Silage - Cost of production

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SILAGE COSTS

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Introduction

The results given in this bulletin were obtained from 31 lowland dairy farms in Cheshire and Staffordshire and 9 upland dairy farms in East Lancashire.

In the lowland dairying districts silage making is now a fairly general practice and most of the farmers visited in the course of the enquiry were familiar with the techniques of the process and were planning their cropping to give silage a definite place in the programme. Under these conditions the enquiry was solely concerned with costs; but under different circumstances in East Lancashire the scope of the enquiry was widened to obtain more general information. In this area of high rainfall, where silage would appear to be a safe method of providing winter food, comparatively few farmers make a regular feature of silage in their cropping programmes. A number adopt an opportunist policy, making silage in seasons when grass is abundant, but the majority are not enthusiastic. The attitude of farmers in the two districts is quite different and it was in an attempt to discover some of the reasons for the contrast that the costs enquiry was extended in the upland dairy area. A random sample of forty-four farms representing the different sizes of dairy farms was visited and the farmers who were not making silage were asked to give their reasons.

Of the 44 farmers in this sample only ten made silage as a normal part of the farming routine. A few more made silage occasionally if the season were suitable but the majority, nearly two-thirds of the total, had never done so and for the most part had no intention of doing so in their present circumstances. The reasons for this apparent lack of enthusiasm were put in a variety of ways but in almost every case they resolved themselves into the

shortage of grass. On the small, heavily stocked, and rather poor farms of the area the grassland, at its present level of production, seldom does more than meet the minimum requirements of the dairy herds for pasture and hay. Without some improvement in the output of grassland, therefore, or a reduction in the numbers of stock, the introduction of silage would entail some encroachment on the area reserved for hay. This involves a risk which farmers are unwilling to take feeling that experience in silage making gained at the expense of part of their hay crop might be very costly. Already short of winter food they dare not risk a failure and prefer the risk of bad hay to that of bad silage. Labour also presents difficulties on the small farms. There is little scope for mechanisation and on the farm run by the farmer himself the work is too heavy.

By contrast, on the larger and more fertile lowland dairy farms there is more grass and a better supply of fodder crops other than hay so that the farmer can obtain his experience in making silage without seriously jeopardising the winter food supply in the event of failure. It would appear therefore, that if silage is to become of major importance as a winter food on the East Lancashire farms not only will the productivity of the grassland have to be improved but farmers will have to be convinced that silage is at least as good as hay and that it can be made with little or no risk of failure. Labour difficulties, were the farmer convinced of the value of silage, could probably be overcome by hiring machinery and by employing casual labour. Two of the costed farms in the area were under 30 acres.

Costs

The 40 farms provided 47 costs covering 62½ acres of arable silage and 575¼ acres of grass silage. The arable silage crops were grown on nine farms in fields of

from 3 to 12 acres while the grass silage was fitted into a variety of uses for the fields. Some grassland was reserved solely for silage on nine farms and several cuts were taken during the year. On the others a cut for silage was taken from fields also used for hay and grazing. In both cases the full costs of growing grass have been apportioned to show the cost of one cut of grass per acre. The costs have been presented for groups depending on the crop used, arable crops or grass, and the grass group has been sub-divided into "manual" and "mechanical" depending on the method of harvesting. The costs of growing the crops are given in Table I and the full costs, including the costs of making and the overhead charges, in Table II. All operations up to and including the final covering of the silage in a pit or stack are included

TABLE I

Costs per Acre of Growing Grass and Arable Silage Crops

	Arable Silage			Grass Manual Group			Grass Mechanical Group		
Number of Costs	9			15			23		
Acres Costed	62½			217½			357¾		
	£	s	d	£	s	d	£	s	d
Manual Labour	1	2	3		7	1		8	5
Horse Labour		1	2			11		1	4
Tractor Labour	1	4	2		4	8		5	11
Total Labour	2	7	7		12	8		15	8
Net Manures	3	1	9	2	11	11	2	5	5
Seeds	3	14	1		-			-	
Establishment of Leys		-			17	4	1	7	7
Rent	1	17	11	1	11	6	2	7	0
Gross Cost	11	1	4	5	13	5	6	15	8
Less									
Proportion to Hay ~~of~~ OR Grazing		-		1	6	3	2	6	11
Cost of Silage	11	1	4	4	7	2	4	8	9

TABLE 11

Cost of Silage per Acre and Per Ton

	Arable Silage				Grass Silage Manual				Grass Silage Mechanical			
	Cost/Ac.			Cost/Ton			Cost/Ac.			Cost/Ton			Cost/Ac.			Cost/Ton		
	£	s	d	£	s	d	£	s	d	£	s	d	£	s	d	£	s	d
Crop Cost	11	1	4	1	10	6	4	7	2	1	1	8	4	8	9	19	11	
Making Cost	3	9	0		9	7	2	13	11		13	4	2	15	11		11	3
Overheads & Miscellaneous	1	12	7		4	6	1	2	8		5	7		19	9		4	0
Total Cost:	16	2	11	2	4	7	8	3	9	2	0	7	8	4	5	1	15	2
Total Yield (tons)	453						877						1770					
Yield Per Acre (tons)	7¼						4.						5.0					

Accurate information on yields was extremely difficult to obtain and the figures given are estimates based on the volume and density and on the quantities fed from the silos. They are measures of the total silage handled and not of edible silage.

The costs of arable silage, mainly oats and vetches, varied from £12.15.2 per acre to £20.19.6 per acre and from £1.9.10 per ton to £6.7.7 per ton. The high cost per ton was associated with a very low yield of only 2 tons per acre. On the low cost farm the yield was 10¾ tons per acre. A moderate yield of 4½ tons per acre gave a cost of 69/6d. per ton and on the remaining farms with yields between 6½ and 8½ tons the costs were all within the range 35/- to 55/- per ton.

Average costs per acre for the two groups of grass silage are very similar and the differences in the cost per ton are the result of the higher average yield in the "mechanical group. This group contains a higher proportion of the better farms giving a greater response to manurial

treatment. Their rents are higher but the cost of manures applied was only £2.5.3 per acre as compared with £2.11.11 per acre for the "manual" group. Another factor contributing to higher yields in the "mechanical"group is the greater reliance on leys as shown by the establishment cost in Table 1. The"manual"group contains most of the East Lancashire farms and in this area the net cost of manures, including F.Y.M. and lime, was nearly £3 per acre while the yield of silage was only 2.4 tons per acre. This comparatively poor response may in part be attributed to the slow growth of hay aftermaths in the dry summer of 1949 since aftermath grass formed a large part of the silage on the Lancashire farms.

The total cost for the East Lancashire farms at £8.0.0 per acre is approximately the same as the group average. The cost of growing the grass was higher and the cost of making the silage rather less. With the low yields, the average cost per ton, however, was £3.5.9, 25/- above the group average.

The full range of yields and the costs per ton for the two groups of grass silage is shown in the following two tables. Twenty-one of the twenty-three costs in the "mechanical" group fall between £1 and £3 per ton but in the "manual" group the low yields on the East Lancashire farms give a wider range. Seven of the ten costs from this area are over £3 per ton.

TABLE 111
"MANUAL"

Distribution of Yields and Costs per Ton

Yield per acre Tons	Number of Costs Between:- £0-1	1-2	2-3	3-4	4-5	5-6	No. per Yield group.
1 - 2	-	-	-	-	2	1	3
2 - 3	-	-	-	-	2	-	2
3 - 4	1	1	1	2	-	-	5
4 - 5	-	1	1	-	-	-	2
5 - 6	-	-	-	-	-	-	-
6 - 7	-	3	-	-	-	-	3
7 - 8	-	-	-	-	-	-	-

TABLE IV

"MECHANICAL"

Distribution of Yields and Costs Per Ton

Yield per acre Tons	Number of Costs Between:- £0-1	1-2	2-3	3-4	4-5	5-6	No. per Yield Group.
1 - 2	-	-	-	-	-	-	-
2 - 3	-	1	3	-	-	-	4
3 - 4	-	1	2	-	1	-	4
4 - 5	-	2	1	-	-	-	3
5 - 6	-	2	2	-	-	-	4
6 - 7	-	3	2	-	-	-	5
7 - 8	1	1	-	-	-	-	2
8 & over	-	1	-	-	-	-	1

Labour

In Table II the cost of making an acre of grass into silage is shown to be practically the same for the two grass groups. No obvious financial advantage follows from the use of special equipment. Money costs, however, conceal a saving in manpower which for the present sample of costs amounted to 3.2 man hours per acre or 1.35 man hours per ton. Horse labour was also less and tractor work was only slightly greater.

TABLE V

Time Spent Cutting, Carting and Filling Silos

	MECHANICAL		MANUAL	
	Per Acre	Per Ton	Per Acre	Per Ton
Man Hours	12.8	2.6	16.0	3.95
Tractor Hours	5.7	1.15	5.3	1.3
Horse Hours	0.65	0.13	1.8	0.45

The saving in man hours reduces the cost of manual labour by approximately 7/5d per acre which is rather less than the charge made for the use of special equipment. (The greater proportion of the special equipment was hired and the charge for all farms was based on the daily or weekly hiring rates. The average cost was 8/- per acre.) Financially, and assuming silage making to be an isolated operation in the farm economy, there is then little difference between the mechanised and unmechanised farms. There will, however, be a financial gain in the farm economy as a whole if the labour displaced in silage making can be used efficiently in other directions. But more important than considerations of possible financial advantage is the great saving in human effort which mechanisation affords. Such a saving is at the least desirable and is probably essential if silage making is to be continued on a large scale.

Costs and Quality

Reports on feeding value were available for 26 lots of silage and the percentages of dry matter and of crude protein in the dry matter are given in the tables of individual results. From a costs point of view this information is mainly of negative value since inter-farm variations in cost appear to have little, if any, bearing on the differences in the quality of silage. Good and bad samples of silage are found at both ends of the cost range and the distribution throughout the range is practically the same for both those of a high or medium protein standard and those of low protein standard. This holds good for growing cost and making cost as well as for total cost.

Since bad silage may cost just as much to grow and make as good silage it follows that in the final measure - the cost per unit of food value - the quality of the product is the most important consideration. In this sample, for

example, the 22 lots of grass silage which were analysed are equally divided between low protein and medium or high protein groups and the average cost per ton of making and growing the silage is approximately the same for each. Yet the cost per cwt of crude protein in the low protein group is 105/- as compared with 74/- in the other. The economic advantage of good quality silage is considerable and although there is scope for reducing growing and handling costs it would appear that, at this stage, even greater economies can be affected by attention to the factors which make for a high grade product. From the remarks made on the analysts' reports the most important of these would seem to be the use of material at the right stage of growth and careful control of temperature in the silo.

Notes on Costing Methods

Labour — Manual Labour was charged at prevailing rates with adjustments for overtime and time lost. Horse labour was charged at 1/- per hour and tractors at 3/- per hour.

Manures — The charge for farmyard manure was 14/6 per ton exclusive of the cost of carting and spreading. 'Net Manures' is the cost of all F.Y.M. and fertiliser applied adjusted for Manurial Residues.

Establishment of Leys — This is a proportion of the original cost of laying down the ley based on the intended life of the ley.

Share of Cost to hay or grazing — The basic figure was one third of the cost of grass production but some variation was allowed for different conditions.

Miscellaneous — The main items were molasses and a charge for the cost of the pit or silo.

Overheads: The Rates charged varied between 4/6 and 6/1 per £1 manual labour according to the size and type of farm.

Arable Silage:

Acres	Yield per acre	PER ACRE: Growing Cost £ s d	Making Cost £ s d	Misc.& Overheads £ s d	Total Cost £ s d	PER TON: Growing Cost £ s d	Making Cost £ s d	Misc.& Overheads £ s d	Total Cost £ s d	% D.M.	% Protein
12	10.8	10 9 4	3 6 11	1 14 8	15 10 11	3 11	6 3	3 3	1 9 10	23.2	10.2
7	7.6	10 16 9	3 12 10	1 4 3	15 13 10	1 8 8	9 8	3 3	2 1 5	-	-
5	8.0	15 18 1	1 16 11	1 8 4	19 3 4	1 17 7	1 1	3 7	2 7 11	24.5	9.6
5	4.5	9 17 1	4 0 8	1 7 11	15 5 8	2 4 9	18 4	6 4	3 9 6	-	-
6	8.3	12 11 11	5 16 8	2 10 11	20 19 6	1 10 3	14 0	6 1	2 10 4	25.6	14.0
9	6.7	11 12 7	3 16 7	1 19 1	18 4 10	1 14 11	13 11	5 10	2 14 9	24.9	12.
3	8.3	14 12 10	1 19 1	1 9 7	18 1 6	1 15 2	4 8	3 6	2 3 4	-	-
8.5	7.0	8 9 8	3 1 9	1 0 2	12 11 7	1 4 1	8 9	2 10	1 15 8	-	-
7	2.0	9 6 4	1 12 11	1 15 11	12 15 2	4 13 2	16 7	17 11	6 7 7	-	-
Weighted Average:	7.0	11 1 4	3 9	1 12 7	16 2 11	1 10 6	9 7	4 6	2 4 7	-	-

Grass Silage (Manual):

Acres	Yield per acre.	PER ACRE: Growing Cost £ s d	Making Cost £ s d	Misc.& Overheads £ s d	Total Cost £ s d	PER TON: Growing Cost £ s d	Making Cost £ s d	Misc & Overheads £ s d	Total Cost £ s d	% D.M.	% Protein of D.M.
50	5.9	3 18 3	3 3 4	1 4 11	8 6 8	13 2	10 8	4 3	1 8 1	-	-
5	6.0	2 17 6	4 4 6	2 2 3	9 4 3	9 7	14 1	7 1	1 10 8	-	-
25	4.2	3 14 1	3 2 4	15 10	7 12 4	17 5	14 9	1 9	1 15 11	-	-
3	3.0	4 7 6	4 5 4	1 19 10	10 12 9	1 9 2	1 8 5	13 4	3 10 11	25.3	16.5
3	3.6	11 17 3	2 17 3	1 10 3	16 4 9	3 4 8	15 7	8 3	1 9 6	20.8	12.7
2	3.5	6 19 9	3 4 1	1 18 10	12 2 8	1 19 9	18 3	11 1	3 9 4	22.5	13.7
5	4.8	5 14 1	3 11 6	1 0 9	14 6 6	2 0 6	14 10	4 4	2 19 8	34.7	7.3
12	2.1	6 0 6	1 13 0	15 4	8 8 10	2 17 10	15 10	7 5	4 1 0	32.4	13.8
10	1.3	3 13 0	1 11 10	8 7	5 13 10	2 16 6	1 4 6	6 8	4 7 6	-	-
6	2.0	4 2 6	3 1 10	1 8 3	8 12 8	2 1 3	1 11 0	14 2	4 6 5	27.7	14.0
6	1.1	3 4 6	1 12 7	1 3 11	6 7 8	2 15 4	1 13 7	1 0 6	5 9 5	26.8	13.2
5	1.6	3 2 0	3 4 10	1 5 6	7 12 4	1 18 9	2 0 6	15 11	4 15 2	25.0	20
10	3.5	1 6 0	1 6 5	14 5	3 7 6	7 7	7 6	4 1	17 10	24.7	18
18.5	6.3	4 0 6	2 9 8	15 11	7 6 1	12 11	7 11	3 11	1 3 6	-	-
57	3.1	4 17 5	2 9 8	1 6 10	8 13 11	1 11 2	15 11	8 7	2 15 9	14.7	8.5
Weighted Average:	3.5	4 7 2	2 13 11	1 2 8	8 3 9	1 1 8	13 4	5 7	2 0 7	-	-

Grass Silage (Mechanical)

Acres	Yield per acre tons.	PER ACRE Growing Cost £ s d	Making Cost £ s d	Misc.& Overheads £ s d	Total Cost £ s d	PER TON Growing Cost £ s d	Making Cost £ s d	Misc.& Overheads £ s d	Total Cost £ s d	% D.M.	% Protein in D.M.
15	7.3	5 9 9	3 13 0	1 0 4	10 2 10	14 11	9 11	2 9	1 7 8	24.1	8.1
15	6.0	3 16 6	7 2 10	1 14 4	12 13 8	12 9	1 3 9	5 9	2 2 4	17.8	12.7
12	5.5	4 8 9	2 18 5	13 11	8 1 1	16 2	10 9	2 4	1 9 4	16.6	15.7
54	7.0	3 19 0	2 1 8	11 0	6 11 8	11 6	6 1	1 7	19 0	-	-
50	3.5	3 11 10	1 6 3	6 11	5 5 4	1 0 7	7 6	1 11	1 10 0	27.7	12.5
20	2.5	2 16 7	2 10 8	15 4	6 2 5	1 2 7	1 0 3	6 1	2 8 11	19.1	16.9
6	8.3	3 7 1	4 4 4	1 0 10	8 12 3	8 3	10 1	2 6	1 0 8	25.6	8.1
6	6.6	13 5 2	4 7 10	1 16 9	19 9 9	1 19 9	13 2	5 6	2 18 6	26.5	11.0
16	6.6	5 16 3	2 15 4	1 16 5	10 8 0	17 6	8 4	5 5	1 11 5	-	-
5	2.5	3 7 0	3 4 11	13 11	7 5 0	1 6 6	1 5 11	5 7	2 18 0	-	-
6	4.6	3 10 10	2 1 10	19 5	6 12 1	15 2	9 0	4 2	1 8 4	-	-
10.5	3.7	3 13 11	4 13 5	1 12 6	9 19 11	19 8	1 4 10	8 8	2 13 2	-	-
20	3.7	3 18 3	2 17 6	1 7 6	8 3 4	1 0 10	15 4	7 4	2 3 7	-	-
15	2.6	3 16 4	1 13 0	12 3	6 1 7	1 8 8	12 4	4 7	2 5 7	21.4	10.6
20	5.0	3 15 8	2 1 4	1 1 2	6 18 2	15 1	8 3	4 3	1 7 8	25.6	12.6
14	5.0	8 12 3	2 9 8	1 6 11	12 8 9	1 14 6	9 11	5 5	2 9 9	22.1	9.6
18	4.4	3 16 4	3 11 7	1 4 2	8 12 1	17 4	16 2	5 6	1 18 9	22.7	9.7
5.5	7.2	3 19 11	4 2 9	1 3 6	9 6 2	11 0	11 4	3 3	1 5 7	-	-
4	6.2	3 16 5	4 3 9	1 14 6	9 14 7	12 3	13 5	5 6	1 11 1	-	-
11	2.9	7 9 4	2 9 0	1 17 2	11 15 4	2 11 4	16 10	12 9	4 0 11	24.7	9.2
8	5.0	6 19 3	4 15 1	1 15 6	13 9 11	1 7 10	19 0	7 1	2 13 11	-	-
18	4.4	3 7 4	2 4 3	15 0	6 3 4	15 2	9 11	3 4	1 8 6	-	-
8.75	5.6	4 12 8	3 16 1	1 0 8	9 9 4	16 9	13 7	3 9	1 13 10	-	-
Average:	5.0	4 8 9	2 15 11	19 9	8 4 5	19 11	11 3	4 0	1 13 2		

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VALLEYFIELD
DUPLICATOR
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VALLEYFIELD

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