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NORTH OF SCOTLAND COLLEGE OF AGRICULTURE

AGRICULTURAL ECONOMICS DEPARTMENT

Feeding  
Stuffs -  
Cost of  
production 0-5.

ECONOMIC REPORT NO. 9

SILAGE COSTS 1948

BY

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## SILAGE COSTS 1948

An investigation into the cost of making silage, including both grass and arable, was carried out in 1948 on 23 farms spread over the North of Scotland. The total acreage involved was  $476\frac{1}{2}$  acres.

In the following costs, overhead charges have been calculated according to the methods agreed on by a committee of Scottish Agricultural Economists, while residual manurial values are based on tables issued by the Department of Agriculture for Scotland. Unproductive work and lost time are taken care of partly in the overhead charges and partly by increasing the cost per man hour which has been taken at  $\frac{2}{5}$ . Horse work is costed at  $\frac{1}{4}$  per hour, wheeled tractors at  $\frac{3}{6}$  and track-layers  $\frac{5}{-}$ . The tonnage of silage produced per acre was arrived at by averaging the farmers estimate with the measured cubic content of the silo.

### GRASS SILAGE

In the case of silage made from grass, there was difficulty in estimating the amount to be placed against the grazing of the aftermath and in order to make for uniformity the following proportions were taken:-

Grass cut at hay stage -  $\frac{1}{3}$  cost of grass to grazing  
very young -  $\frac{1}{2}$   
cut twice -  $\frac{1}{4}$

The cost of laying down the grass was based on investigations carried out by this Department over the last few years.

17 farmers completed the necessary records giving a total of 428 acres.

In 14 cases the grass was cut once.

In 3 cases the grass was cut twice.

In 9 cases mainly man power was used at harvest.

In 8 cases mainly mechanisation was used at harvest.

Details are given in Table I of the average cost of silage made from grass cut once and Table II cut twice.

TABLE I GRASS SILAGE

Average Cost per Acre, one cut

	Average Acre				Your Acre			
	Hours			Cost	Hours			Cost
	Man	Horse	Tractor	£ s. d.	Man	Horse	Tractor	£ s. d.
Rolling & Sowing Manure	1.23	.13	.74	-: 5: 9				
Cutting, Carting, filling and covering	18.27	1.34	6.88	3:10: 7				
	19.50	1.47	7.62	3:16: 4				
Proportion of cost of laying down grass				1: -: 5				
Rent				1: -: -				
Manure				2: 5: 7				
Miscellaneous Charges				-: 1: 11				
Overhead Costs				2:16: 10				
Net Residual Manurial Value B/F				1: 1: 10				
Gross Cost per Acre				12: 2: 11				
<u>Less</u> Net Residual Manurial Value C/F				-:14: 2				
Aftermath Grazing C/F				2: 6: 5				
Net Cost per Acre				9: 2: 4				
Average weight of silage per acre				3½ tons				tons
Average cost per ton				2:12: 1				

Highest cost per acre £13: 4/4    Lowest £5: 8/9

Highest cost per ton £ 5: 6/11    Lowest £1: 2/-

TABLE II GRASS SILAGE

Average Cost per Acre - two cuts

	Average Acre				Your Acre			
	Hours			Cost	Hours			Cost
	Man	Horse	Tractor	£ s. d.	Man	Horse	Tractor	£ s. d.
Rolling & Sowing Manure	3.05	.38	1.02	-:11: 5				
Cutting, Carting, filling and covering	31.54	1.54	10.21	5:13: 5				
	34.59	1.92	11.23	6: 4: 10				
Proportion of cost of laying down grass				-:18: 6				
Rent				-:18: 7				
Manure				1:12: 5				
Miscellaneous Charges				-: -: -				
Overhead Costs				3:15: -				
Net Residual Manurial Values B/F				1: -: 8				
Gross Cost per Acre				14:10: -				
<u>Less</u> Net Residual Manurial Value C/F				-:10: 4				
Aftermath Grazing C/F				1:13: 9				
Net Cost per Acre				12: 5: 11				
Average weight of silage per acre				7 tons				tons
Average cost per ton				1:15: 2				

Highest cost per Acre £16: 6/1    Lowest £9: 14/6

If a farmer makes his silage mainly by man power, he will have a large number of man hours per acre, but this may not have any great practical significance with regard to cost, provided he did the whole job using only his basic staff. In such a case his total wage bill for the year will not be increased. On the other hand a saving in man hours, by mechanisation will be lost unless the time saved is put to useful purpose.

It was found on enquiry that in no case did silage making clash severely with other peak labour periods on the farm and in most cases came between such periods. This "spread over" of labour requirement is of great benefit.

Harvesting methods and hours of work have been set out in Tables III, IV and V (on the opposite page) where it can be seen that the average weight of grass per acre cut once and using man power (Table III) was 4 tons. In Table IV where mechanisation was used the weight of grass was 3 tons. This would indicate that farmers who rely on man power are cutting their grass at a later stage in its growth compared to farmers who are mechanised. This is borne out by the analysis of the silage. The average protein content of samples taken from all silage in Table III was 12%, while it was 17% in the case of Table IV. Short grass is very difficult to pick up by hand methods so that it is evident that the man with the machine tends to make a higher quality product.

The man hours per acre in Tables III and IV are practically the same, so that it would appear that mechanisation in these cases was carried out, not so much from the point of view of reducing the hours of work, but to reduce the burden of work and this would be especially so if the grass was cut at an early stage. It must be noted however, that the man hour requirement depends, amongst other factors, upon the distance of the field from the silo. In the case of Farm No. 8 the haul was over one mile, also in the case of Farm 6 the distance for half the crop was considerable. In all other cases the distance could be described as moderate to very short.

Another point to notice is that with the smaller weight of young grass in Table IV (compared to Table III) the cost per ton has more than proportionally increased compared to costs per acre. This increased cost is compensated by increased protein content.

TABLE III

Harvesting mainly by MAN POWER: one cut of grass

Farm	Acres	Harvesting Method	Man Hours - Harvesting		Yield tons per acre	Total Net Cost of Finished Product	
			per acre	per ton		per acre	per ton
1	12	Mower, rake & man power	20 $\frac{1}{4}$	5	4	£9. 5. 4	£2. 6. 4
2	19	do.	35 $\frac{1}{2}$	8 $\frac{3}{4}$	4 $\frac{1}{4}$	11.19. 1	2.16. 3
3	24	do.	14 $\frac{1}{2}$	3 $\frac{1}{4}$	4 $\frac{1}{2}$	10.14. 5	2. 7. 8
4	36	do.	14 $\frac{1}{2}$	2 $\frac{1}{2}$	5 $\frac{3}{4}$	6. 2.11	1. 1. 4
5	10	do.	13 $\frac{1}{2}$	5	2 $\frac{3}{4}$	6.14. 9	2. 9. -
6	10	Binder & Man Power	13	3 $\frac{3}{4}$	3 $\frac{1}{2}$	7. 4. 6	2. 1. 4
Average			18 $\frac{1}{2}$	4 $\frac{3}{4}$	4	8.13. 6	2. 3. 8

Average cost of Labour (Man, horse & tractor) per acre £3.12. 6  
 Average protein content of dry matter in silage 12%

TABLE IV

Harvesting mainly MECHANISED: one cut of grass

Farm	Acres	Harvesting Method	Man Hours - Harvesting		Yield tons per acre	Total Net Cost of Finished Product	
			per acre	per ton		per acre	per ton
7	32	Green crop loader	22 $\frac{1}{4}$	4	5 $\frac{1}{2}$	£11. 6. 2	£2. 1. 2
8	25	Green crop loader	21 $\frac{3}{4}$	9 $\frac{3}{4}$	2 $\frac{1}{4}$	10. 5. 8	4.11. 5
9	23	Green crop loader	11 $\frac{3}{4}$	7 $\frac{3}{4}$	1 $\frac{1}{2}$	7.17. 3	5. 4.10
10	76	Cutlift	13 $\frac{3}{4}$	2 $\frac{3}{4}$	5	9. 9. -	1.17.10
11	28	Cutlift	26	13	2	11. 4. 6	5.12. 3
12	62	$\frac{1}{2}$ Cutlift; $\frac{1}{2}$ G.C.Loader	28 $\frac{1}{4}$	7 $\frac{1}{2}$	3 $\frac{3}{4}$	13. 4. 4	3.10. 6
13	11	Buckrake	8 $\frac{1}{2}$	4 $\frac{3}{4}$	1 $\frac{1}{2}$	5. 8. 9	3.12. 6
14	14	Buckrake	13	5 $\frac{1}{4}$	2 $\frac{1}{2}$	6.14.11	2.14. -
Average			18 $\frac{3}{4}$	6 $\frac{3}{4}$	3	9. 8.10	3.13. 1

Average cost of labour (man, horse & tractor) per acre £3.19. 2  
 Average protein content of dry matter in silage 17%

TABLE V

Harvesting, mainly by man power, two cuts off one field

Farm	Acres	Harvesting Method	Man Hours - Harvesting		Total net cost of Finished Product
			1st cut	2nd cut	
15	20	Mower, Rake & Man Power	13	10	£10.17. 1
16	4	do.	25 $\frac{1}{2}$	24 $\frac{1}{4}$	16. 6. 1
17	22	do.	9 $\frac{1}{4}$	12 $\frac{1}{4}$	9.14. 6
Average			16	15 $\frac{1}{2}$	£12. 5.11

ARABLE SILAGE

Six farmers completed their records and Table VI gives details of the average cost.

The seed used was mixed grain and pulses. Only two silos were analysed, the percentage of crude protein in the dry matter being 14% in each case.

TABLE VI ARABLE SILAGE

AVERAGE COST

	Average Acre			Your Acre				
	Hours			Cost	Hours			Cost
	Man	Horse	Tractor	£. s. d.	Man	Horse	Tractor	£. s. d.
Ploughing	2.76	-	2.76	-.16. 4				
Other Cultivations	1.64	.22	1.38	-. 9. 1				
Sowing Seed, Manure & Dung	13.17	4.57	1.51	2. 3. 3				
Cutting, Carting, filling, covering	33.75	5.18	8.93	5.19. 3				
	51.32	9.97	14.58	9. 7.11				
Rent				1. -.11				
Seed				4.10. -				
Manure				5.19. 2				
Miscellaneous Charges				-. 8. 7				
Overhead Costs				5. 6. -				
Net Residual Manurial Values B/F				1. 1. 1				
Gross Cost per Acre				27.13. 8				
<u>Less</u> Residual Manurial Values C/F				3.11. 5				
				24. 2. 3				
Average Weight of silage per acre				8½ tons				tons
Average Cost per ton				3. 6. -				

Highest Cost per acre £31.15/5

Lowest £14. 5/1

per ton £5.15/6

£2. 8/4



The Following Table gives further details of individual cases.

TABLE VII Harvesting Arable Silage

Farm No.	Acres	Harvesting Methods	Man Hours - Harvesting		Yield tons per acre	Total Net Cost of Finished Product	
			per acre	per ton		per acre	per ton
18	5	Mower & Man power unchopped, silo in field	36½	4¼	8½	£26. 9. 5	£3. 2. 3
19	9	Mower & Man power Chopped, silo at steading	31½	4¼	7½	£18. 5. 3	2. 8. 8
26	8	Mower & Man power Chopped, pit at steading	46½	4¾	10	24.18. 7	2. 9.10
21	10	Binder & Man Power Unchopped, pit at steading	41¾	3½	12	28.19. 7	2. 8. 4
22	12	Cutlift Unchopped pit at steading	35	6¼	5½	31.15. 5	5.15. 6
23	4½	Buckrake Unchopped pit at steading	10½	2¾	4	14. 5. 1	3.11. 3
Average			33½	4½	7½	24. 2. 3	3. 6. -

In the above record the chopping does not appear to add unduly to the man hours. The reason put forward was that uncut mashlum is very rank and difficult to pack, whereas chopped material does not require so much consolidating.

The records in this report as a whole, show that there is a wide divergence of methods used in harvesting and making silage, but they do not show the great variations which were employed by farmers using the same basic method, namely by hand or by the same machine. It is obvious that there is much investigation to be done in order to eliminate wasteful systems in cutting, carting and filling the silo. With costs continually rising this factor of internal work organisation on the farm is becoming of ever increasing importance.

The Economics Department of the North of Scotland College of Agriculture is very grateful to all farmers who assisted by keeping records and it is hoped that by their continued co-operation it will be possible to produce further reports which may be of interest and assistance.