Kale - Cost of production o.s.

THE WEST OF SCOTLAND AGRICULTURAL COLLEGE

KALE COSTINGS, CROP 1960

P. G. SMITH

6 BLYTHSWOOD SQUARE,
GLASGOW, C.2.

ECONOMICS DEPARTMENT REPORT No. 73
1961.

Price 2/6

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CONTENTS

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INTRODUCTION

Scottish statistics show that the acreage of Cabbage and Kale for stock-feeding has increased from 14,132 acres in 1950 to 18,488 acres in 1960. These published figures do not distinguish between the Cabbage and Kale acreages but undoubtedly some of this increase has been due to the greater popularity of Kale.

This report, which relates only to Kale, continues this College's crop costing series and presents figures derived from 21 costing records that were satisfactorily completed for the Kale crop of 1960. The investigation was confined to Dumfries-shire and Lanarkshire.

The weather during 1960 was good for the kale crop. In both counties April was a very wet month while the rainfall in May was below average. The rainfall in Lanarkshire for the next three months was above average, but in Dumfries-shire it was slightly below average. The temperature over the year was very noar to the average. The weather during September and October over the two counties was dry so that where strip-grazing was practised it did not do any damage to the land.

The "enterprise" method has been used in the preparation of these costings, so that charges for such items as the cost per hour of tractor and horse work, and also the farmer and his family were at estimated average rates. These various estimated rates per hour are shown in another part of this report.

It should also be noted that the charge for the share of farm general expenses (overheads) was based on a national average, since without a full farm costing it would have been impossible to determine and allocate accurately these charges on any one farm.

Grateful acknowledgement is made of the help received from farmers whose records and information form the basis of this report.

P.G. SMITH

SUMMARY

The main results from the 1960 Kale cost study are shown below. The records were divided into two main groups - HAND CUT and STRIP GRAZED - both groups received a dressing of farmyard manure (F.Y.M.).

The average cost per acre for the 13 crops (for which F.Y.M. was applied) which were hand cut and carted was £69, or on an estimated yield of 26.4 tons per acre the cost was £2.15s. per ton delivered at the feeding point.

The average cost per acre for the 3 crops (for which F.Y.M. was applied) which were strip grazed was £38, or on an estimated yield of 24 tons per acre the cost was £1.12s. per ton ready to graze.

	F.Y.M. HAND CUT	F.Y.M. STRIP GRAZED
No. of cost records	13	3
Total acreage costed	20.25	10.5
Average estimated yield per acre - tons	26.4	24.0
	£ s.	£ s.
Cost per acre (excluding share of farm general expenses	45.12	30. 2
Share of farm general expenses	23. 7	8. 4
Cost per acre (a)	£68.19s.	£38. 6s
Cost per ton (a)	£2.15s.	£1.12s.
Per Acre		
Average number of hours (b)		
(i) Excluding F.Y.M. work:-	Hours	Hours
Man	96.30	26.77
Horse	5.14	-
Tractor	33.30	10.60
(ii) Including 1960 F.Y.M. work:-		
Man	106.39	32.68
Horse	6.00	-
Tractor	38.46	14.84

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

(b) Includes all hours worked with the exception of contract lime spreading.

THE SAMPLE

Cost records were obtained from 21 farms in Dumfries-shire and Lanarkshire, the only two counties for which a random sample was attempted.

The distribution of the farms was:-		
	Dumfries-shire	12
	Lanarkshire	9
		21

These farms, with two exceptions, were all growing kale to feed principally to dairy cows. One of the exceptions was growing kale for feeding to hill cows and the other was cutting the kale throughout the winter for feeding to small stock.

GROUPING OF COST RECORDS

The 21 costs, ALL CROPS, were first grouped according to the method of harvesting the crop.

Only two methods of harvesting were found to be in use, and on no farm did the methods overlap.

1. HAND CUT - The kale was cut by hand, loaded and then transported to the livestock by tractor or horse drawn carts.

2. STRIP GRAZED - Passages through the kale were cut by hand so that an electric fence could be erected, behind which the livestock grazed the kale.

The reasons for selecting these two groups were that the harvesting costs were greatly affected by the method adopted and also that the method of sowing

and post-sowing cultivations were directly related to the method of harvesting.

The distribution of farms between these two groups was:-

HAND CUT - 15 farms; STRIP GRAZED - 6 farms.

Within each of these two groups there were points of difference which made comparisons between farm costs difficult, and in order to eliminate one of these differences all farms that did not apply F.Y.M. to the whole of their costed kale acreage were eliminated from the two groups. Thus the only two groups discussed in this report are:-

1. F.Y.M. - HAND CUT 13 farms
2. F.Y.M. - STRIP GRAZED 3 farms

F.Y.M. - HAND CUT

The 13 farms in this group all applied F.Y.M. to their whole kale acreage and then sowed their crops in rows so that interow cultivations could be carried out.

Within this group 2 farms used precision seeders and 8 farms tractor drawn root drills (conventional method), the remainder used various other methods for sowing their cropsin rows and in one of these, (the only farm in the sample) the crop was sown on the flat.

F.Y.M. - STRIP GRAZED

These 3 farms all broadcast their kale seed so that no interow cultivations were possible, though in some cases light harrrowing and rolling did occur before the crop had brairded.

The remaining 5 farms, which did not apply F.Y.M. to their whole acreage are not included in the main averages presented but were used to augment information on specific points. One farm used a precision seeder so that this farm is used in the average when comparing the costs of precision seeding and conventional sowing.

ACREAGE OF KALE COSTED

The acreage of Kale costed on any one farm was not high, the average over the whole sample was only 2.1 acres (total 44.25 acres). The range of acreages grown shows that the majority of farms grew a maximum of 2 acres and that those growing above average acreages were principally strip grazing their crops.

TABLE 1

AVERAGE AND RANGE OF ACREAGES COSTED

	F.Y.M. HAND CUT	ALL HAND CUT	F.Y.M. STRIP GRAZED	ALL STRIP GRAZED	ALL CROPS
Number of records	13	15	3	6	21
Total Acreage	20.25	22.75	10.50	21.50	44.25
Average Acreage	1.56	1.52	3.50	3.58	2.11
Range of acreages					
not exceeding 0.5 acres	1	1	-	-	1
over 0.5 " " 1.0 "	6	7	-	1	8
" 1.0 " " 2.0 "	4	5	-	-	5
" 2.0 " " 3.0 "	1	1	1	1	2
" 3.0 " " 4.0 "	1	1	2	2	3
" 4.0 "	-	-	-	2	2

YIELDS

Various methods were used to estimate the yield of kale, none of which was really satisfactory but the results obtained do give an indication of the range of yields.

The average yield per acre was estimated in the field at the harvesting of the crop, and in the case of the strip-grazed crop, an estimate of the utilised yield, in order to allow for wastage in the field, was also made.

The average estimated yield per acre for the 21 crops was 24 tons and the range was from 10 tons to over 30 tons. The F.Y.M. HAND CUT group had an average estimated yield per acre, for the 13 crops, of 26 tons. The F.Y.M. STRIP GRAZED had an average estimated yield per acre, for the 3 crops, of 24 tons, but when the residue of the crop left after strip grazing was estimated, the utilised yield was only 17 tons per acre on these 3 farms.

TABLE 2

AVERAGE AND RANGE OF YIELD PER ACRE

	F.Y.M. HAND CUT	F.Y.M. STRIP GRAZED	ALL CROPS
Number of records	13	3	21
Average yield per acre - tons	26	24	24
Range of yields			
not exceeding 15 tons per acre	-	-	1
over 15 " " 20 " " "	3	2	7
" 20 " " 25 " " "	2	-	4
" 25 " " 30 " " "	6	-	6
" 30 " " "	2	1	3

YIELDS OF STARCH EQUIVALENT

The Starch Equivalents published in "Rations for Livestock" (Bulletin 48 Ministry of Agriculture, Fisheries and Food) for the Kale varieties are:-

Thousandhead	10.3
Marrowstem	9.0

This gives yields of starch equivalent per acre of 2.39 tons from the F.Y.M. HAND CUT group and 2.24 tons from the F.Y.M. STRIP GRAZED group, or slightly lower if the utilised yield is considered.

The average cost of Starch Equivalent per cwt. for each of the two groups is given in Table 3, where costs are compared with the cost of Starch Equivalent for other feedinstuffs calculated from the prices given in the market report of the Department of Agriculture and Fisheries for Scotland for the week ending 2nd.November 1960.

TABLE 3

COMPARISON OF COSTS - PER CWT. AND PER CWT S.E.

	Cost per cwt.	Cost per cwt. S.E.
	£ s. d.	£ s. d.
Kale (1960 costing) - Hand cut	-. 2. 9	1.10. 3
Kale (1960 costing) - Strip grazed	-. 1. 7	-.17. 3
Hay 1960 costing (this College)	-. 7. 3	1. 2. 8
Grass Silage (1st quality) say	-. 3. 0	1. 4. 7
Turnips say	-. 3. 0	2. 1. 1
Molassed Sugar Beet Pulp	1. 4. 8	2. 2. 4
Oats (grower's price)	-.19. 0	1.11.11
Flaked Maize	1. 8. 8	1.14. 1

CROP VARIETIES

The only variety grown on 17 farms was Marrowstem kale, three other farms grew Marrowstem kale in conjunction with either Canson or Thousandhead kale and one farm grew Canson and Thousandhead kale. With only one exception, where the seeds of Marrowatem and Thousandhead kale was mixed before sowing, the different varieties were all grown separately.

Of the 15 farms on which the kale was hand cut, 14 farms had sown only Marrowstem kale, the other farm has halved his acreage between Marrowstem and Canson kale in order to get a longer cutting season.

Of the 6 farms on which strip grazing was practised, 3 farms grew two varieties of kale, the remaining 3 farms grew only Marrowstem kale.

SEEDING RATES

The seeding rate, as might be expected, showed a considerable difference between the two methods of harvesting the kale crop. When strip grazing was to be the method of utilising the crop the average rate was 6.1 lb.. per acre, but when the crop was to be hand cut the average rate was 2.5 lb.. per acre.

On the 3 farms using precision seeders the average rate was only 0.7 lb. per acre compared with the conventional method where the average rate was 2.8 lb. per acre.

TABLE 4

AVERAGE AND RANGE OF SEEDING RATES PER ACRE

	HAND CUT			STRIP GRAZED
	PRECISION SEEDER	CONVENTIONAL METHOD	ALL CROPS	ALL CROPS
Number of records	3	9	15	6
Acreage sown	3.5	14.5	22.75	21.5
Average seed rate. lb.. per acre	0.7	2.8	2.5	6.1
Range of seed rates.				
not exceeding 1.0 lbs/acre	3	-	3	-
over 1.0 " " 2.0 " " "	-	3	4	-
" 2.0 " " 3.0 " " "	-	3	3	-
" 3.0 " " 4.0 " " "	-	3	5	1
" 4.0 " " 6.0 " " "	-	-	-	4
" 6.0 " " "	-	-	-	1

FERTILISER APPLICATION

Information was collected on the analyses of the fertilisers applied to the 1960 kale crop. The figures below exclude the contribution of manurial residues brought or carried forward, and also the nutrients contained in any F.Y.M. which was applied.

Table 5 shows the number of farms applying the different fertilisers, the average application rates of the actual fertilisers, their plant nutrient content for the two groups and the average for ALL CROPS.

Basic Slag was the only straight phosphatic fertiliser applied and no farm applied a straight potassic fertiliser.

TABLE 5

DETAIL OF 1960 APPLICATIONS OF F.Y.M., LIME AND FERTILISERS

		F.Y.M. HAND CUT	F.Y.M. STRIP GRAZED	ALL CROPS
Number of records		13	3	21
F.Y.M.	No. of crops receiving	13	3	17
	Application per acre (these crops)			
	Average tons	14.3	13.3	13.4
	Range tons	9 - 24	7 - 17	7 - 24
LIME	No. of crops receiving	2	-	2
	Application per acre (these crops)			
	Average cwt.	55.0	-	55.0
	Range cwt.	50 - 60	-	50 - 60
SLAG	No. of crops receiving	5	2	8
	Application per acre (these crops)			
	Average cwt.	12.0	11.0	11.6
	Range cwt.	6 - 20	10 - 12	6 - 20
COMPOUNDS	No. of crops receiving	12	3	20
	Application per acre (these crops)			
	Average cwt.	8.0	8.0	8.5
	Range cwt.	4 - 12	6 - 10	4 - 13
NITROGENOUS	No. of crops receiving	5	1	7
	Application per acre (these crops)			
	Average cwt.	2.9	4.0	3.2
	Range cwt.	2 - 5	-	2 - 5
NUTRIENTS from SLAG, COMPOUNDS and NITROGENOUS FERTILISERS.				
NITROGEN	cwt. per acre	0.73	1.34	0.93
P_2O_5	" " "	1.52	1.41	1.50
K_2O	" " "	0.65	1.27	1.00

FARMYARD MANURE (F.Y.M.) APPLICATION

The average rate of application of F.Y.M., where applied, was 13.4 tons per acre at an average cost, including the value of the F.Y.M., of £14.18s. per acre (excluding all overheads).

Further information on the methods and costs of the F.Y.M. application became available during the course of the investigation. This information, for the 16 farms that applied F.Y.M. with regular farm labour and machinery, is considered below. One farm used a contractor to apply the F.Y.M. but these figures are not included in the groups.

Method of Application

Three distinct methods of working were recognised:-

1. HAND-HAND - Hand loading and hand spreading in the field.
2. HAND-MACHINE - Distributed in the field by a F.Y.M. spreader after hand loading.
3. MACHINE-MACHINE - Distributed in the field by a F.Y.M. spreader after being loaded by a front mounted loader.

The most common method in this investigation was the HAND-MACHINE method on 8 farms. The HAND-HAND and MACHINE-MACHINE methods were used on 4 farms each.

The detailed analysis of the F.Y.M. application is shown in Table 6. All the costs referred to in this Table are only the charges for man and tractor work. These charges exclude repairs and depreciation of equipment, and a share of farm general expenses. On this basis the MACHINE-MACHINE method had the lowest cost and manual labour requirement per ton.

TABLE 6

F.Y.M. APPLICATION

	HAND HAND		HAND-MACHINE		MACHINE-MACHINE	
Number of records	4		8		4	
Total acreage represented	4.75		14.25		10.0	
Average application per acre - tons	17.25		13.50		17.0	
Average distance hauled - yds. (a)	115		240		275	
	Per Acre	Per Ton	Per Acre	Per Ton	Per Acre	Per Ton
Labour and Power	Hours	Hours	Hours	Hours	Hours	Hours
Man work	14.42	0.83	8.11	0.60	5.22	0.31
Tractor work	4.21	0.24	5.47	0.41	5.22	0.31
Horse work	2.53	0.15	-	-	-	-
Cost	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.
Man work	3. 6	-. 4	1.15	-. 2	1. 5	-. 2
Tractor work	-.19	-. 1	1. 5	-. 2	1. 3	-. 1
Horse work	-. 5	neg.	-. -	-. -	-. -	-. -
	£4.10s.	£-. 5s.	£3. -s.	£-. 4s.	£2. 8s.	£-. 3s.

(a) Distance from steading or field clamp to the field.

PRODUCTION COSTS

GENERAL AVERAGES PER ACRE AND PER TON

The structure of the costs incurred in growing kale is shown, in the tables below, for the natural stages of the work; applying F.Y.M., preparing the land and sowing the seed, summer field work and finally harvesting. The costs of F.Y.M. and fertilisers are included in the stages during which they were applied.

All PER TON figures are calculated on the estimated yield of the crop before feeding. In the STRIP GRAZED group where waste could be considerable the cost per ton of utilised kale is also shown.

A summary of the structure of the costs incurred in growing kale for the two principal groups are shown in Tables 7 and 9. The complete cost structure per acre is shown in Appendix Table 1. The range of costs per acre is shown in Table 8.

TABLE 7

COSTS PER ACRE

	F.Y.M. HAND CUT	F.Y.M. STRIP GRAZED
Number of records	13	3
Average yield per acre - tons	26.4	24.0
Costs per acre	£ s.	£ s.
Land preparation and sowing	14. 7	16. 2
Crop sown until start of harvest	8. 6	1. 8
Harvesting	14. 3	3. 7
	36.16	20.17
F.Y.M. cost and application	15.19	14. 4
DIRECT COST	52.15	35. 1
Rent charge	2. 8	2. 1
Share of Farm General Expenses	23. 7	8. 4
GROSS COST	78.10	45. 6
Adjustments for grass and manurial residues, and other field uses	(-) 9.11	(-) 7. -
NET COST PER ACRE	£68.19s.	£38. 6s.

TABLE 8

RANGE OF COSTS PER ACRE

	F.Y.M. HAND CUT	F.Y.M. STRIP GRAZED
Number of records	13	3
Average cost per acre	£68.19s.	£38. 6s.
Range of costs per acre		
over £30 not exceeding £40 per acre	-	2
" £40 " " £50 " "	1	1
" £50 " " £60 " "	2	-
" £60 " " £70 " "	4	-
" £70 " " £80 " "	4	-
" £80 " "	2	-

N.B. These costs include a share of farm general expenses.

TABLE 9

COSTS PER TON

	F.Y.M. HAND CUT	F.Y.M. STRIP GRAZED
Number of records	13	3
Average yield per acre - tons	26.4	24.0
Estimated utilised yield per acre - tons	N.A.	17.5
Cost per ton	£ s.	£ s.
DIRECT COST	2. 2	1.10
Rent charge and Share of Farm General Expenses	1. 0	-. 9
GROSS COST	3. 2	1.19
Adjustments for grass and manurial residues, and other field uses	(-) -. 7	(-)-. 7
NET COST PER TON	£2.15s.	£1.12s.
Net Cost per Ton of Utilised Kale		£2. 4s.

HAND CUT OR STRIP GRAZE

Tables 7 and 8 show that though strip grazing may result in a lower yield of kale per acre there is a considerable saving, in the DIRECT COST, due to reduced post-sowing and harvesting costs. The cost per ton, even with the lower yield of utilised kale, is also lower.

If the DIRECT COST is broken into its component parts, Table 10 shows that the cost saving occurred in the Labour and Power cost, as the other costs were very similar.

TABLE 10

DIRECT COST PER ACRE

	F.Y.M. HAND CUT	F.Y.M. STRIP GRAZED
	£ s.	£ s.
Seeds	-.14	1.11
Lime	-. 7	-. -
Fertilisers	7.18	10. 1
Labour and Power (including depreciation) excluding F.Y.M. work	27.17	9. 5
	36.16	20.17
Value of F.Y.M.	12. 9	11.14
Labour and Power on F.Y.M. work	3.10	2.10
DIRECT COST PER ACRE	£52.15s.	£35. 1s.

The problem then arises, can Labour and Power costs in the HAND CUT group be reduced to make this method more competitive with strip grazing. In

considering reducing costs, Table 11 shows that the greatest difference in cost occurs in harvesting and then in post-sowing work, there being no great difference up to sowing. The method of harvesting may be governed by soil structure, field situation and other factors outwith the farmer's control so that no change in method may be possible. This investigation did not produce any farm where a forage harvester was being used to harvest the kale, so it is not possible to examine this point further.

TABLE 11

STAGE COSTS OF LABOUR AND POWER PER ACRE

	HAND CUT		STRIP GRAZED	
Number of records	15		6	
	£ s.	£ s.	£ s.	£ s.
Land Preparation and Sowing:				
Labour	3. 2		2. 9	
Power	3. 0		2.14	
Contract work	-. 4	6. 6	-.19	5.12
Crop in ground to start of harvesting:				
Labour	6.14		-. 7	
Power	-.16	7.10	-. 7	-.14
Harvesting:				
Labour	9.12		3. 9	
Power	4. 7	13.19	- -	3. 9

PRECISION SEEDING

The use of the precision seeder offers another opportunity to reduce costs before the stage of inter-row cultivations. However, as soon as singling and inter-row cultivations commence, costs will rise above those of the STRIP GRAZED group, this however, must be set against the advantages of cleaning the ground with the inter-row work. Table 12 shows the cost of using a precision seeder compared with the conventional method.

TABLE 12

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

	PRECISION SEEDER	CONVENTIONAL
Number of records	3	9
Total acreage costed	3.5	14.5
Cost per Acre	£ s.	£ s.
Seed	-. 7	-.16
Operations:		
Sowing seed	-.11	-.15
Row cultivations before singling	-. 7	-.13
Singling	2.12	4.12
Row cultivations after singling	-.13	2. 0
Total row cultivation costs	4. 3	8. 0
Depreciation on precision seeder	-. 5	- -
Total	£4. 8s.	£8. 0s.

Comparison of the labour and power requirements are shown in Table 13. The time saved by precision seeding over the conventional method was approximately equal to 2 days of manual row crop work per acre.

TABLE 13

QUANTITATIVE INFORMATION ON CROPS SOWN BY PRECISION SEEDER AND BY CONVENTIONAL METHODS - PER ACRE

	PRECISION SEEDER		CONVENTIONAL		
Seed - lb	0.75		2.77		
Operations	Hours		Hours		
	Man	Tractor	Man	Tractor	Horse
Sowing seed	1.26	1.26	1.92	1.41	-
Row cultivations before singling	0.77	0.77	1.45	1.24	0.07
Singling	12.86	-	22.00	-	-
Row cultivations after singling	1.43	1.43	8.04	1.89	0.14
Total	16.32	3.46	33.41	4.54	0.21

KALE COSTS AND FARM MANAGEMENT ANALYSIS

As the main purpose of growing kale is usually to feed to cattle, the output from the cattle must pay for their own "direct" variable costs, i.e. concnetrates, service fees, etc., but also for the variable costs of their forage, which includes kale, as well as leaving a contribution to the fixed costs and farm profit.

Thus for those who, in their farm business management, use the GROSS MARGIN concept, the variable costs for kale are shown in Table 14.

The overall farm profit also depends on the use made of the fixed costs, particularly regular labour. The way in which the farms in this investigation augmented their regular labour is discussed in the section LABOUR UTILISATION.

TABLE 14

VARIABLE COSTS PER ACRE

	F.Y.M. HAND CUT	F.Y.M. STRIP GRAZED
	£ s.	£ s.
Seed	-.14	1.11
Fertilisers	6.17	8.15
Materials	7.11	10. 6
Tractor work	7.19	2. 5
Contract Services	-. 5	1. 5
TOTAL VARIABLE COSTS		
1. excluding casual labour	15.15	13.16
Casual Labour - hoeing	1. 3	-. -
2. including casual labour	£16.18s.	£13.16s.

LABOUR UTILISATION

Table 11 shows the cost of labour over the different stages of growing a kale crop and Table 13 indicates the actual hours spent on row cultivations for different methods of sowing. Another factor of importance is the work to be done by the regular farm staff during their working week, or must overtime or even casual labour be employed, (for this discussion the 21 farms are considered).

F.Y.M. Application

One farm employed a contractor to apply his F.Y.M., otherwise all the work of applying F.Y.M. was carried out by the regular farm labour.

Land Preparation and Sowing

Apart from two farms who employed contractors to do some deep ploughing and another farm where rotovating was done on contract, all the work was done by regular labour.

All lime spreading was done by contractors, but as this is customary, this work cannot be considered as augmenting the regular labour.

Crop sown to start of harvest.

Where the crop had been sown in rows and singling had to be carried out, three farms had to increase their labour force. No farm that had sown its kale broadcast had to increase its labour force.

Table 15 shows the extent to which these three farms relied on casual labour.

TABLE 15

LABOUR UTILISATION PER ACRE FOR PERIOD, CROP SOWN TO START OF HARVEST

	HAND CUT	
	CASUAL EMPLOYED	NO CASUAL
Number of records	3	12
Regular labour - hours	9.74	33.02
Casual labour - adult - hours	18.00	-
	27.74	33.02
Casual labour - juvenile- hours(a)	20.00	-

(a) No attempt is made to express juvenile labour in terms of adult labour.

Harvesting

As this was a daily task on all farms, there was no cause for the labour to be supplemented on this work.

For the two principal groups the average Labour and Power usage is shown in Table 16. This again demonstrates the importance of casual labour, where the crop is sown in rows and row-cultivations are carried out, in assisting the farm labour over the spring peak.

TABLE 16

LABOUR AND POWER USAGE - HOURS PER ACRE

F.Y.M. application			F.Y.M. HAND CUT Hours	F.Y.M. STRIP GRAZED Hours
Labour	-	Farm	10.09	5.21
		Contract	-	0.70
		Total	10.09	5.91
Tractor	-	Farm	5.16	3.54
		Contract	-	0.70
		Total	5.16	4.24
Horse	-	Farm	0.86	-
Land Preparation and Sowing				
Labour	-	Farm	13.94	10.09
		Contract (a)	0.12	0.63
		Total	14.06	10.70
Tractor	-	Farm	12.45	9.12
		Contract	0.12	0.63
		Total	12.57	9.75
Horse	-	Farm	0.41	-

(a) Excluding lime spreading by contractors.

Table 16 continued on Page 12.

TABLE 16 (Continued)

LABOUR AND POWER USAGE - HOURS PER ACRE

Crop sown to start of harvest			F.Y.M. HAND CUT Hours	F.Y.M. STRIP GRAZED Hours
Labour	-	Farm	24.49	0.98
		Casual	8.77	-
		Total	33.26	0.98
Tractor	-	Farm	3.22	0.85
		Contract	-	-
Horse	-	Farm	1.11	-
Harvesting				
Labour	-	Farm	~~9.83~~ 45.98	15.07
	-	Contract	-	-
Tractor	-	Farm	~~3.94~~ 17.51	-
		Contract	-	-
Horse	-	Farm	~~0.36~~ 3.62	-

OPERATIONAL COSTS

This section and Table 17 deals with individual jobs within each operational stage. The figures are all based on the actual acreage over which the work was carried out. This is the reason for the operational acreage of some jobs exceeding the total acreage of kale costed. On some farms it was not possible to extract the information for each specific job and these were not included in Table 17.

TABLE 17

LABOUR AND POWER USE PER OPERATIONAL ACRE

Operation	No. of Records	Operational Acreage	Per Operational Acre: Man Hours	Tractor Hours	Cost £ s.
Cart and spread F.Y.M.					
a) Hand load, hand spread	4	5	14.42	4.21(i)	4.10
b) Hand load, machine spread	8	14	8.11	5.47	3. -
c) Machine load, machine spread	4	10	5.22	5.22	2. 8
Plough a) single furrow	7	8	4.73	4.73	2. 3
b) two furrow	10	24	4.48	4.48	2. -
Disc Harrow	10	57	0.71	0.71	-. 6
Cultivate	13	32	1.25	1.25	-.11
Harrow	13	65	0.55	0.55	-. 5
Sow fertilisers					
a) with spinner	10	34	0.79	0.62	-. 6
b) " distributor	9	18	0.93	0.83	-. 8
Set up ridges	12	18	1.77	1.77	-.16
Sow seed					
a) Precision seeder	3	4	1.26	1.26	-.11
b) Conventional method	9	15	1.92	1.41	-.15
Row cultivations before singling					
a) After precision seeding	3	4	0.77	0.77	-. 7
b) " conventional "	8	13	1.68	1.44(ii)	-.15
Singling					
a) After precision seeding	3	4	12.86	-	2.12
b) " conventional "	9	15	22.00	-	4.12

(i) In addition 2.53 Horse hours
(ii) " " 0.07 " "

Table 17 continued on Page 13.

TABLE 17 (CONTD.)

LABOUR AND POWER USE PER OPERATIONAL ACRE

Operation	No. of Records	Operational Acreage	Per Operational Acre: Man Hours	Tractor Hours	Cost £ s.
Row cultivations after singling					
a) After precision seeding	2	3	2.00	2.00	-.18
b) " conventional "	9	15	8.04	1.89(iii)	2. -
Harvesting					
a) Hand cut and carting	13	21	43.85	20.14	13.19
b) Cutting passages and moving electric fence	6	22	12.35	-	2.16

(iii) In addition 0.14 Horse hours.

The figures for ploughing and sowing fertilisers relate only to those farms where the work was done by the regular farm staff.

COSTING DEFINITIONS, METHOD AND CHARGES

DEFINITIONS

The definitions, below, are those used for certain terms in this report.

VARIABLE COSTS are those costs which vary with the actual crop being grown. These costs are (1) Seed
(2) Fertilisers
(3) Contract services
(4) Casual labour
(5) Tractor work (excluding that done during the application of F.Y.M.)

DIRECT COST is the total of the costs that are incurred during the land preparation, growing and harvesting of the crop. DIRECT COST includes, in addition to the VARIABLE COSTS, the following costs
(1) Lime and the value of F.Y.M.
(2) Farm labour, tractor and horse work directly associated with the crop and its cultivations, including the application of F.Y.M.
(3) Depreciation on special equipment used for the crop.

METHOD

The costings were prepared by the enterprise method. That is to say the kale crop was regarded as separate from the rest of the farm so that some charges had to be estimated, but wherever possible actual costs were used.

The method of presenting the costs is as follows:

i) The value of the F.Y.M. for the 1960 crop and its direct application costs were charged.

(ii) The cost of lime and fertilisers applied for the 1960 crop was charged.

(iii) Charges were made for labour, horse and tractor work, seed and depreciation on special equipment.

The total of these items is the DIRECT COST

(iv) Rent and a share of farm general expenses added to the DIRECT COST give the GROSS COST.

The Gross cost was adjusted by adding residues from past crops, and deducting residues to future crops and the share of joint costs for other field uses, to give NET COST of PRODUCTION at feeding point.

Sharing joint costs

The only costs to be shared for other uses of the field are those incurred during the period of the year prior to the land being first set aside for kale. These costs are the rent, the overheads allocated on an acreage basis and the manurial residues from past crops.

The sharing of these costs was made on the degree of winter grazing that took place between January and the first field work done for the Kale crop.

CHARGES

Lime and Fertilisers are at net cost after deducting subsidies.

Farmyard Manure (F.Y.M.) is charged at 17/6d per ton at the steading.

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

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

Farmer	4/6d.	Wife		3/2d.
Son (20 and over)	4/6d.	Daughter	(21 and over)	3/2d.
Son (18 - 20)	3/9d.	Daughter		2/11d.
Son (Up to 18)	2/6d.	Daughter		2/3d.

Horse and Tractor Work is charged at estimated hourly rates:-

Horse (excluding horseman)	2/-d.
Tractor - wheeled (excluding driver)	4/6d.

Contract work is charged at cost

Depreciation on Special Equipment is charged only on equipment regarded as additional to the normal farm equipment. It includes a charge for repairs as well as depreciation. For the Kale crops costed, the only equipment in this category was precision seeders and special hoes. F.Y.M. loaders and spreaders are not included as they are now in general use.

An estimated charge for depreciation and repairs on all the normal farm equipment is included in Farm General Expenses.

Rent is based on the rental or gross annual value of the lowground part of the farm.

Farm General Expenses (or Overheads) cannot be calculated for an individual farm without full costings. In this enterprise cost, estimated rates are used, derived from the average for farms in South-West Scotland. The rates used for the 1960 Kale crop were:-

	Dairy Farms	Other Farms
1. For each acre costed	9/-d.	7/9d.
2. For each £1 of labour (farm and casual) used	6/9d.	7/6d.
3. For each tractor hour and for every 4 horse hours worked	8/-d.	5/-d.

The total of these three charges is the "Share of Farm General Expenses" by means of which the Kale crop is debited with a share of the farm costs that cannot be allocated to any specific enterprise.

Grass Residues is the charge made against the four crops following a ley. It is based on the cost of sow-out and the length of the ley, the maximum total charge being £4.12s. per acre, and this is charged against the four crops following the ley in the proportions of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$ and $\frac{1}{8}$.

Residues to Future Crops is the share of 1960 manuring chargeable to future crops.

Residues from Past Crops is the share applicable to the 1960 crop of manurial residues from earlier years. Grass residues are included.

Calculation of Manurial Residues is based on the publication "Residual Values of Fertilizers and Feeding Stuffs" (Department of Agriculture and Fisheries for Scotland).

APPENDIX TABLE 1

KALE CROP OF 1960

AVERAGE COSTS PER ACRE

	F.Y.M. HAND CUT	F.Y.M. STRIP GRAZED
No. of cost records	13	3
Total Acreage	20.25	10.5
Average yield per acre - tons	26.4	24.0
Land Preparation and Sowing	£ s.	£ s.
Lime	-. 7.	-. -.
Slag	1. 1.	1. 6.
Compound Fertilisers	6. 2.	7.15.
Seed	-.14.	1.11.
Labour - Farm	3. 1.	2. 4.
Field Power - Farm	2.16.	2. 1.
Depreciation on special equipment	-. 1.	-. -.
Contract Services	-. 5.	1. 5.
Sub-Total A	14. 7.	16. 2.
Crop Sown until Start of Harvest		
Nitrogenous Fertilisers	-.14.	1. -.
Labour - Farm	5.12.	-. 4.
Casual	1. 3.	-. -.
Field Power - Farm	-.17.	-. 4.
Sub-Total B	8. 6.	1. 8.
Harvesting		
Labour - Farm	9.19.	3. 7.
Field Power - Farm	4. 6.	-. -.
Sub-Total C	14. 3.	3. 7.
TOTAL of A + B + C	36.16.	20.17.
F.Y.M. Application, 1960		
Value placed on F.Y.M.	12.10.	11.14.
Labour - Farm	2. 5.	1. 3.
Field Power - Farm	1. 5.	-.16.
Contract Services	-. -.	-.11.
Sub-Total D	15.19.	14. 4.
DIRECT COST (A + B + C + D)	52.15.	35. 1.
Rent Charge	2. 8.	2. 1.
Share of Farm General Expenses		
allocated on F.Y.M. application work	2.16.	1.16.
allocated on acreage and other field work	20.11.	6. 8.
GROSS COST	78.10.	45. 6.
Add Manurial and Grass residues from past crops	2.14.	4. 4.
	81. 4.	49.10.
Less Manurial Residues to future crops	12. 4.	11. 4.
	69. -.	38. 6.
Less Credit for other field uses	-. 1.	-. -.
NET COST OF PRODUCTION PER ACRE	£68.19s.	£38. 6 s.

APPENDIX TABLE 2

KALE CROP OF 1960

STRUCTURE OF RESIDUE ADJUSTMENTS PER ACRE IN APPENDIX TABLE 1.

	F.Y.M. HAND CUT		F.Y.M. STRIP GRAZED	
	Add from past (a)	Less to future (b)	Add from past (a)	Less to future (b)
	£ s.	£ s.	£ s.	£ s.
Grass residues	1. 3.	-. -.	1.17.	-. -.
Others				
F.Y.M. and its application	-.14.	9. 7.	1. 1.	8. -.
Lime	-. 5.	-. 6.	-. 6.	-. -.
Slag	-. 1.	-.10.	-. 4.	-.13.
Compound Fertilisers	-.11.	2. 1.	-.16.	2.11.
	£2.14s.	£12. 4s.	£4. 4s.	£11. 4s.

(a) Residues from 1959 and earlier crops exhausted by and charged against the 1960 crop.

(b) Share of 1960 manuring carried forward to future crops.

APPENDIX TABLE 3

KALE CROP OF 1960

SUMMARY OF AVERAGE COSTS PER TON

	F.Y.M. HAND CUT	F.Y.M. STRIP GRAZED
No. of cost records	13	3
Total acreage costed	20.25	10.5
Average yield per acre - tons	26.4	24.0
Cultivations and Materials:-	£ s.	£ s.
Land preparation and sowing Crop sown until start of harvest Harvesting	1.10.	-.18.
F.Y.M. and its application 1960	-.12.	-.12.
DIRECT COST	2. 2.	1.10.
Rent charge	-. 2.	-. 2.
Share of Farm General Expenses	-.18.	-. 7.
GROSS COST	3. 2.	1.19.
Add Residues from past crops	-. 2.	-. 3.
	3. 4.	2. 2.
Less Residues to future crops	-. 9.	-.10.
	2.15.	1.12.
Less Credit for other field uses	neg.	-. -.
NET COST PER TON	£2.15s.	£1.12s.

APPENDIX TABLE 4

KALE CROP OF 1960

SUMMARY OF LABOUR AND POWER USAGE

PER ACRE

F.Y.M. HAND CUT 13 FARMS	Land Preparation and Sowing	Crop Sown until Harvest	Harvesting	Sub-Total	F.Y.M. Work	TOTAL
Man Hours	14.06	36.26	45.98	96.30	10.09	106.39
Horse Hours	0.41	1.11	3.62	5.14	0.86	6.00
Tractor Hours	12.57	3.22	17.51	33.30	5.16	38.46
F.Y.M. STRIP GRAZED 3 FARMS						
Man Hours	10.72	0.98	15.07	26.77	5.91	32.68
Horse Hours	-	-	-	-	-	-
Tractor Hours	9.75	0.85	-	10.60	4.24	14.84

This table excludes the man and tractor hours of contract work normally done by contractors, i.e. lime spreading. The man and tractor hours used in contract work usually done by farm labour, are included. The cost of all contract work is included in all cost structure tables.

STANDARD APPENDIX TABLE A

KALE CROP OF 1960

SUMMARY OF AVERAGE COSTS PER ACRE FOR THE TWO GROUPS;

F.Y.M. HAND CUT and F.Y.M. STRIP GRAZED

	F.Y.M. HAND CUT		F.Y.M. STRIP-GRAZED	
No. of cost records	13		3	
Total acreage costed	20.25		10.5	
F.Y.M. work only	**Hours**	**£ s.**	**Hours**	**£ s.**
Labour: Men	9.7	2. 4.	5.9	1. 3.
Women	-	-. -.	-	-. -.
Boys	0.4	-. 1.	-	-. -.
Power: Tractor	5.2	1. 3.	4.2	-.16.
Horse	0.9	-. 2.	-	-. -.
Contract Services		-. -.		-.11.
		3.10.		2.10.
All other work				
Labour: Men	79.2	17.12.	26.8	5.15.
Women	6.6	-.19.	-	-. -.
Boys	10.3	1. 1.	-	-. -.
Power: Tractor	33.3	7. 9.	10.6	2. 5.
Horse	1.9	-.10.	-	-. -.
Contract Services		-. 5.		1. 5.
Machinery Depreciation		-. 1.		-. -.
Seeds		-.14.		1.11.
Value of F.Y.M.		12.10.		11.14.
Lime and Fertilisers		8. 4.		10. 1.
DIRECT COST		52.15.		35. 1.
Rent		2. 8.		2. 1.
Share of Farm General Expenses		23. 7.		8. 4.
		78.10.		45. 6.
Adjustment for Residual Manurial Values		(-) 9.10.		(-) 7. -.
Cost of Production		69. -.		38. 6.
Credit for other field uses		-. 1.		-. -.
NET COST OF PRODUCTION at feeding point		£68.19s.		£38. 6s.

STANDARD APPENDIX TABLE B

ESTIMATED YIELD OF KALE PER ACRE

	F.Y.M. HAND CUT	F.Y.M. STRIP GRAZED	ALL CROPS
No. of cost records	13	3	21
Estimated yield per acre - tons	26.4	24.0	24.3

STANDARD APPENDIX TABLE C

SUMMARY OF AVERAGE QUANTITIES OF MATERIAL PER ACRE

MATERIAL	Average per acre
SEED: PURCHASED	
Sown by precision seeder in drills	0.72 lb.
Sown by conventional method in drills	2.77 lb.
Sown broadcast	6.20 lb.

FERTILISERS AND MANURES	F.Y.M. HAND CUT		F.Y.M. STRIP GRAZED		ALL CROPS	
	Area Dressed	Total Costed Area	Area Dressed	Total Costed Area	Area Dressed	Total Costed Area
	cwt.per acre	cwt.per acre	cwt.per acre	cwt.per acre	cwt.per acre	cwt.per acre
F.Y.M.	286.0	286.0	266.0	266.0	268.0	217.6
Lime	55.0	8.5	-	-	55.0	5.2
Slag	12.0	4.7	11.0	7.3	11.6	4.4
Compounds	8.0	7.4	8.0	8.0	8.5	8.1
Nitrogenous	2.9	1.1	4.0	1.3	3.2	1.1
Nutrients from slag, compounds and nitrogenous fertilisers						
Nitrogen cwt.per acre		0.73		1.34		0.93
P_2O_5 " " "		1.52		1.41		1.50
K_2O " " "		0.65		1.27		1.00