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*Potatoes  
Cost of  
production*

*O.S.*

WITHDRAWN

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UNIVERSITY OF DURHAM

FARM ECONOMICS BRANCH, KING'S COLLEGE,  
NEWCASTLE UPON TYNE



COSTS AND RETURNS OF POTATO GROWING IN 1947  
ON SOME DURHAM and NORTHUMBERLAND FARMS.

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Some recent publications by the Farm Economics Branch.

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- FMS 28 Financial Results of Various Farm Groups in the Northern Counties, 1944 and 1945.
- FMS 29 Financial Results of North Country Hill and Upland Farms, 1944 and 1945.
- FMS 30 Financial Results of Farming in 1946 for Seven Farm Type Groups in the Northern Counties.
- G 19 The Economics of Winter-Fed Cattle in Northumberland, 1944/45.
- G 20 Costs of Growing and Harvesting Oats, 1945.
- G 21 The Economics of Yard-Fed Cattle in Northumberland, 1945/46.
- G 22 Farm Wages and Earnings in the Northern Counties, 1943-46.
- G 23 The Economics of Yard-Fed Cattle in Northumberland 1946/47
- G 24 Interim Report on Costs of Growing Potatoes, 1947, on Durham and Northumberland Farms.
- G 25 Cost of Rearing Lambs from First Cross Ewes, Northumberland 1947.
- M 24 Farm Costs of Milk Production on North Country Farms, 1945/46.
- M 26 Farm Costs of Milk Production on North Country Farms, 1946/47.
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COSTS AND RETURNS OF POTATO GROWING IN 1947

ON SOME DURHAM and NORTHUMBERLAND FARMS

I.

This bulletin presents the results of an inquiry into costs and returns of 47 "lots" of potatoes grown on 35 farms in the counties of Durham and Northumberland in 1947. Further details of the sample are given later but the total area covered by the inquiry, viz. 546 acres, may be related to the following general picture of potato growing in the two counties.

ACREAGES UNDER POTATOES, ACTUAL AND AS % OF TILLAGE AREA, IN DURHAM & NORTHUMBERLAND RESPECTIVELY, 1935-39 and EACH SUBSEQUENT YEAR.

| Year            | Durham       |                              | Northumberland |                              |
|-----------------|--------------|------------------------------|----------------|------------------------------|
|                 | Actual Acres | Percentage of Tillage Area * | Actual Acres   | Percentage of Tillage Area * |
| 1935-39 average | 12,993       | 14.0                         | 4,828          | 6.2                          |
| 1940            | 13,904       | 12.3                         | 5,954          | 5.7                          |
| 1941            | 20,890       | 14.3                         | 10,014         | 6.6                          |
| 1942            | 25,008       | 14.9                         | 12,124         | 5.8                          |
| 1943            | 26,369       | 14.7                         | 13,793         | 6.0                          |
| 1944            | 26,393       | 14.7                         | 12,066         | 5.4                          |
| 1945            | 25,677       | 15.2                         | 11,567         | 6.0                          |
| 1946            | 26,576       | 16.5                         | 12,336         | 6.9                          |
| 1947            | 24,023       | 15.4                         | 10,864         | 6.3                          |
| 1948 +          | 26,695       | 16.8                         | 13,190         | 7.8                          |

\* Tillage Area = Total Arable less Rotational Grass.

+ 1948 figures are provisional.

Four points may be noted. (i) the substantial increases over pre-war acreages, (ii) the comparative steadiness of the proportions of tillage under potatoes, (iii) the relatively greater importance of potatoes in Durham farming, and (iv) the smallness of the sample dealt with in this investigation (approximately 1.5% of the total 1947 acreages).

II.

The general method of the inquiry is what has come to be known as an Enterprise Cost Study. Agricultural Economists have adopted this term to describe an investigation which attempts to extract from the total economy of a farm only those facts and figures attributable to a particular product, and to appraise the findings.

Enterprise Cost Studies, dealing with various farm products, have formed part of the general programme of work carried on by the Farm Economics Branch over a number of years. The studies serve two general purposes. Primarily they are undertaken, in conjunction with other Provincial Centres and the Ministry of Agriculture to assist those annual discussions on policy and prices now known as the Annual Price Reviews.

A secondary objective (with which this bulletin is chiefly concerned) is to provide farmers and general readers with information likely to be of use and interest in the sphere of farm management.

It is advisable to state certain general considerations bearing upon this type of study and the interpretation of the results derived from it.

Results are presented as averages, per acre and per ton, and a good deal of supplementary information is given (a) to illustrate the wide farm to farm variations which lie behind the averages, and (b) to illustrate the association of some particular management decisions with the general results.

Readers are warned, however, that there are several reasons why they should not accept these results as fully representative of the financial aspects of potato growing throughout the counties and in the year concerned, nor as providing answers to all the management problems raised by potato growing.

The smallness of the "sample" has already been indicated. Moreover the sample was not "random" in the statistical sense. That is to say, the farms collaborating were not selected by methods designed to give every potato grower an even chance of being included in the investigation.

The inquiry proceeded on the basis of voluntary co-operation, and, while every effort was made to secure the co-operation of ordinary commercial growers, of both small and large acreages, and to exclude specialists and non-typical growers of one kind and another, willingness to co-operate was an important influence in the selection of cases. Such willingness is widely regarded as an indication of a more than average level of managerial interest and skill.

Had it been possible to obtain a completely randomized sample, it would then have been possible to calculate mathematically how near the true average costs and returns would be to the averages derived from the sample. Statistical perfection of this order could not be achieved within the limits set by available time, staff and finance. Consequently the authors themselves are unable to say just how "representative" these published results are. Nevertheless the results have value of their own, and careful study of the tables and comments may well provide pointers to better management of this important crop.

The word "pointers" is used advisedly. From the farm management aspect, the method of the enterprise cost study is subject to this important limitation, namely, that such a study, being only an extract from the totality of a farm, i.e., a selection of facts and figures related to a particular product or department, provides little or no information about the rest of the farm, or the relationship between the enterprise studied, and the other enterprises carried on.

Since most English farming is mixed farming, in which each farm is a combination of several lines of production, making joint use of labour, land, and other resources, a large part of the management problem lies in deciding what enterprises (lines of production) shall be undertaken, and the most suitable balance between them, in order to achieve the best overall results. Where to expand, where to contract or eliminate, and at what level of intensity of production to aim are questions which cannot be answered merely by examining the costs and returns aspects of one particular product.

This study therefore will not and cannot indicate whether the farms concerned are growing potatoes on too large or too small a scale in relation to optimum profitability of the farms as a whole; whether the potato crop has absorbed a disproportionate share of the labour force of men and machines; whether the crops have been made to bear a due share of the overhead or general expenses of the farm, and similar questions requiring detailed knowledge of the rest of the farming.

Bearing upon these limitations which are imposed by the method of the study, it may be noted, that potatoes occupied a place of substantial importance on most of the farms concerned. In terms of sales revenue, for example, potatoes held first place on 12 of the farms, and second place on 10 others. Cereals were the chief revenue producers on 12 farms and milk on 9 farms. In the two counties as a whole, and in relation to current national needs and the projected expansion programme, there is no crop which can be considered as a complete alternative to potatoes. On individual farms, however, there may well be questions of more or less, either in acreage or in intensity of production, or in handling practice, which deserve examination. The material which follows will have served one of its main aims if it prompts and assists such consideration.

One further general point deserves mention. The spring of 1947 is not yet far enough away for anyone to have forgotten the exceptionally difficult conditions with which farmers had to cope in preparing ground for and planting the 1947 potato crop. This investigation shows that, great though the difficulties were, most growers were able to carry through the normal sequence of operations. In so far as abnormal overtime payments were made necessary, they may have resulted in some increase over "normal" costs of production. Just how far this was the case, or to what extent the concentration of effort on the potato crop prejudiced other farm enterprises cannot be stated from the records obtained. One fairly obvious effect of the abnormal conditions however, was the depression of yields. (See Table 5). The overall average for the sample was 6 tons 11 cwts. per acre of seed and ware. This compares favourably with the 10 year average yield of ware (1934-43) which is officially reported as 6.1 tons for Durham and for Northumberland 6.9 tons per acre. Nevertheless, in the sample studied, 19 of the 47 lots returned yields of less than 6 tons (ware and seed) and in particular cases, yields as low as 13 cwts. and 2 tons 15 cwts. were recorded. When allowance is made for the general character of the sample, containing as it does a high proportion of experienced growers on good farms, there can be little doubt that, as one consequence of the adverse spring conditions, yields were lower than would be expected under more normal circumstances.

### III.

The following notes on accounting technique explain the treatment of certain items of cost or return. While actual cost was used wherever possible, there are some items for which actual cost could only have been obtained by undue extension and elaboration of farm records, and for such items uniform charges based on independent sources of information have been used as follows:-

charged uniformly at:-

|                           |     |     |     |                                    |
|---------------------------|-----|-----|-----|------------------------------------|
| Horse Labour              | ... | ... | 1/- | per hour,                          |
| Tractor Labour            | ... | ... | 2/6 | per hr. for tractors of 13-20 BHP. |
| (exclusive of drivers &c) |     |     | 2/9 | " " " " " 21-30 "                  |
|                           |     |     | 3/0 | " " " " " 31-42 "                  |
|                           |     |     | 4/0 | " " " track-layers                 |

charged uniformly at:-

|  |     |     |   |
|--|-----|-----|---|
| Farmyard Manure  | ... | ... | 10/- per ton, exclusive of leading and spreading.   |
| Home-grown Seed  | ... | ... | estimated market price.   |
| Home-grown Straw for pitting,                          |     |     | 30/- per ton.   |
| Overhead Charges and General Expenses, other than Rent |     |     | £3.10.0. per acre, a figure based on a scrutiny of general farm accounts in the areas affected. |
| Ware Potatoes consumed on the farm,                    |     |     | credited at £7. per ton   |
| Seed " retained " " " " " " "                          |     |     | " " " " " " " " estimated market price.   |
| Chats consumed " " " " " " " "                         |     |     | " " " " " " " " £2. per ton   |

The use of uniform charges for such items as horse and tractor power, farmyard manure, home-grown straw, overhead and general expenses, and so on, tends, of course, to produce greater uniformity of costs between farm and farm than is likely to be the case in actual fact. Independent investigations reveal that for any one of the items listed, the variations between farm and farm can be very wide. The adoption of uniform rates for all farms therefore introduces an element of unreality at precisely those points where efficient management might be expected to reveal itself. For example, a farmer who, by careful organization and close attention to detail, is able to work his medium sized tractor at a cost of two shillings an hour, is not flattered by having his tractor work charged at two shillings and ninepence. On the other hand a farmer who may keep work horses for odd jobs and relief work only and get so little out of them that their cost works out at, say, three shillings an hour (which is easily possible) is flattered by having his horse labour priced at one shilling an hour.

Again, the uniform charge of 2/6d. an hour for tractors of 13-20 B.H.P. suggests that all farmers using such tractors operate them at this cost. This is highly improbable in fact. It is hardly likely, however, that, on any one farm, the differences between the uniform charges and the actual costs on that farm will all be in the same direction. In other words, Farm X's horse labour may actually be costing more (or less) than the uniform 1/- per hour. It does not necessarily follow (though it may still be the case!) that the same farm's tractor power, farmyard manure, home-grown straw, and so on, are also in fact costing more (or less) than the uniform rates adopted in this study for these items.

The simple conclusion from all this is that farmers who wish to know their actual production costs, even for one particular crop, must be prepared to provide much more detail about their whole farming than could be obtained by the method of an enterprise cost study subject to the limitations which have been indicated above.

#### IV. THE SAMPLE.

TABLE 1. SIZE DISTRIBUTION OF 35 FARMS SUPPLYING RECORDS

| Average Size 265 Acres.   |       |         |         |         |         |         |         |         |         |
|---|-------|---------|---------|---------|---------|---------|---------|---------|---------|
| Smallest Farm 93 Acres.                      Largest Farm 500 Acres |       |         |         |         |         |         |         |         |         |
| Farms between Acres   | 0-100 | 100-150 | 151-200 | 201-250 | 251-300 | 301-350 | 351-400 | 401-450 | 451-500 |
| No. of Farms  | 1     | 4       | 8       | 5       | 5       | 3       | 3       | 3       | 3       |

TABLE 2. RANGE IN PROPORTION OF TILLAGE TO TOTAL CROPS AND GRASS ON 35 FARMS SURVEYED.

Average Tillage 51%    Lowest Tillage 14%    Highest Tillage 82%

| Farms with Proportion of Tillage Between | 0-20% | 21-40% | 41-60% | 61-80% | 81% & over |
|--|-------|--------|--------|--------|------------|
| No. of Farms                             | 1     | 4      | 21     | 8      | 1          |

TABLE 3. RANGE IN PROPORTION OF POTATO AREA TO TILLAGE AREA ON 35 FARMS SUPPLYING RECORDS

Average Proportion of Potatoes to Tillage - 18%  
 Lowest Proportion 5%    Highest Proportion 34%

| Farms with Proportion of Potatoes to Tillage between | 5-10% | 11-15% | 16-20% | 21-25% | 26-30% | 31-35% |
|--|-------|--------|--------|--------|--------|--------|
| No. of Farms   | 7     | 9      | 5      | 5      | 8      | 1      |

Note:- Generally the higher the proportion of tillage to total crops and grass, the higher is the proportion of potatoes to tillage.

It was not convenient in every instance to obtain records for all potatoes grown on the farms included in the sample. While it may be hoped that the various reasons why particular fields were chosen and others omitted, have had the effect of cancelling out some bias in selection, it can be said that neither the best nor the worst yielding, the most difficult nor the easiest worked, nor even the smallest or the largest plots were deliberately selected. The guiding considerations were chiefly convenience in keeping track of operations, in measuring acreages and yields and getting a fair representation of the general practice on the farm in its handling of the potato crop.

The 47 individual lots of potatoes which were costed amounted in all to 546 acres or three-fifths of the total acreage under potatoes in 1947 on the farms supplying records. The lots ranged in area from 1 to 70 acres; the distribution by size of individual lots within this range is shown in Table 4.

TABLE 4. RANGE IN SIZE OF 47 INDIVIDUAL LOTS COSTED.

Average Size 11½ Acres    Smallest Lot 1 Acre    Largest Lot 70 Acres

| Lots        | Under 5 Acres | 6 - 9 Acres | 10-14 Acres | 15-19 Acres | 20-24 Acres | Over 25 Acres |
|-------------|---------------|-------------|-------------|-------------|-------------|---------------|
| No. of Lots | 7             | 17          | 8           | 9           | 5           | 1             |

TABLE 5. RANGE OF YIELDS OF 47 INDIVIDUAL LOTS COSTED

Average yield 6 tons, 11 cwt. (Ware & Seed)  
 Lowest Yield 13 cwts,    Highest Yield 11 tons, 13 cwts.

| Yield per Acre | Under 2 tons | 2 tons & under 3 tons | 3 tons & under 4 tons | 4 tons & under 5 tons | 5 tons & under 6 tons | 6 tons & under 7 tons | 7 tons & under 8 tons | 8 tons & under 9 tons | 9 tons & under 10 tons | 10 tons & under 11 tons | 11 tons & over |
|----------------|--------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|-------------------------|----------------|
| No. of Lots    | 1            | 2                     | 1                     | 7                     | 8                     | 8                     | 9                     | 3                     | 4                      | 3                       | 1              |



### V. COSTS AND RETURNS.

The cost of growing, harvesting, and marketing one acre of potatoes was found to average £43.18.0. over the 546 acres, with individual costs ranging from £28.18.9. to £62.14.3. Table 6 gives the constituent items of the above average figure, while Table 7 shows the range of individual costs per acre. Tables 8 and 9 give corresponding details per ton of seed and ware, while Tables 10 and 11 show the overall average relationship between costs and returns and the profit margin per acre and per ton.

TABLE 6. OVERALL AVERAGE COST PER ACRE ON 546 ACRES.

|   | Average of<br>546 Acres |        | Your Total<br>Cost for<br>Acres |       | Your Cost<br>per Acre |       |
|---|-------------------------|--------|---------------------------------|-------|-----------------------|-------|
|   | £. s.                   | £. s.  | £. s.                           | £. s. | £. s.                 | £. s. |
| <u>OPERATION COSTS:-</u>                                |                         |        |                                 |       |                       |       |
| Cultivations before Planting                            | 2.                      | 4.     |                                 |       |                       |       |
| Planting .....  | 1.                      | 18.    |                                 |       |                       |       |
| Summer Cultivations .....                               | 2.                      | 11.    |                                 |       |                       |       |
| Application of Fertilisers<br>and Farmyard Manure ..... | 2.                      | 13.    |                                 |       |                       |       |
| Total ready to lift .....                               | 9.                      | 6.     |                                 |       |                       |       |
| Lifting and Disposal .....                              | 10.                     | 7.     |                                 |       |                       |       |
| <u>TOTAL OPERATION COSTS</u> .....                      |                         | 19.13. |                                 |       |                       |       |
| <u>MATERIALS:-</u>                                      |                         |        |                                 |       |                       |       |
| Fertilisers (Gross) .....                               | 5.                      | 17.    |                                 |       |                       |       |
| Farmyard Manure (Gross) .....                           | 5.                      | 9.     |                                 |       |                       |       |
| Total Manure (Gross) .....                              | 11.                     | 6.     |                                 |       |                       |       |
| *Seed .....   | 10.                     | 17.    |                                 |       |                       |       |
| Miscellaneous (Straw, sacks &c)                         | 10.                     |        |                                 |       |                       |       |
| <u>TOTAL MATERIALS</u> .....                            |                         | 22.13. |                                 |       |                       |       |
| <u>GENERAL EXPENSES:-</u>                               |                         |        |                                 |       |                       |       |
| Rent .....  | 1.                      | 12.    |                                 |       |                       |       |
| Overheads .....   | 3.                      | 10.    |                                 |       |                       |       |
| <u>TOTAL GENERAL EXPENSES</u> .....                     |                         | 5. 2.  |                                 |       |                       |       |
| <u>TOTAL GROSS COST</u> .....                           |                         | 47. 8. |                                 |       |                       |       |
| Add Manurial Residues B/fwd.                            |                         | 6.     |                                 |       |                       |       |
|   |                         | 47.14. |                                 |       |                       |       |
| Loss <sup>o</sup> Manurial Residues C/fwd.              |                         | 3.16.  |                                 |       |                       |       |
| <u>TOTAL NET COST PER ACRE</u>                          |                         | 43.18. |                                 |       |                       |       |

o This credit is made up of £2 for artificial manures and £1.16 for FYM.  
\*  $\frac{2}{3}$  (12 cwt.) Bought Seed @ £7.18 and  $\frac{1}{3}$  (6 cwt.) Home-Grown @ £2.19 per acre.

TABLE 7. RANGE OF INDIVIDUAL NET COSTS PER ACRE

Average Net Cost £43.18.0.  
Lowest Cost £28.18.9.      Highest Cost £62.14.3.

| No. of Lots where cost per acre was:- |     |            |            |            |            |            |            |            |
|---------------------------------------|-----|------------|------------|------------|------------|------------|------------|------------|
| and under                             | £30 | £30<br>£35 | £35<br>£40 | £40<br>£45 | £45<br>£50 | £50<br>£55 | £55<br>£60 | £60<br>£65 |
| 1                                     | 4   | 7          | 11         | 16         | 6          | -          | 2          |            |

TABLE 8. OVERALL AVERAGE COST PER TON (Seed and Ware)

| For 3592 Tons                       |  | Average for<br>3592 tons |          | Your Cost<br>per Ton |       |
|-------------------------------------|--|--------------------------|----------|----------------------|-------|
|                                     |  | s. d.                    | s. d.    | s. d.                | s. d. |
| <u>OPERATION COSTS:-</u>            |  |                          |          |                      |       |
| Cultivations before planting ....   |  | 6.                       | 8.       |                      |       |
| Planting .....                      |  | 5.                       | 8.       |                      |       |
| Summer Cultivations .....           |  | 7.                       | 10.      |                      |       |
| Application of Fertilisers & FYM.   |  | 8.                       | 0.       |                      |       |
| <u>TOTAL READY TO LIFT</u>          |  | 28.                      | 2.       |                      |       |
| Lifting and Disposal .....          |  | 31.                      | 7.       |                      |       |
| <u>TOTAL OPERATION COSTS</u> .....  |  |                          | 59. 9.   |                      |       |
| <u>MATERIALS:-</u>                  |  |                          |          |                      |       |
| Fertilisers (Gross) .....           |  | 17.                      | 10.      |                      |       |
| Farmyard Manure (Gross) .....       |  | 16.                      | 6.       |                      |       |
| <u>TOTAL MANURES (Gross)</u> .....  |  | 34.                      | 4.       |                      |       |
| Seed .....                          |  | 33.                      | 0.       |                      |       |
| Miscellaneous (Straw, Sacks, &c.)   |  | 1.                       | 5.       |                      |       |
| <u>TOTAL MATERIALS</u> .....        |  |                          | 68. 9.   |                      |       |
| <u>GENERAL EXPENSES:-</u>           |  |                          |          |                      |       |
| Rent .....                          |  | 4.                       | 11.      |                      |       |
| Overheads .....                     |  | 10.                      | 7.       |                      |       |
| <u>TOTAL GENERAL EXPENSES</u> ..... |  |                          | 15. 6.   |                      |       |
| <u>TOTAL GROSS COST</u> .....       |  |                          | 144. 0.  |                      |       |
| Add Manurial Residues B/forward     |  |                          | 11.      |                      |       |
|                                     |  |                          | 144. 11. |                      |       |
| Less Manurial Residues C/forward    |  |                          | 11. 7.   |                      |       |
| <u>TOTAL NET COST PER TON</u> ..... |  |                          | 133. 4.  |                      |       |

TABLE 9. RANGE OF INDIVIDUAL NET COSTS PER TON

Average Net Cost £6.13.4.  
 Lowest Cost £3.0.1.                      Highest Cost £49.16.8.

| No. of Lots where cost per ton was:- |    |          |          |          |          |           |            |               |
|--------------------------------------|----|----------|----------|----------|----------|-----------|------------|---------------|
| and under                            | £5 | £5<br>£6 | £6<br>£7 | £7<br>£8 | £8<br>£9 | £9<br>£10 | £10<br>£11 | £11 &<br>over |
|                                      | 6  | 9        | 8        | 7        | 7        | 5         | 3          | 2             |

TABLE 10. OVERALL AVERAGE RETURNS PER ACRE ON 546 ACRES.

|                               | Average on 546 Acres |       | Your farm per acre |     |      |       |    |    |
|-------------------------------|----------------------|-------|--------------------|-----|------|-------|----|----|
|                               | Tons                 | cwts. | £.                 | s.  | Tons | cwts. | £. | s. |
| <u>SALES:-</u>                |                      |       |                    |     |      |       |    |    |
| Ware .....                    | 5.                   | 11    | 41.                | 15. |      |       |    |    |
| Seed .....                    |                      | 5     | 2.                 | 9.  |      |       |    |    |
| Chats .....                   |                      | 2     |                    | 6.  |      |       |    |    |
| <u>TOTAL SALES</u> .....      | 5.                   | 18.   | 44.                | 10. |      |       |    |    |
| <u>CONSUMED ON FARM:-</u>     |                      |       |                    |     |      |       |    |    |
| Ware .....                    |                      | 2.    |                    | 12. |      |       |    |    |
| Seed .....                    |                      | 13.   | 6.                 | 12. |      |       |    |    |
| Chats .....                   |                      | 2.    |                    | 6.  |      |       |    |    |
| <u>TOTAL CONSUMED ON FARM</u> |                      | 17.   | 7.                 | 10. |      |       |    |    |
| <u>TOTAL CROP</u> .....       | 6.                   | 15.   | 52.                | 0.  |      |       |    |    |
| <u>ACREAGE PAYMENT</u> .....  |                      |       | 10.                | 0.  |      |       |    |    |
| <u>TOTAL RETURN PER ACRE</u>  |                      |       | 62.                | 0.  |      |       |    |    |

TABLE 11. OVERALL AVERAGE MARGIN (RETURN OVER COST)  
PER ACRE AND PER TON (SEED AND WARE)

| Average of:-                     | 546 Acres |         | 3592 Tons |         | Your Cost |         |          |         |
|----------------------------------|-----------|---------|-----------|---------|-----------|---------|----------|---------|
|                                  | Per Acre  | Per Ton | Per Acre  | Per Ton | Per Acre  | Per Ton | Per Acre | Per Ton |
|                                  | £.        | s.      | £.        | s.      | £.        | s.      | £.       | s.      |
| Total Sales plus acreage payment | 54.       | 10.     | 8.        | 6.      |           |         |          |         |
| Total Net Cost .....             | 43.       | 18.     | 6.        | 13.     |           |         |          |         |
| CASH MARGIN .....                | 10.       | 12.     | 1.        | 13.     |           |         |          |         |
| Add Consumed on Farm ...         | 7.        | 10.     | 1.        | 2.      |           |         |          |         |
| MARGIN (including crop consumed) | 18.       | 2.      | 2.        | 15.     |           |         |          |         |

VI. FACTORS AFFECTING COSTS & RETURNS.

The extreme range of variation between individual lots is amply demonstrated in the tables already presented, and it would be natural to ask whether further analysis can indicate the reasons for this state of affairs. Some tables are given later to illustrate "associations" between certain elements of costs, on one hand and returns and net margins on the other. Some of the results will be found quite contrary to expectation. They are included here to serve as a warning against the temptation to stretch economic data beyond legitimate limits of interpretation, when all relevant facts are not available.

First of all, it is to be noted that the figures for lifting and disposal included in Tables 6 and 8 represent the average cost for three differing practices or combinations of practices subsequent to lifting. It is not an average for the more common practice of lifting, pitting and sorting at the pits. In all, 21 lots were so treated, but 5 were housed only; 10 were sold direct out of the field at lifting; 10 others were marketed partly direct from the field and partly from pits; and in one case the crop was partly pitted and partly housed. These differing practices, together with the wide variations in yield, account mainly for an extensive range of individual costs for lifting and disposal.

Table 12 on page 10 seems to show that the higher cost involved in pitting, and any loss in saleable produce due to storage, was slightly more than compensated by the higher prices which obtained later in the season. Seasonal prices are, in fact, so arranged to give the grower inducement to hold over his crop and so ease marketing and storage problems.

The winter of 1947/48 may perhaps have favoured storage on the farm, in that potatoes were in most cases harvested in good condition, so that the nearly identical average yields for the two groups (pitted and not pitted) probably do not indicate an appreciably higher yield and therefore possible higher returns for the pitted lots at lifting. Despite this, it is of course true that much of the cost of sorting in winter months represents regular farm labour which might otherwise have been less productively employed, while at lifting this same cost may have been directly incurred as casual labour engaged for a longer period than that necessitated in lifting and pitting.

For this reason the higher net returns, related to lifting and disposal costs, for the pitted lots, than for the lots where the crop was sold direct out of the field may well understate the reward for bearing the risk of storage.

An interesting point bearing upon the decision whether to sell on lifting or to hold the crop for late season selling concerns the choice of variety. Under pre-war conditions of competitive selling, north country growers were at some disadvantage in the marketing of early varieties, since earlies from areas further south were usually available before the corresponding north country crops were ready and took the "cream" of the market. Under the system of fixed national prices this disadvantage is removed and many north country growers have found it advantageous to grow the early varieties. On the other hand, the huge demand for seed resulting from the expansion of the potato acreage has often limited growers' preferences for particular varieties and compelled acceptance of varieties available rather than varieties preferred. The spring conditions in 1947 emphasised this factor. The varieties grown on the farms studied are listed on page 12. The separate acreages under each variety are not available.

In addition to the differences in marketing practice examined above, other significant variations in individual net cost may be expected to arise, in the main, from differing techniques of production and are in fact reflected in the items for seed, manure and cultivations prior to lifting, in that order of importance, subject to what was said on page 6 regarding the use of uniform rates of charge. Thus the individual costs of seed ranged from £6.16.4. to £24.0.0., applications of manure ranged from £2.18.7. to £17.15.9. and cultivations, excluding lifting, from £3. 5. 3. to £10.5.8. The effects of grouping farms with respectively high and low seed costs, manurial costs and cultivation costs are set out in Table 14.

The differences in total costs and in the separate items making up the total costs would not, of course, in any year represent solely the effect of individual management decisions. They are due partly to the method of selecting the lots for investigation which may, for instance, include by chance a field where new rather than once- or even twice-grown seed is used, and partly to circumstances outside the farmer's control, such as differing soil and climatic conditions. It is impossible to isolate and measure the separate effects of these two sets of factors. Nevertheless certain associations between particular practices and total results may normally be expected and looked for. In the year under review, however, the over-riding influence of the exceptional weather seems to have overshadowed all other considerations, almost to the exclusion of the influence of management decisions on the final cost or return. It is perhaps more interesting than useful, therefore, to note from the most unusual results in Table 14 that, whatever the real explanation might be, it has been the case this year and with many of the lots recorded that the application of additional working capital, with the exception of that invested in new seed, has been denied its expected return.

It would be dangerous, to say the least, to accept as a general conclusion that, as a careless reading of Table 14 and this script might suggest, high expenditure on manures will result in lower average yields and something like half the net profit per acre compared with low expenditure on manures. It would be equally dangerous to infer that more intensive cultivations will always result in lower yields and lower net profits than less intensive cultivations, though Table 14 seems to suggest so. The highly important proviso that "other things are equal" would need to be satisfied before valid comparisons in respect of a single element of cost could be attempted.

Conditions under which all other factors but the one for which comparative results are being sought are the same throughout all the cases under investigation can only be approximately established in elaborately designed and controlled experiments. They do not exist where the cases are scattered over a heterogeneous collection of farms operating for commercial ends. There are too many "variables" involved - variety, strain, seed rate, time of sowing, type of soil, local vagaries of weather, kinds, quantities and qualities of manure, kinds, sequences and times of cultivations and so on and so on. Independent investigators cannot assess the effects of all these things on each and every farm. This is the function of management and a main purpose of this report is to indicate both the many points of detail with which managements might usefully concern themselves and also some of the limitations which beset those who presume to offer them guidance in their complicated task.

TABLE 12. COMPARATIVE COSTS, RETURNS, AND MARGINS (Returns over Costs) PER ACRE, FOR POTATOES PITTED AND SOLD ON LIFTING.

| Unweighted Average of -          | 21 Lots Pitted | 10 Lots Sold on Lifting |
|----------------------------------|----------------|-------------------------|
| Average Size of Lot              | 12 Acres       | 7 Acres                 |
| Yield per Acre *                 | 6 Tons 19 cwt. | 7 Tons 1 cwt.           |
| <u>Per Acre</u>                  | £. s.          | £. s.                   |
| Cost of Lifting & Disposal ..... | 11. 16.        | 7. 15.                  |
| Total Cost .....                 | 47. 2.         | 39. 9.                  |
| Total Returns .....              | 69. 2.         | 58. 14.                 |
| Total Margin (Returns over cost) | 22. 0.         | 19. 5.                  |

\* Yields are based on quantities sold and consumed on farm.

TABLE 13. COMPARATIVE COSTS AND RETURNS PER ACRE  
ON TEN HIGH AND TEN LOW COST LOTS

| GROUP                                       | LOW            | HIGH          |
|---|----------------|---------------|
| No. Acres per Lot                           | 16             | 12            |
| Yield per acre                              | 5 Tons 18 cwt. | 7 Tons 6 cwt. |
|   | £. s.          | £. s.         |
| Cultivations before lifting ....            | 6. 0.          | 8. 3.         |
| Lifting .....                               | 7. 0.          | 13. 11.       |
| Manuring .....                              | 6. 19.         | 13. 8.        |
| Seed .....                                  | 9. 14.         | 11. 16.       |
| Rent, Overheads & Miscellaneous             | 5. 0.          | 6. 8.         |
| TOTAL NET COST PER ACRE .....               | 34. 13.        | 53. 6.        |
| TOTAL RETURN (Including acreage<br>payment) | 53. 8.         | 71. 0.        |
| MARGIN (Returns over Costs)<br>PER ACRE     | 18. 15.        | 17. 14.       |

TABLE 14. COMPARATIVE COSTS AND RETURNS PER ACRE ON TEN HIGH  
AND TEN LOW SEED, MANURING AND CULTIVATION COST LOTS.

| GROUP   | SEED           |                | MANURING       |               | CULTIVATIONS   |                |
|---|----------------|----------------|----------------|---------------|----------------|----------------|
|   | LOW            | HIGH           | LOW            | HIGH          | LOW            | HIGH           |
| No. Acres per Lot                             | 14             | 10             | 10             | 9             | 9              | 11             |
| Yield per Acre                                | T. c.<br>4.13. | T. c.<br>7.16. | T. c.<br>7. 8. | T. c.<br>6.10 | T. c.<br>7.19. | T. c.<br>6.17. |
|   | £. s.          | £. s.          | £. s.          | £. s.         | £. s.          | £. s.          |
| CULTIVATIONS before<br>lifting                | 7.12           | 5.19           | 5.13.          | 7. 7.         | 4. 5.          | 8.16.          |
| Lifting .....                                 | 8. 6.          | 9.14.          | 8.14.          | 11. 1.        | 9. 4.          | 11.15.         |
| MANURING .....                                | 10. 3.         | 11. 1.         | 5.18.          | 15. 6.        | 11. 0.         | 12.13.         |
| SEED .....                                    | 8. 3.          | 15. 5.         | 12.10.         | 11. 2.        | 12. 5.         | 10.18.         |
| Rent, Overheads and<br>Miscellaneous          | 5. 5.          | 5.16.          | 5. 2.          | 5.18.         | 5. 6.          | 6. 5.          |
| TOTAL NET COST PER<br>ACRE                    | 39. 9.         | 47.15.         | 37.17          | 50.14.        | 42. 0.         | 50. 7.         |
| TOTAL RETURN (Includ-<br>ing Acreage Payment) | 48. 0.         | 70.12.         | 65.12.         | 65. 4.        | 71. 3.         | 68. 5.         |
| MARGIN (Returns over<br>Cost) PER ACRE        | 8.11.          | 22.17.         | 27.15.         | 14.10.        | 29. 3.         | 17.18.         |

TABLE 15. RANGE OF SEED RATES PER ACRE

Average Seed Rate per acre 18 cwt.  
Highest Seed Rate 24½ cwt.      Lowest Seed Rate 12 cwt.

| Seed Rate<br>per Acre | Under<br>14 cwt. | 14-16<br>cwt. | 16-18<br>cwt. | 18-20<br>cwt. | 20-22<br>cwt. | 22-24<br>cwt. | Over<br>24 cwt. |
|-----------------------|------------------|---------------|---------------|---------------|---------------|---------------|-----------------|
| No. of Lots           | 2                | 6             | 12            | 7             | 16            | 3             | 1               |

TABLE 16. RANGE OF COST PER TON OF SEED USED.

Average Cost per Ton £12. 6. 0.  
 Highest Cost per Ton £24.0.0.                      Lowest Cost per Ton £8.0.0.0.

| Cost per Ton | Under<br>£9 | £9-<br>£10 | £10-<br>£11 | £11-<br>£12 | £12-<br>£13 | £13-<br>£14 | £14-<br>£15 | £15-<br>£16 | Over<br>£16 |
|--------------|-------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| No. of Lots  | 2           | 4          | 5           | 13          | 10          | 5           | -           | 6           | 2           |

TABLE 17. RANGE OF PRICE PER TON OF NEW SEED

Average Price per Ton £11.18.11.  
 Highest Price per Ton £24                      Lowest Price per Ton £8.15.0.

| Price per Ton | Under<br>£11 | £11-<br>£12 | £12-<br>£13 | £13-<br>£14 | £14-<br>£15 | £15-<br>£16 | £16-<br>£17 | Over<br>£17 |
|---------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| No. of Lots   | 2            | 4           | 14          | 10          | 3           | 6           | 2           | 1           |

TABLE 18. VARIETIES INCLUDED IN THE SAMPLE

| Variety                | No. of<br>Cases | Variety               | No. of<br>Cases |
|------------------------|-----------------|-----------------------|-----------------|
| <u>Earlies:</u>        |                 | <u>Maincrop:</u>      |                 |
| Epicure .....          | 7               | Majestic .....        | 15              |
| Arran Pilot .....      | 6               | Arran Banner .....    | 13              |
| Eclipse .....          | 2               | Arran Peak .....      | 9               |
| Duke of York .....     | 1               | Arran Consul .....    | 7               |
| Total Earlies .....    | 16              | Rodskin .....         | 6               |
|                        |                 | Dunbar Standard ..... | 5               |
| <u>Second Earlies:</u> |                 | Great Scott .....     | 3               |
| Dunbar Rover .....     | 2               | Arran Victory .....   | 3               |
| British Qucon .....    | 1               | Craigs Defiance ..... | 3               |
| Total Second Earlies   | 3               | Doon Star .....       | 2               |
|                        |                 | King Edward .....     | 2               |
|                        |                 | Arran Chief .....     | 1               |
|                        |                 | Gladstone .....       | 1               |
|                        |                 | Stormont Dawn .....   | 1               |
|                        |                 | Total Maincrop .....  | 71              |

X. PRIMARY COST STRUCTURE

In the analysis of costs as presented so far, the various items relating to cultivations may be described as secondary costs because they combine, and are derived from the separate charges for manual labour, horse labour, and the use of machinery. For some purposes it is useful to know the primary cost structure, that is, the relative importance in total cost of the prime factors of labour, manures, seed and so on. The primary cost structure for the sample investigated is given on pages 13 and 14.

TABLE 19. PRIMARY COST STRUCTURE DETAIL

| (A) <u>OPERATIONS</u>                      | <u>Per Acre</u>    | <u>Per Ton</u>    |
|--|--------------------|-------------------|
| <u>CULTIVATIONS BEFORE PLANTING</u>        |                    |                   |
| Manual Labour ... ..                       | £. s. d.<br>17. 9. | £. s. d.<br>2. 8. |
| Horse Labour ... ..                        | 1. 8.              | 3.                |
| Tractor Labour ... ..                      | 1. 3.10.           | 3. 7.             |
| Contract Labour ... ..                     | 11.                | 2.                |
| <u>Total before Planting</u> ... ..        | <u>2. 4. 2.</u>    | <u>6. 8.</u>      |
| <u>PLANTING</u>                            |                    |                   |
| Manual Labour ... ..                       | 1. 6. 2.           | 3.11              |
| Horse Labour ... ..                        | 6. 6.              | 1. 0.             |
| Tractor Labour ... ..                      | 4.11.              | 9.                |
| <u>Total Planting</u> ... ..               | <u>1.17. 7.</u>    | <u>5. 8.</u>      |
| <u>SUMMER CULTIVATIONS</u>                 |                    |                   |
| Manual Labour ... ..                       | 1.12. 7.           | 5. 1.             |
| Horse Labour ... ..                        | 5. 0.              | 9.                |
| Tractor Labour ... ..                      | 8. 1.              | 1. 3.             |
| Contract Labour ... ..                     | 5. 4.              | 9.                |
| <u>Total Summer Cultivations</u> ... ..    | <u>2.11. 0.</u>    | <u>7.10.</u>      |
| <u>APPLICATION OF MANURE</u>               |                    |                   |
| Manual Labour ... ..                       | 1.16.11.           | 5. 8.             |
| Horse Labour ... ..                        | 11. 2.             | 1. 8.             |
| Tractor Labour ... ..                      | 4. 8.              | 8.                |
| <u>Total Application of Manures</u> ... .. | <u>2.12. 9.</u>    | <u>8. 0.</u>      |
| <u>TOTAL BEFORE LIFTING</u>                |                    |                   |
| Manual Labour ... ..                       | 5.13. 5.           | 17. 4.            |
| Horse Labour ... ..                        | 1. 4. 4.           | 3. 8.             |
| Tractor Labour ... ..                      | 2. 1. 6.           | 6. 3.             |
| Contract Labour ... ..                     | 6. 3.              | 11.               |
| <u>Total before Lifting</u> ... ..         | <u>9. 5. 6.</u>    | <u>1. 8. 2.</u>   |
| <u>LIFTING and DISPOSAL</u>                |                    |                   |
| Manual Labour ... ..                       | 9. 5. 5.           | 1. 8. 2.          |
| Horse Labour ... ..                        | 7. 4.              | 1. 2.             |
| Tractor Labour ... ..                      | 14. 7.             | 2. 3.             |
| <u>Total Lifting and Disposal</u> ... ..   | <u>10. 7. 4.</u>   | <u>1.11. 7.</u>   |
| <u>TOTAL OPERATION COSTS</u>               |                    |                   |
| Manual Labour ... ..                       | 14.18.10.          | 2. 5. 6.          |
| Horse Labour ... ..                        | 1.11. 8.           | 4.10.             |
| Tractor Labour ... ..                      | 2.16. 1.           | 8. 6.             |
| Contract Labour ... ..                     | 6. 3.              | 11.               |
| <u>Total Operation Costs</u> ... ..        | <u>19,12.10.</u>   | <u>2.19. 9.</u>   |

(Continued overleaf)



PRIMARY COST STRUCTURE (Cont'd)(B) TOTAL NET COST

|                      | <u>Per Acre</u> | <u>Per Ton</u> | <u>Per Cent.</u> |
|----------------------|-----------------|----------------|------------------|
|                      | £. s. d.        | £. s. d.       |                  |
| <u>OPERATIONS</u>    |                 |                |                  |
| Manual Labour ...    | 14.18.10.       | 2. 5. 6.       | 34.1             |
| Horse Labour ...     | 1.11. 8.        | 4.10.          | 3.6              |
| Tractor Labour ...   | 2.16. 1.        | 8. 6.          | 6.4              |
| Contract Labour ...  | 6. 3.           | 11.            | 0.7              |
|                      | 19.12.10.       | 2.19. 9.       | 44.8             |
| Seed ...             | 10.17. 0.       | 1.13. 0.       | 24.8             |
| Manures, Artificial  | 3.17. 0.        | 11. 8.         | 8.7              |
| (Net) F.Y.M.         | 3.19. 0.        | 12. 0.         | 9.0              |
| Straw, Sacks, etc.   | 10. 0.          | 1. 5.          | 1.1              |
| Rent ...             | 1.12. 0.        | 4.11.          | 3.7              |
| General Expenses ... | 3.10. 0.        | 10. 7.         | 7.9              |
|                      | 43.17.10.       | 6.13. 4.       | 100.0            |

The Farm Economics Branch gratefully acknowledges the ready and willing co-operation of the growers who provided the records on which this report is based and trusts that the results will be of interest and use, not only to them but to a much wider circle of farmers and people concerned with farming affairs.

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