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Onions

UNIVERSITY OF NOTTINGHAM

Department of Agriculture and Horticulture



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DRY BULB ONIONS

H. W. T. Kerr
and
C. H. Tilston

Agricultural Enterprise Studies in England and Wales, Economic Report No. 70

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UNIVERSITY OF NOTTINGHAM
DEPARTMENT OF AGRICULTURE AND HORTICULTURE

DRY BULB ONIONS
A study of the 1977 crop

H. W. T. Kerr
and
C. H. Tilston

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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 study was carried out in conjunction with the University of Cambridge and was co-ordinated by the University of Nottingham. The report is divided into three main sections. The first, "The Market for Onions in the UK", has been written by Mr. C.H. Tilston and the second, "The Production Economics of the 1977 Crop", by Mr. H.W.T. Kerr. The final section "Conclusions" is the work of both authors.

The authors are, as usual, greatly indebted to all those growers who so kindly co-operated in this study and others who assisted with it particularly Mr. George le May of ADAS. Mr. Bill Brooks undertook the field work at Cambridge and Mr. Bob Goodrum at Nottingham; Mrs. Mavis Smith was responsible for the analysis of the data, and Mrs. Phyllis Yates typed the report and its several drafts.

H. W. T. Kerr

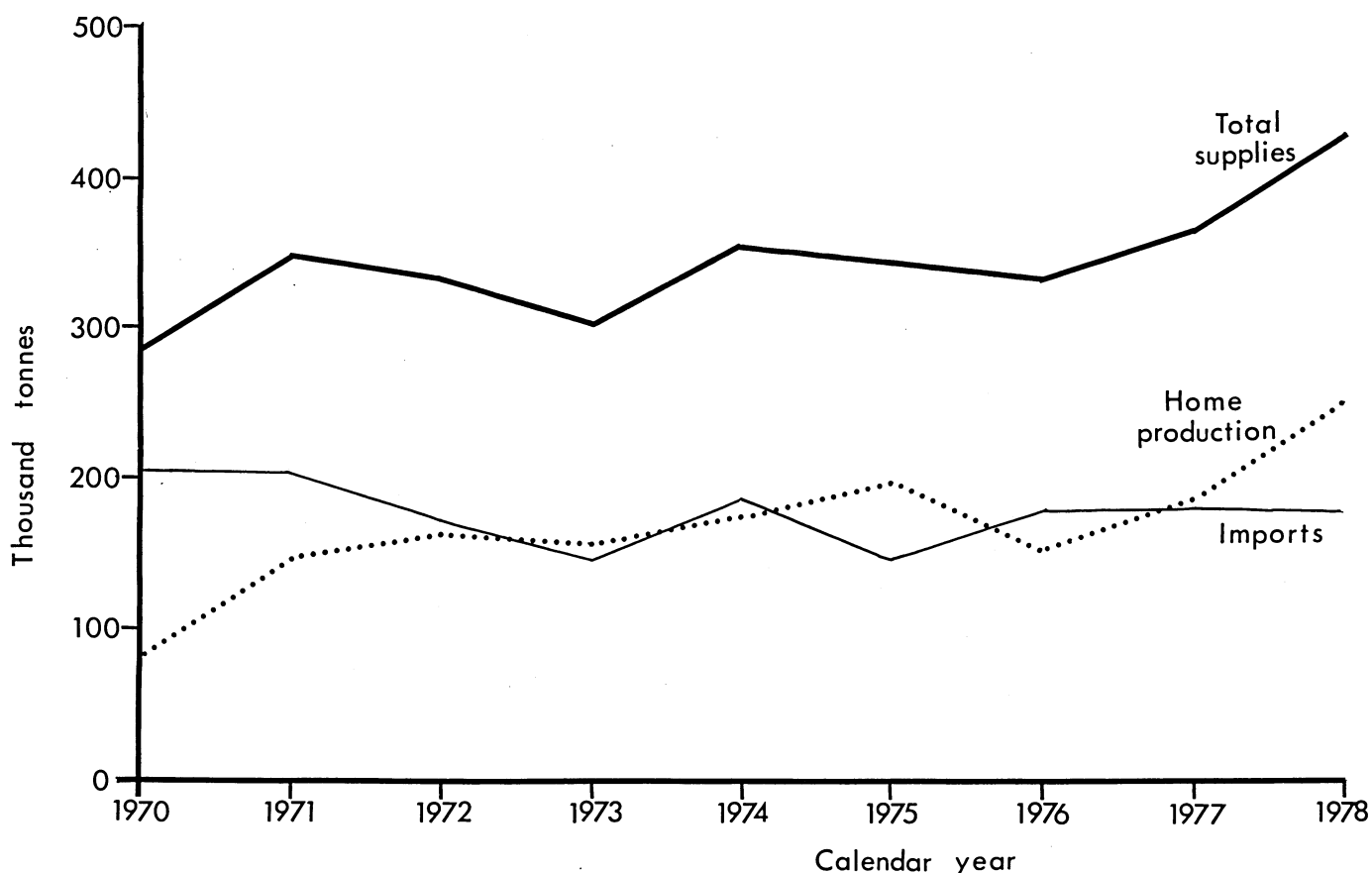
Section 1 THE MARKET FOR ONIONS IN THE UK.

1. Supply of Onions in the U.K.

1.1 Total Supplies of Dry Bulb Onions

Dry bulb onions coming on the U.K. market are supplied from both domestic production and imports. Total supplies vary annually and this reflects fluctuations in both domestic production and imports (Fig. 1).

Fig.1 TOTAL U.K. SUPPLIES OF DRY BULB ONIONS

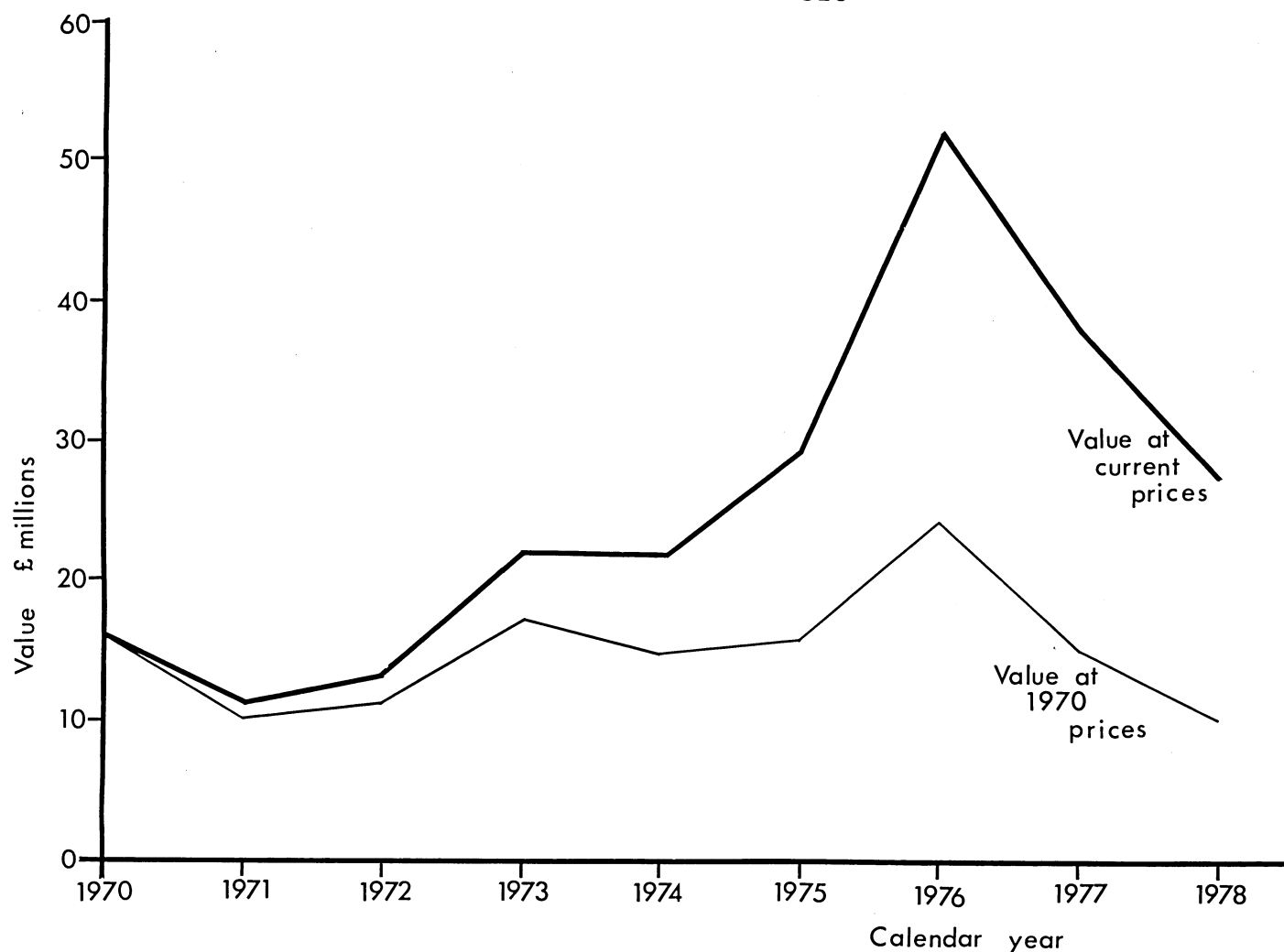


Between 1970 and 1978 average total supplies were 343,922 tonnes per annum, ranging from 285,800 tonnes in 1970 to a peak of 429,300 tonnes in 1978. The United Kingdom has become more self sufficient during the 1970's than previous decades and in 1978 produced more than half of total supplies.

The value of supplies has also shown marked variations reflecting both differences in quality and quantity of domestic production and imported supplies. The total value of supplies has increased from £16.1 million in 1970 to £27.9 million in 1978 at current prices (Fig. 2). At 1970 prices however the value of the crop in 1978 was £10.3 million.

Fig.2

VALUE OF TOTAL SUPPLY OF DRY BULB ONIONS
AT CURRENT AND 1970 PRICES



1.2 Imports

Imports come from many sources but the three major suppliers are Chile, Spain and the Netherlands. Other suppliers of importance include Israel, Canada, Malta, Poland, Egypt and the United States. Together with Chile, Spain and the Netherlands these countries supply over 90% of import requirements.

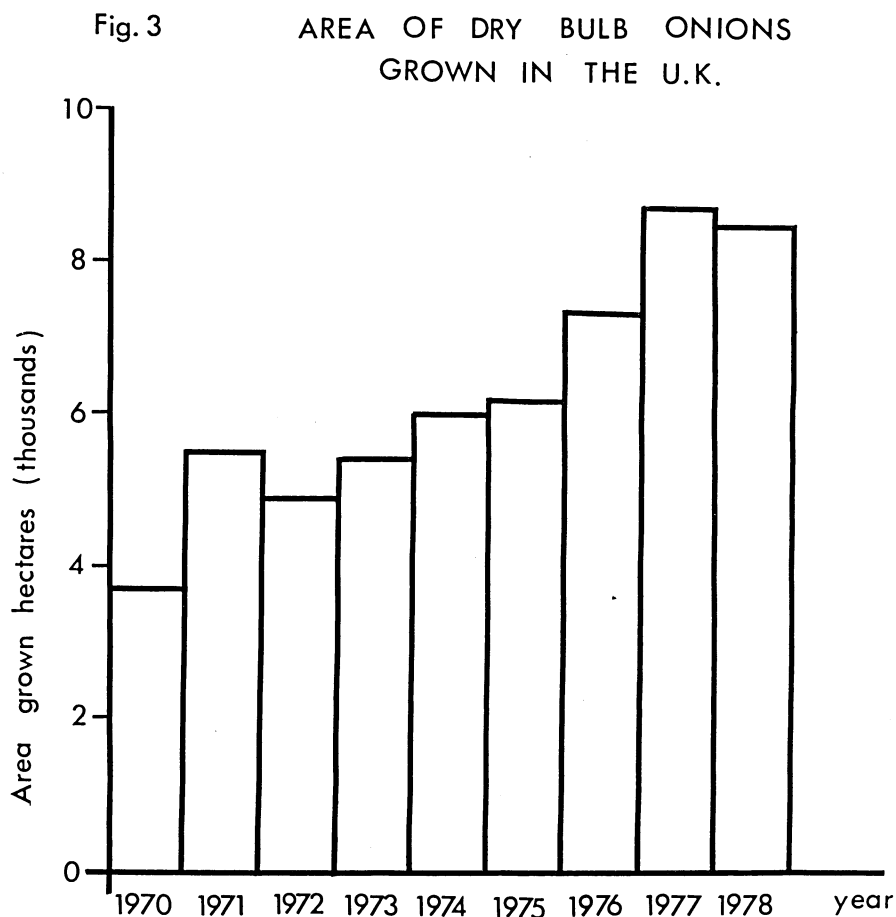
Imports from individual countries are of a seasonally sequential nature. The bulk of Spanish onions are imported between June and February, the main marketings of Netherland onions occur between August and April. Egyptian and Chilean supplies are concentrated in the late spring and early summer period. In total, however, imports complement domestic production and are lowest in September and October when the bulk of English onions are harvested.

1.3 Exports

A small but expanding export market is developing. In 1978, 2973 tonnes valued at £425,000 were exported from the U.K. to West Germany, France and the Netherlands.

1.4 Home Production

The area of dry bulb onions grown in England and Wales rose dramatically between 1961 and 1971 from 845 hectares to 5473 hectares. The area has continued to increase steadily since 1970, the last year in which a study was carried out⁽¹⁾ (Fig. 3).



Most of the crop is grown in the Eastern and East Midland regions. In the East Midlands nearly all the crop is grown in Lincolnshire, and in the Eastern Region in Cambridgeshire and Norfolk (Table 1).

(1) Kerr, H.W.T. Dry Bulb Onions, Agricultural Enterprise Studies in England and Wales, Economic Report No. 25, University of Nottingham, Dept. of Agriculture and Horticulture, Nov. 1973.

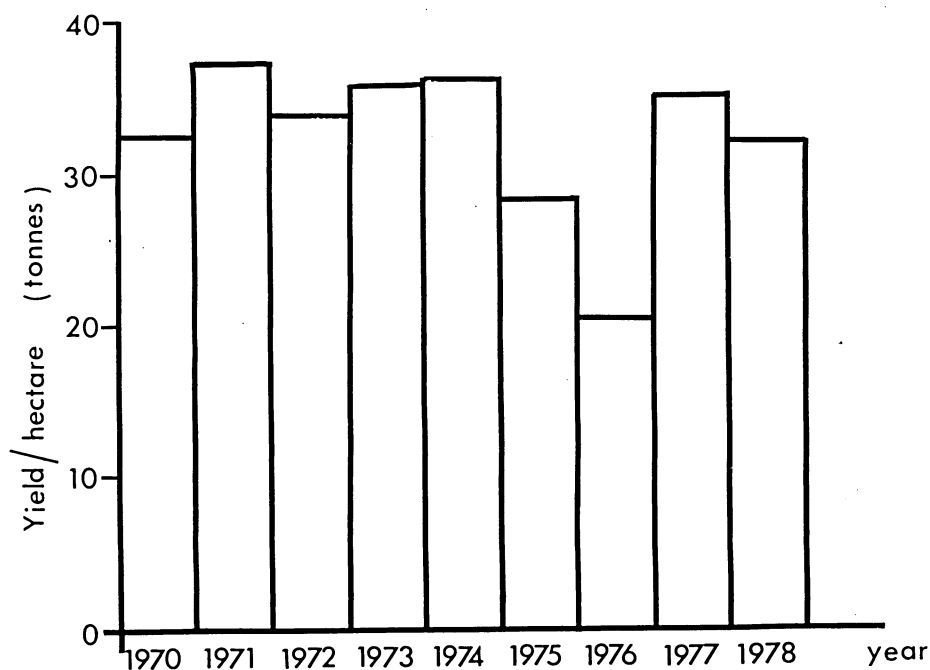
Table 1 Geographical Distribution of Dry Bulb Onions

| | hectares | | |
|--|----------|------|------|
| | 1971 | 1974 | 1977 |
| England and Wales | 5473 | 6081 | 8635 |
| East Midland Region | 2098 | 2349 | 3268 |
| Eastern Region | 2783 | 3066 | 4166 |
| Total East Midland and Eastern Regions | 4881 | 5415 | 7434 |
| East Midland Region Counties | | | |
| Lincolnshire | 2013 | 2274 | 3129 |
| Derbyshire | 2 | 2 | 37 |
| Leicestershire | 21 | 1 | 11 |
| Northamptonshire | 38 | 42 | 35 |
| Nottinghamshire | 24 | 30 | 56 |
| Eastern Region Counties | | | |
| Bedfordshire | 101 | 102 | 102 |
| Cambridgeshire | 1422 | 1574 | 2299 |
| Essex | 164 | 140 | 187 |
| Greater London | 10 | 6 | 4 |
| Hertfordshire | 8 | 5 | 5 |
| Norfolk | 899 | 999 | 1266 |
| Suffolk | 179 | 240 | 303 |

Source: MAFF June 4th Returns

Yields fluctuate annually due primarily to climatic conditions. The average yield between 1970 and 1978 was 31.98 tonnes per hectare with a trough of 20.51 tonnes per hectare in 1976 resulting from the drought conditions in that year and a peak of 37.07 tonnes per hectare in 1971 (Fig. 4).

Fig. 4 ESTIMATED YIELD OF DRY BULB ONIONS
GROWN IN THE U.K.



The proportion of gross production actually marketed is a function of conditions at harvest time. Inadequate storage and drying facilities have resulted in the past in considerable wastage following a poor harvest period and have had a detrimental effect on crop quality and the subsequent price received by farmers. In recent years research and development work has done much to enhance the quality of the crop.

The price which domestic producers receive is dependent on three major factors, the overall supply and demand situation, the quality of the crop and the marketing period. Prior to the early 1970's the major proportion of the supply of dry bulb onions was imported. The prices which domestic producers received was therefore more dependent on the quality of the crop in relation to imports than on the quantity produced. In recent years, however, the increasing degree of self sufficiency has meant that both the quality and the quantity of home produced onions are important factors in determining prices. The demand for onions is relatively price inelastic and hence fluctuations in total supplies result in volatile price movements. The volatility is dampened to some extent by the compensatory role which imports play. In years of low home production the balance of requirements can, in theory, be met by increased imports. In practice reductions in domestic production may coincide with shortages in international trade and prices escalate.

It is not possible from statistics calculated on an annual basis to analyse market conditions since the crop year does not coincide with the calendar year. The statistics calculated on a crop year (Appendix Table 3) provide a clearer insight of the factors operating in the market.

The area grown in 1971 had not been attained previously but with a good yield per hectare and substantial imports the price received was poor and as shown in the previous report⁽²⁾ a loss was made on average by the growers. In 1972 the total area was reduced, the yield per hectare was lower, the volume of imports declined and as a result the price to growers almost trebled. In 1973 the area grown increased, yield increased, imports fell and prices on average increased slightly. In 1974 the area increased, yield increased marginally, imports increased but prices held.

(2) Kerr, H.W.T. op. cit.

In 1975 although the area grown increased the yield fell due to dry conditions and this shortfall was not compensated by imports and prices escalated. In 1976 the area grown again increased but a second dry season drastically reduced yields and despite some compensatory increase in imports, prices rose further. In 1977 the year of the study the area grown again increased substantially but the yield per hectare returned to normal and the price fell to the level of 1972. As a result 1977 was not a good year for onion growers.

Within the overall supply and demand situation the prices which growers receive are dependent upon the quality of the crop. There is a clear differential in favour of imported onions although this differential narrows in periods of short supply. Since 1st February 1974 the home grown crop has been subject to EEC grading standards for onions. Onions must be graded into one of three classes. Whilst Class I and Class II onions are similar in quality to imported supplies there is usually a price differential in favour of imported onions. Moreover there are significant price differentials between Class I, II and III. The average price the producer receives therefore is related to the proportion of the crop within each grade and the price differentials between grades. Whilst conditions at harvest influence the overall quality of the crop a movement towards a higher proportion of onions in Class I is dependent upon the use of efficient curing and storage practices.

The comparison between the annual differential for imported and home produced supplies conceals to some extent the marketing opportunities available to the producer to increase his returns by orientating his selling arrangements towards the seasonal high priced periods. Prices generally follow a seasonal cycle being low in October, rising until May and gradually falling again. The producer can enter the higher priced marketing season by two methods. Firstly by growing autumn-sown crops and marketing before the main spring-sown harvest. Secondly the producer could invest in modern controlled storage facilities and extend the marketing season to April, May and June. Over the years since 1971 greater attention to quality production together with the commercial acceptance of the technique of growing autumn-sown onions for out of season production has led to a greater uptake by the market of the home grown product.

A further potential improvement in marketing arrangements is for producers to sell their crop through a marketing group. Of the 54 farmers surveyed in this study 13 belonged to a specialised marketing group. The primary aim of a production marketing organisation is to improve the long term income of their members. The successful implementation of this objective requires that the group identify buyers requirements and orientate their production and marketing methods to fulfilling these requirements for a greater return than alternative marketing channels. In order to maintain volume, consistency and quality a high degree of member discipline and an efficient market orientated management is of paramount importance. The potential benefits of greater returns resulting from collective action in identifying and satisfying buyers requirements must outweigh the increased costs if the group is to remain viable. The increasing market power of the supermarkets and multiple chain stores seeking contractual supplies outside the traditional wholesale chain must in future lead to a greater demand for direct purchases from growers. The power to negotiate with large scale buyers however is greater if the growers collectively seek to increase their bargaining strength.

2. Outlets for the Product

The onion crop has many uses. A 1970 report⁽³⁾ estimated that 70% of the supply was destined for household consumption, 13% for catering, 7% for manufacturing purposes and 10% for pickling.

2.1 Household Consumption

The official statistics of food consumption in Great Britain are published in the National Food Survey. In the case of onions the data includes fresh green onions and leeks as well as dry bulb onions. However, the supplies of fresh green onions and leeks are a small proportion of the total, and, although it is therefore impossible to accurately analyse the trends in consumption and expenditure of dry bulb onions, a rough assessment can be made.

Between 1972 and 1977 average purchases of dry bulb onions, shallots and leeks was 2.88 ounces per person per week with small variations between years (Table 2).

(3) Agricultural Development Unit. Conrad Jameson Associates Ltd., Report on the Investigation into the Market for Onions in the U.K. 1970

Table 2 Household Consumption and Expenditure
on Dry Bulb Onions, Shallots and Leeks

| YEAR | Consumption oz/person/week | Expenditure at current prices pence/person/week | Retail Price Index 1970 = 100 | Expenditure at Constant 1970 Prices pence/person/week |
|------|-------------------------------|---|-------------------------------------|---|
| | oz | p | | p |
| 1972 | 3.01 | 0.97 | 117.0 | 0.83 |
| 1973 | 2.82 | 1.31 | 128.0 | 1.02 |
| 1974 | 3.02 | 1.43 | 148.5 | 0.96 |
| 1975 | 2.92 | 1.64 | 184.5 | 0.89 |
| 1976 | 2.82 | 2.13 | 215.0 | 0.99 |
| 1977 | 2.68 | 2.27 | 249.0 | 0.91 |

Source: National Food Survey Committee. Report on Household Food Consumption and Expenditure

Expenditure rose steadily during the period from 0.97p per person per week in 1972 to 2.27p per person per week in 1977. The rise in expenditure however is a reflection of rising prices rather than a marked increase in consumption and deflating the expenditure figures by the retail price index (1970 = 100) emphasise this (Table 2).

A relatively static demand in the face of larger price changes is indicative of a price inelastic demand and this is confirmed by the National Food Survey estimate of price elasticity at (-) 0.46. Furthermore the income elasticity of expenditure was estimated at 0.18 and the income elasticity on quantity purchased at 0.14. This shows that as incomes rise consumers purchase marginally more but to some extent transfer their expenditure to the higher quality grades.

Within any one year there are seasonal patterns of consumption and expenditure. The consumption of dry bulb onions is greater during the winter months when the housewife is preparing more dishes which incorporate onions. The seasonal expenditure however is generally higher in the summer months. This is a reflection of reduced home supplies and hence a greater reliance on more expensive imported supplies.

There are also marked regional differences in consumption, demand being highest in the North, North West and Yorkshire/Humberside regions and lowest in Wales, the South West, the South East and East Anglia.

2.2 Catering Demand

The catering trade generally uses unprepared bulb onions. The main users are office and factory canteens particularly in the North of England and Scotland. Hotels and restaurants also prefer fresh unprepared onions. The catering trade, however, is making increasing use of ready-prepared onions which are first peeled and sold to the trade whole, sliced or diced. Thin skinned varieties which are easy to peel are required for this purpose. Institutions such as private schools, nursery establishments and industrial canteens which have a predictable demand are showing a preference for dehydrated onions although they are more costly to purchase and prepare. All dehydrated onions are imported into the United Kingdom since there are no dehydration plants here to handle imported or home grown onions.

2.3 Pickling Demand

Prior to 1972 most of the onions used for pickling and for inclusion in pickles and other sauces were imported. Until 1972 all silver skin or cocktail onions were imported provisionally preserved in brine. Despite considerable research and development into problems of harvesting, peeling and skinning the replacement of silver-skin imports by domestic supplies has not progressed to any appreciable extent.

Domestic production of pickles includes onions graded out of the ware crop and specially grown pickling onions. Pickles graded out of the ware crop are not considered satisfactory because they tend to be the wrong shape. The bulk of domestic production destined for pickling is confined to growers specialised pickling varieties on contract to processors.

2.4 Manufacturers Demand

Unprepared onions are also used in soup manufacture. Manufacturers prefer a round, pale, creamy white onion which must not be marked, skinned, bruised, diseased or show any green parts. Flavour is important but requirements vary from buyer to buyer. Size requirements also vary and both fresh and kibbled onions are used. Dehydrated onions and onion powder are used in the preparation of packet soups.

Onions are incorporated in a vast number of other products such as meat pies, hamburgers, steak and kidney puddings, sausages, stuffings, stocks and cubes for gravies. The demand for these products is met almost entirely by imported dehydrated onions and onion powder. Considerable quantities of fresh onions are used for inclusion in frozen foods particularly beefburgers, rissoles and cornish pasties but only small quantities are canned. Onion oil which is much more concentrated than powder is used for flavouring savoury foods. Most of the requirements are supplied from domestic production and some of the oil is exported.

Section 2 THE PRODUCTION ECONOMICS OF THE 1977 CROP

1. The Sample

The sample was obtained from a stratified random list where the number of growers in each size group was proportional to the total area grown in that size group in 1976, excluding growers with less than 0.4 hectares. This weighted the sample in favour of the growers with the larger areas. The distribution of the sample within the size groups is given in Table 3.

Table 3 The Size Structure of the Sample

| Size Group | The Sample | | | Total Area | |
|---------------|----------------|------------|------------|--------------------|------------|
| | No. of Growers | Area Grown | Proportion | Area Grown in 1976 | Proportion |
| hectares | | hectares | % | hectares | % |
| 1 0.4 to 1.9 | 9 | 13.24 | 2 | 941 | 15 |
| 2 2.0 to 3.9 | 9 | 27.44 | 4 | 771 | 12 |
| 3 4.0 to 7.9 | 11 | 81.07 | 13 | 1109 | 18 |
| 4 8.0 to 12.0 | 8 | 79.00 | 13 | 719 | 10 |
| 5 Over 12.0 | 18 | 428.28 | 68 | 2942 | 45 |
| TOTAL | 55 | 629.03 | 100 | 6482 | 100 |

These figures relate to both the spring-sown and autumn-sown crops and only one grower growing the autumn crop did not also have spring-sown onions. The two crops are treated separately in this section and their distribution in the size groups is given in Appendix Table 5. The results for the spring-sown crop are shown in three size groups - Group A, 0.4 to 3.9 hectares (groups 1 & 2 combined); Group B, 4.0 to 12.0 hectares (groups 3 & 4 combined); and Group C (group 5) - where appropriate. These approximate to groups of 1 to 10 acres, 10 to 30 acres and 30 acres and above.

The geographical distribution of the sample by county is shown in Table 4 together with the figures for the total area in 1977. This comparison indicates that the sample is quite well distributed geographically. The separate geographical distribution of the spring-sown and autumn-sown crops is shown in Appendix Table 6.

Table 4 Geographical Distribution of Sample by County

| County | The Sample | | | Total Area | |
|-----------------|----------------|------------|------------|------------|------------|
| | No. of Growers | Area Grown | Proportion | Area Grown | Proportion |
| | | hectares | % | hectares | % |
| Lincolnshire | 28 | 225.83 | 36 | 3129 | 42 |
| Nottinghamshire | 2 | 23.90 | 4 | 56 | 1 |
| Cambridgeshire | 12 | 175.51 | 28 | 2299 | 31 |
| Essex | 3 | 46.20 | 7 | 187 | 2 |
| Norfolk | 8 | 145.40 | 23 | 1266 | 17 |
| Suffolk | 2 | 12.20 | 2 | 303 | 4 |
| Others | - | - | - | 194 | 3 |
| Total | 55 | 629.04 | 100 | 7434 | 100 |

The sample is thus reasonably representative of the geographical distribution within the main onion growing area of the country and is weighted towards the growers of the bigger areas who grew nearly half the total crop.

The pattern of farming on the farms in the sample is demonstrated in Table 5. These figures show that the farms are predominantly arable with only a very small proportion of the area in grass and with half the arable area in roots and vegetable crops.

Table 5 The Pattern of Farming

| | Average Area per Farm | Proportion |
|------------------------|-----------------------|------------|
| | hectares | % |
| Wheat | 58.29 | 32.44 |
| Barley | 21.28 | 11.84 |
| Oats and Other Cereals | 1.07 | 0.59 |
| Oilseed Rape | 1.30 | 0.73 |
| Sugar Beet | 21.74 | 12.10 |
| Potatoes | 18.97 | 10.56 |
| Onions - Spring-Sown | 12.08 | 6.72 |
| Autumn-Sown | 1.02 | 0.56 |
| Other Vegetable Crops | 34.80 | 19.37 |
| Fallow | 0.84 | 0.47 |
| Total Arable | 171.39 | 95.38 |
| Temporary Grass | 0.76 | 0.42 |
| Permanent Grass | 7.55 | 4.20 |
| Total Grass | 8.31 | 4.62 |
| TOTAL CROPS AND GRASS | 179.70 | 100.00 |

2. Husbandry

2.1 Soil Type and Rotation

The range of soil types on which onions can be grown is limited. Nearly threequarters of the area in the sample lay on mineral and organic fen soils. Of the rest, a little over ten per cent of the total was grown on sandy soils and ten per cent on light and medium loam. Only $4\frac{1}{2}$ per cent of the sample was grown on what was described as heavy loam or clay soil.

Few of the growers admitted to having a definite rotation. Onions commonly followed cereals, particularly winter wheat, but they were in turn followed by a variety of crops. Most growers favoured a break of at least six or seven years between crops of onions.

2.2 Seed

The varieties of seed grown are shown in Table 6. The two Rijnsburgers, Robusta and Wijbo were the most popular varieties accounting for 35% of the spring-sown areas between them. The hybrid Hygro and the Rijnsburgers Balstora and Fénman were the only other varieties sown on any significant area. Nevertheless, a large number of other varieties were grown covering a third of the total area. Only 17.83 hectares, about three and a half per cent of the total area, were sown to a specific pickling variety by three growers who also grew ware varieties. Others sold for pickling were graded out of the ware crop. Produriijn, the most popular variety in 1971, had clearly been superseded by 1977. Of the autumn-sown varieties, Senshyu was sown on nearly two-thirds of the area with Express Yellow the only other variety of any note.

The spring crop was sown in single rows, in double rows or in beds, but there was considerable variation of method within these three broad categories. Of the 52 growers reporting, 19 growing 159 hectares sowed in single rows, 6 covering 65 hectares in double rows and 27 growing 337 hectares in beds. Four of the growers sowing in singles used scattered rows. In general those growing the larger areas favoured beds but two growing over 30 hectares used single scattered rows.

Of the autumn crops, four (16 hectares) were grown in single rows, one (1.60 hectares) in double rows and three (33 hectares) in beds with one grower not reporting.

Table 6

Varieties Grown

(a) Spring-Sown

| Variety | Number of Growers | Area Grown | Proportion of Total Area |
|-----------------------------|-------------------|-----------------------|--------------------------|
| | | hectares | % |
| Rijnsburger Robusta | 26 | 132.97 | 26.51 |
| Rijnsburger Wijbo | 22 | 92.04 | 18.35 |
| Hygro | 11 | 40.37 | 8.05 |
| Rijnsburger Balstora | 10 | 34.13 | 6.80 |
| Rijnsburger Fenman | 6 | 34.40 | 6.86 |
| Hydeal | 6 | 10.26 | 2.05 |
| Rijnsburger Goldball | 5 | 12.98 | 2.59 |
| Rijnsburger Rivato | 5 | 12.72 | 2.54 |
| Rijnsburger Jumbo | 3 | 19.45 | 3.88 |
| Rijnsburger | 3 | 6.40 | 1.28 |
| Earliest of All | 2 | 14.15 | 2.82 |
| Old Brown (picklers) | 2 | 5.68 | 1.13 |
| Early Dirkslander | 2 | 5.63 | 1.12 |
| Compass | 2 | 2.92 | 0.58 |
| Rijnsburger Rijnsburger S65 | 2 | 4.87 | 0.97 |
| Newbrown (picklers) | 1 | 12.15 | 2.42 |
| Garnett | 1 | 8.20 | 1.63 |
| Rijnsburger Heldis | 1 | 2.04 | 0.41 |
| Danver Yellow Globe | 1 | 1.40 | 0.28 |
| Rijnsburger Produrijn | 1 | 1.30 | 0.26 |
| Rijnsburger Rheingold | 1 | 1.10 | 0.22 |
| Waldo Rijnsburger | 1 | 13.43 | 2.68 |
| Early Jubulati | 1 | 7.29 | 1.45 |
| Mabol | 1 | 5.66 | 1.12 |
| Hundrop 65 | 1 | 6.07 | 1.20 |
| Hyduro | 1 | 4.00 | 0.80 |
| American | 1 | 2.82 | 0.56 |
| Boston Prize | 1 | 2.02 | 0.40 |
| Laco | 1 | 2.02 | 0.40 |
| Elsoms Maincrop | 1 | 2.03 | 0.40 |
| Elsoms Eterna | 1 | 1.21 | 0.24 |
| TOTAL | | 501.71 ⁽¹⁾ | 100.00 |

(1) Details not available for 4 growers 75.40 hectares

(b) Autumn-Sown

| Variety | Number of Growers | Area Grown | Proportion of Area |
|---------------------|-------------------|------------|--------------------|
| | | hectares | % |
| Senshyu | 6 | 32.26 | 62.14 |
| Presto | 4 | 4.84 | 9.32 |
| Express Yellow | 3 | 10.50 | 20.22 |
| Imai Early Yellow | 2 | 2.01 | 3.87 |
| Keepwell | 2 | 1.90 | 3.66 |
| Extra Early Kaizuka | 1 | 0.41 | 0.79 |
| Total | | 51.92 | 100.00 |

The average seed rate for the main ware varieties was 4.1 Kg per hectare. Pelleted seed was used on 27 hectares sown at an average rate of 15.7 Kg per hectare.

2.3 Fertiliser Application

A dressing of compound fertiliser was applied to the whole area of the spring and autumn sown crops. In addition straight nitrogen was applied to four spring crops at an average of 110 Kg per hectare dressed and to 8 of the 9 autumn crops at an average of 162 Kg per hectare dressed. The average rates of application of nitrogen phosphate and potash to both crops are shown in Table 7.

Table 7 Fertiliser Application
Spring-Sown and Autumn-Sown Crop

| | Spring-Sown | | Autumn-Sown | |
|---|--------------|-------|--------------|-------|
| | Kg/Ha (1) | Ratio | Kg/Ha (2) | Ratio |
| N | 114 | 1.00 | 219 | 1.88 |
| P | 132 | 1.16 | 116 | 1.00 |
| K | 185 | 1.62 | 159 | 1.37 |

No details on 2 spring sown crops covering 40.9 ha.

- (1) Including average of 16 Kg/Ha applied as top dressing by 4 growers @ 110 Kg/Ha dressed.
- (2) Including average of 137 Kg/Ha applied as top dressing by 8 growers @ 162 Kg/Ha dressed.

2.4 Crop Protection

The area sprayed with herbicides, insecticides and fungicides is shown in Table 8. On average the whole area of the spring-sown crop was covered just over three times and the autumn-sown a little over two and a half times with herbicide.

Table 8

Spray Application

| | Spring-Sown | | Autumn-Sown | |
|---------------------|-----------------|--------------------------|--------------|--------------------------|
| | Area Treated | Proportion of Area Grown | Area Treated | Proportion of Area Grown |
| | hectares (1) | % | hectares | % |
| Herbicides | 2395.5 | 415 | 204.7 | 394 |
| Insecticides | 338.8 | 59 | 9.3 | 18 |
| Fungicides | 267.6 | 46 | 6.8 | 13 |
| Manganese | 68.0 | 12 | - | - |
| Sprout Suppressants | 278.1 | 48 | - | - |

(1) Treated with one proprietary spray

Nearly all the insecticide used was aldicarb for the control of stem eelworm. Nearly half (46%) of the area of the spring-sown crop and just under one fifth (18%) of the autumn-sown crop was treated. The remaining spring-sown area treated (13%) was sprayed mainly with aphicides.

Over a third (37%) of the area of spring and autumn sown crops were treated with fungicide. This was almost equally divided between zineb, benomyl and carbendazim with a very small area treated with thiocarbamate. The seed was generally purchased routinely dressed with a fungicide seed dressing containing benomyl and thiram. Three growers, one on sandy soil and two on black fen covering 68 hectares applied manganese. Sprout suppressant (maleic hydrazide) was applied to 278 hectares.

A detailed analysis of the types of herbicides used on the spring-sown crop is shown in Table 9(a). Paraquat was used as a pre-emergence contact on 65% of the area. Over three quarters of the area was treated with the pre-emergence contact and residual, methazole, and the pre-emergence residuals, propachlor, chlorpropham, and pyrazone/chlorbufam (4) were also used extensively. Most of the propachlor (80%) was applied mixed with chlorpropham for the control of established chick-weed or with paraquat and 210 hectares were treated with a mixture of all three. Both paraquat and chlorpropham were used on their own in only a few instances. In all, 145 hectares were treated with a mixture of two proprietary chemicals and 222 hectares were covered with a mixture of three. The mixture of three chemicals was favoured mostly by those growing larger areas. Some chemicals were used twice on the same area, the most common being pyrazone/chlorbufam which was sprayed twice on 50 hectares.

(4) / denotes proprietary mixture of two chemicals.
Pyrazone is now known as Chloridazon

Table 9

Types of Herbicide Used

| Type of Herbicide | Active Chemical | No. of Growers | Area Treated | Proportion of Area Grown |
|------------------------------------|--------------------------|----------------|--------------|--------------------------|
| (a) <u>Spring-Sown</u> | | | hectares | % |
| Pre-drilling incorporation | Tri-allate | 8 | 118.6 | 21 |
| Pre-emergence contact | Paraquat | 29 | 376.0 (1) | 65 |
| | Dimexan | 4 | 71.1 | 12 |
| Pre-emergence residual | Propachlor | 28 | 355.8 (2) | 62 |
| | Chlorpropham | 20 | 321.7 (3) | 56 |
| | Pyrazone/Chlorbufam (8) | 27 | 284.6 (4) | 49 |
| | Chlorpropham and Fenuron | 1 | 19.4 | 3 |
| Pre-emergence contact and residual | Methazole | 38 | 468.1 | 81 |
| | Ioxynil/Linuron (8) | 8 | 134.2 | 23 |
| | Cyanazine | 9 | 132.1 | 23 |
| Post-emergence contact | Ioxynil | 8 | 69.6 | 12 |
| | Dinoseb | 2 | 25.9 | 5 |
| (b) <u>Autumn-Sown</u> | | | | |
| Pre-drilling incorporation | Tri-allate | 1 | 24.3 (5) | 47 |
| Pre-emergence contact | Paraquat | 2 | 36.4 | 70 |
| Pre-emergence residual | Propachlor | 4 | 38.0 | 73 |
| | Chlorpropham | 4 | 38.0 (6) | 73 |
| | Pyrazone/Chlorbufam (8) | 5 | 13.9 | 27 |
| Post-emergence contact residual | Methazole | 7 | 32.2 (7) | 62 |
| | Cyanazine | 1 | 7.3 | 14 |
| Post-emergence contact | Ioxynil | 2 | 14.6 | 28 |

Notes (1) Applied mixed with other chemicals on 322 ha (5) All applied with proprachlor and chlorpropham

(2) Applied mixed with other chemicals on 283 ha (6) All applied together

(3) Applied mixed with other chemicals on 285 ha (7) Including 1.6 ha treated twice

(4) Applied mixed with other chemicals on 62 ha (8) / denotes proprietary mixture of two chemicals
Pyrazone is now known as chloridazon

More than one herbicide was also often applied in separate applications; 202 hectares were treated with pyrazone/chlorbufam and methazole, 178 hectares with proprachlor and methazole and 59 hectares were covered by all three. In addition another 336 hectares were treated with ioxynil/linuron, ioxynil alone or cyanazine in conjunction with one or more of the other three chemicals.

More sprays were used and mixtures of proprietary chemicals were more popular on the larger areas. Thus growers in Group A on average gave 2.18 treatments to their area whereas those in Group B and C gave 3.79 and 4.72 treatments respectively, (Table 10).

Table 10 Use of Herbicides Spring-Sown Crop

| | Area Treated | Proportion of Area Grown | Average No. of Treatments per crop | Average No. of Applications per crop |
|-----------|-----------------|-----------------------------|--|--|
| | hectares | % | | |
| Group A | 71.6 | 215 | 2.18 | 1.76 |
| Group B | 486.7 | 348 | 3.79 | 2.90 |
| Group C | 1837.2 | 455 | 4.72 | 3.72 |
| All Farms | 2395.5 | 415 | 3.59 | 2.78 |

The maximum number of proprietary chemicals applied by any one grower was eight, two being applied as a mixture.

The herbicides used on the autumn-sown crop are shown in Table 9(b) and are similar to those used on the spring-sown crop.

2.5 The Use of Labour and Machinery

Because of the heavy reliance on casual and contract labour for grading and harvesting by hand which was seldom paid at an hourly rate, figures for labour and tractor usage can only be given up to harvest for the whole sample. These are shown in Table 11 separated into three categories of operation - ploughing, working down and drilling, and post-drilling operations. These figures include an estimation of the hours worked by contract and casual labour. They show little difference between the large and small areas of the spring-sown crop, although the use of both labour and tractors is a little more per hectare in Group A than in the other two groups. The very wide range is due to the variation in the use of casual labour for hand-weeding and again there is little difference between

the size groups. The requirements of the autumn-sown crop are higher than the spring-sown, again largely because of the greater use of casual labour for hand-weeding.

Table 11 Average Use of Labour and Tractors Up to Harvest

| Operation | | Spring | | | | Autumn |
|---------------------------|--------------------------|---------|---------|---------|-----------|-----------|
| | | Group A | Group B | Group C | All Farms | All Farms |
| Ploughing | Man Hours | 4.1 | 3.5 | 3.0 | 3.2 | 2.1 |
| | Tractor Hours | 4.1 | 3.5 | 3.0 | 3.2 | 2.1 |
| Working down and drilling | Man Hours | 8.5 | 7.7 | 8.5 | 8.3 | 11.4 |
| | Tractor Hours | 7.9 | 7.2 | 8.0 | 7.8 | 10.9 |
| Post-drilling | Man Hours ⁽¹⁾ | 51.2 | 46.2 | 47.6 | 47.4 | 77.3 |
| | Tractor Hours | 10.4 | 7.6 | 8.2 | 8.1 | 6.3 |
| Total | Man Hours | 63.8 | 57.4 | 59.1 | 58.9 | 90.8 |
| | Tractor Hours | 22.4 | 18.3 | 19.2 | 19.1 | 19.3 |
| Range | Man Hours | 34.2 | 10.2 | 26.0 | 10.2 | 22.0 |
| | | to | to | to | to | to |
| | Tractor Hours | 145.0 | 117.2 | 150.9 | 150.9 | 162.3 |
| | | to | to | to | to | to |
| | | 36.4 | 34.5 | 32.3 | 36.4 | 37.3 |

(1) Including hand-weeding by casual labour:-

| | |
|-----------|-------------------------|
| Group A | 16.03 hours per hectare |
| B | 25.43 hours per hectare |
| C | 30.69 hours per hectare |
| All Farms | 28.07 hours per hectare |

The use of different-sized tractors owned by the farmers as a proportion of the total use on the crop is shown by size group in Table 12. The most commonly used tractors were in the medium sized group of 50 to 80 h.p. Large tractors were used mainly for ploughing on the bigger farms.

Table 12 Size of Growers' Tractors and Hours Employed
as a Proportion of Total Use on the Crop

| | Percentage | | | |
|-----------|---------------|------------|--------------|-------|
| | Under 50 h.p. | 50-80 h.p. | Over 80 h.p. | Total |
| Group A | 46 | 52 | 2 | 100 |
| Group B | 34 | 62 | 4 | 100 |
| Group C | 25 | 67 | 8 | 100 |
| All Farms | 28 | 65 | 7 | 100 |

Table 13

Method of Harvesting Spring-sown Crop

| | Group A | | Group B | | Group C | | All Farms | |
|------------------------------|--------------|----------|--------------|----------|--------------|----------|--------------|----------|
| | No. of Farms | Area | No. of Farms | Area | No. of Farms | Area | No. of Farms | Area |
| | | hectares | | hectares | | hectares | | hectares |
| Hand Harvested | 6 | 9.21 | 2 | 8.80 | - | - | 8 | 18.01 |
| Part Hand, Part Mechanically | - | - | 1 | 10.50 | 1 | 24.30 | 2 | 34.80 |
| Mechanically Harvested | 9 | 21.65 | 16 | 120.57 | 17 | 379.68 | 42 | 521.90 |
| Contract Harvested | 2 | 2.40 | - | - | - | - | 2 | 2.40 |
| Total | 17 | 33.26 | 19 | 139.87 | 18 | 403.98 | 54 | 577.11 |

Table 14

Labour and Tractor Requirements for Harvesting Mechanically Spring-sown Crop

| | Group A | | Group B | | Group C | | All Farms | |
|------------------------------|-------------------|---------|---------|---------|---------|---------|-----------|---------|
| | Labour | Tractor | Labour | Tractor | Labour | Tractor | Labour | Tractor |
| | hours per hectare | | | | | | | |
| Topping | 0.28 | 0.28 | 0.60 | 0.60 | 1.81 | 1.81 | 1.45 | 1.45 |
| Undercutting and Windrowing | 2.10 | 1.54 | 1.93 | 1.93 | 1.54 | 1.32 | 1.66 | 1.48 |
| Lifting and carting to store | 48.12 | 28.08 | 42.68 | 20.71 | 31.32 | 17.30 | 34.78 | 18.58 |
| Total | 50.50 | 29.90 | 45.21 | 23.24 | 34.67 | 20.43 | 37.89 | 21.51 |

2.6 Harvesting

The areas harvested by hand and mechanically are shown in Table 13. A third of the growers in Group A harvested their crops by hand whilst two brought in contractors to harvest them mechanically. All the others harvested their crops mechanically except for two; one in Group B, and one in Group C both of whom harvested part by hand.

Because of the difficulty of determining the time worked by casual labour in gangs picking by hand, no figures can be given for the labour and tractor requirements for hand-harvesting. Those for mechanical harvesting are given in Table 14. These results show advantages in size of operation in the use of labour and tractors more clearly than in the pre-harvest operations.

3. Financial Results

3.1 The Spring-Sown Crop

The financial results are shown for the whole sample in Table 15 together with the range for each item. Because of the wide variation in the use of casual and contract labour a margin over material costs (seeds, fertilisers and sprays) is shown as well as the gross margin. However, the gross margin has less meaning for this crop than it has for many others because of the inter-relationship between casual, contract and regular labour and the wide variation in the substitution of one by the other on different farms. Nevertheless, the gross margin is shown so that comparison can be made outside the sample. Furthermore, the distinction between variable and fixed costs is useful as it indicates the relative reliability of the data in that the variable costs are all as recorded at prices actually paid, whereas the fixed costs all involve some element of estimation or use of standard costs as detailed in the notes to Table 15.

It proved impossible to obtain a satisfactory estimate of yield out of the field and therefore of waste, so only the yield of crop actually sold is shown. The average yield for the whole sample is considerably lower than the MAFF estimate for the whole crop and so is the price per tonne received. This is similar to the position in 1971.⁽⁵⁾

(5) Kerr, H.W.T. op. cit.

Table 15 Financial Results Spring-Sown Crop Whole Sample

| | | Average | Range | | |
|---------------------------------------|--------|------------|-----------------------------|------|---------|
| | | | | to | |
| Area Grown per farm | ha | 10.69 | 0.40 | to | 75.40 |
| Sales per hectare | tonnes | 22.54 | 1.25 | to | 48.19 |
| Average price per tonne sold | £ | 31.62 | 7.51 | to | 68.44 |
| OUTPUT | | 712.80 | £ per hectare 25 to 1994 | | |
| Variable Costs: | | | | | |
| Seeds | | 94.56 | 28 | to | 168 |
| Fertilisers | | 83.48 | 45 | to | 178 |
| Sprays(1) | | 116.26 | 19 | to | 208 |
| Sub-Total | | 294.30 | 199 | to | 435 |
| MARGIN over MATERIAL COSTS | | 418.50 | (-) | 335 | to 1741 |
| Contract - General | | 4.93 | Nil | to | 86 |
| Haulage | | 8.12 | Nil | to | 186 |
| Contract/Casual Grading & Sorting (2) | | 90.23 | Nil | to | 746 |
| Other Casual(2) | | 54.96 | Nil | to | 138 |
| Fuel/Electricity for Drying | | 56.04 | Nil | to | 332 |
| Miscellaneous | | 74.20 | Nil | to | 675 |
| Sub-Total | | 288.48 | 16 | to | 914 |
| TOTAL VARIABLE COSTS | | 582.78 | 222 | to | 1342 |
| GROSS MARGIN | | 130.02 | (-) | 498 | to 1587 |
| Fixed Costs: | | | | | |
| Regular Labour(2) | | 226.97 | 66 | to | 801 |
| Tractor Operating Costs | | 78.28 | 18 | to | 203 |
| Tractor Overhds & Share Gen. Equip. | | 78.28 | 18 | to | 203 |
| Special Equipment Depreciation | | 76.59 | Nil | to | 314 |
| Repairs | | 15.07 | Nil | to | 104 |
| Special Buildings Depreciation | | 106.48 | Nil | to | 437 |
| Rent | | 82.41 | 40 | to | 140 |
| General Overheads | | 25.15 | 23 | to | 29 |
| TOTAL FIXED COSTS | | 689.23 | 280 | to | 1229 |
| TOTAL COSTS | | 1272.01 | 545 | to | 2354 |
| NET MARGIN | | (-) 559.21 | (-) | 1389 | to 582 |

(1) Further analysis of spray costs see Appendix Table 7

(2) Total Labour Average £372.16

Notes to Table 15

Variable Costs

All as recorded

Regular Labour

Charged at £1.44 (M.A.F.F. Wages Enquiry average for tractor drivers, Jan to Dec 1977) plus 30% allowance for overheads = £1.87 applied to actual physical data recorded in survey.

Hours of regular labour used are shown in Appendix Table 8.

Tractor Operating Costs

Actual physical data recorded in survey charged as follows:

| | |
|--------------------|----------------|
| up to 50 h.p. | £1.41 per hour |
| 50 h.p. to 80 h.p. | £1.71 per hour |
| over 80 h.p. | £3.43 per hour |

to cover depreciation and repairs. Tax and insurance allowed for in General Overheads.

Hours of owners' tractors used are shown in Appendix Table 9.

Tractor Overheads and Share of General Machinery

Charged at £1 per £ of direct tractor cost.

Specialised Machinery

Current cost depreciation calculated by diminishing balance @ 20% from recorded initial purchase price up-dated by M.A.F.F. machinery indices. Repairs as recorded.

Specialised Buildings

Recorded initial cost updated by M.A.F.F. buildings index depreciated by straight line method over 10 years.

Rent

As recorded - actual for tenanted farms, raised rental value for owner-occupied farms.

General Overheads

Average Maintenance plus Miscellaneous costs for "Arable - Roots and Vegetable" farms - Farming in the East Midlands 1977-78 as follows:-

| | |
|-------------------------|----------------|
| Farms less than 100 ha. | £28.98 per ha. |
| Farms 100 to 199.99 ha. | £27.48 per ha. |
| Farms over 200 ha. | £23.12 per ha. |

The average financial results for the three size groups are shown in Table 16. The assumptions used for assessing the fixed costs are the same as those given in the notes to Table 15.

Table 16 Financial Results Spring-Sown Crop by Size Group

| | Group A | Group B | Group C | All Farms |
|---------------------------------------|-------------------------|---------------------------|---------------------------|---------------------------|
| Number of Farms | 17 | 19 | 18 | 54 |
| Area Grown per farm ha | 1.94 | 7.36 | 22.44 | 10.69 |
| Sales per hectare tonnes | 26.16 | 24.12 | 21.70 | 22.54 |
| Average price per tonne sold £ | 27.26 | 30.61 | 32.44 | 31.62 |
| | £ per hectare | | | |
| OUTPUT | 713.00 | 738.19 | 703.99 | 712.80 |
| Variable Costs: | | | | |
| Seeds | 104.68 | 96.61 | 93.01 | 94.56 |
| Fertilisers | 79.05 | 91.31 | 81.14 | 83.48 |
| Sprays | 78.95 | 126.58 | 115.76 | 116.26 |
| Sub-Total | 262.68 | 314.50 | 289.91 | 294.30 |
| MARGIN over MATERIAL COSTS | 450.32 | 423.69 | 414.08 | 418.50 |
| Contract - General | 6.83 | 9.41 | 3.22 | 4.93 |
| Haulage | 1.29 | 17.16 | 5.55 | 8.12 |
| Contract/Casual Grading & Sorting (1) | 7.80 | 121.20 | 86.30 | 90.23 |
| Other Casual(1) | 52.39 | 35.73 | 61.83 | 54.96 |
| Fuel/Electricity for Drying | 8.85 | 36.36 | 66.74 | 56.04 |
| Miscellaneous | 77.09 | 89.64 | 68.61 | 74.20 |
| Sub-Total | 154.25 | 309.50 | 292.25 | 288.48 |
| TOTAL VARIABLE COSTS | 416.93 | 624.00 | 582.16 | 582.78 |
| GROSS MARGIN | 296.07 | 114.19 | 121.83 | 130.02 |
| Fixed Costs: | | | | |
| Regular Labour (1) | 331.25 | 247.45 | 211.29 | 226.97 |
| Tractor Operating Costs | 91.07 | 76.79 | 77.75 | 78.28 |
| Tractor Overhds. & Share Gen. Equip. | 91.07 | 76.79 | 77.75 | 78.28 |
| Special Equipment Depreciation | 75.23 | 72.51 | 78.11 | 76.59 |
| Repairs | 11.12 | 13.92 | 15.77 | 15.07 |
| Special Buildings Depreciation | 49.22 | 101.23 | 113.03 | 106.48 |
| Rent | 73.47 | 81.77 | 83.37 | 82.41 |
| General Overheads | 28.09 | 27.27 | 24.18 | 25.15 |
| TOTAL FIXED COSTS | 750.52 | 697.73 | 681.25 | 689.23 |
| TOTAL COSTS | 1167.45 | 1321.73 | 1263.41 | 1272.01 |
| NET MARGIN | (-) 454.45 | (-) 583.54 | (-) 559.42 | (-) 559.21 |
| Range | (-) 1137 to (-) 9 | (-) 1289 to (+) 582 | (-) 1389 to (+) 220 | (-) 1389 to (+) 582 |

(1) Total Labour

| | | | |
|--------|--------|--------|--------|
| 391.44 | 404.38 | 359.42 | 372.16 |
|--------|--------|--------|--------|

These results show clearly the very high costs of growing onions. In this particular year output was nowhere near high enough to cover these costs. This was mainly due to the low price received which in real terms (price adjusted by retail price index) was only a little better than that received in the poor year of 1971.⁽⁶⁾ Although some advantage was shown by farms in Group C in the cost of labour and machinery, this was offset compared with farms in Group A by higher expenditure on drying and specialised buildings. Group B also spent more than Group A (but less than Group C) on drying and specialised buildings and, in addition, had a higher total labour bill, so returned the worst net margin of the three groups.

3.2 The Autumn-Sown Crop

The average financial results for the nine autumn-sown crops are shown in Table 17 together with the average results of the spring-sown crops. The total cost of growing the two crops shows a remarkable similarity. The aim of growing autumn-sown onions is to get them onto the market before the spring-sown crop and so obtain a higher price. In the event the price received per tonne for the autumn-sown crop was almost three times that of the spring-sown crop in 1977 this was entirely responsible for there being a positive instead of a negative net margin. Although drying is essential to obtain a good quality, the cost of fuel for drying and the depreciation of specialised buildings was lower and this mainly offset the considerably higher cost of seed.

(6) Kerr, H.W.T. op. cit.

Table 17 Financial Results Autumn-Sown Crop and Spring-Sown Crop

All Farms

| | Autumn-Sown | Spring-Sown |
|--|---------------------------|---------------------------|
| Number of Farms | 9 | 54 |
| Area grown per farm ha | 5.77 | 10.69 |
| Sales per hectare tonnes | 20.26 | 22.54 |
| Average price per tonne sold £ | 91.51 | 31.62 |
| | £ per hectare | |
| OUTPUT | 1853.97 | 712.80 |
| Variable Costs: | | |
| Seeds | 196.55 | 94.56 |
| Fertilisers | 97.01 | 83.48 |
| Sprays ⁽¹⁾ | 95.93 | 116.26 |
| Sub-Total | 389.49 | 294.30 |
| MARGIN over MATERIAL COSTS | 1464.48 | 418.50 |
| Contract - General | 4.91 | 4.93 |
| Haulage | 11.86 | 8.12 |
| Contract/Casual Grading & Sorting ⁽²⁾ | 4.04 | 90.23 |
| Other Casual ⁽²⁾ | 143.07 | 54.96 |
| Fuel/Electricity for Drying | 4.77 | 56.04 |
| Miscellaneous | 99.34 | 74.20 |
| Sub-Total | 267.99 | 288.48 |
| TOTAL VARIABLE COSTS | 657.48 | 582.78 |
| GROSS MARGIN | 1196.49 | 130.02 |
| Fixed Costs: | | |
| Regular Labour ⁽²⁾ | 214.17 | 226.97 |
| Tractor Operating Costs | 78.19 | 78.28 |
| Tractor Overhds & Share General Equip. | 78.19 | 78.28 |
| Special Equipment Depreciation | 100.77 | 76.59 |
| Repairs | 14.31 | 15.07 |
| Special Buildings Depreciation | 42.87 | 106.48 |
| Rent | 64.90 | 82.41 |
| General Overheads | 25.58 | 25.15 |
| TOTAL FIXED COSTS | 618.98 | 689.23 |
| TOTAL COSTS | 1276.46 | 1272.01 |
| NET MARGIN | 577.51 | (-) 559.21 |
| Range | (-) 409 to (+) 2797 | (-) 1389 to (+) 582 |

(1) Further analysis of spray costs see Appendix Table 7

(2) Total Labour Autumn-sown £361.28
Spring-sown £372.16

3.3 Capital Investment

The capital investment in specific machinery for growing onions is shown by size group in two different ways. In Table 18 investment is shown at replacement cost indicating what it would cost to start growing onions at 1977 prices. The replacement cost was determined by adjusting the original purchase prices by MAFF machinery indices. In Table 19 the investment is shown at its current (1977) value; that is the replacement cost written down at 20% diminishing balance in the case of machinery and at 10% straight line for buildings.

Table 18 Capital Investment at Replacement Value by Size Group

| | £ per hectare | | | |
|--------------------------------|---------------|------------|------------|--------------|
| | Group A | Group B | Group C | All Farms |
| Drills | 25.74 | 27.71 | 29.79 | 29.05 |
| Cultivating Machinery (1) | 5.33 | 16.14 | 11.12 | 12.00 |
| Harvesting Machinery (2) | 333.03 | 312.97 | 298.65 | 304.11 |
| Grading and Riddling Machinery | 219.06 | 240.03 | 184.10 | 199.67 |
| Drying and Storage (3) | 340.83 | 177.55 | 152.73 | 169.58 |
| Total Machinery and Equipment | 923.99 | 774.40 | 676.39 | 714.41 |
| Buildings | 1031.60 | 1036.87 | 1169.81 | 1129.63 |
| Total | 1955.59 | 1811.27 | 1846.20 | 1844.04 |

(1) Hoes, Sprayers

(2) Toppers, Undercutters, Windrowers, Harvesters

(3) Fans, Ducts, Blowers

Table 19 Capital Investment at Current Value by Size Group

| | £ per hectare | | | |
|--------------------------------|---------------|------------|------------|--------------|
| | Group A | Group B | Group C | All Farms |
| Drills | 2.61 | 7.98 | 13.10 | 11.25 |
| Cultivating Machinery (1) | 3.31 | 8.70 | 5.05 | 5.84 |
| Harvesting Machinery (2) | 126.31 | 124.11 | 148.73 | 141.48 |
| Grading and Riddling Machinery | 108.36 | 93.02 | 61.46 | 71.81 |
| Drying and Storage (3) | 121.28 | 72.39 | 55.08 | 63.09 |
| Total Machinery and Equipment | 361.87 | 306.20 | 283.42 | 293.47 |
| Buildings | 248.77 | 639.74 | 660.89 | 632.01 |
| Total | 610.64 | 945.94 | 944.31 | 925.48 |

(1) Hoes, Sprayers

(2) Toppers, Undercutters, Windrowers, Harvesters

(3) Fans, Ducts, Blowers

These figures clearly demonstrate the high capital investment involved in growing onions. Advantages of size are shown in the investment in total machinery and equipment at replacement cost and to a lesser extent at current value. But the position is completely reversed at current value when specialist buildings are included. At replacement cost there are only small differences between the groups in investment in specialist buildings indicating that growers with the larger areas have much newer buildings than those in Group A. Advantages of size shown at replacement cost in harvesting machinery are also reversed when investment is assessed at current value because the growers with smaller areas use older machines, employ contractors or harvest by hand.

Section 3 CONCLUSIONS

The results confirm that 1977 was not a good year for the majority of onion growers. This was due more to the poor price received than to low saleable yields. The variation about the mean was very wide; positive net margins were achieved but only by three of the 54 growers of the spring-sown crop included in the sample. Adjusted for changes in the purchasing power of money, the average price received per tonne by the growers in the sample was no better than the average price obtained in 1971 (another bad year) and was less than half that of the three years 1972, 1973 and 1974. Clearly a satisfactory net margin will only be achieved at average saleable yields if a better average price than that of 1977 can be obtained.

The autumn-sown crop did fetch a much better price (nearly three times that for the spring-sown) and at a very similar total cost of production this produced an acceptable average net margin. A further analysis of the three spring-sown crops achieving a positive net margin showed their average total cost of production to be almost identical to that of the spring-sown and autumn-sown crops (Table 21). The reason for the growers obtaining a positive net margin is clearly seen to be the much higher output resulting from a combination of the higher than average yield and price received.

Table 21 Comparision of the Main Physical and Financial Factors

| | Average Three Spring-Sown Crops with Positive Net Margins | Average Spring-Sown Crops | Average Autumn-Sown Crops |
|---------------------------|--|---------------------------------|---------------------------------|
| Yield (sales) per hectare | tonnes 27.87 | tonnes 22.54 | tonnes 20.26 |
| | £ | £ | £ |
| Average price per tonne | 51.75 | 31.62 | 91.51 |
| Output per hectare | 1442 | 713 | 1854 |
| Total Costs per hectare | 1277 | 1272 | 1276 |
| Net Margin per hectare | 165 | (-) 559 | 578 |

It would appear that as a broad guide the total cost of growing the crop should fall somewhere between £1,000 and £1,500 per hectare at 1977 money values. On a low cost regime yield and, particularly, quality may well be sacrificed whereas costs of production rising above £1,500 will not usually leave a big enough margin at prices likely to be realised.

The area of bulb onions grown in 1978 in England and Wales fell by about just over 1000 hectares to 7587 hectares according to the June census. Prices received rose and probably averaged around £60 per tonne for the spring-sown crop which at the average yield achieved in the 1977 sample would have produced no better than a break-even return. In 1979 the area again fell by over 1000 hectares to 6371 hectares and prices so far (November 1979) appear to be about double those during the same period of the previous year. If this level is maintained, it should bring the crop back into profitability for the average producer despite the increase in cost which has taken place since 1977.

The price which domestic producers receive is dependent upon the overall supply and demand situation, the quality of the crop and the marketing period. The demand for onions is relatively price inelastic and hence fluctuations in total supplies result in volatile price movements. This volatility may be dampened to some extent by the compensatory role which imports play. Within the overall supply and demand situation the prices which growers receive are dependent on the quality of the crop. There is a clear price differential in favour of imported onions. The potential for an expansion of home production and the displacement of imports centres on the ability of domestic growers to match imports in terms of volume, consistency and quality. Additional marketing opportunities are available to individual producers to orientate their sales towards the seasonal high-price periods.

The relationship between price, quality and marketing period has been clearly established in this study. Autumn-sown crops fetched nearly three times the price of the spring-sown. Furthermore, the three growers achieving positive net margins in the spring-sown sample received £51.75 per tonne compared with the average price of £31.62 per tonne.

A fundamental problem in the onion market is the reaction of the growers to price fluctuations. If adverse climatic conditions which reduce production are accompanied by short supplies in international trade, then prices escalate. The rise in price causes both an expansion in the area by existing producers and an increase in the number of growers. If the expansion in the area grown is combined with above average yields the following year the increase in domestic production must be accompanied by a reduction in imports if prices are to remain relatively stable. The displacement of imports, however, can only be achieved if domestic growers market onions of comparable quality and extend the marketing season. Failure to meet this objective results in only a partial displacement of imported supplies and the increase in total supplies depresses prices. Furthermore, as prices fall the differential paid for quality widens and growers marketing crops of indifferent quality suffer substantial financial loss. The potential displacement of imports is, therefore, clearly dependent on the quality of the crop and the extension of the marketing season.

Additional price premiums may also be achieved if producers can exert countervailing power. The increasing dominance of the retail multiples and the extension of vertical co-ordination within the marketing system suggest that countervailing power may be a prerequisite for improving returns from the market for the grower. The formation of efficient marketing groups which can identify buyers' requirements and orientate production and marketing methods to fulfilling these needs may be necessary if the production of onions is to be an attractive proposition for home producers in the future.

Table 1

Total Supplies of Dry Bulb Onions in the U.K. Calendar Years

| YEAR | Home Production | | Imports | | Total Supplies | | Degree of Self Sufficiency | |
|-------------------|-----------------|-------|---------|-------|----------------|-------|----------------------------|-------|
| | Tonnes | Value | Tonnes | Value | Tonnes | Value | Volume | Value |
| | '000' | £000 | '000' | £000 | '000' | £000 | % | % |
| 1970 | 82.4 | 2829 | 203.4 | 13262 | 285.8 | 16091 | 28.8 | 17.6 |
| 1971 | 145.6 | 2556 | 202.5 | 8474 | 348.1 | 11030 | 41.8 | 23.2 |
| 1972 | 160.2 | 3975 | 173.6 | 9323 | 333.8 | 13298 | 48.0 | 29.9 |
| 1973 | 153.8 | 7059 | 148.5 | 14837 | 302.3 | 21896 | 50.9 | 32.2 |
| 1974 | 172.0 | 8404 | 181.9 | 13529 | 353.9 | 21933 | 48.6 | 38.3 |
| 1975 | 194.8 | 14307 | 148.7 | 15040 | 343.5 | 29347 | 56.7 | 48.8 |
| 1976 | 153.8 | 22749 | 178.8 | 29571 | 332.6 | 52320 | 46.2 | 43.5 |
| 1977 | 184.9 | 13570 | 181.1 | 24584 | 366.0 | 38154 | 50.5 | 35.6 |
| 1978 ^a | 250.0 | 10582 | 179.3 | 17315 | 429.3 | 27897 | 58.2 | 37.9 |

(a) Forecast

Source: MAFF

Table 2

Home Production of Dry Bulb Onions Calendar Years

| YEAR | Estimated Crop Area Hectares | Estimated Yield/Hectare Tonnes | Gross Production '000' Tonnes | Output '000' Tonnes [*] | Average Farm Gate Price £/Tonne | Value of Output £000 | Value Per Hectare £ |
|-------------------|------------------------------------|--------------------------------------|-------------------------------------|--|--|----------------------------|---------------------------|
| 1970 | 3745 | 32.52 | 121.8 | 82.4 | 34.33 | 2829 | 755.4 |
| 1971 | 5473 | 37.07 | 202.9 | 145.6 | 17.55 | 2556 | 467.0 |
| 1972 | 4927 | 33.94 | 167.2 | 160.2 | 24.81 | 3975 | 806.8 |
| 1973 | 5460 | 35.73 | 195.2 | 153.8 | 45.90 | 7059 | 1292.8 |
| 1974 | 6081 | 35.95 | 218.6 | 172.0 | 48.86 | 8404 | 1382.0 |
| 1975 | 6174 | 28.10 | 173.5 | 194.8 | 73.44 | 14307 | 2317.3 |
| 1976 | 7384 | 20.51 | 151.4 | 153.8 | 147.91 | 22749 | 3080.8 |
| 1977 | 8732 | 35.02 | 305.8 | 184.9 | 73.99 | 13570 | 1554.1 |
| 1978 ^a | 8585 | 32.07 | 275.3 | 250.0 | 42.33 | 10582 | 1232.6 |

(a) Forecast Source: MAFF

* Output refers to total marketings in a calendar year

Total Supplies of Dry Bulb Onions in the U.K. Crop Year June/May

Table 3

| Crop Year | Home Production | | | | | | | Imports | | |
|-----------|------------------------------|------------------------------------|-------------------------------|---------------------|---------------------------------|----------------------|---------------------|-----------------------|----------------|-----------------------|
| | Estimated Crop Area Hectares | Estimated Yield Tonnes Per Hectare | Gross Production '000' Tonnes | Output '000' Tonnes | Average Farm Gate Price £/Tonne | Value of Output £000 | Value Per Hectare £ | Quantity '000' Tonnes | Value £000 CIF | Average Value/Tonne £ |
| 1970/71 | 3745 | 32.52 | 121.8 | 112.3 | 28.43 | 3192 | 852.3 | 200.0 | 9910 | 49.55 |
| 1971/72 | 5473 | 37.07 | 202.9 | 175.4 | 15.07 | 2642 | 482.7 | 184.7 | 7457 | 40.37 |
| 1972/73 | 4927 | 33.94 | 167.2 | 134.1 | 40.49 | 5430 | 1102.1 | 168.1 | 14187 | 84.40 |
| 1973/74 | 5460 | 35.73 | 195.2 | 182.7 | 45.64 | 8338 | 1527.1 | 142.1 | 11251 | 79.18 |
| 1974/75 | 6081 | 35.95 | 218.6 | 191.4 | 44.04 | 8430 | 1386.3 | 165.3 | 12915 | 78.13 |
| 1975/76 | 6174 | 28.10 | 173.5 | 158.4 | 116.93 | 18521 | 2999.8 | 166.4 | 21711 | 130.47 |
| 1976/77 | 7384 | 20.51 | 151.4 | 136.9 | 158.66 | 21721 | 2929.7 | 189.3 | 30324 | 160.19 |
| 1977/78 | 8732 | 35.02 | 305.8 | 271.8 | 41.94 | 11399 | 1320.1 | na | na | na |

Source: MAFF H.M. Customs & Excise

Table 4 Value of Total Supplies at Current Prices and at 1970 Prices

| YEAR | Value of Total Supplies at Current Prices £000 | Retail Price Index 1970 = 100 | Value of Total Supplies At 1970 Prices £000 |
|------|---|----------------------------------|--|
| 1970 | 16091 | 100.0 | 16091 |
| 1971 | 11030 | 109.5 | 10073 |
| 1972 | 13298 | 117.0 | 11366 |
| 1973 | 21896 | 128.0 | 17106 |
| 1974 | 21933 | 148.5 | 14769 |
| 1975 | 29347 | 184.5 | 15906 |
| 1976 | 52320 | 215.0 | 24335 |
| 1977 | 38154 | 249.0 | 15323 |
| 1978 | 27897 | 270.0 | 10332 |

Source: MAFF

Table 5 The Size Structure of The Sample

(a) Spring-Sown

| Size Group | No. of Growers | Area Grown |
|---------------|----------------|------------|
| hectares | | hectares |
| 1 0.4 to 1.9 | 8 | 8.62 |
| 2 2.0 to 3.9 | 9 | 24.64 |
| 3 4.0 to 7.9 | 11 | 60.87 |
| 4 8.0 to 12.0 | 8 | 79.00 |
| 5 Over 12.0 | 18 | 403.98 |
| Total | 54 | 577.11 |

(b) Autumn-Sown

| Size Group | No. of Growers | Area Grown |
|---------------|----------------|------------|
| hectares | | hectares |
| 1 0.4 to 1.9 | 4 | 4.62 |
| 2 2.0 to 3.9 | 1 | 2.80 |
| 3 4.0 to 7.9 | 3 | 20.20 |
| 4 8.0 to 12.0 | - | - |
| 5 Over 12.0 | 1 | 24.30 |
| Total | 9 | 51.92 |

APPENDIX

Table 6 Geographical Distribution by County
(a) Spring-Sown

| County | No. of Growers | Area Grown |
|--------------|----------------|------------|
| | | hectares |
| Lincolnshire | 27 | 211.93 |
| Nottingham | 2 | 23.90 |
| Cambridge | 12 | 142.28 |
| Norfolk | 8 | 145.40 |
| Essex | 3 | 41.40 |
| Suffolk | 2 | 12.20 |
| Total | 54 | 577.11 |

(b) Autumn-Sown

| County | No. of Growers | Area Grown |
|--------------|----------------|------------|
| | | hectares |
| Lincolnshire | 5 | 13.90 |
| Cambridge | 3 | 33.22 |
| Essex | 1 | 4.80 |
| Total | 9 | 51.92 |

Table 7 Analysis of Spray Cost

(a) Spring-Sown

| | per hectare grown | per hectare sprayed |
|--------------------|-------------------|---------------------|
| | £ | £ |
| Herbicide | 79.59 | 25.12 |
| Insecticide | 23.80 | 40.53 |
| Fungicide | 6.39 | 13.79 |
| Manganese | 0.06 | 0.52 |
| Sprout Suppressant | 6.42 | 13.31 |
| TOTAL | 116.26 | |

(b) Autumn-Sown

| | per hectare grown | per hectare sprayed |
|-------------|-------------------|---------------------|
| | £ | £ |
| Herbicide | 89.84 | 33.56 |
| Insecticide | 4.29 | 23.97 |
| Fungicide | 1.80 | 13.72 |
| TOTAL | 95.93 | |

APPENDIX

Table 8

Regular Labour

| Spring-Sown | | | | hours per hectare |
|-------------|---------|---------|-----------|-------------------|
| Group A | Group B | Group C | All Farms | All Farms |
| 177.14 | 132.33 | 112.99 | 121.37 | 114.53 |

Table 9

Growers' Tractors

| Spring-Sown | | | | hours per hectare |
|-------------|---------|---------|-----------|-------------------|
| Group A | Group B | Group C | All Farms | All Farms |
| 55.22 | 46.61 | 44.63 | 45.72 | 39.80 |

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