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FODDER CROPS

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W. I. BUCHANAN

Agricultural Enterprise Studies in England & Wales
Economic Report No. 50

1977

Price 70p

University of Reading
Department of
Agricultural Economics and Management

FODDER CROPS

The results of an economic study
in England and Wales, 1975

Compiled by
J. A. L. Dench
and
W. I. Buchanan

Agricultural Enterprise Studies in England and Wales
Economic Report No.50.

1977

ISBN 0 7049 01986 ISSN 0306-8900

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FOREWORD

AGRICULTURAL ENTERPRISE STUDIES IN ENGLAND AND WALES

University departments of Agricultural Economics in England and Wales have for many years undertaken economic studies of crop and livestock enterprises. In this work the departments receive financial and technical support from the Ministry of Agriculture, Fisheries and Food.

A recent development is that departments in different regions of the country are now conducting joint studies into those enterprises in which they have a particular interest. This community of interest is being recognised by issuing enterprise reports in a common series entitled "Agricultural Enterprise Studies in England and Wales", although the publications will continue to be prepared and published by individual departments.

Titles of recent publications in this series and the addresses from which they can be obtained are given at the end of this report.

PREFACE AND ACKNOWLEDGEMENTS

The national character of this study will be apparent from the Introduction overleaf and from the subsequent pages. This Department has, however, had a special interest in the study both as co-ordinator of the data collected by several Universities and in so far as the study represented a continuation of the Department's interest in the wider question of cereal break crops. Earlier reports on outdoor pigs (with Wye College), cash crops (with a special emphasis on oilseed rape), grass and, now, on some of the more common other fodder crops have marked successive steps in that interest.

Grateful thanks are due to all farmers who have provided the data on which the report is based and to colleagues in the Universities of Aberystwyth, Exeter, Newcastle and Reading who helped in designing the study and, subsequently, in collecting the data and forwarding it to us.

The report has been typed and reproduced at Reading by Mrs. P. Longhurst.

INTRODUCTION

This report summarises the results of a joint study by the Departments of Agricultural Economics at the Universities of Aberystwyth, Exeter, Reading and Newcastle. The prime object of the study was to obtain cost information about fodder crops which, suitably updated, could be incorporated into the various livestock enterprise studies which the Universities conduct from time to time. It is hoped, however, that the study will be of rather wider use - to farmers, advisers and students seeking information about the various fodder crops commonly grown.

The data for each crop is set out as uniformly as possible, in a form intended to allow easy reference, together with explanatory notes indicating the physical levels of inputs and outputs. To be of use for budgeting or comparison purposes the cost figures must, of course, be revised using current input prices. An attempt to do this for 1977 and to show the results in metric terms, will be found in Appendix I. Readers are strongly advised, however, to check that the financial values placed on the physical inputs are reasonable for their own circumstances, and do relate to the same time period which they may be concerned with.

When considering the yield or other physical measures of output it should be borne in mind that 1975 was a difficult year for fodder crop production especially in the South and West of England where dry conditions created establishment problems and reduced subsequent growth.

The conventions used in computing the main body of the cost tables will be found in Appendix II.

FLATPOLE CABBAGE

Records collected by University of Exeter

Number of crops		15
Crop area:	total in the survey	25 acres
	per crop	1.7 acres
Yield		29 tons per acre

VARIABLE COSTS	£ per acre
Plants, including cost of collection	23.6
Fertilisers	17.5
Sprays	3.4
Contract	5.0
Miscellaneous	-
Total variable costs	49.5

FIXED COSTS	
Labour	45.0
Tractors	12.1
Machinery	4.1
Rent	10.0
Field Maintenance	1.3
Total fixed costs	72.5

TOTAL COSTS excluding cutting and carting and general farm overheads

Per acre	£122.0
Per ton of green fodder	£ 4.2

Notes

Plants

(a) 4000 to 8000 plants per acre (average 6970) at £3 to £4 per 1000.

(b) Spacing from 3'0" by 3'2" down to 2'3" x 2'3" (average 2'6" by 2'6")

(c) Planting period from late April to early June, concentrated towards mid May (47% of crops).

Fertiliser

Average applications just over 5 cwt. of compound supplying 100N 67P 75K total units per acre. Two crops received poultry slurrey only.

Sprays

Average cost on the 8 crops sprayed; £6.3 per acre
Chemicals used:

Trifluraline soil acting/pre planting herbicide on 4 crops.
Desmetryne translocated and contact herbicide for fat hen on 3 crops
Rogor and DDT insecticide on 2 crops.

Contract

Average expenditure £8.3 per acre on 9 crops for which contract services were used.

Average expenditure on particular operations:

		£ per acre
F.Y.M. or slurrey spreading	(3 crops)	14.0
Rotovating	(2 crops)	4.5
Planting	(2 crops)	8.0
Planter hire	(2 crops)	1.0

Labour and Tractors

Hours per acre and their distribution

	Labour hrs.	Tractor hrs.
Total hours per acre	36.1	13.5
Distribution	%	%
Pre-planting cultivations	29	66
Planting	30	23
Spraying	3	3
Post-planting*	38	8
	100	100

* mainly replanting, hoeing and pulling weeds.

Production

Yields ranged from 15 tons per acre up to 66 tons:

Yield per acre	Number of crops
Up to 20 tons	4
20.1 to 30 tons	6
30.1 to 40 tons	4
Over 40 tons	1
	15

Utilization

Class of livestock	Number of crops
Dairy cows only	8
Beef cattle only	3
Beef cattle and sheep	3
Dairy cows and sheep	1
	15

Optional Costs

Labour, tractor, machinery and contract cost for the main groups of operations:

	£ per acre
Preparation for planting	26.6
Planting	16.4
Spraying	2.1
Post planting (excluding cutting & carting)	21.3
Total operational costs	66.4

Sample Distribution

(a)

Crop area	Number of crops
Under 1 acre	4
1 to 1.9 acres	5
2 to 2.9 acres	4
3 acres and over	2
	15

(b) Location - see Appendix II part 2.

FODDER RAPE

Records collected by University of Aberystwyth

	Whole sample	Non grant-aided farms	Grant-aided farms
Number of crops	59	33	26
Crop area: total in Survey	709 acres	293 acres	416 acres
per crop	12.0 acres	8.9 acres	16.0 acres
Output: livestock unit grazing days per acre	139 days	141 days	137 days
Liveweight gain by lambs, lbs per acre	277 lbs	282 lbs	271 lbs

VARIABLE COSTS		£ per acre	
Seed	8.4	6.4	11.0
Fertilisers	16.5	13.9	19.9
Sprays	0.3	-	1.0
Lime	6.3	5.7	6.9
Contract	4.2	2.0	7.0
Miscellaneous	-	-	-
Total variable costs	35.7	28.0	45.8

FIXED COSTS			
Labour	8.0	9.1	6.6
Tractor	6.4	7.2	5.3
Machinery	2.2	2.4	1.9
Farm Yard Manure	0.4	0.6	0.2
Rent	8.6	9.1	8.0
Field Maintenance	1.3	1.3	1.3
Total fixed costs	26.9	29.7	23.3

TOTAL COSTS excluding general farm overheads:

	£	£	£
Per acre	62.6	57.7	69.1
Per livestock unit grazing day	0.45	0.41	0.50
Per lb. liveweight gain by lambs	0.23	0.20	0.25

Notes

Grant Aided Farms

Crops grown as part of a hill land improvement scheme under which a 50% grant is receivable. The costs shown are before deducting the grant.

Seed

All except 9 crops were mixtures of rape with turnips and/or ryegrass. Eight of the straight rape crops were under 10 acres in area.

Sowing

Month of sowing	Number of crops
April	1
May	11
June	25
July	18
August	4
	59

Varieties

56 crops were "Giant" and 3 crops "Essex". The nine straight rape crops were all "Giant".

Manuring

(a) The ratio of plant nutrients supplied by fertiliser varied widely from crop to crop. Nearly all received substantial amounts of P (phosphate) but a number of crops (mostly on non grant-aided farms) received no K (potash)at all. The average units per acre for all 59 crops was 45N 152P and 22K. Crops on grant-aided farms received about 20% more (54.187.26) and non grant-aided farms about 20% less.

(b) F.Y.M. was applied to 9 crops in addition to fertilisers, the average cost of application being £2.67 per acre.

(c) Lime was applied to 31 crops at an average cost of £11.9 per acre

Sprays

Only 3 crops (all on grant-aided farms) were sprayed the average cost being £5.3 per acre. The spray chemicals were Paraquat, Dalapon and Asulam.

Contract

All operations for growing the crop were carried out by a contractor on 4 farms (3 grant-aided) at an average cost of £27.93 per acre. Of this the average charge for sowing operations was £1.67 per acre. Thirteen other farms used contractors, services for some of the pre sowing cultivations at an average cost of £10.36 per acre.

Miscellaneous Variable Costs

Expenditure on sundry materials etc was negligible.

Notes continued overleaf

FODDER RAPE - Notes continued

Labour and Tractors

Hours per acre and their distribution

Total hours per acre:	Labour Hrs.	Tractor Hrs.
Grant aided farms	6.3	6.3
Non grant aided farms	7.5	7.5
Whole sample	7.0	7.0
Distribution	%	%
Pre-sowing cultivations	82	82
Sowing and covering	8	8
Post-sowing operations	10	10
	100	100

Production

It must be emphasised that both the measures of output shown are approximate guides only, particularly the liveweight gain by lambs. Average livestock unit grazing days per acre appeared to be higher from the crops of smaller area :

Non grant-aided farms		Grant-aided farms	
Crop area	Average LUGD per acre	Crop area	Average LUGD per acre
5 acres & under (9 farms)	204	No crops of 5 acres or less	
All other crops (24 farms)	118	12 acres & under (13 farms)	175
		Over 12 acres (13 farms)	100

Distribution of production:

Livestock Unit Grazing days per acre	Number of crops
Less than 100	25
100 but less than 200	25
200 " " " 300	4
300 and over	5
	59

Utilization

All except 2 crops were used for Autumn grazing between September and January, the exceptional two being grazed from December to March/April.
Grazing was entirely by lambs on 49 farms, lambs plus ewes or cattle on 7 farms and by ewes only or cattle only on 3 farms:

Type of livestock	% of total LUGD from all crops
Lambs	91
Ewes	4
Cattle	5
	100

Operational Costs

Labour, tractor machinery and contract costs for three main groups of operations:

	Whole sample	Non grant-aided farms	Grant-aided farms
		£ per acre	
Pre-sowing cultivations	17.4	16.8	18.2
Sowing and covering	1.5	1.6	1.3
Post-sowing operations	1.9	2.4	1.2
Total operational costs	20.8	20.8	20.7

Sample Distribution

(a)

Crop area	Number of crops
5 acres or less	9
5.1 to 10 acres	22
10.1 to 15 acres	16
15.1 to 20 acres	6
over 20 acres	6
	59

(b) Location - see Appendix II Part 2.

KALE

Records collected by: University of Exeter, 69 crops on 43 farms
University of Reading, 10 crops

	Whole sample	Marrowstem	Maris Kestrel	Other Varieties and mixtures
Number of crops	78	30	24	24
Crop area: total in Survey	517 acres	196 acres	182 acres	139 acres
per crop	6.6 acres	6.5 acres	7.6 acres	5.8 acres
Yield of green fodder, per acre	20.0 tons	23.3 tons	21.0 tons	16.0 tons
VARIABLE COSTS		£ per acre		
Seed	4.0	3.2	4.5	4.6
Fertilisers	15.9	15.9	16.7	15.2
Sprays	1.6	2.2	2.6	1.2
Contract	1.4	1.2	1.8	1.3
Miscellaneous	0.5	0.1	0.1	-
Total variable costs	23.4	22.6	25.7	22.3
FIXED COSTS				
Labour	6.8	6.0	6.9	7.8
Tractors	4.7	4.3	4.7	5.1
Machinery	3.0	2.8	3.0	3.4
Rent	9.4	9.7	9.2	9.1
Field maintenance	1.3	1.3	1.3	1.3
Total fixed costs	25.2	24.1	25.1	26.7
TOTAL COSTS excluding cutting and carting and general farm overheads.				
Per acre	£48.6	46.7	50.8	49.0
Per ton of green fodder	£ 2.4	2.0	2.4	3.1

Notes

Seed

Typical sowing rates:

Marrowstem 4½lbs per acre @ 70p per lb.
Maris Kestrel 3¾ lbs per acre @ £1.20 per lb.
Other varieties 5 lbs per acre @ 90p per lb.
Drilled crops, 4 lbs per acre
Broadcost crops, 5 lbs per acre

There appeared to be little yield advantage in seed rates above 5 lbs. per acre.

Notes continued overleaf

KALE - Notes continued

Sowing

(a) Method of sowing

Method of sowing	Row width	Number of crops: Marrow-stem	Maris Kestrel	Other Varieties
Broodcast	-	16	5	14
Direct or precision drilled	12" to 18"	4	6	1
Ordinary seed drilled	18" to 24"	10	13	9
		30	24	24

(b) Period of sowing.

Marrowstem from late May to early June but 60% of crops were sown in mid June.
Maris Kestrel, from mid May to late July - 50% of crops in June.
Other varieties and mixtures, from early May to late July - 75% of crops from mid June to mid July.

Varieties

Other varieties and mixtures consisted of Hungary Gap or Thousand Head kale and mixtures of more than one type of kale or kale with rape, swedes or turnips.

Manuring

Usually 4 to 5 cwt per acre of a compound. Nearly half the crops also received a 1 to 2 cwt top dressing of 34% nitrogen fertiliser.

The average nutrients supplied were:

	Units per acre		
Marrowstem	98N	44P	53K
Maries Kestrel	98N	51P	53K
Other varieties and mixed crops	98N	38P	36K

Sprays

Thirtysix crops were sprayed at an average cost of £4.14 per acre of which 16 crops were Marrowstem 13 Maris Kestrel and 7 Other Varieties and mixed. The spray treatments included Paraquat for direct drilling (approximately one third of the sprays for Marrowstem and Maris Kestrel crops), pre and post emergence herbicides(mainly for control of fat hen - Chenopodium album) and insectacides (on two Marrowstem crops only).

Contract

Average expenditure £5.04 per acre on the 22 crops for which contract services were used - mainly for direct drilling.

Miscellaneous Variable Costs

Average expenditure £3.01 per acre on the 12 crops for which these expenses were incurred - mainly for bird scaring materials.

Labour & Tractors

Hours per acre and their distribution

	Labour hours	Tractor hours
Total hours per acre	5.5	5.0
Distribution	%	%
Pre-sowing cultivations	73	75
Sowing & covering	16	17
Spraying	2	2
Post-sowing operations	9	6
	100	100

Production

Yield per acre	Number of crops			
	Whole Sample	Marrowstem	Maris Kestrel	Other varieties and Mixtures
10 tons or less	6	-	3	3
10½ to 15 tons	11	2	-	9
15½ to 20 tons	22	10	7	5
20½ to 25 tons	22	9	9	4
25½ to 30 tons	11	5	3	3
Over 30 tons	6	4	2	-
	78	30	24	24

Utilisation

(a) All except two of the 78 crops were wholly fed off in the field by means of some form of strip fencing or folding. All except 5 crops were fed entirely to cattle, mainly dairy cows. The crops fed to other cattle and sheep were mostly the "other varieties and mixtures".

(b) Marrowstem crops were mostly utilised in late Autumn, only a few lasting into the New Year. Rather more Maris Kestrel crops were carried into the second half of the Winter and, of the other kales, Hungary Gap kale in particular was grown for use at the very end of the Winter.

Operational Costs

Labour, tractor, machine and contract costs for four main groups of operations.

	Whole Sample	Marrow-stem	Maris Kestrel	Other varieties and mixtures
	£ per acre			
Pre-sowing cultivations	11.2	10.1	10.3	13.4
Sowing & covering	3.1	2.8	3.7	2.7
Spraying	0.5	0.5	0.4	0.5
Post-sowing operations	1.2	0.9	2.0	1.0
	16.0	14.3	16.4	17.6

Sample Distribution

(a)

Crop area (all types)	Number of farms
Up to 5 acres	19
5.1 to 10 acres	18
10.1 to 15 acres	9
15.1 to 20 acres	4
Over 20 acres	3
	53

(b) Location - see Appendix II Part 2.

MANGOLDS

Records collected by:	University of Exeter	10 crops
	University of Reading	14 crops
	University of Newcastle	3 crops

Number of crops	27
Crop area: total in the Survey	68 acres
area per crop	2.5 acres
Yield of roots per acre	32 tons

VARIABLE COSTS	£ per acre
Seed	3.6
Fertiliser	22.7
Sprays	5.6
Contract	6.1
Miscellaneous	0.5
Total variable costs	38.5
FIXED COSTS	
Labour	92.5
Tractors	18.2
Machinery	4.2
Rent	12.6
Field Maintenance	1.3
Total fixed costs	128.8
TOTAL COSTS excluding general farm overheads	
Per acre	£167.3
Per ton of roots	£ 5.2

Notes

Seed

Seed rates varied widely from 1 to 10 lbs of seed per acre. The average for 27 crops was just over 4lbs per acre and the most frequently used rates were 2 and 3 lbs per acre (41% of crops). Three crops sown at 1 lb per acre gave below average yields but there appeared to be no advantage from seed rates over 6 lbs per acre.

Sowing

(a) Row widths ranged from 18" to 28", the most popular width being 24" followed by 18", 21" and 28".

(b) Sowing period: late April and early May

Varieties

	% of crop area in Survey
Tuckers Exhibition	21
Orange Tudor	20
Red Intermediate	16
Yellow Globe	16
Wintergold	14
Yellow Intermediate	13
	100

Fertiliser

Five crops received Farm Yard Manure, poultry manure or slurry with reduced or no fertiliser. The remainder received an average of 96.68.83 units of N.P.K. per acre as 5 cwt. of a compound. Five crops received part of the nitrogen as a top dressing of straight fertiliser.

Notes continued overleaf

Sprays

Average expenditure on the 15 crops sprayed was £9.7 per acre, the expenditure on individual crops ranged from £2 up to £20 per acre. Sprays used were soil acting herbecides to reduce the cost of hoeing and weeding.

Contract

Average expenditure, £14.5 per acre on 11 crops for which a contractor's services were used - mainly for drilling (£2 to £3 per acre) also in a few cases for manure spreading (£5 to £16 per acre). All operations for growing one crop were contracted.

Miscellaneous Variable Costs

Average expenditure £2.4 per acre on 5 crops for which miscellaneous materials were used (bird scaring materials or polythene sheet for clamps).

Labour & Tractors

Hours per acre and their distribution:

	Labour Hours	Tractor Hours
Total hours per acre	120	34
Distribution	%	%
Pre-sowing cultivations	10	30
Drilling & fertiliser application	4	12
Spraying and hoeing	28	13
Harvesting & storage	58	45
	100	100

Production

Yields of roots per acre varied widely from 9 tons to 80 tons per acre. The best 25% of crops averaged 52 tons per acre.

Utilisation

Most of the crop was clamped or stored for late winter feeding to cattle (on 17 farms) and to sheep (on 15 farms) On 2 farms the mangolds were fed to dairy cows and on another two, part or whole of the crop was sold.

Operation Costs

Labour, tractor, machinery and contract costs for four main groups of operations:

	£ per acre
Pre-sowing cultivations	19.2
Drilling and fertiliser application	3.8
Spraying and hoeing	33.3
Harvesting and storage	64.7
	121.0

Sample Distribution

(a)

Crop area	Number of crops
Under 2 acres	13
2 to 3.9 acres	10
4 acres and over	4
	27

(b) Location - see Appendix II Part 2

MAIZE FOR SILAGE

Records collected by University of Reading

	Whole Sample	No Contract Drill or Harv.	Partial Contract	Contract Drill & Harv.
Number of crops	75	19	26	30
Crop area: total in Survey	2819 acres	947 acres	908 acres	964 acres
per crop	38 acres	50 acres	25 acres	32 acres
Yield	Average, 12 tons silage per acre at 30.4% drymatter			
VARIABLE COSTS		£ per acre		
Seed	9.8	9.5	10.1	9.8
Fertilisers	16.3	16.7	16.6	15.8
Sprays	4.3	4.2	4.5	4.3
Contract	17.8	0.4	12.2	33.6
Miscellaneous	2.2	2.2	1.7	2.7
Total variable costs	50.4	33.0	45.1	66.2
FIXED COSTS				
Labour	7.9	11.4	7.8	5.6
Tractors	6.8	9.6	7.0	5.0
Machinery	5.6	8.5	5.8	3.5
Rent	12.0	12.0	12.0	12.0
Silo costs	2.3	2.2	2.3	2.3
Field maintenance	1.3	1.3	1.3	1.3
Total fixed costs	35.9	45.0	36.2	29.7
TOTAL COSTS excluding general farm overheads.				
Per acre	£86.3	78.0	81.3	95.9
Per ton of silage	£ 7.2	6.5	6.8	8.0
Per ton of drymatter	£23.7	21.4	22.3	26.3

Notes

Seed — Normally purchased in one acre packs at a cost of £8 to £10 and giving a seed rate of 40,000 to 50,000 per acre.

Sowing — By precision drill in 28" to 30" rows from mid April to mid May.

Varieties

	% of crop area in Survey
Dekalb 202	28
L.G.11	22
Caldera 535	20
Julia	8
Fronica	8
Other varieties	14
	100

Manuring — (a) Average fertiliser applications were 4 to 6 cwt per acre of compound providing 103N 58P and 56K total units per acre.
(b) Farm Yard Manure and/or slurrey was applied to 70% of the crops. Dressings were substantial in many cases with a consequent reduction in fertiliser.

Sprays — (a) Herbicide: 2 to 3 lbs of atrazine applied to nearly all crops.
(b) Pesticide: phorate granules were applied to 25% of the crops as a frit fly preventative.

Contract

There was a relatively heavy reliance on contract services for the specialised operations; drilling (on 44 farms) and for part or whole of the harvesting operation (on 42 farms). Typical charges were; drilling £3 to £5 per acre, harvesting about £30 per acre for the complete operation of cutting, carting and clamping.

Miscellaneous Variable Costs

The cost of bird scaring materials, polythene for clamp covering, and silage additives where used.

Labour and Tractor

Hours per acre and their distribution

	Labour hours	Tractor hours
Total hours per acre	6.5	6.3
Distribution	%	%
Pre-sowing cultivations	59	61
Drilling & apply fertiliser	9	10
Spraying	3	3
Harvest and storage	29	26
	100	100

Machinery

Beside general farm equipment the specialised machines used included precision drills and forage harvesting equipment where these operations were not carried out by a contractor.

Silos

Storage was mainly in open clamps plus some covered clamps and a few towers. Standard charges to cover depreciation and maintenance have been imputed as follows:

Open clamps	£2 per acre
Covered clamps	£3 per acre
Tower silos	£4 per acre

Production

Reasonably accurate yield figures were obtained for about half the crops in the survey. The range was from 4 tons of silage per acre up to 28 tons per acre for one irregated crop. The best 25% of the yields recorded averaged 19 tons per acre. Drymatter yields averaged 3.6 tons per acre.

Utilisation

(a) Most of the maize was ensiled, the silage being fed largely to dairy cows and some to other cattle.
(b) Harvesting for silage took place mostly between mid September and mid October.

Operational Costs

Labour, tractor, machinery and contract costs for four main groups of operations.

	Whole Sample	No Contract Drill or Harv	Partial Contract	Contract Drill & Harv.
	£ per acre			
Pre-sowing cults.	12.0	11.4	11.3	12.9
Drill & apply fertiliser	4.9	3.3	5.4	5.6
Spraying	0.8	0.8	0.9	0.7
Harvest & storage	20.8	13.9	17.2	28.4
	38.5	29.4	34.8	47.6

Sample Distribution

(a) crop area	Number of farms
Up to 20 acres	26
21 to 40 acres	23
41 to 60 acres	15
61 to 100 acres	6
Over 100 acres	5
	75

(b) Location - see Appendix II Part 2.

TURNIPS AND SWEDES

Records collected by: University of Aberystwyth 21 crops
University of Newcastle 62 crops

	Whole Sample	Crops under 4 acres	Crops 4 to 7.9 acres	Crops 8 acres and over
Number of crops	83	27	29	27
Crop area: total in the Survey	673 acres	65 acres	159 acres	449 acres
per crop	8.1 acres	2.4 acres	5.5 acres	16.6 acres

GROWING COSTS (up to harvest or folding)

VARIABLE COSTS	£ per acre			
Seed	0.7	0.7	0.7	0.6
Fertilisers	18.3	16.2	17.1	21.7
Sprays	3.3	2.0	3.0	4.9
Contract	2.5	2.7	3.1	1.7
Total variable costs	24.8	21.6	23.9	28.9
FIXED COSTS				
Labour	20.2	29.5	16.5	14.6
Tractors	8.4	10.8	7.7	6.9
Machinery	5.6	5.1	5.4	6.2
F.Y.M. application	4.7	5.4	3.3	5.6
Rent	8.9	8.6	9.9	8.1
Field maintenance	1.3	1.3	1.3	1.3
Total fixed costs	49.1	60.7	44.1	42.7
Total growing costs	73.9	82.3	68.0	71.6

HARVESTING COSTS

Crops lifted and stored (North of England only)

Number of crops	55	16	17	22
Crop area: total lifted	231 acres	34 acres	52 acres	146 acres
per crop	4.2 acres	2.1 acres	3.1 acres	6.6 acres
Yield of roots per acre	25.3 tons	25.5 tons	25.6 tons	24.9 tons
COSTS	£ per acre			
Labour	26.3	28.7	29.3	22.2
Tractors	11.0	9.6	11.7	11.5
Machinery	2.0	1.0	1.3	3.4
Contract	1.9	1.6	0.8	2.9
Materials	0.9	1.5	0.6	0.6
Total lifting & storing costs	42.1	42.4	43.7	40.6

Crops folded (North of England and Wales)

Number of crops	56	11	22	23
Crops area: total folded	410 acres	23 acres	88 acres	298 acres
per crop	7.3 acres	2.1 acres	4.0 acres	13.0 acres
Output: Livestock Unit Grazing days per acre	382	378	382	384
COSTS	£ per acre			
Labour	6.4	5.3	7.5	5.7
Tractors	0.5	0.6	0.5	0.5
Materials	1.7	2.3	1.8	1.4
Total folding costs	8.6	8.2	9.8	7.6

TOTAL COSTS excluding general farm overheads

Crops lifted and stored:				
Per acre	£116.0	124.7	111.7	112.2
Per ton of roots	£ 4.6	4.9	4.4	4.5
Crops folded:				
Per acre	£ 82.5	90.5	77.8	79.2
Per L.U.grazing day	£ 0.22	0.24	0.20	0.21

Notes

Seed — The average seed rate was just over ½lb per acre. Rates ranged from ¼lb to 1¾ lbs per acre.

Sowing — (a) Method; by precision drill at 14" to 30" row width, most commonly 28" although 14" row width was popular in Wales. Spacing in the rows was up to 12" but mostly 4" to 6". Six crops were broadcast, 60 crops(72%) were sown on ridges and 23 crops(28%) on the flat.

(b) Period; in North England May to mid June, in Wales April to August. Threequarters of all the crops were sown in May, mostly in the second half of the month.

Varieties

	% of crop area in the Survey
Wilhelmsburger	16
Victory	11
Brittania	8
Viking	6
Magnificent	5
Fosterton Hybrid	5
Best of all	5
Doon Major	4
Other varieties (each less than 4%)	40
	100

Manuring — (a) Average fertiliser applications were about 4 cwt per acre of a high phosphate fertiliser supplying a total of 41.82.48 units of N.P. & K. per acre.

(b) Farm yard manure was applied to 52 crops(63%) in addition to fertiliser. The average cost of application to these crops was £7.56 per acre.

Sprays — The average expenditure on 47 crops sprayed was £5.78 per acre. The most frequently used spray was trifluralin soil acting pre sowing herbicide (on 30 crops). Other soil acting herbicides included T.C.A. (on 10 crops) and nitrofin, E.P.T.C. or similar (on 12 crops). Paraquat was used for 6 crops and two crops were sprayed with miscible D.D.T. insectacide.

Contract — Average expenditure on contractors services and machine hire charges where these were incurred:

		£ per acre
Pre harvest cultivations, drilling etc	(33 crops)	6.4
F.Y.M. spreading	(8 crops)	5.4
Harvesting	(10 crops)	10.3

Notes continued overleaf

TURNIPS AND SWEDES - Notes continued

Materials

(a) Lifted and stored crops; the cost of straw and other materials for clamping, which averaged £3.17 per acre on 15 crops.

(b) Folded crops; an annual charge for fencing and stakes, which averaged £2.67 per acre on 36 crops.

Labour and Tractors

(a) Hours per acre:

	Growing (pre-harvest) operations		Harvesting Lift & store		Harvesting Folding	
	Lab	Tr.	Lab.	Tr	Lab	Tr
Whole sample (all crops)	16.1	9.3	21.3	12.4	5.5	0.7
Crops under 4 acres	23.7	12.2	24.0	12.4	4.3	0.6
Crops 4 to 7.9 acres	13.1	8.3	23.0	13.6	6.0	0.6
Crops 8 acres & over	11.7	7.3	17.9	11.6	5.6	0.8

(b) Distribution of pre-harvest hours (all crops)

	Labour(%)	Tractor(%)
Pre-sowing cultivations	27	46
Sowing and covering	20	34
Post-sowing operations	53	20
	100	100

Machinery

In addition to general farm equipment the specialised machines used were precision seeders on 47 farms and steerage hoes on 3 farms.

Production

(a) Lifted and stored crops. Yields of roots ranged from 11½ tons per acre up to 39½ tons.

Yield - tons per acre	Number of crops
Less than 20	7
20 but less than 25	14
25 but less than 30	23
30 and over	11
	55

(b) Folded crops. Production, measured in livestock unit grazing days, was very variable depending partly on the extent of supplimentary feeding.

L.U. Grazing days per acre	Number of crops
Less than 200	14
200 but less than 400	17
400 but less than 600	18
600 and over	7
	56

Utilisation

Of the 83 crops, 21 were wholly lifted and stored, 22 were wholly folded or grazed and 40 were partly folded and partly lifted and stored.

Type of livestock to which fed	Lifted crops: % of total tonnage		Folded crops: % of total LUGD
Dairy cows	25		4
Beef cows	12		3
Other cattle	32		-
Breeding ewes	25		30
Fattening sheep	5		47
Store sheep	-		5
Sold	1	Agisted	11
	100		100

Operational Costs

Labour, tractor, machinery and contract costs for three main groups of pre-harvest operation.

	Whole Sample	Crops under 4 acres	Crops 4 to 7.9 acres	Crops 8 acres and over
	£ per acre			
Pre-sowing cults.	13.1	17.1	13.5	8.7
Sowing & covering	10.5	10.5	9.2	11.9
Post-sowing operations	13.0	20.4	9.9	8.8
	36.6	48.0	32.6	29.4

Sample Distribution

(a) Crop area - see beginning of this section
(b) Location - see Appendix II Part 2.

APPENDIX I

Estimated cost structures per hectare for 1977 based on the 1975 Survey results

Crop	Cabbage	Rape	Kale	Mangolds	Maize	Turnips & Swedes
			£ per hectare			
VARIABLE COSTS						
Seed/Plants	82 (1)	30	20	15	37	4
Fertilisers	54	51	49	70	50	57
Sprays	13	1	6	22	17	13
Lime	-	23	-	-	-	-
Contract	18	15	5	21	63	9
Miscellaneous	-	-	2	2	8	-
Total variable cost	167	120	82	130	175	83
FIXED COSTS						
Labour	147	26	22	302	26	66
Tractors	42	22	16	64	24	29
Machinery	14	8	11	15	20	20
F.Y.M. Application	-	2	-	-	-	16
Silo Costs	-	-	-	-	8	-
Rent	36	29	34	45	43	31
Field Maintenance	4	4	4	4	4	4
Total fixed costs	243	91	87	430	125	166
TOTAL COSTS excluding general farm overheads	410 (2)	211	169 (2)	560	300	249 (3)

1. Cost of plants
2. Cost excluding cutting & carting
3. Cost of growing to pre-harvest stage

Factors used for up-dating the 1975 costs

Conversion to hectares: 1 hectare=2.471 acres

The following factors have been calculated from the change in price or price indices, over the most recent two-year period:

Seed; varying factors from 43% to 119% increase depending on the type of crop.
Fertiliser; 25% increase (in the fertiliser types usually used on fodder crops)
Sprays: 60% increase
Contract: 43% increase
Labour: 32% increase
Tractors & Machinery: 42% increase
Rent: 35% to 45% increase depending on locality.

HARVESTING COSTS - Turnips and Swedes

Crops lifted and stored	£ per ha.
Labour	86
Tractors	38
Implements	7
Contract	7
Materials	3
Total	141
Crops folded	
Labour	21
Tractors	2
Materials	6
	29
Total costs	
Crops lifted & stored	390
Crops folded	278

NOTE:

The estimated 1977 cost per tonne of fodder has not been shown here because the 1975 fodder crop yields were likely to be rather lower than normal due to adverse weather conditions that year.

APPENDIX II

1. Definitions of terms and conventions used in calculating the 1975 cost structures.

Measures of production

(a) Crop area is the area drilled plus headlands, recorded to 1/10 of an acre.

(b) Yields of roots, green material or silage have, for the majority of records, been calculated from sample weighings of each crop or field.

(c) Livestock Unit Grazing Days (L.U.G.D.) represent the number of days for which the crops were grazed or folded adjusted to standard units as follows. Days grazed by:

dairy cows	times	1.0
beef cows	"	0.8
other cattle	"	0.6
breeding ewes	"	0.2
other sheep	"	0.1

Variable costs

Actual use and cost has been recorded. Where machines were borrowed free an appropriate charge has been estimated and included under 'contract'.

Lime

The cost shown includes materials and spreading net of subsidy.

Labour

The hours recorded have been charged at a fixed rate of £1.25 per hour.

Tractors

The hours recorded have been charged at the following standard hourly rates.

up to 50 h.p.	£0.70
50 to 70 h.p.	£1.00
70 to 90 h.p.	£1.20
Large four-wheel drive	£1.45
Crawlers over 65 h.p.	£2.25

Machinery

General farm machinery and cultivating impliments have been charged at standard per acre rates according to the type of machine.

The charge for 'specialised' machines including precision drills, combine drills, forage and root harvesters, and forage boxes has been based on the current estimated value of each machine and the proportion of its annual use which was devoted to the costed crop.

Farm Yard Manure

Where applied, the charge made is for hauling and spreading only (labour, tractors, machinery and contract). With the exception of turnips and swedes, for which this cost is shown separately, these costs have been included under the appropriate input headings.

Rent

Actual rents have been charged for rented land. For owner occupied land a rental value, comparable with local tenanted farms, has been assumed.

Field Maintenance

A standard charge of £1.30 per acre for hedging, ditching and drainage maintenance.

General Farm Overheads

No charge has been included on the grounds that any charge would, of necessity, be on an arbitrary basis and that in any case an allowance is generallylevied on the livestock enterprise for which the fodder is grown.

2. Geographical location of crops in the study

The University Departments, which were involved in the Study collected their records from the following areas:

University of Aberystwyth:	Central and South Wales
University of Exeter:	Devonshire
University of Reading:	Central Southern England and South West Midlands.
University of Newcastle:	North of England.

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