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SELF-FEEDING OF SILAGE IN DEVON 1958/59

Some Further Observations and Individual Feeding Results on 14 Farms

by

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Price Two Shillings and Sixpence

1, COURTENAY PARK,
NEWTON ABBOT,
DEVON.

S E L F-F E E D I N G O F S I L A G E I N D E V O N.

1958/59

by

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F O R E W O R D.

The last few years have brought about many technological changes in dairy farming in this country including the South Western counties. This technological revolution is still in full swing. Among the many innovations there have been new techniques for the production and preservation of bulky feed, including grass, from the farm acres. High prices for milk and the opportunities for increasing incomes by expanding cow numbers provided the impetus for much of the effort in this direction.

With the declining relative profitability of the industry in the recent years there has been some shift to a search for innovations which are cost reducing. These include developments in facilities and techniques for housing dairy cattle and performing dairy chores, made doubly necessary by the increase in cow numbers and rising labour costs. Thus the improved shippon and the milking machine has given way to the yard and parlour arrangement which in turn has called for new methods of bulk food storage and the feeding of this bulk food to the cows. Developments in this field range from the strip grazing of kale in the field to the cafeteria system of silage consumption at the point of storage. This latest practice has come to be known as self-feeding of silage.

Whenever another innovation of this kind comes along the farm economist is constantly asked "Does it Pay?" Such a question is not easy to answer since apart from the 'teething' costs of such new techniques, the resulting economy does not always arise from the introduction of the innovation itself, but from a whole bundle of new practices of which the innovation is one. So it is with the self-feeding of silage. The process calls for a considerable amount of re-organisation of the established practices which are concerned not only with labour economy, but with food substitution etc.

This present report is concerned only with some limited aspects of this whole field of developments. It is felt that the experience of this group of pioneers in dairy herd management may be of value to other farmers. For any particular farm the answer will depend upon the circumstances of that farm. If this small study does no more for any farmer than point the way to the answer it will have been justified.

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I. INTRODUCTION.

Self-feeding of silage is essentially a method of allowing stock to help themselves to silage from a silo instead of cutting and carting the silage to them. This means that there is no further handling of the silage after filling the silo. Up to now, self-feeding has been most popular for dairy cows, but young dairy stock and beef animals may also be successfully self-fed -- and there seems no real reason why sheep should not be allowed to help themselves to silage under the right conditions.

A previous report by this Department described the practice of self-feeding on 30 Devon farms in 1957/58. Studies of self-feeding on milk selling farms were continued during the 1958/59 winter with the object of providing further information on this method of feeding. Particular attention has been given to the likely effect of the introduction of self-feeding on farm profits and to the provision of some standards of feed and labour use on a sample of farms self-feeding silage. Accordingly, this short report includes a section on budgeting to show the probable financial effect of a changeover from hand-feeding to self-feeding silage and some individual results of feed and labour use on farms in 1958/59. In order to put self-feeding in perspective, however, it may be appropriate in the first instance to briefly outline some of the reasons for the tremendous interest in this technique.

There is little doubt that the introduction of self-feeding on many farms is largely due to labour problems. Silage making, though steadily increasing, is not popular on every farm. Many farmers point to the heavy work involved not only in the making stage but also at the feeding stage. Probably one of the main reasons why more silage is not made is the very fact of the labour entailed in feeding. It has already been pointed out that these difficulties are largely due to the weight and bulk of the material, not to mention the persistent smell at times. In hand feeding, the stockman has to handle appreciable weights. Apart from the laborious nature of this work, it is also very time consuming and this is serious in view of the trend in wage rates. Many farmers have, therefore, been forced to use more capital in the form of buildings and better layouts so that an increased volume of work can be performed by each worker. We now think in terms of one man being able to handle 40 cows instead of perhaps 20 cows which was more the order of the day ten or fifteen years ago.

Secondly, an important aim on many farms is to make more use of bulky home-grown foods. This is based on the assumption that home-grown feed is cheaper than bought concentrates. Where it is possible to provide large quantities of silage per cow the difficulties in hand feeding are increased and the handling of these large quantities of bulk feed becomes a greater problem. The trend on many farms is to ensure that the cows help themselves to grass and silage all the year round.

II. SELF-FEEDING OF SILAGE - EFFECT ON PROFITS.

When any change is made in the organisation of a farm the question always arises - Does it Pay? In other words, what effect will the change have on farm profits? Any farmer contemplating introducing self-feeding of silage needs to answer this question. This section sets out some of the main considerations that must be borne in mind in attempting to answer this question and then illustrates these points by showing the effect of the changeover from hand-feeding to self-feeding on a particular type of farm, in this case a medium sized farm with a herd of 30 milking cows.

Requirements for Self-feeding.

(1) Buildings. Firstly, there is the capital outlay on a silo and loose yard to be considered if these are not already available. For self-feeding, most farms have a permanent surface silo at the farm buildings which is covered by a conventional Dutch Barn structure or similar roof.* In addition, the other requirement for self-feeding is a loose yard, since cows must have free access to the silage when they feel like feeding. A yard and parlour system is a very popular layout and fits in well with self-feeding, but milking can take place in a shippon, bail or anything else that is being used. A parlour is not a necessity - it is the loose yard which is the essential requirement.

Where cows self-feed silage for 24 hours or for 12 hours or more during the night period, a covered bedded-down area of yard is necessary. But where limited self-feeding is practised for only a few hours during the day a covered section may not be required. The cows are then housed at night in a shippon or wherever else they were housed previously.

The capital requirements of buildings, therefore, will vary greatly with the system to be adopted and the buildings already available. The cost of introducing self-feeding may vary from, say, £200 on a farm where a silo is already available and only a little concreting and adapting has to be done to £2,000 or more on a farm where a completely new silo and covered yard has to be erected.

(2) Quantity of silage. Some farmers contemplating self-feeding may be

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* Some details of silo costs were given in an earlier report by this Department. See Report No. 107 July 1958.

rather apprehensive concerning the popular belief that a large amount of silage is needed for self-feeding. In other words, that the tonnage of silage required per cow is much greater than with hand-feeding. The extra tonnage required depends on the quantity of silage previously made and the system of self-feeding to be adopted. For example, if the practice has been to feed 70 or 80 lb. of silage per cow per day by hand, then a changeover to self-feeding may not require a much bigger quantity. Figures of average consumption of silage per cow per day with self-feeding vary from 40 to over 120 lb. and some of the main factors influencing the daily intake are the quantities of other bulky foods fed at the same time (e.g., hay and kale), the number of hours per day the cows are allowed access to the silage and the quality of the silage. In addition, other factors such as the width of feeding face, the height of the face and the ease of approach to the silo etc., affect the daily intake.

Advantages of Self-Feeding.

(1) Labour saved. The introduction of self-feeding usually reduces the number of hours of direct labour on feeding. On most farms the actual hours saved, compared with hand-feeding the silage, can be estimated and the effect on the labour costs of the dairy herd calculated. On large farms it may be possible to reduce the number of men employed on livestock, but on the smaller farm, the benefits of self-feeding may only be felt if the labour saved is used for expanding farm output.

(2) Possible savings in Concentrates. It is also popular to associate self-feeding of silage with savings in the amount of concentrates fed. There is a need to be very careful in assessing this saving, however.. For example, if self-feeding is introduced on a particular farm, and the same quantity of silage is used each day as with the old method of hand-feeding, then there is unlikely to be any savings in feed. But, if the introduction of self-feeding provides an incentive to the farmer to make more silage and the cows eat more in a given period then there may well be a saving in concentrates.

Many other advantages are often associated with self-feeding. It is often suggested that cows are more contented when housed in yards and may make better use of the silage by feeding "a little and often". Secondly, on farms where the aim is to feed the cows as much bulk food as they can deal with, self-feeding may be important if the cows are able to consume more than under any hand-feeding methods. Lastly, it may be mentioned that loose yarding enables the farmer to be more flexible in adjusting cow numbers.

THE INTRODUCTION OF SELF-FEEDING OF SILAGE ON A 150 ACRE FARM.

The following budget is shown to illustrate the effect of the change-over from hand-feeding on farm profits on an individual farm.

Basic description of farm.

(1) The farm is about 150 acres in size.

(2) The farm carries a herd of 30 cows (average milk yields)

(3) Silage was previously fed at the rate of 50 lb. per cow a day for 120 days (4 months). It was cut and carted from a conveniently placed pit silo with a tractor and trailer. The quantity was 90 tons.

(4) The farmer introduced self-feeding in 1957/58, and an extra 50 tons of silage was made.

The main items to be considered in the Budget are as follows:-

Additional Costs.

(1) Capital outlay on buildings. On this farm the existing buildings were such as to be fairly readily re-organised. It was possible to erect a new silo and also a lean-to yard, making use of some side walls already in position. After deduction of silo grants and other subsidies the capital outlay was £1,000. The capital was borrowed at 5%. The farmer planned to give the buildings a life of 20 years so that capital cost must be written off at 5% also -- making a charge of 10% or £100 in the first year.

(2) Cost of extra Silage. The farmer has applied more fertilizer to his grassland, generally stepped up the level of management and has been able to make a further 50 tons of silage without decreasing the stocking rate. It is assumed that the cost of extra fertilizers and additional harvesting costs amounted to £1 per ton for the additional silage.

Costs Saved.

(1) Labour. Previously it took two men just over one hour a day to feed the silage by hand. Now it takes one man just over ½ hour each day to tidy the feeding face and approach. The labour involved has been reduced from 2¼ hours to ½ hour a day - a saving of 1¾ man hours for 120 days.

(2) Concentrates. An extra 50 tons of silage has meant another 30 lbs per cow a day, sufficient for the production of 1 gallon of milk. During the self-feeding period bulky foods were then reckoned to provide for maintenance and 1½ gallons (previously they were only expected to provide

for maintenance plus ½ gallon). This rationing was strictly adhered to without any appreciable effect on yields. However, not all cows self-feeding were able to convert this extra silage into milk since some were dry and others drying off. For this budget it is assumed that on any given day during the self-feeding period about half the herd -- or 15 cows -- were giving 1½ gallons or over. Therefore, it may be estimated that the farmer saved 15 x 4 lb. of concentrates per day, or 15 x 1/3d for 120 days.

These items may now be summarised in a Budget.

BUDGET.

ADDITIONAL COSTS.		£	COSTS SAVED*		£
(a) Buildings. £1,000 invested in silo & yard -- 10% charge	=	100	(a) Labour. 1¾ man hours per day for 120 days @ 3/9d per hour	=	39
(b) Extra Silage. Additional cost of extra 50 tons @ £1 per ton	=	50	(b) Concentrates. Concs. for 1 gallon a day from 15 cows 15 x 1/3d x 120 days	=	113
		£150			£152

The effect of introducing self-feeding on this farm, which may well be the situation on many farms of this size and type, shows that the change has little effect on farm profits. The whole point is that any savings in labour and feed are likely to be offset by the charges to be set against new buildings and the other additional costs.

If this is the true position on many farms, why then is there such a tremendous interest in this technique? The reason is that two important considerations have not been taken into account in the budget set out above. Firstly, there is the saving in drudgery and the fact that life is made more pleasant for the cowman with self-feeding. This aspect is readily appreciated -- particularly on weekends and Bank Holidays. But it is very difficult, if not impossible, to assess this in monetary terms. There seems little doubt though that this is the major attraction on many farms, especially if the other costs and savings will cancel out.

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* There was also a small saving in tractor fuel etc., but this has not been taken into account here. Probably more important is the fact that the tractor is now free for use on other work.

Secondly, the labour saved may be profitably employed in expanding farm output. For example, the labour supply on a dairy farm may be only just able to cope with the present volume of work and labour may be the only factor limiting an expansion in the size of the herd. If the introduction of self-feeding means that some time could be saved and that more cows could then be looked after by the present labour force, then the resulting effect on farm profits may be much greater.

Other Situations.

If the farm used in this budget portrays the average situation, then it is now necessary to look at farm organisation where self-feeding may be more or less important than on this farm.

When looking at the systems of dairy farming and dairy herd management that are being developed to-day, several broad generalisations and comments may be made. Mention was made earlier of the big drive to increase the amount of food produced off the farm acres and the need to reduce the costs of milk production by cheapening feed costs. Much has been done in this direction on some of the larger dairy farms, particularly where land is relatively plentiful in relation to the size of the herd.

A Devon farm of 300 acres provides a good illustration here. The cropping pattern on this farm is usually 90 acres corn, 30 acres kale and 130 acres or more in young leys. The farm carries a Friesian herd of 45 cows and followers. Cow numbers are gradually increasing. On this farm the aim is to provide the maximum tonnage of silage and kale for winter feeding that the cows can possibly deal with. The cows strip graze kale by day and help themselves to silage during the night. The requirement is generally at least 5-6 tons of silage per cow, i.e., up to 300 tons for the milking herd alone. In addition the older stores self-feed during the day while the herd is at kale. Ground home-grown barley supplements the bulk foods. One man milks in a parlour system and high yields are not sought after -- the average gallonage per year being only 750-800 gallons per cow. Here the aim is to produce cheap milk from a fairly large herd. It is a low cost feed and labour system. With the quantity of silage used on this farm, self-feeding is very important indeed and may be said to be the king-pin in the winter management of the herd. The cowman would have difficulty in managing 45 cows if the silage was fed by hand.

On the other hand the position is very different on many of the smaller dairy farms where land is relatively scarce in relation to stock numbers. Many small farms are heavily stocked. Here, the emphasis is on intensive use of land and this often means that the quantity of home-grown feed available per cow is strictly limited. At the same time, every effort should be made to increase the size of the farm business by using purchased foods and attaining higher yields per cow. Cows are treated as individuals.

This is sound economics and often the only way to make an adequate income on many of the smaller farms.

If the quantity of feed e.g., the quantity of silage available per cow is small, it is usually hand-fed to the cows in milk to make the best use of scarce resources. In this case it is difficult to see how the technique of self-feeding can fit in -- or whether there is any need for it at all. The labour is often available for the cows to receive more individual attention -- and this pays up to a point -- and the amount of silage to handle is not usually great. Thus, it may be argued that there is only limited scope and limited need for self-feeding of silage on the smaller farm. Nevertheless, there are small farms where one man is doing all the work and an appreciable quantity of silage is available. On these farms the advantages of self-feeding are attractive. The opportunity of cutting out the heavy manual labour involved in handling silage may be considerable and a system of modified self-feeding may be evolved where the farmer retains some control of the daily intake of silage, and yet reduces the labour in feeding to the minimum. *

Summary.

Self-feeding of silage should be considered as one more useful technique or method to save labour and cut out one of the present bottlenecks in the feeding routine on many farms. With an average sized herd, fed moderate quantities of silage, the introduction of self-feeding is unlikely to have any immediate effect on farm profits, since the savings in labour, and possibly in feed, may well be offset by the cost of new buildings and other additional charges. Nevertheless, the technique is attractive and welcomed on farms because it reduces drudgery and makes life more pleasant for the stockman. It is a very useful technique on some of the larger farms where appreciable quantities of silage are fed per cow. On these farms self-feeding is very important indeed and the whole system of dairying would be difficult to arrange without it. But on other farms, particularly many of the small dairy farms, the method may have limited use.

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* For these situations a variety of systems have been suggested. Many incorporate a trough running the length of the silo, so that there is room for each animal to feed. The silage is then cut and tipped over the side of the silo into the troughs. In this way the farmer can ration the silage and yet have many of the benefits of self-feeding. Some farmers are suggesting that the addition of yokes to control feeding to an even greater extent may be well worth while.

III. WINTER FEEDING 1958/59.

Seventeen farmers, who had previously intended to self-feed silage to dairy cows during the 1958/59 winter, were visited in the spring of 1959. Of these, one had given up milk production before the winter period started and a second had his silage making programme seriously interrupted by ill health. A third farmer, attempting to introduce self-feeding for the first time, experienced a big drop in milk yields and found that his cows were very discontented with self-feeding. Possible reasons suggested for this were (a) layout of yard and silo, (b) the fact that the herd had previously been used to spending the winter outdoors, (c) the kale was cut and carted to the cows instead of being strip-grazed as before, (d) the fact that the cows were confined in yards for the whole period instead of being out of doors day and night. Consequently, the farmer abandoned attempts to self-feed after some two weeks in the face of rapidly falling milk yields.

The herds on the remaining fourteen farms continued to self-feed and the farmers concerned were generally satisfied with the results. Figures of milk output and feed and labour use are given on pages 12 and 13.

The results of feeding during the 1958/59 winter must be interpreted in the light of the weather conditions which prevailed during the period from early spring 1958. The wet season and lack of sunshine were responsible for poorer quality hay and silage on a large number of farms and livestock generally started the winter in poorer condition than in other years. Many farmers started to use supplementary feed earlier than usual in the autumn of 1958 and the level of concentrate feeding was generally higher than originally intended throughout the winter period.

Some average figures of milk output, feed and labour use for the 14 herds are set out in the following table together with the results from a sample of 58 other dairy herds in Devon for 1958/59. The figures for the two groups provides an interesting comparison.

Milk Yields per Cow.

The evidence from the previous year's survey suggested that the average milk yield per cow on self-feeding farms was somewhat lower than that on dairy farms in general in the South-West, but it was difficult to ascertain whether this was a reflection of the system of dairying or due to the sample... In 1958/59, however, the level of yield on the 14 self-feed farms was very similar to that on 58 other milk-selling farms.

Seasonality of milk production.

The self-feeding farms produce just over half of their milk during

the winter six months. This is a rather higher than average proportion of winter milk.

	14 Devon Farms Self-feeding Silage 1958/59 *	58 other Devon Farms 1958/59
Av. Size of Herd (Cows)	37·5	33·0
Av. Yield per Cow (Galls)	737	733
Per Cent Winter Milk	50·1	47·0
WINTER PERIOD (OCT-MAR).		
FOODS (Per Cow)		
Silage (cwt.)	81·0	17·9
Hay "	5·6	19·8
Kale "	53·0	37·9
Other Bulky (cwt.)	1·2	18·4
Total Concs "	9·6	11·6
Concs. per Gall (lb.)	2·87	3·79
Labour hours per cow	43·5	51·2

* Simple average of 14 herds

Feeding.

The cows on the self-feeding farms consume four times as much silage and considerably more kale, but only about one-third of the hay fed to the average dairy cow. The individual results on pages 12 and 13 show that self-fed silage and strip grazed kale is the popular feeding pattern in the 14 self-fed herds, and that little use is made of other foods such as mangolds, cabbage, swedes and fodder beet.

Cows in the self-fed herds received 9·6 cwt. of cake and corn on average during the winter period and the table indicates that this is 2 cwt. per cow less than in the 58 other herds. Consequently, with a similar yield

per cow, the level of concentrate feeding per gallon was about 25% lower in the self-feeding herds (2·87 lb. as against 3·79 lb. per gallon).

Labour.

The overall figures of labour hours per cow for the six winter months show that the labour input was 15% lower on the self-feeding group.

APPENDIX.

INDIVIDUAL RESULTS FOR 14 HERDS SELF-FEEDING SILAGE TO DAIRY COWS.

Notes on tables.

1) Milk produced is total gallonage produced between 1st April 1958 and 31st March 1959. This includes wholesale and retail sales, milk fed to livestock and that used in the farmhouse etc.

2) Average yield per cow is the total gallonage for the year divided by the average number of cows in the herd.

3) Percentage winter milk is calculated by taking the gallonage produced during the winter six months October to March inclusive as a proportion of the total gallonage for the year.

4) The average quantities of Silage and Kale consumed per cow are estimates based on the total tonnage of these foods that were considered to be used. Too much reliance should not be placed on these figures - they are only meant to be a useful guide to the feeding pattern on individual farms.

5) Total concentrates used in the winter six months includes purchased cakes and meals together with home-grown cereals fed to the dairy cows. No distinction has been made between the various grades of cakes and meals.

6) Labour hours per cow during the winter six months refers to the direct hours spent on the dairy herd itself and includes the time spent on such operations as milking, washing dairy utensils, feeding, taking cows to kale and moving electric fences, cleaning parlours, shippons, and general yard work connected with the dairy herd.

GENERAL DATA.

Farm No.	Size of Farm	Size of Herd	Breed of Cow	Total Milk Produced (April 58 - Mar 59)	Average Yield per cow (gallons)			Per cent Winter Milk	* Buildings for Cows
					Summer	Winter	Year		
	Acres	Cows		Galls				%	
1.	52½	17·0	Ayrsh.	15,149	312	579	891	65·0	Y/P
2.	56	19·0	Guern.	15,100	350	445	795	56·0	Y/S
3.	74	25·5	Fries.	23,670	429	499	928	53·8	Y/P
4.	67	26·0	Fries.	19,358	332	413	745	55·5	Y/P
5.	146¼	29·5	Guern.	20,534	388	308	696	44·3	Y/S
6.	60	30·0	Jersey	15,546	308	210	518	40·6	Y/P
7.	140	32·0	Fries/ Short.	27,291	382	471	853	55·2	Y/P
8.	90	33·0	Fries.	28,968	471	407	878	46·4	Y/P
9.	110	36·0	Ayr/ Fries.	24,205	332	340	672	50·5	Y/P
10.	300	44·5	Fries.	36,465	424	395	819	48·1	Y/P
11.	145½	46·5	Ayr/ Mixed	26,934	327	252	579	43·5	Y/P
12.	277½	46·5	Ayrsh.	29,378	325	307	632	48·5	Y/P
13.	220	55·0	Short.	41,027	386	360	746	48·2	Y/P
14.	350	85·0	Ayr/ Short.	47,747	305	257	562	45·8	Y/P
Simple Average	149	37·5	-	-	362	375	737	50·1	-

* Y/P = Yard/Parlour Y/S = Yard/Shippon

THE WINTER SIX MONTHS. OCTOBER 1958 to MARCH 1959										
Silage feeding period				Average quantity per cow (excluding Grazing)					Concs per Gall.	Labour hours per Cow
Date Self-feed Started.	Length of Feeding period	Access per day	Silage per cow per day	Silage	Hay	Kale x	Other Bulky Foods	Total Concs		
	days		lbs	cwts	cwts	cwts	cwts	cwts	lbs	hrs.
18 Nov	134	Night/ 24 Hr	85·9	103	-	69	-	13·4	2·7	56·3
27 "	125	Night/ morn	41·8	47	10·0	48	-	16·6	4·4	74·2
1 "	98	Night	95·7	82	12·9	75	-	16·1	3·8	58·0
31 Dec	60	24 Hr	125·8	67	2·1	43	1·5 (mang)	9·7	2·9	41·7
15 Nov	133	Aft + Night	108·0	128	2·5	69	-	7·0	2·5	43·2
7 Dec	121	Aft + Night	40·3	41	5·7	58	-	3·0	1·6	36·4
25 Nov	123	Night	49·7	55	8·5	45	-	15·1	3·6	52·1
18 "	129	Night	78·6	85	0·8	79	-	8·2	2·3	41·3
27 "	124	Night	88·7	98	5·0	50	-	7·8	2·6	30·4
1 Dec	121	Night	86·4	93	-	14	-	11·0	3·1	33·1
23 "	90	Morn/ 24 Hr	58·0	38	10·8	38	-	7·1	3·3	30·2
10 Nov	95	Night/ 24 Hr	110·6	94	3·0	66	12·0 (swds)	5·4	2·1	29·7
1 Nov	117	Night/ 24 Hr	110·8	147	6·6	40	-	8·7	2·8	47·5
15 "	92	Night	60·8	57	10·8	46	3·5 (mang)	5·6	2·5	35·0
-	112	-	81·5	81	5·6	53	-	9·6	2·87	43·5

x The kale was strip grazed on every farm