6d. to 4/- per lb. Some farmers with seed barrows also used dressed seed and sowed more thinly than they would have done had they been using ordinary seed. The per acre weight of seed sown by the ordinary method is, therefore, perhaps a little light because of this occasional use of dressed seed.

The impression gained was that those who had bought precision seeders were pleased with the result. There was occasional experimenting with the spacing but by far the commonest setting was at two inch spacing.

At the end of this report there is an Appendix of five Tables, some of which have already been referred to. There is also a Standard Appendix of three Tables.

#### OPERATIONAL COSTS

This section deals with individual jobs. In most cases the sample of farms referred to is not exactly the same as the sample of thirty-two crops in the earlier part of the report, the main reason being that some of the costing records obtained related to crops not carted and stored after shawing. While these could not be included with the main thirty-two crops, they were suitable for use in the preparation of figures about individual jobs.

Farm horses are now little used in this area and on the farms that took part in the costing horse work was unimportant. For this reason any individual job record where horses were used was excluded, and an analysis made only of jobs done by man and tractor work.

A few miscellaneous jobs such as carting stones were omitted altogether, but for the others Table 8 gives the cost incurred and the time taken in performing the operation once on one acre.

TABLE 8

Labour and Power Use - per Operational Acre  
(Cost figures are in £'s and decimal parts of £'s)

Operation	Number of Records	Operational Acreage	Per Operational Acre		
			Man Hours	Tractor Hours	Cost £
Cart and spread dung					
(a) Hand load, machine spread	7	43	8.02	4.91	2.76
(b) Machine load, machine spread	8	53	6.39	6.72	3.01
Plough	37	261	4.91	4.91	2.12
Cultivate	32	384	1.19	1.19	0.51
Disk	19	256	0.94	0.94	0.41
Harrow	35	482	0.51	0.51	0.22
Sow slag (farmer's machine)	9	50	1.22	1.22	0.54
Sow fertiliser (farmer's machine)	32	226	0.76	0.69	0.32
Ridge	36	250	1.67	1.67	0.72
Sow seed					
(a) Precision seeder	13	120	1.36	1.29	0.63
(b) Conventional method	18	77	1.21	1.21	0.50
Inter-row cultivations before thinning					
(a) After precision seeding	13	134	1.03	1.03	0.45
(b) After conventional seeding	19	115	1.11	1.11	0.47
Thin					
(a) After precision seeding	13	120	20.07	-	4.21
(b) After conventional seeding	22	120	28.02	-	5.71
Inter-row cultivations after thinning					
(a) After precision seeding	12	207	0.86	0.86	0.38
(b) After conventional seeding	14	105	1.32	1.32	0.55
Other inter-row cultivations					
(a) After precision seeding	5	42	6.87	-	1.42
(b) After conventional seeding	8	36	12.64	-	2.49
Shaw	28	142	28.25	-	5.73
Cart and store	31	176	20.13	13.25	7.07

Most of these jobs were performed only once on each acre, but some were carried out more often. For these jobs Table 9 gives the average figures per crop acre, that is to say the total time taken and the total cost incurred where a job was performed more than once on at least part of the total crop acreage.

TABLE 9

Labour and Power Use - per Crop Acre  
(Cost figures are in £'s and decimal parts of £'s)

Operation	Number of Records	Crop Acreage	Per Crop Acre		
			Man Hours	Tractor Hours	Cost £
Cultivate	32	221	2.07	2.07	0.89
Disk	19	125	1.94	1.94	0.85
Harrow	35	242	1.01	1.01	0.43
Sow fertiliser (farmer's machine)	32	210	0.82	0.75	0.34
Inter-row cultivations before thinning					
(a) After precision seeding	13	120	1.15	1.15	0.50
(b) After conventional seeding	19	95	1.34	1.34	0.57
Inter-row cultivations after thinning					
(a) After precision seeding	12	112	1.59	1.59	0.71
(b) After conventional seeding	14	60	2.28	2.28	0.95

Tables 8 and 9 taken together show the average number of times that the jobs listed in Table 9 were performed on each crop acre. For example, the crop acreage harrowed was 242 and the operational acreage was 482. This means that where fields were harrowed they were, on average, given two strokes.

The figures for sowing slag or fertiliser do not include those farms where these were applied by a contractor, as the equipment used is different from that normally owned by farmers and the time taken in these circumstances is not comparable.

A more detailed analysis was made of the dung application figures, as shown in Table 10.

TABLE 10  
Dung Application

	Hand Load and Machine Spread		Machine Load and Machine Spread	
Number of cost records	7		8	
Total acreage represented	43		53	
Total tonnage handled	542		819	
Average application per acre (tons)	13		15	
Average distance hauled (yards) (a)	730		710	
<u>Labour and Power (b)</u>	<u>Per Acre</u>	<u>Per Ton</u>	<u>Per Acre</u>	<u>Per Ton</u>
	<u>Hours</u>	<u>Hours</u>	<u>Hours</u>	<u>Hours</u>
Man work	8.02	0.64	6.39	0.41
Tractor work	4.91	0.39	6.72(c)	0.44(c)
<u>Cost</u>	<u>£</u>	<u>£</u>	<u>£</u>	<u>£</u>
Man work	1.72	0.14	1.36	0.09
Tractor work	1.04	0.08	1.36	0.09
Contract work (d)	-	-	0.29	0.02
	<u>2.76</u>	<u>0.22</u>	<u>3.01</u>	<u>0.20</u>

- (a) Distance from steading or field clamp to the field.
- (b) Includes contractors' men and tractors.
- (c) Includes some standing-by time.
- (d) Inclusive cost of hire of contractors' men, tractors and machinery.

All costs referred to in this section take account only of the direct charges for man and tractor work. They exclude depreciation and repairs on the equipment drawn by tractors.

COST MODELS

Within the thirty-two costing records used in other sections of this report, there were variations in both the number and kind of operations carried out on the crops and in the quantities of fertilisers and seed used. Although the averages obtained represent itemised and total costs for the crop as given over a number of farms, a detailed build-up by "typical" operational costs, fertiliser use, etc. cannot be satisfactorily obtained.

The turnip costings can be divided into four groups according to whether the land was dunged and whether a precision seeder was used. Where dung was applied, slag generally was not and so the types can be classified as:-

1. Dung and compound fertilisers applied, but no slag
  - (a) Precision seeder used
  - (b) Precision seeder not used.
2. Slag and compound fertilisers applied, but no dung.
  - (a) Precision seeder used
  - (b) Precision seeder not used.

Using the operational cost figures and averages for dung and fertiliser applications and seed requirements, cost models can be built up to show variations among these types. Table 11 gives those for crops where dung was used and Table 12 those for where it was not.

TABLE 11  
(COST MODEL A)

Dung and Compound Fertilisers Applied, but no Slag  
(Cost figures are in £'s and decimal parts of £'s)

	<u>Precision Seeder</u>			<u>Conventional Method</u>		
	<u>Per Crop Acre</u>			<u>Per Crop Acre</u>		
	<u>Man</u> <u>Hours</u>	<u>Tractor</u> <u>Hours</u>	<u>Cost</u> <u>£</u>	<u>Man</u> <u>Hours</u>	<u>Tractor</u> <u>Hours</u>	<u>Cost(a)</u> <u>£</u>
Dung work (hand load, machine spread)	<u>8.02</u>	<u>4.91</u>	<u>2.76</u>	<u>8.02</u>	<u>4.91</u>	<u>2.76</u>
Plough	4.91	4.91	2.12	4.91	4.91	2.12
Cultivate (b)	2.38	2.38	1.02	2.38	2.38	1.02
Disk	0.94	0.94	0.41	0.94	0.94	0.41
Harrow (b)	1.02	1.02	0.44	1.02	1.02	0.44
Sow fertiliser	0.76	0.69	0.32	0.76	0.69	0.32
Ridge	1.67	1.67	0.72	1.67	1.67	0.72
Sow seed	<u>1.36</u>	<u>1.29</u>	<u>0.63</u>	<u>1.21</u>	<u>1.21</u>	<u>0.50</u>
	<u>13.04</u>	<u>12.90</u>	<u>5.66</u>	<u>12.89</u>	<u>12.82</u>	<u>5.53</u>
Inter-row cultivations before thinning	1.03	1.03	0.45	1.11	1.11	0.47
Thin	20.07	-	4.21	28.02	-	5.71
Inter-row cultivations after thinning (b)	<u>1.72</u>	<u>1.72</u>	<u>0.76</u>	<u>2.64</u>	<u>2.64</u>	<u>1.10</u>
	<u>22.82</u>	<u>2.75</u>	<u>5.42</u>	<u>31.77</u>	<u>3.75</u>	<u>7.28</u>
Shaw	28.25	-	5.73	28.25	-	5.73
Cart and store	<u>20.13</u>	<u>13.25</u>	<u>7.07</u>	<u>20.13</u>	<u>13.25</u>	<u>7.07</u>
	<u>48.38</u>	<u>13.25</u>	<u>12.80</u>	<u>48.38</u>	<u>13.25</u>	<u>12.80</u>
Total labour and power	<u>92.26</u>	<u>33.81</u>	26.64	<u>101.06</u>	<u>34.73</u>	28.37
Dung		13tons @ 17/6d	11.37	13tons @ 17/6d		11.37
Compound fertilisers		8cwt @ 16/9d	6.70	8cwt @ 16/9d		6.70
Seed		2/3rd lb. @ 7/6d	0.25	2 <sup>3</sup> / <sub>4</sub> lb. @ 4/6d.		0.62
			<u>44.96(c)</u>			<u>47.06</u>

(a) Excludes depreciation and repairs on equipment drawn by tractors.

(b) Hours and costs given assume that these jobs were performed twice on each crop acre.

(c) Depreciation on the precision seeder would add £0.31 an acre.

On this basis, ignoring rent, share of farm general expenses and all residues, the costs per acre are approximately £45 and £47.

TABLE 12.  
(COST MODEL B)

Slag and Compound Fertilisers Applied, but no Dung

(Cost figures are in £'s and decimal parts of £'s)

	<u>Precision Seeder</u>			<u>Conventional Method</u>		
	<u>Per Crop Acre</u>			<u>Per Crop Acre</u>		
	<u>Man</u> <u>Hours</u>	<u>Tractor</u> <u>Hours</u>	<u>Cost</u> <u>£</u>	<u>Man</u> <u>Hours</u>	<u>Tractor</u> <u>Hours</u>	<u>Cost(a)</u> <u>£</u>
Plough	4.91	4.91	2.12	4.91	4.91	2.12
Cultivate (b)	2.38	2.38	1.02	2.38	2.38	1.02
Disk	0.94	0.94	0.41	0.94	0.94	0.41
Harrow (b)	1.02	1.02	0.44	1.02	1.02	0.44
Sow slag	1.22	1.22	0.54	1.22	1.22	0.54
Sow fertiliser	0.76	0.69	0.32	0.76	0.69	0.32
Ridge	1.67	1.67	0.72	1.67	1.67	0.72
Sow seed	1.36	1.29	0.63	1.21	1.21	0.50
	<u>14.26</u>	<u>14.12</u>	<u>6.20</u>	<u>14.11</u>	<u>14.04</u>	<u>6.07</u>
Inter-row cultivations before thinning	1.03	1.03	0.45	1.11	1.11	0.47
Thin	20.07	-	4.21	28.02	-	5.71
Inter-row cultivations after thinning (b)	1.72	1.72	0.76	2.64	2.64	1.10
	<u>22.82</u>	<u>2.75</u>	<u>5.42</u>	<u>31.77</u>	<u>3.75</u>	<u>7.28</u>
Shaw	28.25	-	5.73	28.25	-	5.73
Cart and store	20.13	13.25	7.07	20.13	13.25	7.07
	<u>48.38</u>	<u>13.25</u>	<u>12.80</u>	<u>48.38</u>	<u>13.25</u>	<u>12.80</u>
Total labour and power	<u>85.46</u>	<u>30.12</u>	24.42	<u>94.26</u>	<u>31.04</u>	26.15
Slag	13cwt @ 5/5d.		3.52	13cwt @ 5/5d		3.52
Compound fertilisers	8cwt @ 16/9d.		6.70	8cwt @ 16/9d		6.70
Seed	2/3rd lb. @ 7/6d.		0.25	2 3/4 lb. @ 4/6d		0.62
Total			<u>34.89(c)</u>			<u>36.99</u>

(a) Excludes depreciation and repairs on equipment drawn by tractors.

(b) Hours and costs given assume that these jobs were performed twice on each crop acre.

(c) Depreciation on the precision seeder would add £0.31 an acre.

The cost per acre of the crops that were not given dung is shown here as about £10 less than that for those that were, but this cost advantage is much reduced if the usual adjustments are made for manurial residues. It is also important that the charge made for dung is not a direct cost like purchases of fertilisers.



COSTING METHOD AND CHARGES

METHOD

The costings were prepared by the enterprise method. That is to say, the turnip crop was regarded as separate from the rest of the farm and charges were made against it whether the items involved a cash outlay or not. Some charges had to be estimated, but wherever possible actual costs were used.

The method of presenting the costs in Table I of the Appendix is as follows:-

- (i) If dung was applied to the 1959 crop, the application costs and an estimate of the value of the dung were charged.
- (ii) An estimated charge was made for "grass residues", if any.
- (iii) The cost of lime and fertilisers applied for the 1959 crop was charged.
- (iv) Charges were made for labour, horse and tractor work, materials, depreciation on special machinery, rent and a share of "farm general expenses".

The total of these items is shown as Gross Cost.

Gross Cost was adjusted by adding manurial residues from previous crops and deducting residues chargeable to future crops, to give Net Cost.

No credit was given for turnip shaws.

CHARGES

Lime and Fertilisers are at net cost after deducting subsidies.

Dung is charged at 17/6d a ton.

Materials (for example, straw for clamps) are at cost, if purchased, or at an estimated charge, if produced on the farm.

Hired Labour is at actual cost. The charges for regular workers include the farmer's share of National Insurance and an addition of 7% to allow for sick time, broken time and holidays.

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

Farmer	4/3d to 4/6d
Son (21 and over)	4/3d to 4/6d
Son (20)	4/- to 4/2d
Son (19)	3/5d to 3/7d
Wife	3/- to 3/3d
Daughter (21 and over)	3/- to 3/3d
Daughter (18 - 20)	2/8d to 2/11d

Horse and Tractor Work charges are at estimated hourly rates:

Horse (excluding ploughman)	2/-
Wheeled tractor (excluding tractorman)	4/3d

Contract Work is charged at cost..

Depreciation on Special Equipment is charged on machines regarded as not yet being part of the normal equipment on a farm. For the turnip crop the only machines in this category are precision seeders and shawers, and depreciation is charged at 10% +  $\frac{1}{4}$ .

An estimated charge for depreciation on all the normal farm machinery is included with "Share of Farm General Expenses".

Rent is based on the rental or assessed rental of the farm. Where only part of the farm was arable, the share appropriate to that part was agreed with the farmer.

Farm General Expenses (or Overheads) cannot be calculated for an individual farm unless full costing is carried out. In enterprise costing it is necessary to use estimated rates obtained from a large sample of the accounts of Scottish farms. The rates used are:-

	<u>Dairy Farms</u>	<u>Other Farms</u>
(a) For each acre costed	8/9d	7/3d
(b) For each £1 of labour (farm and casual) used on the crop	6/9d	7/9d
(c) For each tractor-hour and for every four horse-hours worked on the crop	8/3d	4/9d

The total of these three charges is the item "Share of Farm General Expenses".

By means of this, estimated charges are brought in for the following and other items:-

- (i) 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 enterprise.
- (ii) A share of car running and depreciation.
- (iii) A share of miscellaneous farm expenses.
- (iv) A share of repairs to buildings, fences and drains.
- (v) Shares of implement repairs, rates, insurances and depreciation on tenant's fixtures.

Grass Residues is a charge made against the four crops following a lea. It is based on the cost of the sow-out and the length of the lea, the maximum total charge per acre being 92/-, and is charged against the four crops following the lea in the proportions of  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{8}$  and  $\frac{1}{8}$ .

Residues from Previous Crops is the share applicable to the 1959 crop of residues from manuring in earlier years. Grass residues are included.

Residues to Future Crops is the share of 1959 manuring chargeable to future crops. Grass residues are included.

Calculation of Manurial Residues is based on the advisory leaflet "Residual Values of Fertilisers and Feedingstuffs" published by the Department of Agriculture and Fisheries for Scotland.

TABLE I

TURNIP CROP OF 1959

AVERAGE COSTS PER ACRE FOR 32 CROPS

(All figures are in £'s and decimal parts of £'s)

	No Dung Applied	Dung Applied	All Crops
Number of cost records	18	14	32
Total acreage costed	105 $\frac{3}{4}$	73	178 $\frac{3}{4}$
Average yield per acre - tons	23	23 $\frac{1}{2}$	23 $\frac{1}{4}$
Number using precision seeder	9	4	13
Number using mechanical shaver	1	-	1
<u>Land Preparation and Sowing</u>	£	£	£
Lime	.91	.15	.58
Slag	2.95	.92	2.07
Mineral Phosphates	-	-	-
Other Fertilisers	6.13	6.48	6.28
Seed	.50	.49	.50
Labour and Field Power (a)	6.09	6.03	6.06
Depreciation, etc. on Special Equipment	.16	.12	.14
Sub-total A =	<u>16.74</u>	<u>14.19</u>	<u>15.63</u>
<u>Crop Sown until Start Harvest</u>			
Materials	-	-	-
Labour and Field Power (a)	6.96	8.00	7.41
Sub-total B =	<u>6.96</u>	<u>8.00</u>	<u>7.41</u>
<u>Harvesting</u>			
Materials	.16	.12	.14
Labour and Field Power (a)	14.50	11.84	13.34
Depreciation, etc. on Special Equipment	.02	-	.01
Sub-total C =	<u>14.68</u>	<u>11.96</u>	<u>13.49</u>
Total of A + B + C =	38.38	34.15	36.53
Rent charge	1.60	1.44	1.53
Share of Farm General Expenses	20.46	21.77	21.04
	<u>60.44</u>	<u>57.36</u>	<u>59.10</u>
<u>Dung application, 1959</u>			
Value placed on dung	-	12.57	5.50
Labour and Field Power (a)	-	3.27	1.43
	<u>60.44</u>	<u>73.20</u>	<u>66.03</u>
<u>Grass Residues</u>			
Value placed on these	2.03	-	1.14
GROSS COST	<u>62.47</u>	<u>73.20</u>	<u>67.17</u>
<u>Less Credit for shaws</u>	-	-	-
	<u>62.47</u>	<u>73.20</u>	<u>67.17</u>
<u>Add Residues from previous crops</u>	2.18	1.73	1.98
	<u>64.65</u>	<u>74.93</u>	<u>69.15</u>
<u>Less Residues to future crops</u>	5.45	11.50	8.10
NET COST PER ACRE	<u>£59.20</u>	<u>£63.43</u>	<u>£61.05</u>

(a) Including contract machinery services.

TABLE II

TURNIP CROP OF 1959

DETAIL OF RESIDUE ADJUSTMENTS PER ACRE IN TABLE I

(All figures are in £'s and decimal parts of £'s)

	<u>No Dung Applied</u>		<u>Dung Applied</u>		<u>All Crops</u>	
	Add from previous(a)	Less to future(b)	Add from previous(a)	Less to future(b)	Add from previous(a)	Less to future(b)
<u>Grass Residues</u>	.64	1.01	1.11	-	.84	.57
<u>Others:-</u>						
Dung	.54	-	-	8.05	.30	3.52
do. Applications	.10	-	-	.70	.06	.31
Lime	.29	.78	.23	.13	.26	.50
Phosphate	.08	1.48	.07	.46	.08	1.03
Potash	.04	.35	-	-	.02	.19
Compounds	.49	1.83	.32	2.16	.42	1.98
	<u>£2.18</u>	<u>£5.45</u>	<u>£1.73</u>	<u>£11.50</u>	<u>£1.98</u>	<u>£8.10</u>

(a) Residues from 1958 and earlier crops exhausted by and charged against 1959 crop.

(b) Share of 1959 manuring carried forward to future crops.

TABLE III

TURNIP CROP OF 1959

SUMMARY OF AVERAGE COSTS PER TON FOR 32 CROPS

(All figures are in £'s and decimal parts of £'s)

	<u>No Dung Applied</u>	<u>Dung Applied</u>	<u>All Crops</u>
Number of cost records	18	14	32
Total acreage costed	105 $\frac{3}{4}$	73	178 $\frac{3}{4}$
Average yield per acre - tons	23	23 $\frac{1}{2}$	23 $\frac{1}{4}$
Number using precision seeder	9	4	13
Number using mechanical shaver	1	-	1
<u>Cultivations and Materials:-</u>	£	£	£
Land preparation and sowing )			
Crop sown until start harvest ) (a)	1.77	1.89	1.81
Harvesting )			
<u>Rent charge</u>	.08	.07	.08
<u>Share of Farm General Expenses</u>	.93	1.08	1.00
	2.78	3.04	2.89
Dung and its application, 1959	-	.67	.30
Value placed on grass residues	.09	-	.05
<u>GROSS COST</u>	2.87	3.71	3.24
<u>Less Credit for shaws</u>	-	-	-
	2.87	3.71	3.24
<u>Add Residues from previous crops</u>	.11	.09	.10
	2.98	3.80	3.34
<u>Less Residues to future crops</u>	.25	.58	.40
<u>NET COST PER TON</u>	<u>£2.73</u>	<u>£3.22</u>	<u>£2.94</u>

(a) Inclusive of seed, fertilisers, labour and power, contract services and depreciation on special equipment.

TABLE IV

TURNIP CROP OF 1959

STRUCTURE OF THE COSTS PER ACRE

(Figures are in £'s and decimal parts of £'s)

	No Dung Applied	Dung Applied	All Crops
Fertilisers (excepting lime, slag and dung) applied 1959	6.13	6.48	6.28
Seeds	.50	.49	.50
Materials	.16	.12	.14
	<u>6.79</u>	<u>7.09</u>	<u>6.92</u>
Man Work	20.39	19.67	20.07
Horse Work	.24	-	.13
Tractor Work	6.65	6.07	6.40
Farm Lorry	-	.01	-
Contract Work	.27	.12	.21
	<u>34.34</u>	<u>32.96</u>	<u>33.73</u>
Depreciation and repairs on special machinery	.18	.12	.15
	<u>34.52</u>	<u>33.08</u>	<u>33.88</u>
Rent charge	1.60	1.44	1.53
Share of Farm General Expenses	20.46	21.77	21.04
	<u>56.58</u>	<u>56.29</u>	<u>56.45</u>
Lime, 1959	.91	.15	.58
Slag, 1959	2.95	.92	2.07
Mineral Phosphates, 1959	-	-	-
Dung, 1959	-	12.57	5.50
Application cost of Dung 1959:-			
Man Work	-	1.80	.79
Horse Work	-	.06	.03
Tractor Work	-	1.13	.49
Farm Lorry	-	-	-
Contract Work	-	.28	.12
	<u>60.44</u>	<u>73.20</u>	<u>66.03</u>
Add Residues from past Grass residues	2.18	1.73	1.98
	<u>2.03</u>	<u>-</u>	<u>1.14</u>
	<u>64.65</u>	<u>74.93</u>	<u>69.15</u>
Less Residues to future	5.45	11.50	8.10
	<u>59.20</u>	<u>63.43</u>	<u>61.05</u>

TABLE V

TURNIP CROP OF 1959

SUMMARY OF LABOUR AND FIELD POWER USAGE

PER ACRE

No Dung Applied 18 Farms	Dung Work	Land Prepara- tion & Sowing	Crop Sown until Harvest	Harvesting	Total
Man Hours (a)	-	14.67	30.61	50.57	95.85
Horse Hours	-	.25	.25	1.92	2.42
Tractor Hours (b)	-	13.41	2.26	15.78	31.45
<u>Dung Applied</u>					
<u>14 Farms</u>					
Man Hours (a)	8.04	14.34	37.86	46.55	106.79
Horse Hours	-	-	-	-	-
Tractor Hours (b)	5.92	13.64	2.85	12.09	34.50
Lorry Hours	-	.02	-	-	.02

- (a) Includes the man hours for operators with contract machines, but see (c) below.
- (b) Includes the hours for tractors hired as part of contract machinery services, but see (c) below.
- (c) For lime, slag or fertiliser applied on contract, man and tractor hours are excluded from Table V, but the cost of these items are included in all cost structure tables.



STANDARD APPENDIX TABLE A

TURNIP CROP OF 1959

SUMMARY OF AVERAGE COSTS PER ACRE

(Figures are in £'s and decimal parts of £'s)

	No Dung Applied		Dung Applied		All Crops	
	Hours	£	Hours	£	Hours	£
Number of cost records	18		14		32	
Total acreage costed	105 $\frac{3}{4}$		73		178 $\frac{3}{4}$	
<u>Dung Work Only:-</u>						
Farm Staff	-	-	5.51	1.31	2.42	.58
Farmer and Wife	-	-	2.23	.49	.97	.21
Casual and Gang	-	-	-	-	-	-
Contract Services:- Operators	-	-	.30	.28	.13	.12
" " Tractor	-	-	.30		.13	
Horse Work: Farm	-	-	-	.06	-	.03
Tractor Work: Farm	-	-	5.62	1.13	2.46	.49
Depreciation and repairs (a)	-	-	-	-	-	-
<u>All Other Work:-</u>						
Farm Staff	60.43	13.07	50.00	10.11	55.86	11.76
Farmer and Wife	15.73	3.41	21.64	4.79	18.32	4.02
Casual and Gang	19.39	3.92	26.98	4.76	22.72	4.29
Contract Services:- Operators	30	.27	.13	.12	.23	.21
" " Tractor	.24		.13		.19	
Horse Work: Farm	2.42	.24	-	-	1.36	.13
Tractor Work: Farm	31.21	6.64	28.45	6.08	30.00	6.40
Lorry Work: Farm	-	-	.02	.01	.01	Neg.
Depreciation and repairs (a)		.18		.12		.15
Seed		.50		.49		.50
Dung		-		12.57		5.50
Fertilisers and Manures		12.02		7.55		10.07
Sundries		.16		.12		.14
Rent		1.60		1.44		1.53
Share of Farm General Expenses		20.46		21.77		21.04
		62.47		73.20		67.17
Adjustment for residues		3.27		9.77		6.12
Cost of production		59.20		63.43		61.05
Credit value of shaws		-		-		-
Net Cost of Production (b)		<u>£59.20</u>		<u>£63.43</u>		<u>£61.05</u>

(a) Relates to farm-owned specialist equipment for this crop. See the definitions for Farm General Expenses and Depreciation on Special Equipment.

(b) At delivery point, i.e. at farm stading.

STANDARD APPENDIX TABLE B

Yield (estimated) of Turnips per acre =  $23\frac{1}{4}$  tons

STANDARD APPENDIX TABLE C

SUMMARY OF AVERAGE QUANTITIES OF MATERIALS PER ACRE

<u>Material</u>	<u>Average</u>	<u>Overall Average</u>
<u>Seed: Purchased</u>	<u>per Acre</u>	<u>per Acre</u>
Sown by precision seeder	.68 lb.)	2.01 lb.
Sown otherwise	2.79 lb.)	

  

<u>Fertilisers and Manures</u>	<u>Area Dressed Only</u>		<u>Total Costed Area</u>
	<u>Acres</u>	<u>Cwt.per Acre</u>	<u>Cwt.per Acre</u>
Dung	73	268.00	117.00
Lime	$53\frac{1}{2}$	37.50	9.38
Slag	106	13.55	7.62
Mineral Phosphates	-	-	-
Phosphatic	-	-	-
Potassic	$28\frac{3}{4}$	7.33	0.69
Compounds	162	7.51	7.04
Nitrogenous	-	-	-