



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Silage - cost of production

THE NORTH OF SCOTLAND COLLEGE OF AGRICULTURE

AGRICULTURAL ECONOMICS DEPARTMENT

GIANNINI FOUNDATION OF
AGRICULTURAL ECONOMICS
LIBRARY

APR 28 1959

ECONOMIC REPORT No. 78

SILAGE PRODUCTION AND COSTS SURVEY: 1958 SEASON

by

A. B. K. TRACEY

March, 1959

Price 1/6 plus
Postage

AGRICULTURAL ECONOMICS DEPARTMENT

Provincial Agricultural Economist	Albert D. Imper, M.B.E., B.Sc. (Agr.), M.Sc. (Econ.), Ph.D., N.D.A.
Senior Agricultural Economist	Gordon G. Hayes, B.Sc. (Econ.), N.D.A.
Agricultural Economists	John Clark, B.Sc. (Agr.), N.D.A. Alexander Grant, B.Sc. (Agr.), Dip. Agr. Econ., A.C.W.A. David Godfrey, B.Sc. (Agr.) W. A. C. Jones, B.Sc. (Agr.) A. B. K. Tracey, B.Sc. (Agr.), N.D.A. Miss Margaret Haughs, B.Sc. (Agr.) Miss Audrey M. Chalmers, B.Sc. (Agr.)
Executive Officers	George Cowie Walter A. Duthie

The North of Scotland College of Agriculture,
Economics Department,
41½ Union Street,
Aberdeen.

SILAGE PRODUCTION AND COSTS SURVEY: 1958 SEASON

The Objects of the Survey

The survey was undertaken to establish the level of production possible from leys set aside for silage production under commercial farming conditions. Choice of farmers was selective with the aim of including a number who went in for intensive production from one year leys, since data of this type was particularly difficult to find. The remaining farmers mostly used leys of the three to four year type, cutting them mostly in their first or second year.

In addition to silage production an estimate of grazing yield was also made based on the numbers and types of animals kept and the duration of the grazing period.

The Design and Operation of the Survey

Of about forty farmers visited in connection with the survey 35 decided to take part. It was hoped that data from these 35 would refer to three or four year leys and one year leys in about equal proportion. However many who had decided to ensile their one year leys, had to change their plans and graze in the early part of the season instead. This was, of course, due to the very late start made to the 1958 grazing season as it applied particularly to the slower growing strains of grasses comprising the three or four year leys normally used for grazing. This in turn upset the survey to a certain extent, since many silos were later filled partly with one year ley from a second cut and partly with three or four year ley which came on later in the season and was not then required for grazing as planned. Because of this it was impossible on many farms to assess yields at all and the number of effective records was reduced from the anticipated 35 to 20. These 20 records related to the types of ley as set out in Table II on page 3.

Two visits were made to each of the co-operating farmers. One in early Spring to measure the dimensions of the silos empty and another, later in the year, when the silos had been filled. Yield was estimated from the volume of silage made, using density figures of 42 cubic feet per ton on farms where forage harvesters were used and 47 cubic feet per ton on others.

Grazing output was measured in terms of utilised starch equivalent (U.S.E.) based on the normal standards.

Table I

Individual Farm Results

Type of Ley and Code Number	DETAILS OF MANURES USED	SUMMARY OF MANURES USED				Number of Silage Cuts	Yield per Acre		
		Nitrogen Manures	Compound Manures		Other Manures		Total Manures	Silage	Grazing
			Concentrated	Other					
		- - -	- -	cwts. per acre	- - -				
<u>One Year Leys</u>									
Cut 1st Year: SP2	3 Cwts. Nitro Chalk 4 Cwts. Fisons 32	3.0	-	3.0	-	6.0	2	11.7	2.4
SP3	7 " Nitro Chalk	7.0	-	-	-	7.0	2	9.6	8.0
SP7	2 " Nitro Chalk 4 Cwts. S.A.I. C.C.F.	2.0	4.0	-	-	6.0	2	7.4	4.4
SP12	4 " Nitro Chalk 2½ Cwts. C.C.F. No. 2	4.0	2.5	-	-	6.5	2 (partly)	9.4	4.6
SP13	4 " C.C.F. No. 2	-	4.0	-	-	4.0	1	5.7	7.5
SP14	10 " S.A.I. C.C.F. No. 2	-	10.0	-	-	10.0	2 (partly)	8.2	8.6
SP17	2 " Nitro Chalk 6 Cwts. High Nitrogen	2.0	-	6.0	-	8.0	2 (partly)	5.9	5.5
<u>Three to Four Year Leys</u>									
Cut 1st Year: SP8	3 " Nitro Chalk 4 Cwts. C.C.F. No. 1	3.0	4.0	-	-	7.0	2	8.1	3.0
SP10	3 " Medium Nitrogen	-	-	3.0	-	3.0	1	10.0	13.3
SP16	3 " Low Nitrogen	-	-	3.0	-	3.0	1	8.4	6.0
SP18	3 " P.M.P.	-	-	-	3.0	3.0	1	5.0	7.0
SP19	1 " Nitro Shell 4 Cwts. Fisons 36	1.0	-	4.0	-	5.0	1	11.0	8.3
SP22	3½ " Nitro Chalk 4½ Cwts. Potato Manure	3.5	-	4.5	-	7.5	2	4.7	2.4
Cut 2nd Year: SP4	5 " Fisons 32	-	-	5.0	-	5.0	1	6.5	6.2
SP5	3 " Nitro Chalk 6 Cwts. Basic Slag	3.0	-	-	6.0	9.0	1	5.0	7.4
SP6	4 " Nitro Chalk 3 Cwts. C.C.F. No. 2	4.0	3.0	-	-	7.0	1	8.2	3.5
Cut 3rd Year: SP21	2½ " Nitro Chalk 4 Cwts. C.C.F. No. 2	2.5	4.0	-	-	6.5	1	5.2	8.4
<u>Longer Leys</u>									
Cut 3rd Year: SP20	3 " Nitro Chalk 4 Cwts. C.C.F. No. 2	3.0	4.0	-	-	7.0	2	9.1	4.6
Cut 4th Year: SP1	3 " Nitro Chalk 3 Cwts. C.C.F. High Nitrogen	3.0	3.0	-	-	6.0	2	15.8	3.6
Cut 5th Year: SP9	4 " Hadfields "A"	-	-	4.0	-	4.0	1	3.7	7.2
						Average Yields per Acre		7.9	5.9

The Results of the Survey

The individual results for the 20 farm records which could be accurately completed are shown in Table I. Analysis of these does not show any striking relationships between yield on the one hand and manuring or age and type of ley on the other. Thus no general conclusion along these lines can be drawn from the figures.

The most interesting aspect of the table is that it demonstrates the high yield of silage which can be obtained per acre in commercial farming practice. The highest yield was 15.8 tons per acre and this was produced in two cuts from a cocksfoot ley in its 5th year. Another 6 farms had yields of 9 or more tons of silage making a total of 7 farms with yields of silage of 9 or more tons per acre. No single reason accounts for the high yields on these farms, but it is interesting to note that the leys were in their first year on 5 out of the 7 farms.

The yields per acre obtained from the different types and ages of ley are detailed in Table II.

Table II

Average Yields from Different Leys

Types of Ley	Number of Farms	Average Yield of Silage
		tons per acre
One Year Leys:	7	8.3
3 - 4 year Leys:		
Cut in 1st year	6	7.8
Cut in 2nd year	3	6.6
Cut in 3rd year	1	5.2
Longer Leys:		
Cut in 3rd year	1	9.1
Cut in 4th year	1	15.8
Cut in 5th year	1	3.7
TOTAL NUMBER	<u>20</u>	
Average Yield		<u>7.9</u>

From these figures it would appear that the highest yields are to be obtained from one year leys and the first year of 3 - 4 year leys. However the numbers in each of the sub-groups in the table are rather small and conclusions should therefore be drawn with appropriate caution.

Manurial practice is also of interest. The average application amounted to 5.8 cwts. per acre and while this figure is actually slightly less than the average of 6.0 cwts. per acre for the lower yield farms, it is very different from it in composition. Whereas the average nitrogen manure applied on the

latter farms was only 1.5 cwts. per acre, the high yield farms applied 3.0 cwts. per acre. However the high yield farms used slightly less in the form of compound manures.

Details of these different manurial policies are shown in Table III.

Table III

Manurial Policies

Type of Silage Production	Average Manurial Policies			Average Yield	
	Nitrogen Manures	Compound Manures Concentrated	Others		
	- - -	- - cwts. per	acre -	- - -	tons/acre
High Yield: (9 tons or more/acre)	3.0	1.3	1.4	-	10.9
Low Yield: (less than 9 tons/acre)	1.5	2.1	1.7	0.7	6.3

The figures in the table suggest that the level of nitrogen manuring might be a major influence in the yield of silage obtained. However the number of observations is too small definitely to confirm this supposition.

In all cases there was a certain amount of grazing output in addition to the silage produced. On the high yield farms this was equal to 6.4 cwts. of utilised starch equivalent compared with 5.6 cwts. U.S.E. on the low yield farms. There does not therefore seem to be any significant difference in the amount of grazing obtained according to the yield of silage obtained.

Most of this grazing occurred in the late part of the season after the silage had been cut and, in general, no additional manure was applied. It can therefore be regarded as a modified form of the well known "late bite" policy and would be sufficient in quantity to keep three or four advanced store cattle for about three or four weeks.

The Average Costs of Production of Silage

Table IV shows how the average costs of production of silage are calculated. Cost records were obtained from 9 farms growing an average of 11.2 acres of silage each - a total of 101.5 acres for the whole sample. The average cost works out at £16 per acre and £2. 6. 5d. per ton. The average yield of silage for these 9 farms was 7.6 tons per acre.

Table IV

Average Costs of Production

Operations	MAN		TRACTOR		Total Cost
	Hours	Cost	Hours	Cost	
Pre-Harvesting	1.10	£ s. d. -. 4. 5	1.09	-. 4. 5	£ s. d. -. 8.10
Harvesting	11.90	2. 7. 7	9.90	2. -. 5	4. 8. -
TOTAL	13.00	2.12. -	10.99	2. 4.10	4.16.10
Seed Cost				1.11. 5	
Rent				1.10. 6	
Manures Applied			4.16. -		
Plus R.M.V. b/f			-. 9. -		
Less R.M.V. c/f			<u>2. 4. 5</u>		
Net Manures				<u>3. -. 7</u>	
Total Cost of Growing				6. 2. 6	
Less $\frac{1}{4}$ to Grazing				<u>1.10. 9</u>	4.11. 9
Other Costs (Equip. Deprecn. etc.)					2.16. 7
Overheads					<u>3.14.10</u>
Total Cost per Acre:					<u>£16. -. -</u>
Average Yield per Acre:					7.6 tons
Average Cost per Ton:					£2. 6. 5
Number of Farms Costed:					9
Acreage of Silage Costed:					101.5
Acreage Costed per Farm:					11.2

Variation from the average figures in Table IV was very wide. The lowest cost per acre was £10.19. 9d. and the highest £23. 7. 9d. while the corresponding range for cost per ton was from £1. 5/- to £3. 4.10d. A number of reasons are responsible for this, the most important being the yield per acre which ranged from 3.22 tons to 10.00 tons. This relationship is illustrated in Table V which has the results arranged in order of descending yield per acre.

Table V

The Influence of Yield per Acre on Costs per Ton of Silage

Cost per Acre	Yield per Acre	Cost per Ton
£ s. d.	tons	£ s. d.
17.11.10	10.0	1.15. 2
12.10. 1	10.0	1. 5. -
13. 5. 9	8.4	1.11. 5
23. 7. 9	8.2	2.17. -
15.15. 2	8.2	1.18. -
19.14. 8	6.5	3. -. 8
19. 3. 6	5.9	3. 4.10
10.19. 9	5.0	2. 1. 7
11.18. -	3.2	3. 4. 5

The average cost per ton was £2. 6. 5d. and 5 farms had results which were lower than this figure. In their case the average yield worked out at 8.3 tons per acre. Costs per ton of silage on the other 4 farms were greater than average and in their case the average yield per acre worked out at 5.9 tons. Thus yield per acre can be seen to have an important bearing on costs of production per ton of silage.

Summary and Conclusions

The survey carried out in the 1958 silage making season showed that yields of silage per acre averaging 7.9 tons were obtained on the 20 farms for which accurate records were available. In addition, grazing was obtained to the extent of 5.9 cwts. per acre of utilised starch equivalent. The highest yield was 15.8 tons of silage per acre and this result, along with 6 others, made up a total of 7 farms with yields of 9 tons or over of silage per acre. The average yield of these 7 farms was 10.9 tons of silage per acre. The remaining 13 farms had yields of silage which were less than 9 tons per acre averaging out at 6.3 tons.

The only really noticeable differences between the high yield and low yield groups were in the ages of the leys cut and in manurial policy. On 5 out of the 7 high yield farms the leys were mainly of the one year type or longer leys cut in their first year. In addition the average nitrogen manurial dressing was 3.0 cwts. per acre compared with a corresponding average figure of only 1.5 cwts. per acre for the low yield group.

The average yield per acre obtained from different types of ley did vary, with one year leys producing higher yields than three to four year leys, the respective average figures being 8.3 tons per acre for the former and 7.8 tons per acre for the latter in their first productive year. However, individual results from longer and older leys did exceed these figures, showing that there can be no absolute generalisation about the relationship between yield per acre and type or age of ley.

The average costs of production were calculated for 9 of the farms included in the survey. These worked out at £16 per acre and £2. 6. 5d. per ton, the average yield per acre being 7.6 tons. Costs per acre ranged from £10.19. 9d. to £23. 7. 9d. and per ton from £1. 5/- to £3. 4.10d. The main reason for this wide variation was the yield per acre. On the 5 farms where costs per ton were less than average, the average yield per acre was 8.3 tons whereas the corresponding figure for these farms on which costs per ton were greater than average was only 5.9 tons.

It is thought that the survey results might have been more conclusive had it been possible to type group the farmers concerned to a greater extent according to their managerial policies. Every effort was made to see that this was done but in spite of this, from the 35 farmers who agreed to co-operate, accurate and relevant data was finally obtained only from 20. Costs records were kept on only nine of these 20 farms.

Acknowledgment

The hospitality and kindness extended by the farmers and their families to the staff of this department is gratefully acknowledged.

