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Potatoes - Cost of production o.s.

JANUARY 1966

ECONOMIC REPORT No.90

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EARLY POTATOES - 1965

by

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EARLY POTATOES - 1965

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Piece-Work Potato Gathering
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Report on Grain Drying - 1958 Harvest
Organisation of Hill and Upland Farming in Selkirkshire
Economic Aspects of Tractor Work, 1957-58
Some Notes on the Depreciation and Repair Costs of Farm Machinery
Hill and Upland Sheep Production Costs

Copies of these publications may be obtained on request to
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FOREWORD

This report reviews part of a study of the production of potatoes being carried out jointly by the three Scottish Colleges of Agriculture. The growing of this crop is of particular importance in the arable areas and the differences in yields per acre, quality and other factors outside the control of the individual farmer can and do manifest themselves in wide fluctuations in the scale of the returns from this crop. This position has been all too painfully obvious during the last few years. At times when the general market situation has been inimical to the farmer's interests, the operations of the Potato Marketing Board introduce a considerable degree of stability (the situation in the absence of the Board would be chaotic) but the Board is faced with problems relating to the country-wide production of main crop potatoes over the whole marketing period. In such circumstances, individual producers or areas may find it difficult to obtain returns commensurate with the costs of producing the crop; its contribution to the farm profit can easily be negligible or, at the worst, be a burden on other sections of the farm economy. The solving of the problem of the optimum relationship between production and consumption is not the immediate concern of the farmer himself except for his responsibility as a member of a group of producers represented by a statutory Marketing Board. He must fit his production of this crop into the restrictions laid down by his Board; his main activity is the organisation of growing the crop on the farm.

Many farmers, whose soil and climatic environment permit, have turned to that section of potato production which still presents some freedom from regulation, i.e. the growing of early potatoes. A study of potato production would not be complete without some reference to the early crops. Here the grower has to face the same uncertainties of weather, yield, quality etc. which confront the producer of main crop ware; he is selling on a market which is even more sensitive to fluctuations in supply and lacks the full measure of support derived from the activities of the Potato Marketing Board. In short, the early potato grower is working in a very speculative market in which returns and profits can be very good and can be equally bad. As with the main crop producer the economic factors which are within his control are those on the costs side and some knowledge, not only of his own costs, but how costs may vary and what levels of production may follow, cannot help but be of value. Production business management based on records and comparative data is perhaps of even more importance as the degree of speculation on the marketing side increases.

In this report the costs data relating to crops of early potatoes grown in 1965 in the East of Scotland - a season which presented an unusual range of problems on the production side - are discussed with due regard for these problems. Although it would be easy to suggest how much better things might have been if a number of "ifs" had worked out to the farmer's advantage, the grower must at least evaluate his own position on the costs side and it is hoped that this report will be of some assistance in this way.

J. D. Nutt
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Introduction

The survey of early potato production in the East of Scotland during 1965 covered 431 acres grown on 13 farms in East Lothian and one in the Carse of Gowrie between Perth and Dundee. Due to being a little late in visiting farmers in the first instance some of the early work, mainly dung-handling and the work of setting out the seed for chitting, has had to be estimated. However the results which are contained in this report should give a reasonable guide to production costs. It should be noted that no charge has been made for any dung applied although the work of handling it has been included. No attempt has been made to value the dung because of the difficulty of assessing the quality, weights applied and the lack of any really satisfactory method of calculating its worth to the potato crop. Should there be a wish to include its value it should be entered as a variable cost thereby reducing the gross margin.

Early potatoes remain very much a speculative crop. The results show that this year it was possible to obtain reasonable profits during the first few weeks, but with an out-break of blight from the end of July and with supplies of second earlies coming forward sooner than usual due to the wet season, prices collapsed in early August and failed to recover. The fall in price was to some extent offset by increased weights but disease reduced this potential very considerably among many of the later crops.

Epicure was by far the most popular variety grown, mainly because of its ability to recover from frost damage which can be a real danger to early crops in this part of the country. Arran Pilot remains the most popular variety in England but was represented by only one crop in the survey. Two crops of Home Guard, one of Pentland Envoy and three crops of Craigs Royal were included in the crops costed. As might be expected, there was little difference in production costs between varieties.

The Farms Concerned

Early potato production in the East of Scotland is largely centred on the coastal strip of East Lothian, while a few crops are also grown in the Carse of Gowrie and around Dundee. Both areas are low-lying with generally good land. Annual rainfall of around 25 inches can be a critical factor with regard to production in East Lothian, but is of less importance in the Dundee area where about 30 inches is normally recorded.

An indication of the type of farm concerned can be gained from Table I which shows the average cropping. Vegetables such as cabbages and carrots were important crops on several of the East Lothian farms.

TABLE I

Average Cropping				
Crop	Acres		Percentage Distribution	
	Wheat	90.8		21.0
Barley	107.0		24.8	
Oats*	4.2	202.0	1.0	46.8
Early potatoes	30.9		7.1	
Main crop potatoes	42.2	73.1	9.8	16.9
Sugar beet	15.7		3.6	
Turnips, swedes & mangolds	9.8		2.3	
Kale & rape	1.0	26.5	0.2	6.1
Vegetables		41.9		9.7
Grass: 1-3 year	54.2		12.5	
4-6 "	7.1		1.7	
permanent	26.0	87.3	6.0	20.2
Other		1.2		0.3
Totals		432.0		100.0
*Partly for arable silage.				

The General Practice

Most crops were grown after wheat or barley. Dung was applied in 17 cases, mainly during the late summer and autumn depending on labour commitments. Most crops were grown from chitted seed which was boxed off the riddle where home-grown. Stacking the seed in the chitting houses was completed by late autumn and the land ploughed by the end of the year.

Spring work began whenever conditions were suitable, the earliest starting in mid February. There was a break of about two weeks at the end of the month when the weather turned wet and cold, but despite this most crops were planted by mid March. Summer cultivations were carried out during April, May and early June. Weeds were controlled chemically on several farms with very mixed results, being more successful where couch (wrack) was not a problem. Many farms were equipped to irrigate had the season demanded it, but rainfall was generally adequate this year.

Lifting started during the last fortnight in June (all-be-it on a small scale) and was largely completed by the end of August. Rather less than half the crop was lifted by machine, the remainder by hand. In many cases the crop was dressed under cover and was generally sold in half-hundred-weight paper bags.

Chitting

All but three crops were grown from chitted seed. The buildings used for chitting were generally old, most had lighting laid on and a few had had larger doors fitted. The houses were filled during the autumn, boxes being stacked to about eight feet. Lighting was usually started about the beginning of January and continued until planting, the lights burning the full 24 hours during the last few weeks. In one or two cases heat was used to a greater extent than lights to promote sprouting. Small heaters were used occasionally during the winter to prevent frost damage. The boxes were turned at least once during the winter on many farms and in one or two cases required extensive picking-over to remove diseased tubers. Much of this work was done on wet days.

Boxes cost anything between 5s. and 7s. each and farmers generally agreed that an average life of 10 to 12 years could be expected. An annual charge of 6d. per box has been used for this report, equivalent to £1.10s. per ton. Fluorescent lights and fan heater units cost about £8 to £10 each, further expenditure being necessary to provide power points. Running costs over a 24 hour period would be lower for lights than heaters - 12 lights costing 3s.7d. against 13s.9d. for a pair of 2 Kw. heaters at 1½d. per unit. In practice, typical running costs would appear to be around 10s. per ton for lights and £2.10s. per ton for heaters where used to promote sprouting.

As already mentioned, the buildings used for chitting on the farms covered by this survey were old and therefore only minor charges have been made for them, mainly for recent alterations. The following figures are included as a guide for a new building at present-day prices. They relate to a structure which would store about 30 tons of seed in boxes 18" x 30" x 6". This quantity would plant about 25 acres. The floor area would be about 700 square feet and the building would require to have cavity walls, windows, insulated roof and wide doors. The cost might be around £1400 and would be eligible for a $\frac{1}{3}$ grant if approved. This grant could be reduced to a $\frac{1}{4}$ in the near future.

Building @ £2 per square foot	£1400	
less grant of $\frac{1}{3}$	<u>466</u>	£934
Electrical equipment		<u>200</u>
Total		£1134
Annual charge if written down over 10 years		113
Add interest @ 8% on half of purchase price		<u>45</u>
		£ 158
Cost per ton over 30 tons		£5.3

Seed

Seed for chitting purposes should be available by late autumn and consequently seed bought in for early potatoes tended to cost more per ton than main crop seed for the 1965 crop year. This is one of the difficulties with which early potato growers are faced, and is one which is always liable to occur as they are on the market for seed before the general supply position can be ascertained. For this reason many farmers grew the bulk of

their crops from home-grown seed, buying in only sufficient to plant a "seed" acreage for the following year's crop. Home-grown seed was generally uncertified as it was intended for home use only. Seed use and prices are summarised in Table II.

TABLE II

Summary of Seed Use					
	Seed rate /acre cwt	Cost/ acre £	Cost/ ton £	Spacing inches	Drill width inches
Range	17.1 - 45.7	13.0 - 41.1	11 - 26	7 - 14	26 - 28
Average	25.0	21.5	17.2	-	-
Typical	21.5	19.4	18.0	12 - 13	26

Fertilisers

Fertilisers were generally applied by placement at the same time as drawing the drills. There was little difference in the quantities applied between those crops receiving dung and those which did not. The average cost was £10.4 per acre and there was a range in cost from £7.9 to £16.0 per acre. Some crops probably received too much nitrogen which has a tendency to delay bulking and by encouraging leaf formation, may render the plant more susceptible to blight. Phosphate and potash dressings varied considerably depending on soil type. The average dressings are summarised in Table III. Where dung was applied, the typical dressing was 15 tons per acre.

TABLE III

Summary of Fertiliser Use				
	cwt/acre	Units		
		N	P	K
Average	8.5	168	103	122
No F.Y.M.	8.3	179	101	109
F.Y.M.	8.7	163	104	129

Planting

Planting was generally completed by the third week in March. Machines were used on most farms but were usually not of the fully automatic type, semi-automatic planters being preferred as it was felt that there was less risk of damage to chitted seed. This meant that a worker was required for each drill on the implement and frequently a further person was carried to ensure a supply of seed from the boxes to the planters. For a three-row planter a squad of four on the machine plus the tractor driver was typical.

At the same time as the planter was at work, the seed-bed preparations were being carried out. Usually the land was either disced or grubbed and then rotovated prior to drawing the drills.

This meant that a squad of eight to ten people were used to complete the planting including one or two men carting out seed and fertiliser. On smaller farms, of course, this work would be staggered but most of the farms were large enough to carry sufficient people for the whole operation to go forward at once. Three to four of the team were generally casual and were often workers' wives. As a result there was little reliance on outside labour on many farms. Field work generally did not begin before about nine o' clock in the morning when the casual workers arrived so that the early work was concentrated on loading seed etc.

Hand planting tended to require more regular labour in carting out and in general assistance than machine work. Outside squads were more expensive as commission and transport had to be paid. On balance although squads might cover a greater acreage in a day, which might be important in some instances, there seems little doubt that machine work was cheaper than hand work where more than about 20 acres were to be planted, depending on the cost of the implement. If casual labour were unobtainable there would, of course, be no alternative to machine work short of going out of potatoes.

The situation could be summarised as follows, assuming the preparation of the seed-bed and the drawing of the drills to be the same for either system. The hours involved have been derived from the results of this survey and represent quite high figures for labour on the planter i.e. a squad of four. Less labour would improve the case for machine work.

Comparison between Machine and Hand Planting per Acre
(Chitted Seed)

Operation	Hours		
	Tractor	Reg. Labour	Cas. Labour
<u>Hand Plant</u>			
Carting	2.6	3.6	-
Planting	-	2.7	13.5
Covering	1.2	1.2	-
Totals	3.8	7.5	13.5
<u>Machine Plant</u>			
Carting	.9	1.8	-
Planting	1.6	3.5	4.2
Sub-totals	2.5	5.3	4.2
Covering*	1.2	1.2	-
Totals	3.7	6.5	4.2
*If not included with planter			

Variable Costs Associated with the Two Systems

<u>Hand Plant</u>	£
13.5 hours @ 4s.9d.	3.2
Transport	.5
	<hr/>
Total	£3.7
<u>Machine Plant</u>	£
4.2 hours @ 3s.9d. (farm rate)	.8
Depreciation & repair allowance over 30 acres	1.4
	<hr/>
Sub-total	£2.2
Transport and higher rate for outside casual labour	.6
	<hr/>
Total	£2.8

Regular labour and tractor costs (apart from fuel) would be incurred regardless of method and therefore do not affect the choice.

Weed Control

Weed growth was fairly active during the late spring and early summer with the result that cultivations had often to be repeated at relatively close intervals and sprays were less effective, in particular against couch (wrack). On most farms weed control was attempted by the traditional method of repeated cultivations, final ridging being completed by the end of May in most cases. Several crops were sprayed and where annual weeds were the chief problem, the results were encouraging. Any control of couch by chemical means is dependent very much on the timing of the treatment. At the moment satisfactory control is not always achieved by the use of sprays, frequently only a check in growth being obtained.

Linuron, acting as a residual herbicide and applied at the rate of 2 - 3 lbs per acre, gave satisfactory control over annual weeds, while a mono-linuron dinoseb mixture also achieved good control over annual weeds on another farm. The use of a contact herbicide such as paraquat will kill existing foliage, including couch, but has no residual effect. Success will depend on how long the crop takes to close the drills, and on the rate of recovery by the weeds - likely to be more rapid in a wet year. A single run through with a cultivator might be necessary to delay weed recovery where paraquat is used. Spraying should be carried out just before the crop comes through if the best advantage is to be gained. There is, of course, no point in using a contact spray if the weed population is not yet in leaf - a residual chemical such as linuron should be used in these circumstances. Paraquat can be used with safety up to 15% emergence with only temporary, minor effects to the crop.

Costs appear to be around £3 - £5 per acre for materials depending on the choice of chemical and the quantity applied, but was as high as £7 in one instance. From the economic point of view, once sprayed the crop should generally be left alone. Experiments have shown that improved yields can often result if cultivations are drastically reduced or abandoned. This advantage would be lost if after spraying, further cultivations were carried out. The spray would still have to be paid for, labour would have

to be transferred from other work and in all likelihood yields would be depressed. The effect might well be to aggravate the situation rather than improve it. Traditional methods required around 2 to 3 hours of work per acre in most cases, which might have been more profitably used elsewhere. This would be particularly so if, by disturbing the crop and damaging roots and foliage, a potential extra yield were lost.

There seems little doubt that more reliance will be placed on chemicals to control weeds in the future, the major black spot at the moment being the unreliability in their use for the control of couch. Where annual weeds are the problem, residual chemicals such as linuron have proved effective in many cases already.

Irrigation Equipment

Eleven farms in the survey had irrigation equipment. The cheaper installations were intended to pump direct from a ditch thus avoiding extensive use of mainline piping. As surface water supplies are limited in the coastal strip of East Lothian, several farms relied on bore holes for their requirements. These necessitate mainline distribution which adds still further to the cost. As a result there was a wide range in the amount of capital invested, the average being £2116 per farm. A more useful guide can be gained by calculating the investment on a per acre basis over the acreage of high value crop covered by the equipment. A sum of around £40 per acre would appear to be reasonably typical.

Bearing these figures in mind and also remembering that early potatoes were the principle crop intended for irrigation, the annual charges have worked out around £10 per acre for depreciation and repairs based on an allowance of 20% of the net purchase price. An alternative method would be to calculate the cost over a 10 year period, which allowing for interest and an allocation for repairs - largely couplings and pump maintenance - works out a little cheaper than the method taken for this survey. A comparison is given below.

Annual Charges for Irrigation Equipment

150 feet of bore @ £4 per foot	£600	
less 50% grant	<u>300</u>	£300
600 yards of main line pipe @ 45s. per yard (6" aluminium)		1350
Sprinkler line (incl. sprinklers)		270
Pump (tractor driven)		<u>250</u>
Total		£2170
Annual allowance for depreciation and repairs per acre over 50 acres based on 20% of net cost		£8.7
Alternatively:		
Equipment as above		£2170
Annual charge over 10 years		£217
Interest @ 8% on half the net cost		<u>87</u>
Total		£304
Annual allowance per acre over 50 acres		£6.1
Repairs @ say £1 per acre		<u>1.0</u>
Total		£7.1
Total investment per acre over 50 acres		£43.4

In a dry year costs should be more than recovered by the increased yield, possibly at an earlier date, as a result of irrigation. The depreciation and repairs have already been mentioned. The variable costs might be in the region of £2 - £3 per acre for fuel and casual or overtime regular labour, but no useful information is available as only three crops were irrigated during 1965. This might increase the cost to about £12 per acre which would require to be recovered by greater output in order to break even. Regular labour during the normal working day has not been considered as it would have to be paid anyway. The cost of irrigation is therefore quite high, but when one remembers that the equipment may not be used every year, there is some justification for including a relatively high figure, particularly where budgets are being prepared.

From the management point of view, provided the fixed costs have been met by the principle enterprise i.e. early potatoes, the equipment can be used relatively cheaply for other crops either before or after the main one, thereby contributing to improved farm output. Its use with a high value crop is however essential in order to justify the initial investment.

Blight Control

The earliest crops were lifted before any need for blight protection became apparent. By mid July blight was more prevalent and several crops were sprayed, sometimes more than once, at a cost per application of around £1 per acre for materials or £1.7s. per acre inclusive for contract work.

Haulm Destruction

Most of the earlies were either pulverised or left alone altogether. This is understandable as the crop is bulking right up to the last day. Several of the later crops were burnt down with acid at a contract charge of £3.5s. per acre. In one or two cases this was done in an effort to prevent blight reaching the tubers but would appear to have been done too late, judging by the amount of diseased tubers at harvest time. One crop was put down with diquat at a cost of £2.3s. per acre and using normal farm equipment.

Harvest

Lifting began at the end of June and was largely completed by the end of August, three crops of Craigs Royal, part of a field of Epicure and a field of Arran Pilot being lifted later. The most typical period was during late July and early August. Conditions were quite reasonable for the first few weeks, but as the season progressed the situation became more difficult with much broken work due to wet weather, and was aggravated by a rising incidence of disease in many crops. As a result some of the later crops were very dirty to handle which resulted in slower rates of work. Seven farms in the survey had potato harvesters which were used to lift $9\frac{1}{2}$ crops, the remainder being lifted by hand in the traditional manner.

Labour remains the chief problem with early potatoes as the crop is dressed while lifting is going on. In general, all the tractor men and one or two others on the riddle were regular staff, the remainder being casual. The use of a harvester reduced the casual labour requirements very considerably. This is an important factor as casual labour is becoming increasingly more

difficult and expensive to obtain. Machine lifting required about 5 pickers compared with the typical squad of around 18 to 20.

Riddling required a further 3 to 5 casual workers, which, with the grieve and possibly another regular worker, brought the dressing team up to a total of about 6. There was a relatively wide range of dressing times per acre depending on the lifting conditions, the amount of disease present and the tonnage being handled. However about 35 minutes per ton with a squad of 6 would appear to be fairly typical, amounting to about 14 tons per day. This meant in practice that dressing kept up well with the lifting in most cases. Usually dressing was done under cover. One or two of the earliest crops were dressed by eye in the field by the pickers. Paper bags were in fairly general use and were often supplied by the merchant.

A summary of the casual labour costs is given below and relates to the typical situation where all the tractor work and the overseeing of the riddle were carried out by regular staff. Lifting by harvester required two tractors and trailers, while hand work appears to have required only one. Pallet boxes were used on one farm and a specially equiped tractor was required to handle them. The range of costs shown in Table IV results partly from a greater or lesser use of regular labour compared with the typical situation, while difficult conditions and less efficient squads were also contributory factors. Where squads came complete with their own equipment, there was liable to be an additional charge of up to 20% of the wage bill to cover the extra costs.

TABLE IV

Summary of Harvest Casual Labour Costs per Acre						
	Lifting		Dressing	Transport	Totals*	
	Squad	Harv.			Squad	Harv.
	£	£	£	£	£	£
Typical	21.4	7.1	4.9	2.0	28.3	14.0
Range L.	17.9	5.2	2.1	1.2	19.8	7.8
H.	35.5	11.5	14.5	3.0	49.7	26.4
*Use of squad equipment not included						

A comparison between hand and machine work indicates a saving of about 60 hours of casual labour which is equivalent to about £14 per acre. It therefore follows that provided the cost of a harvester is not more than about £14 per acre it should be cheaper to lift by machine, i.e. for more than 20 to 30 acres approximately depending on the cost of the implement. A higher cost might be justified in some cases if casual labour were very difficult to obtain, provided returns were satisfactory. The position can be summarised as follows.

Capital Cost of a Potato Harvester

Purchase price	£820
Annual charge if depreciated over 4 years	205
Interest @ 8% on half of the purchase price	35
Total annual cost	<u>£238</u>

Annual charge per acre, including a repair allowance of £1.10s. per acre over:

10 acres	£25.3
20 "	13.4
40 "	7.5

Casual Labour Requirements per Acre

Hand lifting	90 hours
Harvester	<u>30 hours</u>
Saving	60 hours

Value of saving @ 4s.9d. per hour = £14.5s.

Note. As 8 to 9 casual workers would still be required in the typical "harvester" situation, any substantial saving in transport costs is unlikely. Regular labour requirements will remain largely as before and it is probable that the digger will be retained also.

The Results

The average results are summarised in Tables V, VI and VII. The 5 most profitable and least profitable crops are also shown for comparison. There is little difference in the cost structure between the best group and the average, the main difference being in terms of output. Three of the 5 best crops were Epicure, the fourth being Home Guard and the sales from these were completed early on in the season. The fifth crop was a field of Craigs Royal where a very good yield was obtained with an average price of £13.7 per ton. At the other end of the scale, the 5 least profitable crops had a much greater reliance on casual labour which boosted the variable costs by £15 per acre on average, while the fixed costs declined by only £8. The higher cost of casual labour was largely due to the fact that all 5 crops were hand lifted, squads being used in only two cases among the most profitable group. Weather difficulties and the disease factor contributed to slower working in the later crops, tending to increase the already higher charges associated with hand work.

The most important difference between the two groups however, was in terms of output. Yields of saleable ware from the later crops proved very disappointing, largely as a result of disease. Both groups sold roughly the same weights per acre but the least profitable group received less than half the average price per ton obtained for the best crops.

It is stressed that the figures shown in Tables V, VI and VII are

average figures, and therefore could give misleading results if used for the preparation of budgets. Data for this purpose is included in the management section. By choosing figures appropriate to a situation being studied, a more reliable budget should be obtained than could be possible by using average figures.

TABLE V

Average Results per Acre						
	Best 5 Crops		All Crops		Worst 5 Crops	
	£	£	£	£	£	£
<u>Variable Costs</u>						
Seed - bought	7.5		7.2		8.8	
home-grown	15.1	22.6	14.3	21.5	16.2	25.0
Fertiliser		9.8		10.4		11.4
Casual labour		18.0		24.6		36.3
transport etc.		2.7		3.8		7.3 ¹
Contract - F.Y.M.	.5		.5		.6	
weed spray	-		.1		-	
other spray ²	1.7		.6		.9	
other ³	.1	2.3	.4	1.6	1.8	3.3
Fuel - chitting	.4		.5) .1 ⁴	
dresser	.1	.5	.1	.6		
Sundry - boxes	1.8		1.6		1.3	
weed spray	1.7		1.1		-	
blight spray	-		.1		.2	
haulm spray	-		.1		-	
P.M.B. levy	2.0		2.5		3.0	
paper bags ⁵	3.7		2.8		2.5	
other	.3	9.5	.2	8.4	-	7.0
Total Variable Costs		65.4		70.9		90.4
<u>Fixed Costs</u>						
Regular labour		15.0		14.8		9.2
Tractor ⁶		6.7		6.8		5.2
Specialised equip. depr. & repairs						
- t. driller	.2		.2		.3	
planter	.4		.5		.4	
pulveriser	.2		.2		.1	
harvester	1.7		1.1		-	
digger	.1		.3		.4	
dresser	1.2		.8		.2 ⁴	
chitt. shed ⁷	.3		.4		.1	
irrigation	6.4		5.9		6.2	
other	.3	10.8	.2	9.6	-	7.7
Rent		6.1		5.9		5.6
Overheads		21.3		23.7		23.9
Total Fixed Costs		59.9		60.8		51.6
Total Costs		125.3		131.7		142.0

- 1) Includes squad equipment.
- 2) Blight and haulm.
- 3) Hire.
- 4) Merchant's dresser 3 cases.
- 5) Often supplied by merchant.
- 6) Includes fuel and depreciation/repair allowance.
- 7) Largely electrical - buildings generally old.

TABLE VI

Supplementary Data Relating to Costs			
	Best 5 Crops	All Crops	Worst 5 Crops
Seed rate	25.2c	25.0c	30.0c
Cost per ton	£18.0	£17.2	£16.7
Fertiliser use			
Rate applied	7.8c	8.5c	9.7c
Units - nitrogen	169	168	207
phosphate	95	103	103
potash	102	122	127
Hours - casual	83.5	105.3	146.5
regular	46.9	47.9	29.1
Total	130.4	153.2	175.6
Hours tractor work	31.1	30.5	23.1*
Total acreage	56.0	431.0	111.0
Average acreage	11.2	18.0	22.0
No. of crops	5	24	5

*Squad lifting resulted in less tractor work

TABLE VII

Average Output per Acre						
	Best 5 Crops		All Crops		Worst 5 Crops	
	£	£	£	£	£	£
Sales	168.1		129.9		84.5	
Seed ret.	14.6		14.2		11.8	
Brock	.4	183.1	.6	144.7	.3	96.6
Gross margin		117.7		73.8		6.2
'Profit'		57.8		13.0		-45.5
Sales - tons		8.65		9.0		8.6
av. price/T.		£19.4		£14.4		£ 9.8
best price/T.		£45.0		£45.0		£14.5
worst price/T.		£13.7		£ 8.0		£ 8.0
Seed retained						
tons		1.0		.9		.85
av. value/T.		£14.6		£15.0		£13.9
Lifting - start	June 18		June 18		Aug. 1	
finish	July 22*		Mid Oct.		Mid Oct.	

*1 crop of Craigs Royal lifted during September

(£0.1 = 2s.)

Output

It must be recognised that the East of Scotland is not really a first early district. As a result the few early farms do not receive the same premium as producers in more favourable parts of the country. There are only four or five farms in East Lothian which can be fairly sure of lifting by the first week in July. These producers have done quite well this year but as the average prices show, unless there was a substantial increase in saleable ware, it became much more difficult to make a satisfactory return from mid July onwards. Yields for the first crops were around the 6 tons per acre level and quickly bulked to over 11 tons per acre by the end of July.

TABLE VIII

Average Price per Ton - Predominantly Epicure										
Weeks	June		July				August			
	3	4	1	2	3	4	1	2	3	4
Average £	37.0	23.3	17.5	17.1	15.3	14.5	13.9	12.4	10.4	9.5

Basically, the movement of prices reflects the situation of there being too many potatoes on the market. The rapid fall in prices was aggravated from the end of July onwards by a rising incidence of disease and by better quality second early and early maincrop varieties coming forward. (Early maincrop varieties appeared earlier on the market partly as a result of weather difficulties holding back the grain harvest.) Epicure is a variety prone to becoming too large and coarse as the season progresses, and with heavy dressings of fertiliser and adequate rain, this stage was reached much earlier than usual and contributed to the lower prices received for Epicures later on in the year.

The tendency to over supply the market is not made any easier by reason of the fact that most farms endeavour to lift before the grain harvest, and also because of the necessity of holding onto a squad once engaged. The supply of casual labour is such that it is not possible to get a good squad on a day to day basis depending on the market. Storage is not the answer for more than a day or two as early potatoes, being unripe, are not good keepers. Loss in yield is also a point against storage, particularly during the early weeks.

Gross Margin

The average gross margin of £74 per acre can be considered reasonably satisfactory, but it must be remembered that this figure includes wide variations as shown by the figures for the 5 best and the 5 least profitable crops. With the relatively high level of fixed costs it is desirable that the gross margin be not less than about £70 per acre if the crop is to remain competitive with other enterprises, bearing in mind the considerable organisational problems associated with the crop. Nine crops did in fact have a gross margin of less than £70 per acre; eight of these showed a loss when the fixed costs were deducted.

It would be difficult to justify early potatoes with a lower gross

margin unless fixed costs were proportionally less than the general run. It might also be argued that when fixed costs for the farm as a whole were spread evenly on an acreage basis over the whole farm, a lower gross margin could be acceptable provided it remained better than the possible alternatives. However a low gross margin must serve as a warning as to the weakness of the enterprise, and higher-than-average costs should be studied with care to see what can be remedied.

In practice the problem is often simply one of poor returns either due to low yields and/or low prices. Low yields are essentially the result of husbandry techniques, and therefore within the scope of the individual farmer to correct. Low prices can be a reflection of poor quality but in general they are the result of the overall supply position which is outwith the immediate control of the individual producer in any one year. It is interesting to note that the results show a range of only £17 per acre in total costs between the two groups, while the gross margins varied by £112 reflecting the range in output from £183 down to £97 per acre.

Acknowledgments

Grateful acknowledgment is made to the farmers who took part in the scheme, and to my colleagues for their help and advice in the preparation of this report.

Summary

1. The results are based on 24 crops covering 431 acres on 14 farms, all but one being in East Lothian. Epicure was by far the most popular variety grown.
2. Most crops followed a cereal, were dunged and were grown from chitted seed, usually machine planted.
3. Lifting began at the end of June and continued through to September, the most typical period being late July and early August. Nine crops were lifted by machine on 7 farms.
4. Prices began well but fell rapidly, compensated partially by increasing yields which rose from around 6 tons per acre to over 11 tons by the end of July. Later crops made poor prices due to a surplus to requirements, a rising incidence of disease and competition from better quality second early and early main crop varieties.
5. Average costs worked out at £132 per acre, £71 as variable costs and the remaining £61 as fixed costs. The 5 most profitable crops had average variable costs of £65 per acre, and the least profitable of £90 per acre, the difference being largely due to a much greater emphasis on casual labour (all hand lifted) by the least profitable group. Later lifting under difficult conditions was partly responsible for this. Fixed costs averaged £60 per acre for the best 5 and £52 per acre for the other group. Total costs varied by only £17.
6. Output averaged £145 based on a yield of 10.2 tons per acre. The best group generally sold early benefiting from the better prices and averaging £183 per acre. At the other end of the scale, the average output was only £97 per acre from a yield of 8.6 tons - much the same yield as that for the best group, but selling later in the season, i.e. a relatively poor yield at lower prices.

7. The gross margin for the best 5 crops worked out at £118 per acre, the average at £74 and the least profitable group at only £6 per acre.

8. The estimated profit was £13 per acre on average with a range from a profit of £58 per acre for the 5 best crops, to an average loss of £45 per acre for the worst group. Eight crops out of the 24 costed, made a loss on a full cost basis.

APPENDIX A

Costing Method

The costs have been split into variable and fixed costs. The variable costs are specific to the potato crop and increase or decrease in direct proportion to the acreage grown. Fixed costs **include** those items which are of a general nature and are therefore less readily allocated to any one enterprise. Fixed costs remain relatively stable during minor changes of farm policy.

Seed

Purchased seed has been charged at cost, including haulage. Home-grown seed has been charged at market value.

Fertilisers

Fertilisers have been charged at cost, including haulage. No allowance has been made for manurial residues and no charge has been made for dung.

Casual Labour and Contract Work

Charged at the rates paid.

Regular Labour

Regular labour has been charged at the rates operating on the individual farms, including insurance and allowances for perquisites and holidays. Any manual work by the farmer has been charged at the farm rate.

Tractor

Tractor work has been charged at 4s.6d. per hour for wheeled tractors and 13s.6d. per hour for crawlers. No attempt has been made to allocate tractor fuel, the charge covering fuel, depreciation and repairs.

Depreciation and Repairs

Specialised implements have been charged at 20% of the purchase price, electrical equipment at 15% and new buildings or conversions at 5%, spread over the total potato acreage or 'earlies' acreage where appropriate.

Rent

Rent has been charged at the rate in operation, or at a figure agreed with the owner-occupier.

Overheads

Overheads have been charged at the following rates:-

	s.	d.
Per acre	15	3
Per £ labour	7	3
Per tractor hour	5	9

APPENDIX B

Farm Management Data

This section contains data for farm management purposes. As stressed in the general report, results could be misleading if average figures were used for the preparation of budgets. It is hoped that the various figures which have been collected together in this section will provide a more reliable basis. It is suggested that anyone preparing a plan should do so by using the typical figures for each operation or item of cost specific to the situation in mind. As the figures for the field operations are derived from rather better farms, times could be increased a little if a difficult field was being considered. Two example budgets are given at the end of the section showing results to the gross margin stage, or if required, the complete estimation of costs. The figures for the repair and depreciation of implements serve as a guide only and are not necessarily very accurate. Overheads from the farm management point of view, tend to be charged on a flat rate over the whole farm and would probably be less per acre than the figures given in the average results. For purposes of comparison however, they may be estimated by using the rates shown on the previous page.

Guide to Depreciation and Repair Charges for
Specialised Equipment

Implement	New Price	20%	Over	
			30 ac.	60 ac.*
	£	£	£	£
Triple driller	90	18	.6	.3
Planters - 3 row semi-auto.	200	40	1.4	.7
3 row automatic	300	60	2.0	1.0
2 row semi-auto. + fert. attach.	220	44	1.5	.8
Coverer (3 row)	80	16	.6	.3
Pulveriser	200	40	1.4	.7
Digger - 1 row spinner	100	20	.7	.4
1 row elevator	250	50	1.7	.9
2 row elevator	300	60	2.0	1.0
Harvester -				
1 row	820	164	5.5	2.7
1 row	1200	250	8.3	4.2
2 row	1600	320	10.7	5.4
Dresser	300	60	2.0	1.0
	500	100	3.4	1.7

*Other charges can be calculated by dividing the 20% figure by the appropriate acreage

Irrigation Equipment

A rough guide to the individual items is given below. Permanent works such as the bore-hole, main-line etc., are eligible for a 50% grant if approved.

Bore-hole - per foot	£3 - £4
Reservoirs - wide range according to circumstances	
Permanent main-line (6" asbestos) per yard	£2
Portable main-line (6" aluminium) per yard	£2.5s.
Sprinkler line complete (1 acre approx. at a setting)	£270
Tractor-mounted pump	£250
Diesel engine and pump	£750

(See page 7 for a worked out example)

Chitting House

Typical figure relating to minor alterations and cost of electrical fittings.

£150 - electrical fittings @ 15%	£22.5
£ 50 - structural alterations @ 5%	3.0
Total	£25.5
Over 30 acres	£ 0.8

Labour and Tractor Hours per Acre

Date	Operation	Typical hours	Typical squad	Range hours
Autumn & winter	Chitting - stacking and turning once	3.5/T	2 - 3	.8 - 7/T
October December	Dung handling (15 ton)			
	- tractor	4.0	2 - 3	2.0 - 11.4
	regular labour	4.8	4 - 5	2.0 - 13.0
	Ploughing (2 furrow)	2.3	1	1.6 - 4.3
Mid Feb. Mid Mar.	Spring cultivations (harrow, grub, rotovate)	2.4	1	.5 - 4.1
	Fertiliser application (triple-driller)	1.5	1	.6 - 2.4
	Carting seed & fertiliser			
	Hand plant - tractor	2.6	1 - 2	1.4 - 3.3
	reg. labour	3.6	1 - 2	1.4 - 5.0
	Machine plant - tractor	.9	1	.2 - 1.9
	reg. labour	1.8	2	1.1 - 3.3
	Planting (chitted seed)			
	Hand - reg. labour	2.7	1 - 2	0.0 - 5.3
	cas. labour	13.5	9	9.9 - 17.7
	Machine (3 row semi-auto.)			
	- tractor	1.6	1	1.3 - 2.2
	reg. labour	3.5	1 - 2	1.6 - 6.1
	cas. labour	4.2	3 - 4	1.5 - 8.5
	Covering (generally after hand work only)	1.2	1	.3* - 1.4
April May	Summer sultivations (harrow, grub, ridge x 1 or 2)	2 - 3	1	1.1 - 6.7
April	Weed spray	.4	1	.3 - .5
July	Blight spray (per applic.)	.4	1	.4
End of June onwards	Pulverising	1.2	1	1.0 - 2.2
	Lifting			
	Hand - digger (tractor and driver)	4.2	1	3.1 - 7.6
	pickers (casual)	90.0	18 - 20	71.0 - 143.0
	carting (tractor and driver)	4.7	1	3.9 - 17.3
	Machine - harvester (tractor and driver)	6.5	1	5.0 - 8.5
	pickers (casual)	30.0	4 - 5	15.0 - 40.0
	carting (tractors and drivers)	13.0	2	10.0 - 17.0
	Dressing (often into p. bags)			
	3.1 hrs total labour/T			
	For 10 T. reg. labour	10.4	2	0.0 - 25.6
	cas. labour	20.8	4	9.4 - 51.0

*Running-up following partial closing by planter

Typical Costs per Acre

Item	Typical £	Range £ - £
Seed - 21.5 cwt @ £18 per ton	19.4	13 - 41.1
Fertiliser - around 8 cwt	10.0	7.9 - 16.0
Casual Labour		
Farm rate for women 3s.9d. per hour		
Squad rate for women 4s.3d. per hour*		
Mixed squads 4s.9d. per hour*		
Total cost of casual labour	-	9.9 - 52.0
Planting - hand 13.5 hrs @ 4s.9d.	3.2	2.2 - 4.2*
machine 4.2 hrs @ 4s.9d.	.9	.3 - 2.0*
transport	.5	.4 - 1.2*
Lifting - hand 90 hrs @ 4s.9d.	21.4	16.9 - 34.0*
machine 30 hrs @ 4s.9d.	7.1	3.6 - 9.5*
Dressing - 3.1 hrs per ton casual and regular labour		
squad of 4 dressing		
10 ton - 20.4 hrs @ 4s.9d.	4.9	2.2 - 12.1*
Transport (both pickers and dressers)	2.0	1.2 - 3.0
per day for exclusive use of bus £5 - £6		
hire of digger etc., up to 20% of wage bill		
Fuel - Chitting lights	.5	.2 - .7
Dresser	.2	.1 - .3
Sundry - boxes 60 to the ton @ 6d. for 21.5 cwt	1.6	1.0 - 2.4
weed spray - residual	5.0	3.3 - 7.0
contact	3.0	
blight spray - per application	1.0	
haulm spray (for acid see contract)	2.2	
P.M.B. levy - before July 17th	1.0	
from July 18th	3.0	
paper bags - 6d. each	1.0/T	2.5 - 9.1
Contract - dung spreading	3.3	2.6 - 3.5
blight spraying	1.3	1.2 - 1.3
spraying down (Acid)	3.2	3.2 - 3.5
hire of plough	.5	
hire of sprayer	.3	
Regular Labour - inclusive of perquisites, insurance & holidays, 6s.3d. per hour		
Total regular labour cost	14.4	3.7 - 27.7
Tractor	7.3	2.8 - 11.1
Rent	6.0	3.2 - 7.0
Overheads	23.4	16.0 - 33.6
*Approximate figures		

Budget Examples

<u>Labour and Tractor Work</u>						
	Example 1			Example 2		
	Dung Machine plant " lift Weeds sprayed			Dung Hand plant " lift Trad. weed control		
Operation	Hours			Hours		
	Reg.	Cas.	Tr.	Reg.	Cas.	Tr.
Chitting	4.0			4.0		
Dung handling	4.8		4.0	4.8		4.0
Ploughing	2.3		2.3	2.3		2.3
Spring cultivations	2.4		2.4	2.4		2.4
Fertiliser & drills	1.5		1.5	1.5		1.5
Carting (seed & fert.)	1.8		.9	3.6		2.6
Planting	3.5	4.2	1.6	2.7	13.5	
Covering		incl. above		1.2		1.2
Summer cultivations				2.5		2.5
Weed spray	.4		.4			
Pulverising	1.2		1.2	1.2		1.2
Lifting	6.5	30.0	6.5	4.2	90.0	4.2
- carting	13.0		13.0	4.7		4.7
Dressing	7.2	14.4 (7 T)		10.4	20.8 (10 T)	
Totals	48.6	48.6	33.8	45.5	124.3	26.6
Cost @	6/3	44.4 @ 4/9 4.2 @ 4/3	4/6	6/3	4/9	4/6
Totals	£ 15.2	£ 11.4	£ 7.6	£ 14.2	£ 29.5	£ 6.0
Overheads(based on above)	£20.0			£24.2		
Cost carried over to next page						

Budget Examples

	Example 1		Example 2	
	Sold first 2 wks. July		Sold last 2 wks. July	
	£	£	£	£
<u>Output</u>				
Sales - 7 ton @ £19 9 ton @ £15	133		135	
Seed retained - 1 ton @ £14	-	133	14	149
<u>Variable Costs</u>				
Seed - 21.5 cwt @ £18/ton		19.4		19.4
Fertiliser - 8 cwt		10.0		10.0
Casual labour		11.4		29.5
transport		2.5		2.5
Fuel - chitting house	.5		.5	
dresser	.2	.7	.2	.7
Sundry - boxes	1.6		1.6	
weed spray	5.0		-	
paper bags	7.0		9.0	
P.M.B. levy	1.0	14.6	3.0	13.6
Total Variable Costs		58.6		75.7
Gross Margin (output less var. costs)		74.4		73.3
<u>Fixed Costs</u>				
Regular labour		15.2		14.2
Tractor (incl. depr. etc.)		7.6		6.0
Specialised equipment depr. & repairs*				
- triple driller	.3		.3	
planter	.7		-	
coverer	-		.3	
pulveriser	.7		.7	
harvester	4.2		-	
digger	-		.9	
dresser	1.0		1.0	
chitting house	.8		.8	
irrigation equipment ¹	8.7	16.4	8.7	12.7
Rent		6.0		6.0
Overheads		20.0		24.2
Total Fixed Costs		65.2		63.1
Total Cost		123.8		138.8
'Profit' (output less tot. costs)		9.2		10.2

* Over 60 acres

¹ As on page 7

APPENDIX C

Standard Appendix

The figures in this appendix are based on 24 records covering 431 acres on 14 farms.

TABLE 1

Summary of Average Costs per Acre

Item of Cost	Hours			£
	Men	Youths	Women	
	Regular labour	42.6	-	
Casual labour	105.3			28.4
Power - tractor	30.5			6.8
horse	-			-
machinery depreciation & repairs				9.6
contract services				1.6
other fuel				.6
Materials - seed				21.5
fertiliser				10.4
sundry				8.4
Rent				5.9
Market costs				-
Total Direct Costs				108.0
Share of general farm expenses				23.7
Adjustment for residual manurial values				-
Gross cost of production at delivery point				131.7

TABLE 2

Yield, Costs, Returns and Margin per Acre

Yield per acre		10.2 tons	
	Total	Returns	
		Per Ton	Per Acre
	Tons	£	£
Sold	9.0	14.4	129.9
Retained - brock	.3	2.0	.6
seed	.9	15.0	14.2
house	-	-	-
Total or Average	10.2	-	144.7
Cost			131.7
Margin			13.0

TABLE 3

Summary of Average Quantities per Acre

Materials			Overall Average
Seed - home grown			cwt
bought			17.7
Fertilisers and Manures			7.3
	Area Dressed Only		
	Acres	cwt per acre	
F.Y.M.	262	300	165.0
Lime	-	-	
Artificials -			
straights - N	-	-	
P	-	-	
K	-	-	
compounds	431	8.5	8.5

