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Potatoes - Cost of production

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MAINCROP POTATO PRODUCTION IN THE NORTH WEST

A Survey of Crops on 98 Farms in 1954

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Appreciation

The Department of Agricultural Economics is grateful to the farmers who co-operated in this investigation. Their patience in a difficult and often worrying season is an example to those who only research.

A summary of each farmer's results is entered in his copy of the report at Table 2, on page 4.

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SUMMARY

Maincrop potato growing costs and returns were obtained for 109 crops covering almost 1,400 acres on 98 farms in 1954.

Results were affected by the exceptionally wet season, and local variations of weather and soil in these circumstances produced a range of margins from almost £40 per acre deficit to nearly £134 per acre surplus.

Average figures were:

Cost	£72-7-0 per acre
Return	£97-8-2 " "
Margin	£25-1-2 " "
Yield	8 tons 14 cwts. per acre.

More than one-fifth of the crops resulted in a loss; this was due to harvesting difficulties rather than to excessive costs.

Financial results were generally better in Shropshire and Staffordshire, yields tended to be heavier, and a greater proportion of higher priced varieties were grown there than in Lancashire and Cheshire.

Direct operational costs accounted for over two-fifths of the outlay on potato growing, whilst manual labour alone was accountable for over one-quarter.

Yields seemed responsive to the weight of seed used and the net cost of manures.

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MAINCROP POTATO PRODUCTION IN THE NORTH WEST

A Survey of Crops on 98 Farms in 1954

Introduction

On the 98 farms from which records were obtained, maincrop potato growing in 1954 showed an average margin of approximately £25 per acre. This average figure, however, covered a wide range of results varying from a deficit of nearly £40 per acre to a surplus of almost £134 per acre. Whilst considerable variations will always occur due to differences in farming practices and to differences between farms, the potato crop in this Province - especially in such areas as central Shropshire and South-West Lancashire - is expected to yield as high a return and as great a profit per acre as any crop available for general planting. These are areas where the yield of maincrop potatoes is normally above the national average and, therefore, other things being equal, they are areas which are likely to obtain greater than average profits from potato growing. It should not be necessary to add that only a relatively small acreage of potatoes is associated on each farm with the other generally less profitable but necessary crops, and that the results of potato growing offer no guide to the level of general farm profits.

In 1954 results were affected by the weather for exceptionally heavy and prolonged rainfall occurred in many districts just as the potatoes were ready to be harvested. Where an attempt was made to gather the crop before the fields were dry, tractors often become bogged down, making the harvesting time abnormally high, irrespective of the weight of potatoes to be lifted and of the way in which the operations were planned and organised. On the other hand, waiting for the soil to dry out meant in many cases that the harvest did not start until late winter or early spring, by which time some potatoes had been affected by frost, thus becoming unusable.

Despite this unfavourable weather, which made it impossible on some farms to secure a full crop of saleable potatoes, certain factors still appear to have had a fairly consistent influence upon the economic results. Perhaps of greatest significance amongst these was the use of fertilisers and manures; to this and other points further references will be made later.

Nevertheless, the 1954 season was so untypical that the detailed analysis of the economics of maincrop potato growing originally planned has had to be abandoned, so far as that year's crop is concerned. The present report, therefore, is mainly concerned to record the broad results from the 98 co-operating farms. Separate costs were recorded for 109 crops on these farms and their distribution is shown in Table 1.

Table 1 — Distribution and Acreage of 109 Potato Crops Surveyed for 1954 Harvest

	Cheshire and Lancashire	Shropshire and Staffordshire	N. W. Province
Number of crops	59	50	109
Total acreage	642.2	748.6	1390.8
Acreage per crop	10.8	15.0	12.8

Costs, Returns, Margins, and Yields

A statement of the average results is given in Table 2. Here the costs are broken down into the component factors of labour, machinery, materials and land used in producing the crops. The average margin was certainly satisfactory having regard to the inclement weather at harvest time.

Table 2 — Average Costs, Return, Margin, and Yield per Acre for 109 crops, 1954

	£	s	d	All Crops £	s	d	Your Farm £	s	d
Manual Labour				21	2	7			
Tractor and Horse Labour				6	18	5			
Contract				1	19	5			
Seed				16	6	0			
Manures and Lime									
Applied	18	9	10						
Residues brought in	2	13	7						
Residues carried out	8	12	0						
Net Manure Cost				12	11	5			
Other Materials and Miscellaneous*					19	5			
Rent				2	12	0			
Machinery Repairs and Depreciation				6	2	5			
Share of General Farm Expenses				3	15	4			
TOTAL COST				72	7	0			
RETURN				97	8	2			
MARGIN				25	1	2			
YIELD				8tons 14 cwts.					

* "Other Materials and Miscellaneous" consist mainly of sprays, straw for clamping and depreciation of seed boxes.

As has already been said, the average covers a wide range. Even in 1954 there were many farms which, by reason of lighter soil, the aspect of the field and its free drainage, or other advantages, were able successfully to harvest good crops of potatoes. The influence of these farms upon the average results must not be allowed to obscure the fact that over one-fifth of the farms in the survey failed to cover their potato growing expenses from the sale of their crops.

Table 3 Average Results per Acre for 109 Crops, Grouped by Size of "Margin", 1954

	27 lowest margin crops			55 intermediate margin crops			27 highest margin crops		
Yield	5.2 tons			8.8 tons			11.9 tons		
	£	s	d	£	s	d	£	s	d
Return	55	17	0	96	1	9	141	13	2
Cost	67	11	2	73	3	9	75	8	2
Margin	-11	14	2	22	18	0	66	5	0

Some indication of the range in results is given in Table 3, where farms are grouped by size of margin (deficit or surplus) on the crop. The farms in the bottom quarter, which averaged almost £12 per acre loss, are seen to have relatively low average costs. Special circumstances in 1954 go far to explain this coincidence of losses and low costs. For on farms where conditions made it impossible to gather substantial parts of the potato crop, harvesting costs were avoided and total costs per acre were low. But returns too were low since there was, at best, only a negligible yield of saleable potatoes. Low costs on these farms, therefore, were associated with harvest failures and lack of sales, whilst the whole enterprise resulted in a substantial deficit. To some extent the present type of analysis even underestimates the loss incurred on such farms. It is, of course, true that where there was no harvesting farmers escaped the usual costs of casual labour for picking; but their own regular workers still had to be paid although there was no alternative productive work available for them. Expenses of this kind cannot be recorded in the normal form of enterprise costing.

In a year like 1954 exactly the reverse relationship might also hold true. Conditions might not be so bad as to prevent harvesting, yet they might be so difficult as to prolong the operation and increase its expense out of all proportion to the yield of potatoes obtained. Low margins, therefore, may be found associated with both low and high levels of expenditure. In so far as these reflect harvesting conditions, the levels of cost are no indication of the farmer's standard of management.

Table 4 shows the average results for farms from the southern and northern counties in the Province. Losses were more frequent in Lancashire

and Cheshire than in Shropshire and Staffordshire: they were also commoner there than in 1952. (1) It seems likely that, for conditions prevailing in 1954, the soil, topography and climate of the southern half of the Province were generally the more favourable for potato growing. This difference in conditions enabled the farmers in Shropshire and Staffordshire to harvest crops averaging 26 cwts. per acre more than in Lancashire and Cheshire.

Table 4 Regional Average Cost, Return, Margin, and Yield per Acre for 109 Potato Crops, 1954

	Cheshire and Lancashire			Shropshire and Staffordshire		
	£	s	d	£	s	d
Cost per acre	72	17	5	71	14	7
Return per acre	88	5	0	108	4	7
Margin per acre	15	7	7	36	10	0
Yield per Acre	8tons 2cwt.			9tons 8cwt.		

The average costs per acre were very similar in the two regions. Practically the whole difference in the average margin per acre between the two groups is due to the higher average returns in the "Shropshire and Staffordshire" group, mainly because of the higher average yield per acre, but partly also because a larger proportion of farmers in that area grew higher priced varieties (chiefly King Edward).

Normally one would expect to find some consistent relationship between the inputs of labour, manures, and seed on the one hand and the yield of potatoes and profitableness of the crop on the other. It has been explained that harvesting conditions disturbed the normal labour use pattern. To a considerable degree, the influence of fertilisers and seed inputs seem to be observable despite the weather disturbance. These three inputs are dealt with below.

Labour

The charges for regular and casual labour, use of tractor and horse, together with those for contract work - all of which may be regarded as the labour cost of potato growing - amount to over two-fifths of the total cost of producing the crop. Since manual labour alone accounts for more than one-quarter of the whole potato growing bill, any substantial grower of potatoes has ample cause to examine the possibilities of mechanisation. In the exceptional conditions of 1954, however, there were some farms where it was not possible to take machinery into the fields at harvest time: thus the possibility of substituting machinery for labour must be related to varying conditions over a number of years.

(1) Over 30 per cent. of the Lancashire and Cheshire crops surveyed suffered a loss in 1954: the proportion of losses - from a different but similar group of Lancashire and Cheshire farms - in 1952 was 12 per cent.

No detailed analysis of labour use has, under the circumstances been attempted. A statement of average times and costs of labour, by operations, is presented in Table 5. Attention may be drawn to the dependence upon manual labour, especially at harvest time. Whilst there is considerable difference between farms in the composition of the category "labour", there was remarkably little regional variation in the average cost of "labour" per acre employed for the 1954 maincrop potato production.

Table 5 — Average Times and Costs of Labour per Acre for 109 Potato crops, 1954

	Pre-Harvest Operations		Harvest		Clamping & Subsequent Operations		Total	
Times (Excluding Contract)	Hours	Mins.	Hours	Mins.	Hours	Mins.	Hours	Mins.
Manual	42	12	75	34	25	29	143	15
Tractor	18	11	11	0		13	29	24
Horse	3	22	1	24	-	-	4	46
Costs (Excluding Contract)	£ s d		£ s d		£ s d		£ s d	
Manual	6	1 7	11	6 2	3	14 10	21	2 7
Tractor	4	2 0	2	9 5		1 0	6	12 5
Horse		4 2		1 10		- -		6 0
Contract Cost	1	16 3		3 2	-	- -	1	19 5
TOTAL LABOUR COST	12	4 0	14	0 7	3	15 10	30	0 5

In reading Table 5 it should be remembered that all figures are averages: since only a small proportion of farmers employed horses or contractors, the average figures against these items are small. It was not possible to record hours of contract work - engaged mainly for spraying against blight and for haulm destruction - so only its cost can be shown. On eleven farms in Lancashire and Cheshire casual workers for potato picking were employed at piece rates. The rates were 1s 0d. or 1s. 1d. per score yards (over £15 per acre), but transport to the farm and meals often had to be provided as well. All these costs, and an estimate of the hours of piecework, are included under manual labour.

Seed Rate and Fertiliser Input

Seed rate and level of manuring are among the main factors likely to influence the yield. They, therefore, have a bearing on the margin of profit, which is the chief concern of the farmer as a businessman. Average yields obtained at the different levels of seed rate and of net manure cost are shown in Table 6.

Table 6 Average Yields of Maincrop Potatoes, in Tons per Acre, at different Seed Rates and Net Manure Costs, 109 Crops, 1954

Seed Potatoes Planted per Acre	Net Manure Cost per Acre				Group Average
	Under £9	£9 and under £12	£12 and under £15	£15 and over	
	tons	tons	tons	tons	tons
Under 13 cwts.	3.0 (3)	8.4 (6)	6.0 (5)	9.8 (6)	7.4 (20)
13 cwts. and under 16 cwts.	5.9 (5)	8.0 (8)	10.4 (4)	10.2 (8)	8.7 (25)
16 cwts. and under 19 cwts.	6.2 (4)	8.9 (11)	9.4 (6)	10.4 (8)	9.0 (29)
19 cwts and over	9.1 (6)	8.4 (10)	9.2 (14)	10.8 (5)	9.2 (35)
Group Average	6.5 (18)	8.5 (35)	8.9 (29)	10.3 (27)	8.7 (109)

The figures in brackets indicate the number of crops in each category.

Although it is common practice to manure and fertilise heavily for the potato crop, variations in the position of the crop in the rotation (where rotations are followed) do affect the kind and quantity of fertiliser used. Further, since much of this fertilising is normally regarded as being of a "rotational" character, it was felt better to base any analysis upon supposedly available plant food than solely upon quantities applied in 1954. So far as Table 6 is concerned the available fertilisers are measured by "net manure cost". Seed rates are measured in terms of the weight of seed used per acre, irrespective of variety or grade.

The main conclusion which emerges from this table is that satisfactory yields (8 tons per acre and over) are almost always obtained for seed rates above 13 cwt. per acre, so long as the Net Manure Cost is above £9 per acre. It can also be seen that in most cases - within the limits shown - additional fertiliser gave rise to extra yield worth more than the extra fertiliser cost. Increases in seed rate appear to tend the same way but the results are less conclusive.

It would be so difficult to determine how far these relationships were influenced by the abnormally wet weather and a late potato harvest. Some technical investigations, as reported in "Agricultural Review" July 1955, have reached rather different conclusions so far as seed rates are concerned, and it will be desirable to check our results in a less rainy season.

Conclusion

A broad survey of the results from 109 lots of maincrop potatoes, scattered over the Province, shows that three factors imposed some degree of pattern over the extremely wide inter-farm variations. These factors were quantity of seed per acre, net manure cost per acre, and region. Adequate seed and fertiliser usage tended to be found together, as one would expect of features of good management, and it is not easy to separate their influence on yields and margins. The regional difference between Shropshire and Staffordshire, on the one hand, and Lancashire and Cheshire, on the other, cuts across all distinctions of management and points to the relatively favourable position of the southern group in a season of such weather as was experienced in 1954.

Finally, a survey like this helps to restore a sense of proportion. For some potato growers it would be little exaggeration to say that 1954 was a disastrous season. Yet this survey would seem to indicate that, for potato growers as a whole in North-West England, the effects of the weather were less serious than might well have been expected. It is to be hoped that the second year of the survey will provide a check on the tentative conclusions reached here, and that the material will be suitable for a somewhat fuller analysis.

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DEFINITIONS

Total Cost: The final cost includes all expenses directly incurred in growing the potatoes, plus appropriate allowances for expenses which cannot be attributed to specific enterprises. See also manual labour, tractor, machinery depreciation and repairs, and general farm expenses. Costs are taken only to the farm gate and do not include any marketing or transport costs.

Manual Labour: Actual rates paid on the farm have been charged, with certain additions. To cover the cost of holidays with pay and national insurance for regular employees, 3d per hour was added to the rates for men of 21 and over, and 2d per hour to the rates for other workers. For all workers (regular and casual), the value of perquisites has been included in the wages charged.

Man Equivalent Hours: As used in Table 5, is a conversion of female, youth, and casual hours into man hours in proportion to the relative wage rates.

Tractor Labour: Includes an allowance for depreciation and repair of tractors; tractors were charged at 4/6 per hour.

Horses: Charged at 1/3 per hour.

Contract: Charged at the rates paid for machines and their accompanying crew.

Seed: Purchased seed was charged at cost. Home-grown seed was charged at the fixed price for once-grown seed.

Manures: Purchased manures were charged at net cost; farmyard manure produced on the farm was charged at 15/- per ton. Residues were calculated in accordance with the recommendation of the ScottWatson Committee.

Machinery Repairs and Depreciation: An allowance was made at the rate of 4/- per tractor hour and 1/- per horse hour.

Share of General Farm Expenses: Certain labour (e.g. ditching) and certain other expenses (e.g. farm telephone) are not attributable directly to specific enterprises. To cover these an addition, composed of 10 per cent. of the manual labour

cost and 6d per £1 of direct costs, has been made under this heading.

Returns: These are chiefly receipts for potatoes sold (net of any credit for delivery by the farmer), but they included credits for potatoes retained on the farm as follows:-

Ware potatoes at average controlled price for variety and district.

Seed potatoes at the fixed price for once-grown seed.

Chat potatoes at £4-10-0 per ton.

Margin: The difference between Returns and Total Cost.

Yields: The weight of all potatoes grown - ware, seed and chat.

Averages: These are "simple" averages: i.e. each crop result is expressed as so much per acre; these per acre figures are added together for all crops in a group and are then divided by the number of crops concerned to obtain the average.

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