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THE COSTS AND RETURNS OF SCOTTISH POTATO PRODUCTION

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Biographical Details

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Abstract

The gross and net margins for a representative sample of 53 Scottish potato producers classed as "Seed" (>80% of area grown for seed), "Ware" (>80% of area grown for Ware) and "Mixed" for the rest were obtained for the 1999 growing season according to the methodology of MAFF (1990,1999).

The farms were arable. Yields were average but for seed growers for whom tuber number in the seed size is more important. Prices were the lowest for six years variable costs were high and gross margins are above the best for cereals. However fixed costs excluding seasonally rented land are considerable leaving negative net margins.

Potato price fluctuates widely. Prices were high in 1998. Applying these prices to the 1999 data left good net margins. Average prices still left reasonable net margins. Break-even prices were £85/t for ware and £200/t for seed, which were not reached in three of the last six years. These results show the considerable investment in both fixed and variable costs and risk for this important Scottish crop.

Introduction

Although Scottish potato area is small, on output potatoes are, with wheat, second only to barley. Seed potato production is important with significant exports. Production, prices and profitability have varied markedly in recent years.

This report presents the results of a survey of the output and costs of potato production for the 1999 crop year in Scotland commissioned by the Scottish Executive Environment and Rural Affairs Department (SEERAD). The objective was to determine gross and net margins for a representative sample of 53 Scottish potato producers stratified by enterprise type defined as "Seed" (>80% of area grown for seed), "Ware" (>80% of area grown for Ware) and "Mixed" for the rest (Table 1). The methodology for the survey and analysis are detailed in the Special Commodities Study Manuals (MAFF 1990,1999) details in appendix 1.

Results

Cropping & Stocking

Table 1 Summary Of 1999 Average Cropping On Sample Farms By Potato Enterprise Type

Potato Enterprise Type	Mixed	Seed	Ware	All
No. of Farms	**5**	**23**	**25**	**53**
	ha.	**ha.**	**ha.**	**ha.**
Cereals & Oilseeds	170.0	283.3	174.0	221.0
Turnips	0.0	1.8	1.1	1.3
Seed Potatoes	18.8	32.0	0.5	15.9
Main Crop Potatoes	11.8	1.1	28.1	14.8
Early Ware Potatoes	0.0	0.0	2.0	0.9
Soft Fruit, Veg. &Other	2.5	23.9	14.7	17.5
Set aside	20.5	47.2	23.1	33.3
Total Arable	223.6	389.3	243.3	304.8
Temp. Grass	17.9	30.5	9.8	19.5
Perm & Rough Grass	8.1	49.9	19.2	31.5
Woods Buildings & Other	10.7	18.1	7.0	12.2
Total Farm area	260.3	487.8	279.3	368.0
Rented seasonally for Potatoes	35.8	22.5	15.8	20.6
Rented Grass & Other Crops	6.6	11.1	7.5	9.0
Total Farmed area	303	521.5	302.6	397.6

Table 2 Summary Of 1999 Average Stocking On Sample Farms By Potato Enterprise Type

Potato Enterprise Type	Mixed	Seed	Ware	All
No. of Farms	5	23	25	53
Description	No.	No.	No.	No.
Dairy Cows	27.4	28.9	0.6	15.4
Beef Cattle	52	127.5	66.5	91.7
Sheep	96.8	193.8	3.1	94.7
Pigs	0	127.4	425.7	256.1
Poultry	8,060	1.1	12,000.0	6,421.2

The farms sampled were principally arable with potatoes accounting for 6.8% of crop area on Seed farms and 10% on Ware and Mixed farms. About 40% of the area grown was on seasonally rented land costing £600/ha. The need for a seven years break between seed potato crops limits the area that can be grown on a farm. Renting land spreads fixed costs, while the farmer renting out benefits from a break crop without the investment needed for potatoes.

Output

The Ware and Mixed producers yield was above the UK national average of 44t/ha., but Seed producers were lower. For seed, tuber number in the seed size range, plant and tuber health are important. Therefore, the growth of seed crops is stopped, by earlier burning down than for ware, resulting in a lower yield. Indeed this must be done within a specified period after SEERAD inspection of the growing crop. The amount of stockfeed was greater for Seed, due to higher dressing standards. (Tables 3 & 4).

Table 3 Yield Of Potatoes t/ha. By Enterprise Type

Enterprise Type	Mixed	Seed	Ware	All
No. of Producers	5	23	25	53
Yield t/ha. Total	49.2	32.6	49.1	41.5
Seed	12.4	19.0	1.5	10.9
Ware	32.7	3.4	41.4	22.8
Stockfeed	4.2	4.7	4.0	4.4
Combined	0.0	5.5	2.2	3.5

Table 4 Price Of Potatoes £/t By Enterprise Type

Enterprise Type	Mixed	Seed	Ware	All
Seed	124.8	123.8	104.7	122.8
Ware	48.0	69.2	60.3	58.8
Stockfeed	5.3	4.6	4.8	4.8
Combined		114.3	47.1	96.4
Overall avg.	63.7	99.3	56.5	73.1
Value of Total Output £	**2,966**	**3,097**	**2,702**	**2,918**

Both the ware and average price for Ware growers (Table 4) was below the GB maincrop average price (£61.84/t). Seed growers received a higher price for ware (above the GB maincrop average). Seed and Mixed producers received about £20/t more for seed than Ware producers who sell lower grades of seed. Despite a lower total yield and more sold as stockfeed, Seed producers had the highest returns, due to higher seed and ware prices (Table 5).

Variable Costs And Gross Margins

Seed and seed treatment costs were one of the most important variable costs. For Seed growers, purchasing higher grade seed, these were 40% of variable and 21% of total costs. For the Ware producers using cheaper, lower grades of seed, costs were 20% of variable and 12 % of total costs. Costs were particularly high for the 1998 seed crop.

Table 5 Average Net Margin By Enterprise Type (All outputs and costs £/ha.)

Enterprise type	Mixed	Seed	Ware	All
Number of producers	5	23	25	53
Total Crop Area ha. all producers	323	1270	1129	2,723
Average enterprise Area ha.	64.5	55.2	45.2	51.4
Average Area planted ha.	60.9	52.9	43.9	49.5
Total Output Seed	1,464	2,251	154	1,288
Total Output Ware	1,481	227	2,428	1,289
Total Output stockfeed	21	21	19	20
Total Output Other	0	598	101	321
Total Output	**2,966**	**3,097**	**2,702**	**2,918**
Seed & treatment costs	647	893	508	704
Fertiliser	150	162	180	168
Crop Protection	236	354	338	333
Casual Labour	174	191	124	161
Contract	182	237	523	349
Miscellaneous	155	412	252	314
Total Variable Costs	**1,545**	**2,248**	**1,925**	**2,031**
Gross Margin	**1,421**	**850**	**777**	**887**
Labour	223	252	221	236
Rent/ rental value	63	88	99	90
Buildings	110	110	176	137
Machinery and Plant	740	783	720	751
Overheads	510	537	592	557
Fixed Costs ex. Seasonal Rent	**1,647**	**1,771**	**1,808**	**1,772**
Seasonal Rent	342	250	196	239
Total Fixed Costs	**1,989**	**2,021**	**2,004**	**2,010**
Total Costs	**3,534**	**4,269**	**3,929**	**4,041**
Net Margin	**-568**	**-1,171**	**-1,227**	**-1,123**

Seed producers growing for tuber number had lower fertiliser costs than Ware while the few mixed growers which included organic growers were the lowest, and also had the lowest crop protection costs. Seed producers, who store the crop for longer and have higher phytosanitary standards to meet, had the highest crop protection costs. With more exacting dressing requirements and field rogueing of the crop they also had the highest casual labour costs.

Ware producers had almost double the contract costs of the others, due to greater use of machinery rings, contractors and cooperative groups for machinery, storage and grading. Seed growers had the highest miscellaneous costs as these included field and seed inspection costs, labels and plant royalties not incurred for ware.

Total variable costs were highest for the Seed growers, some £300/ha, more than the Ware growers. With higher total output Seed growers had a higher gross margin than Ware growers. The small Mixed group had the highest gross margin, these included organic growers, with lower fertiliser and chemical costs and premium prices for their produce.

Fixed Costs And Net Margins

For the same reasons as casual, regular labour costs were higher for Seed producers, but was important for all groups. Machinery and plant costs were considerable (30% of fixed costs) despite the use of contractors, which was highest for the Ware group. Seed growers had the highest machinery and plant costs (39% of fixed costs). More Ware growers had recently completed specialist buildings, so had higher costs. Excluding seasonally rented land, fixed costs are highest for the Ware then Seed then Mixed producers. The price paid for, and the proportion of the crop grown on, seasonally rented land affects the average cost of this land. With longer rotational restrictions on seed growers, their costs and those of mixed growers were slightly higher. Total fixed costs, including seasonally rented land, were around £2,000/ha. for all groups similar to variable costs. The resulting net margins were all negative being poorest for the Ware growers and best for the Mixed. While the overheads are calculated, the other fixed costs are incurred at farm level and exceed the gross margin by £400/ha. for Seed and Ware producers. These include the non-cash cost of depreciation but with interest and loan repayments the producers will have incurred a negative cash flow in 1999.

Output Values

1999 potato prices were the lowest for six years. Over the last 10 years only 1992 prices were lower. Prices for 1998 were among the highest of the last decade. The output values gross and net margins (Table 7) were recalculated for the 1999 yields using the mean 1998 **prices (Table 6).**

Table 6 1998 Prices Used To Recalculate 1999 Output (£/t)

Enterprise Type	Mixed	Seed	Ware

Seed	**200**	**200**	**180**
Ware	**137**	**137**	**137**
Combined	**165**	**165**	**120**
Stockfeed	**10**	**10**	**10**

Table 7 Output Costs And Margins At 1998 Average Prices and 1999 Prices

Enterprise type	Mixed		Seed		Ware		All	
	1998	1999	1998	1999	1998	1999	1998	1999
Total Output	6,982	2.966	5,189	3,097	6,228	2,702	5,888	2,918
Gross Margin	5,437	1,421	2,941	850	4,303	777	3,857	887
Net Margin	3,448	-568	920	-1,171	2,299	-1,227	1,847	-1,123

Output more than doubles, with 1998 prices, for Mixed and Ware producers and was up 70% for Seed producers. In 1999 Seed producers had better prices for ware than other producers. The net margins were all positive. This shows the profitability of the potato industry in years of high output prices. However high prices may be due to reduced marketable yield so the margins even in a good year may be less than these

Average Prices

Using the GB maincrop mean ware price for the last six years and estimating a price for seed (Table 8) gives the output and margins shown in Table 9. For Ware and Mixed producers the net margin is over £1,000. The average seed price is difficult to estimate but the figures used result in only a small net margin, which would not justify the extra costs.

Table 8 Six Year Average Prices Used To Recalculate 1999 Output (£/t)

Enterprise Type	Mixed	Seed	Ware
Seed	160	160	150
Ware	107	107	107
Combined	137	137	107
Stockfeed	10	10	10

Table 9 Output Costs And Margins At Six Year Average Prices and 1999 Prices

Enterprise type	Mixed		Seed		Ware		All	
	Mean	1999	**Mean**	1999	**Mean**	1999	**Mean**	1999
Total Output	**5,524**	2,966	**4,352**	3,097	**4,959**	2,702	**4,791**	2,918
Gross Margin	**3,979**	1,421	**2,104**	850	**3,034**	777	**2,760**	887
Net Margin	**1,990**	-568	**83**	-1,171	**1,030**	-1,227	**750**	-1,123

Break Even Price

The break even prices were calculated and are shown in Table 10. Allowing 3t/ha. as stockfeed at £10/t then the average prices required for the seed/ware fraction are £85/t for Ware producers and £143/t for Seed producers. Therefore seed needs to sell at £200/t for Seed producers to break even, which is only the estimated average of 1998 seed prices. There will be enormous variation in the seed yield and prices obtained for different varieties. The GB maincrop average price would not have reached the breakeven price in three of the last six years.

Table 10 Break Even Prices

	Mixed	Seed	Ware	All
Total Costs	3,534	4,269	3,929	4,041
Avg. Yield ex. Stockfeed	46.25	29.56	46.14	38.46
Break even avg. Seed/Ware Price £/t 1)	76	143	85	104

This highlights the effect of price variability on margins (if any). Higher prices are obtained for supermarket prepacks, which depends on product quality and marketing. The effect of seasonal yield and quality both at home and abroad is also important

For seed, product quality and grade are important, as are differences between varieties and through the marketing season, which are difficult to predict. Contract growing can reduce the risks of market variability for the Seed grower.

Costs

The variable and fixed costs, at about £2,000/ha each, are ten times that of cereals, and equal field scale vegetables. It may be difficult to reduce variable costs without compromising on yield or crop quality.

Fixed costs may be an area on which producers can economise. Contracting costs are important, particularly for the Ware producers, and may be replacing the use of expensive owned machinery. It might be expected that contracting substitutes for fixed costs of labour and machinery/plant, but the combined fixed costs + contract costs for those groups with high contract costs are similar to the other groups.

Some producers had contracted out the storage and grading to improve the quality and marketability of their crop, for the pre-pack supermarket trade, which may improve returns rather than reduce costs.

Buildings, tractor, machinery and plant cost are significant components of fixed costs. These include depreciation, which indicates the considerable investment particularly in specific machinery, buildings and plant.

The high level of variable and fixed costs and the level of investment in fixed equipment and buildings for an enterprise with variable returns indicates the high risk involved in growing potatoes.

Conclusion

Given the level of costs found in this study, the considerable variations between recent years in prices mean that in some years good gross and net margins may have been made but in three out of the last six years average prices may have been below breakeven price. The increased specialisation in recent years may continue given the level of investment and the risks associated with the market.

Appendix 1 Methodology and Terms are from the Special Commodity Studies Manual of MAFF April 1990 and the draft revised Manual of August 1999.

Farm Area cropping and stocking was recorded as at June 1999 census.

Enterprise Area and Weighting

All values presented are weighted by the area being the total values of all farms divided by the total area used for potatoes. The values are per hectare used for potatoes, including unplanted headlands. In calculating costs the appropriate area treated or worked was used.

Output includes sales, ex farm, and retentions. Retentions were valued at the time of retention, reflecting the market value foregone. "Combined" covers crops group marketed with all costs and returns averaged over the group so the breakdown of seed/ware/stockfeed was not known.

Variable Costs were recorded from farm data. The costs for materials including supply and application have been separated into application –under contracting - and ingredient – in fertiliser or crop protection costs.

Fixed Costs

Labour, tractor and general implement usage were taken from actual work rates achieved on farm. Tractor and general implement costs including fuel, repairs and depreciation were calculated from standard cost data supplied by MAFF for the size, power and type of equipment. General Equipment included such items as trailers, sprayers, forklifts, ploughs and general cultivation equipment. Labour costs were taken from the farmer's records or calculated from the wage rate and additional costs.

All specific machinery, plant equipment and buildings costs were adjusted for use out with the potato enterprise, on other crops or off farm. Specific machinery charges were calculated from actual repairs, plus hire charges or depreciation. Depreciation was calculated from either current value at 20% for stone separators, haulm pulverisers, and potato harvesters, 15% for all other machines or from current replacement cost depreciated at a rate for the age and type of machine calculated by MAFF.

Plant and fixed equipment costs were similarly calculated, including repairs and depreciation at 15%. Building costs included repairs and depreciation calculated at 10% of current replacement value.

Energy costs for grading, storage, refrigeration and chitting were recorded where known or estimated from available information. Electrical energy costs for irrigation equipment, where incurred, were also recorded. Use and cost of tractors and trailers for irrigation were recorded under field operations and included under tractor costs, while irrigation equipment was included in specific machinery costs.

Rent/Rental value was calculated according to the manual with allowance for residences and applied to the enterprise area on the farm.

Seasonal Rent was the cost of seasonally rented land.

Overhead costs were calculated using the coefficients and values from MAFF and relevant values from the Scottish Farm Accounts Survey results.

Rogue is to manually inspect the growing seed crop and remove any plants if present that are diseased or those of the wrong variety.

Tops are the tubers larger than seed size range in a seed crop, which are then graded for tuber quality for sale in the ware market.