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Apples

Agricultural Enterprise Studies
in England and Wales
Report No. 27

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DESSERT APPLES AND PEARS IN 1972-1973

Financial Results for a Sample of Growers

R. R. W. Folley

FARM BUSINESS UNIT
SCHOOL OF RURAL ECONOMICS AND RELATED STUDIES

1974

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32

Agricultural Enterprise Studies in England and Wales

Report No. 27

DESSERT APPLES AND PEARS IN 1972-73

Financial Results of a Sample of Growers

University departments of Agricultural Economics in England and Wales have for many years undertaken economic studies of crop and livestock enterprises. In this work the departments receive financial and technical support from the Ministry of Agriculture, Fisheries and Food. A recent development is that departments in different regions of the country are now conducting joint studies into those enterprises in which they have a particular interest. This community of interest is being recognised by issuing enterprise reports in a common series entitled "Agricultural Enterprise Studies in England and Wales", although the publications will continue to be prepared and published by individual departments. Titles of recent publications in this series and the addresses of the University departments are given at the end of this report.

Further copies of this report are obtainable from:

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John S. Nix

Head, Farm Business Unit

CONTENTS

	page
Foreword	1
The Size and Features of the Enquiry	3
Analysis of Financial Results	7
Discussion of the Results	16
The Reward for Risk-taking	21
Variety Prices and Returns	23
Relevance of the Special Payments Scheme	25
Definitions	28

FOREWORD

This is only the second country-wide enquiry of its sort into the profitability of English apple- and pear-growing. A previous study was conducted on similar lines by the same University staff in 1959 in order to gain experience for the current study which is to cover the 1972 and 1973 crops.

The value of these reports lies in replacing opinion with fact. Hardly anyone in the country knows the whole of English fruit growing. Technical aspects are widely discussed, and there is little doubt, for example, about the selectivity of herbicides. On the subject of marketing, plenty of advice is offered about ways of helping growers, distributors or consumers, sometimes on inadequate knowledge. The desires and aims of growers as a whole (and those imputed to them) are diverse: and not until the whole can be seen - regrettably, only in figures - can the contrasts in purpose and in variety of practice be realised.

So mixed an industry may well be a sign of immaturity. There is no lack of comment upon the way events are making life more difficult for growers; but whether the eventual outcome will be at all like that most frequently prophesied remains to be seen.

Whereas the 1969 harvest gave a good crop of high-quality fruit, the 1972 crop was exceptionally low and will soon be forgotten in all but one respect - its profitability. Were this year, prior to the start of the transition period into the EEC regulations, to have seen the end of English fruit growing it would have gone out in a blaze of glory.

So, while the results presented here are mainly of historic interest, something of the extraordinary demand-and-supply situation in the year in question has been revealed, as well as something of the cost-flexibility within an industry usually thought of as subject to high fixed costs. The latter suggests English fruitgrowing to be more durable under stress than is commonly conceived.

While stressing the virtues of a 'cross section' coverage of fruit-growing, mention of its dangers cannot be omitted. The 'random sample' method of selecting participants' reports upon the human condition rather than the output or supply condition: that is to say, each grower is considered equal, and decisions are examined for their frequency, not for their importance. It is possible that, say, 20 per cent of growers sold their fruit locally: if they were all small growers, the effect upon the marketing of the national crop might not be noticeable. Awareness of the actual number of growers involved in local trade, however, could be valuable in another context.

A further hazard in trying to present a fair overall view of apple- and pear-growing is the lack of accuracy inevitable when a variety of practices has to be encompassed and these are recorded with varying degrees of attention to detail on each farm. This remark applies particularly to Kent, an area which seems rich in forms of fruitgrowing practice. Nevertheless, the following results would not have been published unless those concerned with the data were satisfied they are 'right' in each case, if not absolutely precise. The most contentious figures will be those for the fruit's due share of overhead costs when grown on mixed farms. There is no completely satisfactory way of deciding this figure: but a decision cannot be avoided when, as in this instance (a) the majority of participants have entire fruit holdings and the results for single enterprises have to be made to conform, and (b) the aim of the enquiry is profitability. The Gross Margin is an inappropriate indication of profitability here: it has a well-known function in management-type financial analysis, but management analysis has made minimal headway in fruitgrowing and a Gross Margin on a fruit crop leaves some £250-400 an acre to be split between fixed costs and profit and leaves the profitability issue wide open.

There is no good alternative, therefore, to trying to estimate profitability, which in any case deserves attention at this time, to serve in the future as a past record of performance before Britain becomes embodied into the EEC.

The Size and Features of the Enquiry

The area of the 43 participants' apple and pear orchards totalled 2,172 statute acres: this is a sample of less than 3 per cent of all growers in the area covered, and is probably inadequate as a reliable guide to actual events in 1972 - it may be, but it cannot be proved to be.

The distribution of results between regions in relation to expected numbers of participants is as follows:

	<u>no. expected</u>	<u>no. realised</u>
Bristol region	8	5
Cambridge region	17	15
Wye region	30	23
	<hr/> 55	<hr/> 43

Individual results have not been closely analysed. In each case the orchard enterprise has been treated as a whole, with no distinction between apples and pears, or even between dessert apples and a small representation of culinary apples, actual acres costed being as follows:

Dessert apples	1766	statute acres
Pears	241	" "
Culinary apples	165	" "
	<hr/>	
Total	2172	" "

The orchards themselves seem normal enough, as revealed by the following statistics:

	<u>Mean value</u>	<u>Most frequent value</u>
Number of trees an acre	157	120-150
Age of trees (years)	19	21-25
Apples and pears as a proportion of output of the farm (%)	76	75-100

The financial side can be summarized as follows:

385,712 bushels of apples and pears were marketed from 2,159 acres.

The average marketed yield of 179 bushels an acre (8.55 tonnes per ha) realized £894,391 from 2,085 acres, equivalent to £429 an acre, for producers either at the packhouse or on the farm - i.e. before marketing costs were deducted.

After paying marketing charges or costs the amount available to meet orchard-based expenses was £743,000, or £342 an acre.

After paying the so-called production expenses, producers were left with a Management and Investment Income of £201,309, or £93 an acre.

Assuming (on the basis of the 1969 enquiry) an investment in fixed assets of £720 an acre, the Income represents a return of 13 per cent, which also includes any reward for management that proprietors could justifiably claim.

Results per bushel marketed are as under:

		<u>£ per bushel</u>
Sale value in market	(226,082 bu:)	2.85
Value to producers	(366,312 bu:)	2.40
Value after marketing	(385,712 bu:)	1.91
Residual value	(385,712 bu:)	0.52

The higher level of prices in 1972 had the effect of reducing to one-third the proportion of sale price absorbed by marketing. In the 1969 enquiry the figure was two-fifths (40 per cent).

Or, to put it another way, the cost of marketing was half the cost of growing the same crop (including profit). On a cost basis growers spent about £0.94 per bushel on marketing and about £1.39 a bushel on growing this light crop.

Some further features of the results from this sample of growers are expressed in the distributions on p. 27. Here the phenomenon is clearly the predominance of a small-to-modest business, for revenue on more than 60 per cent of enterprises fell within the range of £2,000-10,000 (top right-hand diagram). This result could be realised by growers using cooperative packhouses having 25-30% more acreage than growers marketing independently; for the latter receive all the (net) revenue from sale of their fruit whereas the cooperative receives perhaps 70-80 per cent, the remainder being kept by the packhouse for services rendered.

The distribution of yield (top left-hand diagram) shows the now familiar bi-modal form: that is to say, only a minority of growers had an average yield - the average is actually the (arithmetical) result of most growers having below-average or above-average yields.

The lower diagrams on page 27 show (on the left) an approximately 'normal' distribution of profit per acre and (on the right) a skewed distribution giving the welcome message that a low unit cost of production was a most frequent occurrence.

The major inter-regional physical differences are (a) the relative importance of the apple and pear enterprise on the holding, and (b) in the intensity of production.* Here are the details:

	<u>Bristol</u>	<u>Cambridge</u>	<u>Wye</u>
Mean tree nos. per acre	136	151	164
Mean age of tree (yrs.)	20	21	18
Resources in enterprise (%)	61	74	80
Intensity of production	116	150	134

* defined here as the combined cost per acre of variable-type costs and regular labour.

Differences between holdings are brought out in a later section. As regards the table above we have the picture of the Bristol province farms having the largest trees and also the least important fruit enterprises and the most economical (or efficient?) way of managing them. This is to be expected where apples and pears constitute a big enterprise on a large mixed farm. Enterprises in Essex, Suffolk and Lincolnshire are distinguished by high orchard inputs (possibly connected with the higher average prices realized) - evidence of a desire to do the crop well. As regards Kent and Sussex, the figures for the Wye sample indicate the regeneration of fruit-growing: by comparison this region has the most closely-planted trees, the youngest trees and the highest degree of specialization.

These mean sample figures, being liable to be swayed by, say, one extreme case in each instance, are in truth partly accidental. None of the quantities is significantly different from the others in the statistical senses. However, it is clear that three out of every four participants were either specialized growers or horticultural producers with apples and pears as a main interest (i.e. at least 70 per cent of total farm revenue from dessert apples and pears), which should mean that the results have particular significance for the growers concerned.

Participants will know that the enquiry was intended to be comprehensive, and to collate information upon the extent and type or irrigation installations in use, and whether adaptable for frost protection. It was also thought a knowledge of the rate of release of fruit from store would be useful, and a record of variety prices

helpful to growers who were not members of a cooperative.

These extra intentions proved too ambitious in practice, and would probably be best realized through a specific enquiry. For the record -

63 per cent of growers had stores on the farm,
23 per cent had irrigation,
19 per cent had specific frost-prevention equipment
(either sprinklers or candles).

About 10-11 per cent are revealed as the fully-equipped, intensive farm of a type which had publicity some years ago. No startling results were realised on irrigated orchards, however. The mean yield on the farms in question was 166 bushels an acre - fractionally higher than the mean for non-irrigated orchards of 154 bushels an acre. This extra 12 bushels an acre would have added about £23 to the producer's net return per acre.

As regards the variety prices and net returns per acre, thirty-five usable records were received. Regrettably, the average prices fell mainly into one of two classes - either 'ex-market' or 'ex-packhouse' - which are not easy to reconcile, and, moreover, once outside the pure case of total reliance on one packhouse, marketing practice was mixed and thus rendered results likely to mis-interpretation. Some purely factual results are given in a later section.

Finally, the number of participants from whom results were not obtained was higher than usual, and higher than Universities would like: this was mainly due to accounts not being ready by the closing date; and in addition to normal 'wastage' on account of retirement from the industry and so on, there was occasional objection to the disclosure possibly misleading figures.

Analysis of Financial Results

This section consists of a four-part analysis of the overall results previously summarized, and with one small difference from the summary.

Separate presentations are made of the following:

- a. aggregate results on the enterprises individually;
- b. regional results;
- c. results by size of enterprise;
- d. results on specialized and mixed holdings.

The small difference referred to above is that in this section the basis of analysis is a mean value per farm. In the previous summary there were given average values for the whole crop. The average figures serve when data about the whole sample is required, but from the management and policy aspects it is more useful to know the situation on individual farms. There can be big differences between the two. In this case, because yields per acre were notably lower on the small enterprises in the sample than on the large enterprises, to divide the aggregate output by the orchard acreage used gives a yield of 179 bushels an acre: when the yield per acre on individual farms is averaged the figure is 157 bushels an acre.

The Financial Pattern in 1972-73 : An Overall View
Results per statute acre of orchard area

	<u>Range within the sample</u>	<u>Most frequent value</u>
Bushels marketed	43-386	100-150
Sale Price per bushel (£)	1.64-3.33	2.76-3.00
Money received from the buyer (£)	101-883	300-350
	£	£
<u>Sharing of Proceeds</u>		
1. to the wholesaler or intermediary in selling the crop	18-111	31-40
2. to the producer for marketing his own crop	16-218	31-60
3. left to the producer to pay for production costs and for profit (= Gross Output)	81-705	151-200 and over 400
4. to the producer for variable-type cost	29-186	50-70
of which : sprays and herbicides	8-51	30-35
manures	2-19	6-13
casual labour	0-129	11-20
5. left to the producer as Gross Margin	44-623	151-200
6. to the producer for fixed-type costs	50-429	100-150
of which : regular and own labour	29-196	40-60
all other	46-293	50-70
7. residual amount left to the producer (= Management and Investment Income)	(-)93-265	51-100
8. item (7) above, but including value of own labour (= Net income or Profit)	(-)93-265	100-150
9. Management and Investment Income as percentage of sale proceeds	-	23

The Financial Pattern in 1972/73

Set out on the opposite page is a series of figures showing what has been called the 'financial pattern' of producing the 1972 crops. Frequent reference is made in this report to the big variation recorded in apparently similar quantities. What most readers learn from this sort of survey - and it is not always welcome knowledge - is that there are numerous ways of producing and marketing an apple and pear crop.

To condense highly-variable quantities into 'an average figure' can be misleading. So while the information opposite is not so convincing or as neat as the customary array of arithmetically correct averages, it is thought to reveal more of the actual receipt and manner of disbursement of the revenue producers had from the sale of their crops.

Values are expressed on the 'per (statute) acre' only, not 'per bushel'. For the crop in question, costs per bushel are further from normality than costs per acre. 'Normality' is expressed in the column of figures nearest the right-hand margin, and it only serves to stress the extent of departure from normality on individual enterprises in this admittedly exceptional season.

Table 1. Average Results by Region

	BRISTOL province	CAMBRIDGE province	WYE province
No. of enterprises	5	15	23
Mean acreage	66	48	61
Yield per statute acre of orchard (Marketed bushels)	127	146	171
Net return to producer (£ per bushel)	1.83	2.27	1.66
Net return per acre or GROSS OUTPUT (£)	233	331	284
Variable-type costs (£)	68	68	66
GROSS MARGIN (£)	165 ⁽⁴⁾	263	218
Regular labour cost (£)	35 ⁽⁴⁾	93 ⁽¹³⁾	68
MARGIN OVER LABOUR (£)	130 ⁽⁴⁾	170 ⁽¹³⁾	150
Other fixed costs per acre (£)	67 ⁽⁴⁾	98	85
MANAGEMENT AND INVESTMENT INCOME per acre (£)	63 ⁽⁴⁾	72	65
Proprietor's labour per acre (£)	17 ⁽³⁾	-	27 ⁽¹⁴⁾
NET INCOME per acre (£)	80 ⁽³⁾	72	75 ⁽¹⁴⁾

Note: Figures in parenthesis denote the number of enterprises concerned.

Regional results

The constitution of each regional sample conforms with what is known about each region. Middle-sized enterprises of intermediate intensity predominate in the Bristol group. Cambridge covers an area in which relatively modern enterprises, normally specialized, are managed more intensively; but there are also notable instances of production on farms in the province. Wye deals with a longer-established area in which the variety of enterprises is probably greater than elsewhere.

As regards comparative yields, mean values increased towards the south-east of the country. The pre-eminence of Kent and Sussex is partly accidental, because in such small samples one exceptional result can influence all results. By another criterion, that of the percentage of enterprises having a yield of between 100 and 200 bushels an acre, regional results are as follows:

Bristol	- 60 per cent
Cambridge	- 40 per cent
Wye	- 50 per cent

- which suggests that (a) weather effects were experienced nationally in 1972, and (b) no particular part of the country can be relied upon to produce normal quantities of fruit under adverse conditions (as would seem to be desirable if English growers wish to retain their present share of the market).

The higher mean net home price realised in Cambridge province was largely due to (a) advantageous sales to wholesale markets and (b) little variation between growers - the range in Cambridge province was £1.74-2.69, against £1.35-2.50 for Wye province. Should this situation recur with the normal sized crop of 1973 it will be examined more closely, particularly (if possible) whether Essex-grown fruit moves to particular markets.

The greater intensity of production in Essex and Suffolk shows in the cost structure, but mean financial results were very similar in all three regions.

Table 2. Average Results by Size of Enterprise

Size Group (stat: acres)	<u>10-20</u>	<u>21-50</u>	<u>51 and over</u>
No. of enterprises	13	13	17
Yield per statute acre of orchard (Marketed bushels)	135 ⁽¹²⁾	174	159
Net return to producer (£ per bushel)	1.92 ⁽¹²⁾	1.99	1.94
Net return per acre or GROSS OUTPUT (£)	230	346	311
Variable-type costs (£)	63	73	67
GROSS MARGIN (£)	167	273	244
Regular labour cost (£)	74	64	70 ⁽¹⁶⁾
MARGIN OVER LABOUR (£)	93	209	181 ⁽¹⁶⁾
Other fixed costs per acre (£)	86	89	90 ⁽¹⁶⁾
MANAGEMENT AND INVESTMENT INCOME per acre (£)	7	120	91 ⁽¹⁶⁾
Proprietor's labour per acre (£)	37 ⁽⁷⁾	19 ⁽⁵⁾	7 ⁽²⁾
NET INCOME per acre (£)	42 ⁽⁷⁾	116 ⁽⁵⁾	114 ⁽²⁾

Note: Figures in parentheses denote the number of enterprises concerned.

Results according to size of enterprise

One of the features of these results is the poor showing of the smallest class of enterprise, those with between ten and twenty acres. Almost without exception these enterprises were entire holdings and not small areas on mixed farms. It can usually be expected that these small businesses are particularly well-located; but this theory was exploded in 1972, for there was a high proportion of crop failures on small areas. On five of the thirteen enterprises marketed yield was less than 100 bushels an acre, and hence, in comparison with enterprises which did fulfill expectation, results here were even more variable than in the sample as a whole. Mean yield was 135 bushels an acre.

Small growers' prices, however, were closer to the average for the sample. Low yield and low quality frequently go together, and this can explain the instances of poor price which bring down the group's average. On the other hand, small growers can frequently sell more of a short crop at retail, and the evidence for this year does not indicate the small grower being in a weak bargaining position with his buyer(s).

It has been shown in 1972/73 that a small enterprise can be managed to produce a result which a large enterprise cannot, and that is to show a paper profit on a Gross Output of less than £100 an acre. This is done by cutting everything to the bone to match the minimal revenue. In fact, a few small enterprises only paid proprietors for their work because they did not do any: that is to say, the proprietor delegated or contracted out such work as was essential and pocketed the small cash surplus realized.

More frequently, small enterprises have the higher fixed costs to meet and rely upon more-intensive production to offset this. This diverse group shows the expected handicap of high labour costs (in relation to output): otherwise, average costs are not out of line and their downfall was lack of fruit.

Once away from small-scale production, it would appear that the economies of larger-scale operation are less potent than the loss of actual efficiency in the circumstances of 1972/73. It is unexpected to see superior efficiency operative down to the level of an enterprise of 25-30 acres.

Table 3. Average Results - two types of practice

	<u>Specialized</u>	<u>Mixed</u>
No. of enterprises	4	4
Mean acreage	66	42
Per cent of resources in enterprise	85	57
Yield per statute acre of orchard (marketed bushels)	262	183
Net return to producer (£ per bushel)	2.10	2.02
Net return per acre or GROSS OUTPUT (£)	547	370
Variable-type costs (£)	95	72
GROSS MARGIN (£)	452	298
Regular labour cost (£)	96	33
MARGIN OVER LABOUR (£)	356	265
Other fixed costs per acre (£)	153	62
MANAGEMENT AND INVESTMENT INCOME per acre (£)	203	203
Proprietor's labour per acre (£)	-	7 ⁽²⁾
NET INCOME per acre (£)	203	241 ⁽²⁾

Note: Figures in parentheses denote the number of enterprises concerned.

Specimen results from contrasting practice

Specialized producers, who have the highest degree of commitment to apple and pear production, tend to look askance at farmers' efforts in the same direction. Specialists set the quality standards for the industry and, owing to their high overhead expenses on a limited acreage, depend upon high output for their success. In the writer's experience specialists are to some degree involved in adapting their immediate environment in order to try to secure a high level of output.

By contrast, the farmer who is in the right place can get a crop without the expense of adaptation - not the same crop as the specialist, but still of good commercial quality and at considerably lower cost.

A comparison of results from the two ways of growing fruit is shown in the table opposite. Numerically, farmers are much in a minority in the sample and it would consequently be unfair to compare all specialists and all growers. Instead, the means of the best four results in each case were compared, and, without any connivance by the writer, Management and Investment Incomes were identical.

In short, the specialists were marketing 43 per cent more per acre, at slightly higher average price, than the farmers but spending twice as much per acre in doing so. It would seem from the table that the farmers were not denying the trees the essential raw materials, but they were managing with labour applied as thought necessary, and, of course, with lower overheads per acre. It is not impossible to carry over orchards for one year on an input of 65-70 hours' regular labour per acre: the same cost occurs elsewhere in enterprises where economy was the order of the day.

Discussion of the Results

There are few, if any, normal years in English fruit growing, but by any standards 1972 was exceptional. This being so, there is little to be gained by working out management standards or detailed costs per bushel. Purely for the record, however, two large-scale observations seem to be invited: these concern production and demand respectively, and are now dealt with in turn more fully.

Production

This sample of results provides no evidence of a trend towards a uniform practice in apple and pear growing. As will be shown later, the variation between enterprises in the item 'variable costs', which consists largely of essential materials like orchard sprays and fertilizers is greater than the variation in yield and at least as great as that in labour use and in fixed costs - and almost everyone is aware of how the grower's standards of living affects the latter.

A year like 1972 probably does more to delay conformity to norms than to hasten it. For example, will a 'profit' (Management and Investment Income) of £58 an acre on a crop of 75 bushels an acre (3.6 tonnes per ha) encourage the grower to grub the trees? Or will the farmer who picked 118 bushels an acre (5.6 tonnes per ha), grown at a cost of £128 an acre be influenced to change his methods? Much as there is thought to be a 'right' way of growing fruit, at present, and in the short term, when Nature more than usually sets man's efforts at nought, there are many viable practices.

In fact, Man's intervention in fruit growing practice was very much of the same order as Nature's intervention between holdings in the year in question. To measure variation by the simple process of comparing means and standard deviations shows the differences between (a) variable costs per acre and (b) all allocable regular labour per acre on the individual farms to be if anything greater than the differences in marketed yield as follows (Table 4).

Table 4. Individual Variation between Enterprises

		Mean value	Standard deviation	Deviation as % of mean
Yield per acre (bu:)		161	68.4	42
Variable cost per acre	(£)	71	33.7	47
Allocable reg. lab. per ac.*	(£)	70	42.7	61
Average cost [†] per bu:	(£)	1.57	0.53	34
Net output per £100 lab.	(£)	35	18.2	48

* on farms having regular labour

[†] fixed and variable orchard based costs

Moreover, if the farms on which no regular labour is employed (a permissible state on a small acreage ?) had been included in the analysis the coefficient for 'allocable regular labour' would have been higher still.

It is not altogether certain that departures from the norm invite disaster. Obviously, excessively high cost in 1972 was frequently recompensed in price, but the ability to cut costs and still realise a good price is a sign of flexibility and strength. Production on mixed farms stands out in this context, as is shown in Table 3.

Marketing

Oddly enough, the cost of marketing is one of the least variable factors within the sample. Almost every grower either thought it right to, or was compelled to, sort or grade and pack his fruit, although to do so was the costliest operation on the farm.

No correlation existed in 1972/73 however, between what is spent on marketing and the subsequent sale price per bushel. In partial explanation of this one may cite (a) the lack of reward for storing fruit in 1972/73 and (b) the more general situation of smaller producers selling either on the farm or direct to retailers and so 'at a stroke' both raising their selling price and reducing their marketing costs. The packhouse which makes a retail feature of its small apples is not in quite the same position, as the small apples, having been through the grading process, are not cheap apples at the time of sale.

One cannot infer too much from a year when apples and pears were relatively scarce, but the thought cannot be dismissed that the marketing processes to which single farm's fruit is subject are determined by something more than the basic (i.e. improvable by marketing) value of the sample.

Judged by results, individual practices are rational and have the effect of producing relative uniformity in cost-of-production (without regard to quality). The same situation was found in the 1969 crop enquiry. This intention to keep costs per acre within bounds results in lower unit costs than otherwise, and when the unit price of apples and pears is high, actually allows a greater tolerance in performance than in a year of normal crop.

How this variation in the management of single enterprises should be regarded is not absolutely clear - and is perhaps not worth intensive consideration in this exceptional year. Overall it would seem that the general principles of higher yield related to lower unit cost apply on single farms, but not between farms without qualification. And even the point of greatest profitability in yield needs careful calculation on each farm.

Farm management theory has never been able completely to abandon the notion that all farms are in certain elements unique: these results lend support to this notion. Most present-day fruit-growers have had long experience, and are consequently able to manage resources effectively according to their desires - as evidence of which we may cite only the usual degree of variation in the Net output per £100 labour figure (Table 4).

Possibly, the two basic philosophies of growers are (a) the time-honoured one of "do what you must and take what you can" and (b) the science-based one of "we must improve upon Nature". The nation may incur the greatest loss when either philosophy is applied in unsuitable circumstances. For instance, where the natural environment is too inimical, science may not have the answers at acceptable cost; just as where a good crop comes naturally, but irregularly, performance could be improved by more-intensive practice.

In either case, flexibility in the organization would seem to be highly desirable, for yields in England will continue to be unreliable, and revenue per acre more variable than in the past. The less-intensive growers and the smaller growers can adjust to lower revenue by accepting lower personal earnings for a given amount of work. Intensive growers and large growers, who have tried to ensure regular and high revenue will be in the more difficult position if they fail, because, by definition, they have high fixed costs.

About four growers out of five (79 per cent) showed a financial surplus in 1972/73, compared with almost two out of three (65 per cent) in 1969/70, according to similar criteria.

Thus, the phenomenon of the 1972/73 season was the high price. And if ruling prices for apples were higher than anticipated, one reason therefor may have been that the crop was even shorter than anticipated. Figures of average yield per acre of apples on this sample of farms were generally 8 per cent lower than official estimates, as under:

Yield* per statute acre (cwts)

	<u>Official estimate</u>	<u>Sample result</u>
Dessert apples	69.2	63.9
of which Cox O.P.	61.0(e)	63.7
Dessert and cooking pears	72.6	77.2

e = estimated (87,000 tons from 28,500 acres)

* "Gross production" (official); marketed yield (sample)

The margin of some 8 per cent in yield estimates is not likely to be entirely accounted for by differences in definition of 'yield'.

This was a season in which storage helped to even out prices, rather than to create differentials between the start and finish of the season. Cox in particular kept a steady price throughout, Class II being quoted at wholesale at 10.3p a lb. in mid-October 1972 and 9.9p a lb. in mid-March 1973.

Such orderly marketing is a good augury for the future. It now seems that few reputable growers contemplate low-cost production and low-price marketing early in the season. Given low-cost production and no plethora of other autumn-harvested fruits, to sell the whole crop unstored is feasible - as it once was in Canada. When there is competition from other fruits, however, and a low price for apples does not induce the required rate of consumption, to get out of the crop quickly - unless it be at a good price for storage by someone else - is not a profitable strategy. On the other hand, if fruit is to be cheap out of store it has to be cheap going into store. Storage will not transform the prospects for a high-cost crop.

Demand

Why should the price have been so consistently high during 1972-73? Economic theory cannot account for consumers' tastes, but it does attempt to explain the observed situation through the notion of elasticity of demand - in this case IN-elasticity of demand. This means that the quantity of crop sought by consumers is not greatly affected

by the unit price. Inelasticity more usually shows itself in horticultural crops as an excessive fall in price when produce is in excess - consumers are not sufficiently attracted by the lower price to buy more produce (which, incidentally, is the economic flaw in the classical function of price in produce markets - that is, to clear the produce available on the day of offer).

Conversely, when supplies are short, because price is an inadequate deterrent, price rises possibly out of proportion to the degree of scarcity. In comparison with 1969, for example, the yield in 1972 was exactly one-third down, and producers' revenue per acre was 55 per cent greater (£342 against £221). This is precisely the situation which leads economists to contend that agricultural producers tend to oversupply and hence to receive lower earnings (and more farm-income support) than otherwise. But the economists' position needs careful explanation. Unreasonably low market prices for produce may suit governments and be acceptable as policy: but where an agricultural sector has to be self-supporting and is required to earn incomes equal to those elsewhere, supply management is usually necessary. That is to say, production should be more than adequate (to ensure there is enough to go round), but supply to markets should not be excessive.

It is apparent from the better results in 1972 than in 1969 that the most profitable level of output of English apples and pears is nearer the 250,000 tons of '72 than the 350,000 tons of '69. However, continuation of the '72 situation is no more to be welcomed than that of '69. The 1972 position is unstable and unreal because: (a) if continued, it would encourage greater production and price would fall again, and (b) if 250,000 tons were the 'right' amount to market each year, present resources in men and trees would be excessive. A regular output of 250,000 tons could be grown at less cost than in 1972.

The Reward for Risk-taking

Once it is accepted that an income per acre (as used here) of £93 is rather high, and of £33 (as in 1969) is too low, the way is open for consideration of a 'proper' income for English apple and pear growers. When interest rates were at the level of 6-8 per cent, growers expressed the idea that a return of at least 14 per cent on investment was justified in their case. So a current 13 per cent return is likely to be thought inadequate for those engaged in such a risky industry - and a majority of growers would surely claim fruit-growing in England and Wales to be risky.

But what of the risks themselves? It would seem here that in the past a general case has been argued from a particular condition without regard for the difference between the two. Looking to the future, it may be said that growers might well seek above-average returns just now because they will be below average in the future. This is one way of saying that the price of keeping growers on their farms has gone up because the risk of reduced incomes has increased: and is understandable in its way.

Looking backward, and to the individual case, a grower may have been ignorant of the risks when he started, and found thereafter that many things can spoil his plans. Crop failure was not necessarily one of them; for as the 1972 results have shown, if all growers have a light crop the result is not disaster, but the reverse. The 'weather' risk for the individual grower has been the chance of a light crop when most other growers had a full crop. This cannot happen to all growers and thus has not been as great a risk to the industry as has been popularly supposed. Actually, the greater risk of income loss to the industry as a whole comes from (a) the low prices in a full-crop season, and (b) incomplete knowledge of fruit-production processes. The fact that biological material is inherently less reliable than inert material would cause a prudent man to raise his price a little for dealing with it. This argument can be refined by assuming a prudent man also to equip himself with the additional knowledge and management expertise required by the situation: in which case there is less justification for reward for risk-bearing and more justification for a claim for exercising higher managerial skill.

So, in the past, the risk borne by individual fruit-growers may have been exaggerated, with too much thought for natural hazards and too little for longer-term effects upon a business, such as lack of either a successor or of opportunity to be 'taken over' by another firm: but there is still a case to be made for a 'risk' rate of return in fruit-growing, and this is attempted in general terms below.

Fruitgrowers can claim society's indulgence on two counts. First, all growers will experience wider fluctuations than normal in their annual incomes. Years of adequate income will be interspersed with years of inadequate income, which cannot be foreseen. The result is uncertainty, upsets to preconceived plans and possibly both short and long periods of indebtedness. They also have large investments at stake which have low transfer value. Penury may be unavoidable for those who cannot cope with the situation. Those who do progress will succeed by applying out-of-the-ordinary management skill. This might be labelled 'service beyond the producer's normal line of duty', and as such merits a reward.

Second, there are specific risks for firms individually. Any single firm could succumb to an inexplicable event. Such a disaster is the more probable in fruitgrowing because neither production nor marketing is under control. This is the type of risk which ordinarily becomes aggregated and part of fruitgrowing lore. It is a risk not likely to affect all growers all the time. It is more likely to affect a few growers for some of the time: but, because its incidence cannot be forecast, all growers feel themselves equally vulnerable, although their notional reward for sustaining this added uncertainty can be no higher than the costs of insuring against it.

The above still does not explain why profits can be high in a risky industry - it seems a contradiction in terms, for if risks are real and operative, profits should be below-average. This phenomenon can only be explained satisfactorily in the time dimension, as follows:

1. It is clearly permissible for all firms in a risky industry to make good profits in certain years, provided this happens occasionally and not regularly.
2. It is clearly permissible for average profits to be high for longer periods than in (1) above, as when risk is unfairly experienced or unequally counteracted and successful firms succeed very well while others fail.
3. It is clearly essential for long-term average profits of all, including the original, firms to be below average, otherwise the label of 'risky' is undeserved. Firms which have collapsed cannot in practice have their results set against those that continue: but unless they are included in an assessment of an industry its riskiness cannot be determined.

In this way, English apple and pear growers may have qualified for a 'risk' rate of return in 1972 not because the crop failed but to compensate for previous years when a crop failure was a serious matter to the individual and industry-wide profits were below average.

Variety Prices and Returns

It is not clear how the mixed response of growers to this part of the survey can be given suitable expression. To emphasize freak results, for example, could do more harm than good, and in all cases to use a price without full knowledge of circumstances involves a certain amount of risk of misrepresentation.

The two guidelines now adopted are:

- i. there is safety in numbers : report only frequent occurrences,
 - and ii. do not average dissimilar values,
- and the results are (a) each average price is the mean of at least five entries, and (b) average prices are more extensively quoted than average net returns, for the latter are heavily influenced by the variations in yield which are far greater than those in price.

One set of values is given for prices ex-market and one ex-packhouse; and the variations shown are simply factual. It is not known to what extent, if at all, a given price results from, say, poor quality or small size of sample, long storage, weak selling, high deductions or any other likely cause.

The range and mean of the prices reported are as follows (Table 5):

Table 5. Variety Prices - 1972 crop - in £ per bushel

	<u>ex-market</u>		<u>ex-packhouse</u>	
	mean	range	mean	range
<u>APPLES</u>				
<u>Early varieties</u>				
George Cave	1.85	1.37-2.24	-	-
Discovery	3.15	2.58-3.66	2.87	2.49-3.17
T.E. Worcester	2.52	1.56-3.11	1.87	1.54-2.27
<u>Mid-season varieties</u>				
Worcs. Pearmain	2.03	1.16-3.41	1.55	1.23-2.67
Egremont Russet	3.10	1.77-4.14	2.09	1.89-2.50
Lord Lambourne	2.75	2.30-3.33	-	-
<u>Stored varieties</u>				
Cox's O.P.	2.92	1.65-4.31	2.19	1.51-3.14
Golden Delicious	-	-	2.39	1.73-3.83
Crispin	-	-	1.66	1.41-2.00
Laxton's Superb	2.53	1.77-3.20		
<u>PEARS</u>				
Conference	2.15	1.50-3.05	1.64	1.34-1.99
Comice	2.65	1.16-4.06	2.02	1.67-2.37

The above figures are chiefly notable for this indication of the eclipse of Cox in 1972-73. This variety was as short as any in relation to its length of marketing season, and would normally have benefitted from the higher prices for stored fruit. Discovery was the most reliable of the early varieties, but overall Lord Lambourne seems to have provided the best samples and was the real money-spinner in 1972 among all varieties of apples and pears, with Spartan showing up well at its few appearances.

With regard to calculated net returns per acre, values of less than £100 and of more than £1,000 have to be accommodated. To this end, an idea of the comparative performance of varieties can be given by quoting the range, within limits of £100 an acre, within which most individual results fall. See Table 6 below.

Table 6. Variety Net Returns - 1972 crop - most frequent value
(in £ per statute acre)

	<u>ex-market</u>	<u>ex-packhouse</u>
<u>APPLES</u>		
<u>Early varieties</u>		
George Cave	0-100	-
Discovery	400-500	-
T.E. Worcester	200-300	200-300
<u>Mid-season varieties</u>		
Worcs. Pearmain	400-500	300-400
Egremont Russet	400-500	-
Lord Lambourne	1400-1500	-
<u>Stored varieties</u>		
Cox's O.P.	450-550	400-500
Golden Delicious	-	400-550
Laxton's Superb	550-650	-
<u>PEARS</u>		
Conference	450-550	-
Comice	600-700	-

note: - indicates extreme variation in individual results.

Relevance of the Special Payments Scheme

When trying to work out whether they would be better off without their dessert apple or pear trees, growers are more likely to refer to their accountant's Net Profit figure than the economist's figure of Management and Investment Income (MII). For a working proprietor, Net Income is more serviceable than MII (because it includes the value of his labour, which he would want an alternative to provide as well), but both the economist's terms leave a lot unsaid about the assets and liabilities position, and MII is used here only as a substitute for Net Profit.

The distribution within the sample of MII per acre was as follows (Table 7).

Table 7. Distribution of MII per acre

Income range (£)	-50 or more	-49 -0	1- 49	50- 99	100- 149	150- 199	200 and over
No. of enterprises	3	5	7	15	4	4	5
Percentage of enterprises	7	12	16	35	9	9	12

Possibly 25 per cent of enterprises might be considered prima facie cases for compensation, but growers' response to the Special Payments Scheme, which offers once-for-all payments mainly in the range £120-150 an acre, is said to have been poor. The inferences are (a) that few enterprises have been consistently unprofitable, and (b) hope lingers on and growers do not give up easily.

Which growers would be better off with £130 an acre in their pocket and no trees? The answer is perhaps in three parts -

- i. the intended duration of production,
- ii. the incentive to give up,
- iii. the sacrifices in giving up.

Only in one case in (i) above is any advantage likely to be clear-cut. A grower who has already decided to give up in 1974 can take the payment and better himself by the amount of the payment. Otherwise, the further a grower looks ahead, the less the present value of a lump sum seems to be.

In all other cases the grower has the problem of comparing two future income states - one with and one without his trees - and balancing financial and non-financial factors in his decision. The unusual feature of the Special Payments Scheme is its anticipation of events. Growers have to decide before they know. The outcome will always be in doubt.

So the incentive to give up an entire holding has to be considerable, and has to outweigh the sacrifices called for. The decision about a constituent enterprise will be less onerous. Incentives can only be largely financial: for if fruit-growing is a chosen way of life nothing is preferable to it. As regards the Scheme, this means that (a) financial inducements will need to exceed financial and non-financial sacrifices before growers give up voluntarily, and (b) financial hardship may be willingly accepted as the cost of continuing in production.

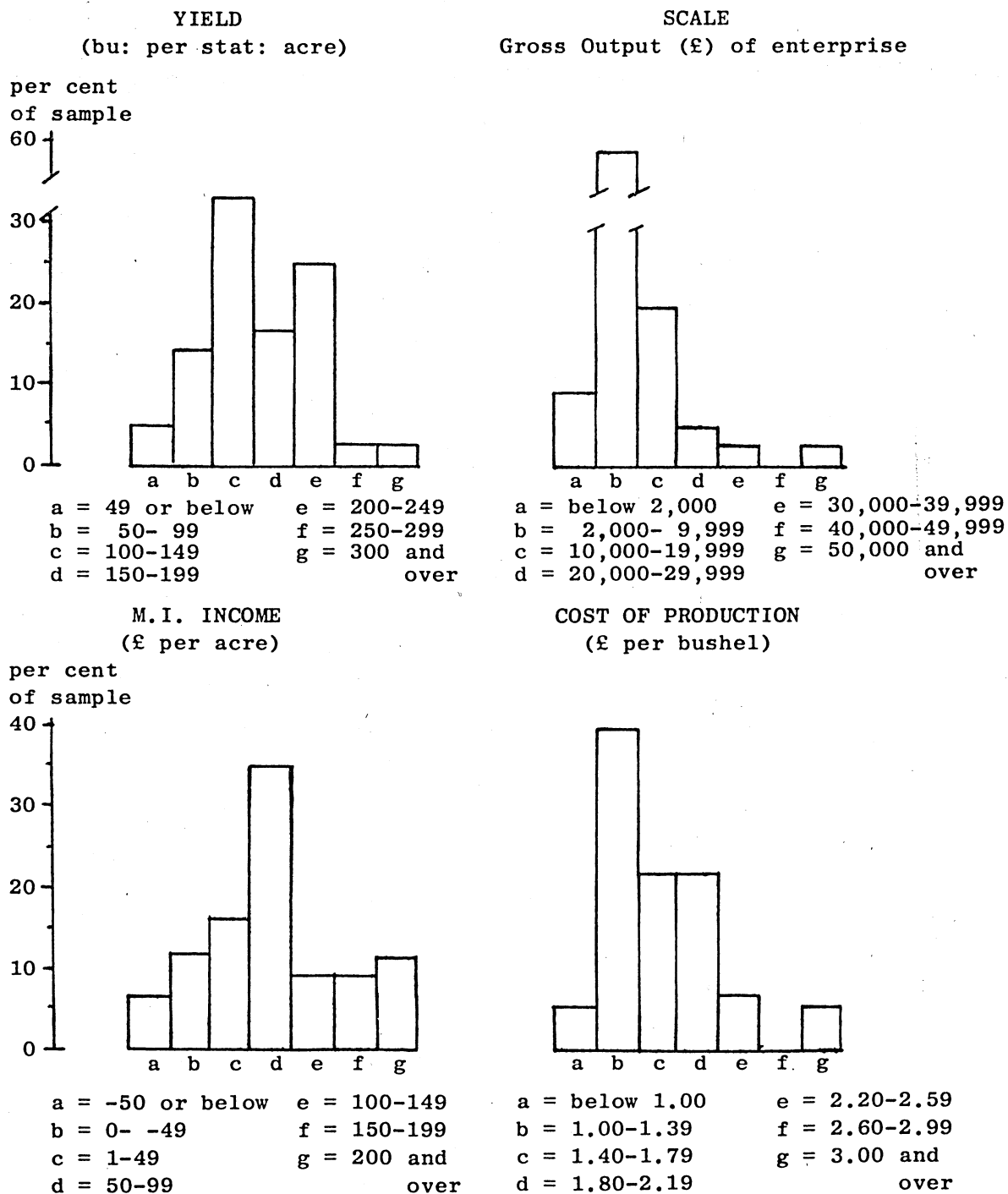
Financial inducements under the Scheme are of two sorts. First, there is the cash payment. This diminishes in annual value the longer it is supposed to operate. A lump sum payment of, say, £150 a year used as an investment to earn interest, (at 8 per cent), is worth £162 after one year (£150 + £12). For a ten-year period (without discounting) its notional value is £27 a year - not much of an inducement, perhaps on a farm of 25 acres. The alternative inducement is not subject to this diminishing value with time. Although he has grubbed his trees, a grower still has his land and can either let it or farm it. That is, in cases where a grower is looking a long way ahead, the profit from the prospective alternate use of land is a more effective inducement than the worth of a present lump sum. A frequent obstacle here may be that the lump sum is inadequate to re-capitalize the holding for another form of intensive production.

Were substantial inducement offered and not accepted it can only be concluded that the sacrifices enjoined are even more substantial. Such voluntary sacrifices cannot be nicely judged, although they may be resolved by force majeure. Sacrifices are both financial and non-financial. Almost by definition financial sacrifices cannot be high, which suggests that the non-financial sacrifices loom large for growers. They would have in mind not only the loss of satisfaction in life, but the projected toil of re-establishing a new line of business on the farm.

All in all, it would seem to be inordinately expensive simply to attract growers away from fruitgrowing. A 'push' factor is necessary to complement the 'pull', if only because a frequent decision is not whether to give up fruit growing but the more serious one of whether to get out of farming altogether.

Much can be covered up in an average figure, so another presentation is given below - the distribution by value of the individual enterprises' results. These are intended for comparison with 1973 crop figures (when available) as much as for present consumption.

Four Distributions



Definitions

The following definitions may help the interpretation of the terms used in Tables 1-3.

Net return to producer is what the grower has left when all market and marketing costs or charges have been paid. It is the sum available to meet costs incurred on the farm other than marketing. For the grower marketing through a cooperative packhouse it is the same as Gross Output.

Variable-type costs are predominantly incurred in the orchard: they include all chemicals or other raw materials such as canker paint and grafting wax, and also all casual labour, whether for picking, or for fruit-thinning or pruning.

Gross margin - Gross Output minus Variable Costs.

Regular labour cost is the amount paid to regular staff, including the proprietor on farms where he claimed an allowance was due for his own manual work.

Margin over labour cost is Gross Margin minus regular labour cost.

Other fixed costs consist of the operation (including fuel), upkeep and depreciation of all production equipment (including motor vehicles; repairs to business premises; business expenses (including levies); rent of the farm and rates on farm property; paid management where actually incurred, and, in a few instances, depreciation of orchards.

The rent charge is that agreed with the proprietor, and its level is intended to signify the investment in fruit-growing, over and above the rental value of the bare land. Individual figures lie between £15 and £30 an acre.

Depreciation, at the rate of £16 an acre, has been added to the costs obtained from the grower where the average age of the orchards exceeds twenty years and there is no provision for replacement of trees.

Net Income approximates to an accountant's "net profit", because it is the proprietor's total income from his enterprise. As the value of his labour has been deducted in determining Management and Investment Income, the Net Income figure is obtained by adding it back again.

Management and Investment Income is the sum remaining after paying all costs and dues for outside labour, materials and services. It is the economists' way of standardizing "profit" and is necessary because the variety in business organization - i.e. partnerships, limited liability companies, sole proprietor - gives results which are not strictly comparable.

It is given this title because it is the sum available to reward the proprietor for (a) his management, and (b) his investment. (By making suitable allowance for management the reward to investment can be estimated, and vice versa.)

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