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Peas

UNIVERSITY OF NOTTINGHAM

Department of Agriculture and Horticulture



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VINING PEAS

R. A. Macaskill

Agricultural Enterprise Studies in England and Wales, Economic Report No. 68

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VINING PEAS

A study of the 1977 crop

R. A. Macaskill

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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, receiving financial and technical support from the Ministry of Agriculture, Fisheries and Food.

The departments in different regions of the country conduct joint studies of those enterprises in which they have a particular interest. This community of interest is recognised by issuing enterprise studies reports prepared and published by individual departments in a common series entitled "Agricultural Enterprise Studies in England and Wales".

Titles of recent publications in this series and the addresses of the University departments are given at the end of the report.

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FOREWORD

This report follows that of an earlier study on the 1970⁽¹⁾ crop. The present study was also carried out in conjunction with the University of Cambridge, but on this occasion it was co-ordinated by the University of Nottingham. There was some doubt whether a field study of the 1977 crop was necessary since there had been little change in the techniques and organisation of growing and harvesting the crop since 1970 and it was suggested that the 1970 figures might be up-dated as a desk exercise. In the event this contention was supported by the results, since the average group operating cost in 1970, inflated by a retail price index, was almost the same as the average in 1977. However, it now seems certain that we are on the threshold of a far-reaching new development in harvesting the crop with the introduction of the complete harvester. It will, therefore, be valuable to have actual figures for the last year before the introduction of the new machines, so that a true comparison can be made when the groups are all eventually re-equipped.

We are, as usual, indebted to all those who so kindly co-operated with us in the study and particularly the group chairmen and secretaries who were responsible for supplying most of the data: also Mr. Ken James and Mr. Beverley Howden for their valuable assistance in setting up the sample.

The field work was undertaken by Mr. Bill Brooks at Cambridge and by Messrs. Allan Macaskill and Hugh Kerr at Nottingham. Analysis of the data was carried out by Mrs. Rosemary Holmes and the report was typed by Mrs. Gillian Meredith.

H.W.T. Kerr

(1) Hinton, W.L., "Outlook for Peas in Britain and Europe." Agricultural Enterprise Studies in England and Wales, Economic Report No. 18. Agricultural Economics Unit, Cambridge University, July 1973.

Kerr, H.W.T., "Vining Peas." University of Nottingham, Department of Agriculture and Horticulture, June 1972.

1. INTRODUCTION

1.1 Vining Pea Production

The area of vining peas grown in England and Wales over the period 1967-1977 is shown in Table 1

Table 1 Peas Grown for Processing - England and Wales

Year	Hectares
1967	39,351
1968	42,279
1969	45,078
1970	51,614
1971	41,355
1972	44,511
1973	50,453
1974	55,218
1975	55,331
1976	54,090
1977	55,645

A very wide coverage of the vining pea crop was obtained by the survey. The sample covered 13992 hectares, representing 25 per cent of the total area grown in England and Wales in 1977.

1.2 The Location of Vining Pea Production

The location of vining pea production is primarily in the eastern counties, the reasons for this being threefold:-

- a) the relatively dry climate in these areas is favourable for growing and harvesting the crop.
- b) proximity to the processing plants, originally established at eastern coastal ports for freezing fish.
- c) the large, arable farms in these areas can justify vining pea production. The crop provides a profitable break and helps them to spread their fixed costs.

The predominance of the eastern areas in vining pea production can be seen from Table 2.

Table 2 Distribution of Vining Pea Production
in England and Wales 1977:-

<u>Eastern Counties</u>	<u>Hectares</u>
Bedfordshire	408
Cambridgeshire	2151
Essex	1912
Greater London	44
Hertfordshire	216
Norfolk	9201
Suffolk	4599
<u>East Midlands</u>	
Leicestershire	219
Lincolnshire	18433
Northamptonshire	38
Nottinghamshire	885
<u>Yorkshire</u>	
Humberside	10889
North Yorkshire	1696
South Yorkshire	2102
West Yorkshire	217
<u>Other Regions</u>	2635
TOTAL	55645

Source:- M.A.F.F., June 4th Returns.

1.3 Selection and Distribution of the Sample:-

As a result of experience gained from conducting the previous survey, a different sampling approach was adopted. Rather than dealing with individual growers as before, the majority of the financial

information was obtained from the group's accounts. Whilst an inevitable delay occurred in the collection of audited data, this was justified by its greater reliability. Any additional material required, relating to the growing operation and its cost, was obtained from representative individual growers.

The objective of the survey was to try and obtain a sample of those groups producing peas for freezing and those producing peas for canning. Whilst groups operating specifically for the production of peas for freezing were easy to isolate, specialist canners were limited in number. There would appear to have been a decline in the number of canners and the majority follow a mixed policy of producing peas for canning and freezing. In addition to those groups operating on behalf of the national processors, a small number of independent, grower-processors were incorporated. These would seem to be increasing in strength and size, but the sample was not sufficiently large to enable them to be regarded as representative of their type. An indication of how the area of vining peas is distributed amongst processors is given by Table 3.

Table 3 Distribution of Vining Pea Hectarage
Between Processors

	1976	1977
<u>Freezers</u>	% of Total Area	
Nationals	41.3	42.4
Semi-Nationals	7.3	8.1
Grower-Processors	22.6	24.2
<u>Canners</u>	21.2	18.5
<u>Dehydrators</u>	7.6	6.8

Source:- Processed Vegetable Growers Association.

From the sample two distinct categories of groups emerged:-

Category 'A' Those producing peas for freezing by the large national or semi-national processors.

Category 'B' A mixed group, incorporating those producing peas for both freezing and canning and also those acting as grower-processors.

The distribution of the groups and their growers between the counties in which they operate is indicated by Table 4. The distribution of the groups between the different processors is given by Table 5.

Table 4 Distribution of Groups and Growers by County

County	Number of Groups	Number of Growers	Hectares
Norfolk	5	98	2779
Suffolk	2	44	981
Cambridge	1	6	411
South Humberside	4	35	3776
Lincolnshire	8	65	5438
Nottinghamshire	1	1	607
TOTAL	21	249	13992

Table 5 Distribution of Groups Between Processors

Processor	Number of Groups	Number of Growers	Hectares
Anglia Cannors	2	29	584
Birds Eye	9	136	5086
Findus	2	14	2367
Ross	2	21	1121
Smedley	3	30	1050
Independents	3	19	3784
TOTAL	21	249	13992

1.4 Special Features of the 1977 Crop

A cold and wet spring meant that drilling conditions were not particularly favourable and drilling dates had to be modified in certain instances. Final yields varied considerably, with the early varieties proving disappointing. The later varieties, however, more than adequately compensated for them, leading to above average yields overall.

Although not applicable to all groups, a feature of the harvesting season was the irregular maturity of the peas. In some instances this led to substantial areas being "by-passed", with the total area "by-passed" being 1,139 hectares (8.1 per cent of the drilled area). The dry conditions, which lasted almost throughout the harvesting period, helped to keep down the costs of vining.

2. The Cultural and Husbandry Aspects of Growing

Vining Peas

2.1 Rotational Constraints

In order to avoid a build up of fusarium wilt, downy mildew and pea cyst eelworm, for which there is no satisfactory chemical control, a three to four year break between crops of peas and other susceptible crops (e.g. - field beans, broad beans, vetches) is practised. This policy was adhered to by all the groups by the renting of additional land when rotation restrictions demanded.

Vining peas act as an ideal break crop because they are harvested early and leave a residual supply of nitrogen in the soil. Therefore, they provide an excellent entry for winter wheat, which is the main arable crop on the farms growing vining peas.

2.2 Soil Type

Peas were grown on a wide variety of soil types, varying from the light and sandy, to the heavy loams and boulder clays. They favour well drained soils with a good soil structure and do best on medium loams such as those found on the Wolds of Lincolnshire and Yorkshire. The soils must not be lime deficient, nor must the pH be too high as this may result in a manganese deficiency, particularly on organic soils.

2.3 Cultivations

A fine seed bed is not a prerequisite for vining peas, in fact excessive cultivations can lead to tilth destruction and the land becoming water-logged after heavy rain. The labour requirements are not, therefore, demanding and if the land is ploughed before the winter frosts a single pass with harrows will often suffice before drilling. The labour and tractor requirements for growing the crop are shown in Table 6.

Table 6 Labour and Tractor Requirements for Growing up to Harvest

Operation	Hours per Hectare Man and Tractor
Ploughing	2.56
Working down and Drilling	2.03
Post Drilling and Spraying	1.10
TOTAL	5.69
Range	3.75 - 8.14

Since the 1970 survey it is apparent that quite substantial savings in labour and tractor time have been achieved, up to 35 per cent in the case of ploughing. This is an obvious consequence of the much larger and more powerful tractors and cultivating equipment, now being employed.

2.4 Fertiliser

Fertiliser application showed considerable variation, with only 15 per cent of the drilled area receiving any fertiliser. Policy varied between the groups, with some growers generally applying no fertiliser at all, whilst others applied different compounds reflecting their individual assessment of the soil requirements. Eighty per cent of the drilled area received no nitrogen, whilst the average application of phosphate and potash to those hectares dressed, was 45 kg/ha and 60 kg/ha respectively. The application of fertilisers by type and rate is shown in Table 7.

Table 7 Fertiliser Application

Analysis of Fertiliser			Rate of Application	kg/ha			Area Treated	Proportion of Treated Area
N.	P.	K.	kg/ha	N.	P.	K.	ha's	%
0	10	10	251	0	25	25	56	2.8
0	17	17	251	0	43	43	40	2.0
0	20	20	265	0	53	53	870	43.3
0	14	28	300	0	43	86	641	32.0
5	25	25	289	14	72	72	51	2.6
7	11	14	251	18	28	36	347	12.3
17	17	17	118	20	20	20	65	0.6
22	11	11	125	28	14	14	12	3.2
34	0	0	88	30	0	0	25	1.2
				*20 - 45 - 60			2107	100.0

* average application per ha to those hectares receiving fertiliser.

2.5 Sowing

A scheduled sowing programme is implemented, in order to provide the processing factory with a continuous period of operation of six to

seven weeks during the harvesting period. Sowing is spread over a period generally extending from late February to mid May, with drilling dates determined by the "accumulated heat-unit"⁽²⁾ system. Varieties with different growth characteristics are drilled and each drilling period is intended to continually satisfy the factory's requirements over a twenty-four hour period.

The main varieties grown for the 1977 season are shown in Table 8.

Table 8 Main Varieties Grown in 1977

Type	Variety
Very Early	Avola Sparkle Sprite
Early	Scout Swan Galaxie
Late	Dark Skin Perfection Johnson's Freezer Puget
Petit Pois	Marquis Wavenex

Drill spacing was largely determined by the type of drill available, with the most common spacing being either 11.25 cms or 17.50 cms. Depth of planting was again variable, being a function of soil type and conditions at drilling, 3.75 cms was the most widely used depth. Seed rates are determined by the processor in consultation with the grower and vary according to the variety being sown; soil type and the time of

(2) M.A.F.F. Bulletin No. 81. "Peas". H.M.S.O. 1969.

sowing. In general, the early varieties were sown at a rate of approximately 300 kg/ha, with the later varieties slightly lower at around 250 kg/ha, a plant population of between 80 and 100 plants per square metre being the objective.

2.6 Crop Protection

Peas, particularly the early sowings, are susceptible to attack by soil borne fungi of Spp. Fusarium, consequently dressed seed is supplied.

Owing to its prostrate growth, the crop can be seriously affected by weeds and every effort has to be made to minimise this competition.

Table 9 shows that approximately one quarter of the area was treated prior to drilling to control wild oats and blackgrass. Sixty-four per cent of the drilled area was then treated with a pre-emergent herbicide and 28 per cent with a post-emergent spray.

Table 9 Crop Protection

Type of Spray	Area Sprayed	Proportion of Drilled Area	Purpose
<u>Herbicides</u>	ha's	%	
Pre-Drilling	3546	25.3	Wild Oats and Blackgrass
Pre-Emergence	8983	64.2	Broad-Leaved Weeds
Post-Emergence	3988	28.5	Broad-Leaved Weeds
<u>Insecticides</u>			
Organo-Phosphorous	6394	45.7	Midge/Moth/Aphis

The quantity of insecticide used by the groups varied substantially and was largely a reflection of their location. Some groups used a minimal amount of insecticide, whilst others, in an attempt to counter local infestations, used considerable quantities. Just over 45 per cent of the total crop area was treated for the control of midge, moth and aphid.

3. Method of Payment

The financial arrangements relating to vining pea production are complex with contractual commitments varying between processors.

The most common form of arrangement is for the processor to pay for the crop at the point of harvest and then pay a vining allowance to the group to cover the cost of harvesting. The price per tonne paid by the processor for the peas is on a sliding scale, based on the tenderometer reading of the peas at harvest. The price is highest at the lower end of the tenderometer scale when the yield is low and is progressively reduced up the scale, as the yield increases. The scales are designed to give the highest total return at an optimum tenderometer reading of between 95 and 105. Examples of the payment scales operated by two processors can be seen in Table 10.

Table 10 Contract Price Scales 1977

	Processor 'X'	Processor 'Y'
Tenderometer Reading	£/tonne	
Not exceeding 90	107.50	109.50
91- 95	106.50	104.25
96-100	105.50	100.75
101-105	103.50	94.75
106-110	99.50	87.75
111-115	93.50	81.25
116-120	88.50	76.50
121-125	81.50	70.75
126-130	79.50	68.50
Exceeding 130	76.50	66.25
Vining Allowance	31.13	TR up to 120 33.50 over 121 28.00

Table 10 also indicates that the vining allowance varies. It may comprise simply of a fixed payment per tonne vined or be a more complex arrangement whereby a variable allowance is paid, depending on the tenderometer reading of the peas. In some instances a vining allowance may not be paid at all, with the cost of harvesting covered by the contract price for the peas. This is a more common procedure amongst groups growing for canning, with processors requiring the peas to be harvested at an optimum tenderometer reading of 120.

Other payments and differences in contractual arrangements are given below.

(1) Seed A wide variety of arrangements existed between the processors and groups. Although one processor provided the seed free of charge, the most common arrangement was for the processor to provide the seed at a subsidised rate. The differences in price charged for the seed were then reflected in the price paid by the individual processors for the harvested peas. Those groups acting independently had to purchase their seed on the open market and, therefore, paid the full commercial price.

(2) Late Drilling Bonus This is an additional payment for sowings made at the processor's request after a given date, usually in late April or early May. This bonus again operates on the basis of a sliding scale and is a reflection of the varieties grown, as indicated by Table 11.

Table 11 Late Planting Bonus - An Example

Period	Payment £/tonne
1	7.38
2	8.86
3	10.33
4	11.81
5	13.29
6	14.76
7	16.24
8	17.72
9	19.19
10	20.67

(3) By-passed Allowance If the factory is unable to take the crop when it is ready, it will be by-passed at the discretion of the processor. The processor may require the crop to be harvested dry for seed and will pay the cost of harvesting and drying, if it is necessary. Compensation arrangements again differ between processors, they may be based on the value of the crop for freezing at the time it should have been harvested, or the price may vary according to yield.

If the by-passed area is not taken for seed it can be ploughed in or allowed to mature and then harvested either for sale to a merchant or to be used on the farm as feed.

4. Operation of the Vining Groups

4.1 Organisation

There is only a short period during which individual varieties are at a suitable stage for processing. Furthermore, it is essential to maintain a regular supply of peas of optimum quality and in sufficient quantity to meet the daily intake requirements of the processing plant. These constraints emphasise the need to have reliable and efficient harvesting equipment, which consequently has been developed to an advanced stage.

The specific nature and high capital cost of the equipment required for harvesting vining peas, has meant that the majority of the crop is harvested by farmer syndicates. These groups were largely established with the aid of capital grants, made available by the Central Council for Agricultural and Horticultural Co-operation in the late 1960's⁽³⁾.

The organisation of the groups varies, some are concerned purely with the harvesting operation, whilst others are responsible for both growing and harvesting. They are truly co-operative in that members provide men and equipment to the group and are reimbursed for providing these services. Rates paid vary according to the nature of the work being

(3) Kerr, H.W.T., Op. Cit.

done, for example, tractor drivers were generally charged at £1.80/hour - fitters £2.20/hour; foremen £2.35/hour, and the type of equipment supplied - four wheel drive tractor £115/week; medium sized tractor £75/week, in 1977.

All the specialised machinery and equipment - cutters, viners, mobile workshops etc, is the property of the group. Very occasionally a specialist manager is brought in from outside to run the group, but normally one of the members or his manager is seconded to the group for the season.

4.2 Labour and Machinery Requirements for Vining

None of the groups in the survey were operating complete harvesters in 1977, consequently the method of harvesting was the same as that encountered in 1970. The crop is first cut and swathed, using either tractor mounted cutters or self-propelled machines and it is then picked-up and vined by a mobile viner. Teams operate two, twelve hour shifts, throughout the harvesting season.

The normal complement of viners was a team comprising between three and six viners (Table 12) - i.e. the same organisational structure that had operated in 1970. The area covered by individual groups varied from 190 ha's to 2,100 ha's, with an average of 100 ha's being handled by each viner over the season.

Table 12 Typical Team for Harvesting by Mobile Viner

Harvesting Equipment	Tractors	Labour per 12 hour shift
6 Viners	6	6 Drivers
3 Cutters	2	2 Drivers
2 High Lift Carts	2	2 Drivers
1 Work Shop	1	1 Mechanic
1 Water Bowser + Compressor	1	1 Driver
1 Fuel Bowser		
1 Van	-	1 Foreman
TOTAL	12	13

4.3 Operating Costs

The average operating costs for the twenty-one groups supplying information are shown in Table 13 where the costs are given for:-

- (i) all groups
- (ii) those groups producing peas specifically for freezing - Category 'A'
- (iii) those groups operating a mixed policy and producing peas for both canning and freezing - Category 'B'

Table 13 Group Operating Costs

	All Groups	Category 'A'	Category 'B'
Hectares Vined*	13856	10675	3181
Number of Groups	21	14	7
Average ha's Vined per Group	660	763	454
<u>Operating Costs</u> (1)	- £ per hectare -		
Labour	35.39	33.74	38.69
Machinery	17.07	18.31	14.61
Repairs & Maintenance	24.48	24.93	23.56
Fuel & Oil	6.00	5.28	7.43
Haulage	7.74	-	23.21
Management	4.11	4.90	2.54
Miscellaneous	6.10	5.00	8.29
Depreciation	24.77	25.13	24.06
TOTAL COSTS	125.66	117.29	142.39
Range	78 - 215	78 - 181	95 - 215

* The area vined is the total area vined by the group, including contract work for farmers outside the group. The cost incurred in vining this additional area has been included in the total operating cost, but no allowance has been made for the income received for this contract work.

NOTES: (1) The operating costs are those taken from the group accounts, with the exception of the figures included for depreciation

Labour - this is composed largely of the payment made to group members for the hire of their workers. Any labour hired outside of the group, normally an insignificant amount, is also included in this figure.

Machinery - this is the payment made by the group to the members for the provision of their equipment. Also included in this cost is the payment for any machinery on contract, hire or lease from outside the group members.

Haulage - for comparative purposes, where haulage charges were incurred by the groups producing for freezing (two cases), these charges were deducted and the output adjusted accordingly. Haulage charges were of greater significance for those groups falling into Category 'B'.

Depreciation - this has been calculated on current values, using the diminishing balance method at 20 per cent. M.A.F.F. machinery indices were used for up-dating the original cost of the machinery - see Appendix.

4.4 Capital Investment

The investment by the groups is shown in Table 14 at replacement cost and at current value. The replacement cost is the cost of purchasing a machine in 1977 and has been derived by multiplying the original purchase price by the index relating to the year of purchase. The current value is the replacement cost written down at 20 per cent diminishing balance. Groups in Category 'B' have a higher level of investment than those in Category 'A', as indicated by the replacement cost of their inventory. This is because of the additional equipment such as cleaners, chillers etc. required by those sending their produce for canning. However, the greater difference between the replacement cost and the current value of the Category 'B' inventory suggests that their equipment is also older than that of Category 'A'. The figures in Table 14 indicate the high level of investment required for vining pea production.

Table 14 Capital Investment by Groups

	All Groups	Category 'A'	Category 'B'
Ha's Vined	13856	10675	3181
Number of Groups	21	14	7
Av ha's Vined per Group	660	763	454
<u>Total Investment</u>	- £ per hectare -		
Replacement Cost	290.83	285.94	307.25
Current Value	97.58	102.17	82.20

5. Financial Results of the 1977 Crop

5.1 Margin Over Direct Growing and Group Harvesting Costs

Table 15 indicates the margin achieved over direct growing and harvesting costs.

Table 15 Direct Growing and Harvesting Costs

	All Groups	Category 'A'	Category 'B'
Hectares Grown	13992	11034	2958
Number of Groups	21	14	7
Av ha's Grown per Group	666	788	423
	£ per hectare		
Output (1)	646.39	484.71	675.10
Vining Allowance (2)	-	147.31	-
DIRECT GROWING COSTS			
Seed (3)	95.20	95.80	94.00
Fertiliser	11.63	8.70	17.49
Spray (i) Herbicide	15.43	14.95	16.38
(ii) Pesticide	5.48	5.53	5.40
Miscellaneous	1.85	2.18	1.19
TOTAL Direct Growing Costs	129.59	127.16	134.46
Harvesting Costs	125.66	117.29	142.39
MARGIN Over Direct Growing and Harvesting Costs	391.14	387.57	398.25

- Notes (1) Output - comprises the payment made by the processor to the group for:- a) the sale of peas
b) late planting allowances
c) by-pass compensation.
In addition, income from the sale of dried peas has been included.
- (2) Vining Allowance - these were only possible to clearly identify for those groups in Category 'A' - who were paid an average vining allowance of £147.31 per hectare.
- (3) Seed - the full commercial rate has been charged in all cases and where necessary the output adjusted accordingly.

The range of yield, costs and margin is shown in Table 16. As with other arable crops, the range in the margin is mainly related to the level of output, which is in turn a reflection of the yield obtained.

Table 16 Average and Range of Yield, Costs and Margin

	- Category 'A' -		- Category 'B' -	
	Average	Range	Average	Range
Yield per ha Vined	4.82	4.12-5.65	5.06	4.24-6.85
	t/ha		t/ha	
OUTPUT	632	562-725	675	462-814
	£/ha		£/ha	
Direct Growing Costs	127	96-151	134	113-155
Harvesting Costs	117	78-180	142	95-215
MARGIN over Direct Growing and Harvesting Costs	388	153-517	398	186-539

5.2 Assessing the Net Margin of Vining Pea Production

From the data collected, it is possible to make an assessment of the farm fixed costs associated with vining pea production. An estimate of the total cost of vining pea production together with the net margin for the crop are shown in Table 17.

Table 17 Farm Fixed Costs and Net Margin

	All Groups	Category 'A'	Category 'B'
<u>Farm Fixed Costs</u>	- £ per hectare -		
Labour(1)	11.79	11.29	12.79
Tractors(2)	15.37	15.15	15.80
Tractor Overheads and Share of General Equipment(3)	15.37	15.15	15.80
Rent(4)	69.35	67.85	72.35
General Overheads(5)	23.13	23.13	23.13
Total Fixed Costs	135.01	132.57	139.87
Total Direct Growing Costs	129.59	127.16	134.46
Total Harvesting Costs	125.66	117.29	142.39
TOTAL COSTS	390.26	377.02	416.72
TOTAL OUTPUT	646.39	632.02	675.10
NET MARGIN	256.13	255.00	258.38

Notes: (1) Labour - recorded hours charged at £1.44 per hour. This charge is based on the cost of employing a tractor driver (M.A.F.F.) Wages Enquiry 1977) plus a 30 per cent overhead allowance.

(2) Tractors - the recorded hours charged at the following rates:

<u>Size of tractor</u>	<u>Rate per hour</u>
	£
Up to 50 H.p.	1.41
50-80 H.p.	1.71
Over 80 H.p.	3.43

(3) Tractor Overheads and Share of General Machinery - charged at £1 per £ of direct tractor cost.

(4) Rent - is the actual rent paid for tenanted land with a rental value raised for owner occupied land. Land rented outside the group has been charged at similar rates, a charge having been raised for ploughing and included in the labour and tractor costs.

(5) General Overheads - this is the average maintenance plus miscellaneous costs on "Arable, Roots and Vegetable Farms" over 200 hectares in the East Midlands Farm Management Survey⁽⁴⁾.

(4) Babington, R.J. and Johnson, H.W., "Farming in the East Midlands Financial Results 1977-78". University of Nottingham, Department of Agriculture and Horticulture, January 1979.

5.3 Comparison with Other Crops

Some comparison with other crops can be made using gross margins. However, because of the group operations it is difficult to arrive at a figure which is truly comparable with other crops. Nevertheless, if it is assumed that only contract haulage costs paid by the group are "variable costs" whereas all the other group costs are "fixed costs", then the gross margin for vining peas would have been £516.80 per hectare in 1977. This is shown in Table 18, where the gross margin is compared with that of winter wheat, sugar beet and potatoes.

Table 18 Gross Margin of Vining Peas Compared with Winter Wheat, Sugar Beet and Potatoes - East Midland Region 1977 Crop.

	Average	Range
	£ per hectare	
Vining Peas	517	348 - 674
Winter Wheat	332	75 - 549
Sugar Beet	468	189 - 785
Potatoes	127	(-)434 - 680

Notes: (1) for vining peas, whilst the cost of haulage has been treated as a variable cost, all the labour and machinery costs have been counted as fixed costs. Thus exact comparisons with the other crops is not possible as some casual labour and machinery contract charges have been included in their variable costs.

(2) Gross Margin Results - "Farming in the East Midlands Financial Results 1977-78". University of Nottingham, Department of Agriculture and Horticulture, January 1979.

Although 1977 was a good year for both winter wheat and sugar beet, the gross margin of vining peas was considerably better than that for either of them. Eventual yields were substantially above average despite unfavourable drilling conditions. A high level of output in conjunction with a relatively easy harvest, resulted in high gross and net margins for the crop.

6. The 1978 Crop

The high yield of 1977 in conjunction with an ample supply of cheap, fresh vegetables resulted in an over-supply of frozen peas. This was particularly true for the large national processors who found themselves with some 20,000 tonnes of excess supply, which proved extremely expensive to hold in hired, cold storage. To try and re-introduce stability into the market the national processors and to a lesser extent the grower-processors, enforced strict contract terms for the 1978 crop. There was a general cut back in pea hectareage of 15 per cent and no increases were allowed in pea prices or vining allowances.

The 1978 pea harvest indicated, once again, just how difficult it is to regulate production and prices within agriculture. The harvest proved to be one of the longest and most difficult on record, with wet conditions and delayed maturity resulting in growers incurring extremely high harvesting costs. The smaller area grown, combined with below average yields (3.6 tonnes/ha), resulted in only 85 per cent of the processor's requirements being met. Consequently the supply position altered dramatically from one of an overall surplus to one of deficit, with the trade price of peas rising by up to 20 per cent in the late summer.

7. Current Developments

7.1 Complete Harvesters

1977 could be regarded as a watershed in the history of vining pea production. Harvesting the crop had progressed from the static to the mobile viner by the late 1970's, although the basic threshing principle remained unchanged. After unsuccessful attempts at introducing a self-propelled pod-picker the next major development has come with the introduction of the self-propelled, complete pea harvester. Instead of a process of first cutting the peas and then picking-up and vining, the operation becomes all-in-one. "A reduced intake viner⁽⁵⁾" is an appropriate term for the new machine as some haulm as well as pods are removed by the picking head.

Extensive trials have been carried out and despite the expected teething troubles, there has been a favourable reaction from both growers and processors, resulting in an increasing number of machines being introduced. The new machines offer several advantages:-

- a) the separate cutting operation is eliminated, thereby removing the inconvenience and cost involved and resulting in a substantial reduction in man hour requirements.
- b) The losses resulting from pods falling to the ground and inefficient cutting, which can be as high as 10 per cent, are reduced. Very few pods are left on the plant by the new viners.
- c) Output is high. The complete harvester can handle at least 240 hectares in a normal season, achieving an average harvesting rate of 0.53 hectares per hour compared with 0.25 hectares per hour for conventional viners.
- d) They appear to be able to cope effectively with a wide range of harvesting conditions. Not only are they quick and manoeuvrable in ideal circumstances, they can also operate successfully on slopes, in wet conditions and can deal adequately with long and short hauled crops and those in which weeds are a problem.

(5) Knott, C.M., "The New Generation of Pea Harvesters". Big Farm Management, December 1977.

e) They can harvest all the commercial varieties presently grown. The most suitable varieties are those such as Puget which are multi-headed and carry most of the pods at the top of the plant, thus minimising the amount of vine picked.

The cost of these new viners is high, approaching £80,000 at 1979 prices. The advantages listed, however, mean that one complete harvester can replace two conventional viners and one cutter. Consequently the cost of a new viner would be virtually matched by the cost of the equipment it would replace. A substantial saving in labour costs, however, can be expected to follow from their introduction, theoretically up to 67 per cent.

The economic implications that may be expected to accompany the introduction of a complete harvester are indicated by Table 19.

Table 19 Comparative Running Costs of Cutting/Vining and Complete Harvesting

	Old System		New System		
		Total £	£/ha*	Total £	£/ha*
Capital Investment	2 Mobile Viners) 1 Cutter)	80,000		1 Complete Harvester	80,000
Depreciation over 5 yrs		16,000	67		16,000 67
Labour	3 Men x 24 hrs. x 42 days @ £2.56 per hr	7,741	32	1 man x 24 hrs x 42 days @ £2.56 per hr	2,580 11
Hire Charge	2 Tractors x 6½ wks @ £165 per wk	2,145	9		
	TOTAL ANNUAL COST		108		78

* assuming 240 ha's for each system.

The above table indicates a potential cost saving in the region of 28 per cent per annum.

7.2 Contract Arrangements

In an attempt to introduce a greater degree of stability into the returns that can be expected from vining peas, certain new contractual arrangements have been introduced for the 1979 crop. These are as follows:-

- a) The introduction of a Yield Compensatory Clause by Ross. Although this has been used in the past for other vegetable crops, it is the first time it is to be applied to vining peas. For the 1979 crop, two yield bands on either side of threshold limits will determine the extent of the increase or decrease in the price paid to the grower.
- b) The introduction of a pilot Cost Sharing scheme, based on the retail price, by Birds Eye. This scheme is directed at the production of medium quality peas, a portion of the market which has been dominated by the grower-processors. The growers are to stand the cost of harvesting and haulage and the processor the cost of processing and marketing. After the deduction of a freezing charge of approximately 2.2p per kg, the grower will secure 57 per cent of the retail price based on a yield of 4.57 t/ha, this percentage rises as the yield falls.

8. Conclusions

The long term stability and success of vining pea production is in the interests of both grower and processor. For the grower, the crop is one which is relatively easy to grow under a wide range of conditions. It is an ideal break crop, enabling an excellent entry for winter wheat and fitting in well with the existing arable organisation. For the processor, the crop facilitates the continual use of plant for a six to seven week period during July and August. Although competition from fresh vegetables is an important consideration, the market demand for processed peas is likely to remain strong. This is particularly so when considered within a European context and in the light of the continual growth of home freezing facilities.

Consequently it is essential that the returns should consistently compensate for capital invested and risks taken. Capital investment is high in terms of harvesting machinery and processing equipment. Risk is inherent with the uncertain production levels and harvesting costs, whilst demand fluctuates erratically.

The ultimate success of the new viners will depend very much on their reliability and the associated back-up services provided by the manufacturers. Whilst both physical and financial benefits will follow their introduction, some of the flexibility inherent in operating a team of viners will be lost and the cost of any delay correspondingly magnified.

It also remains to be seen whether the new contractual arrangements for the 1979 crop, help to introduce a greater degree of stability into the pea industry, leading to acceptable returns to both the grower and the processor on a continuing basis.

APPENDIX

M.A.F.F. Machinery Indices

Year	Index
1977	1.00
1976	1.26
1975	1.48
1974	1.90
1973	2.27
1972	2.52
1971	2.75
1970	3.02
1969	3.32
1968	3.43
1967	3.55

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Note: A list of previous numbers can be obtained from M.A.F.F. (Economics Division 1), Whitehall Place, London, S.W.1.

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