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Potato Production and Storage Cost
Estimates for Minnesota in 1982

Fred J. Benson



Department of Agricultural and Applied Economics

University of Minnesota
Institute of Agriculture, Forestry and Home Economics
St. Paul, Minnesota 55108

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Department of Agricultural and Applied Economics
University of Minnesota
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INTRODUCTION

In 1980, Minnesota ranked ninth in terms of income from potato production. This is typical over the years. Most of Minnesota's potato production is in the northwest part of the state commonly referred to as the Red River Valley. The Red River marks the border between Minnesota and North Dakota, so potato production also takes place in the western part of the Red River Valley in North Dakota. The Red River Valley as a potato production region is second only to the western region.

Minnesota typically devotes 70,000 to 80,000 of its 30 million acres of farm land to potatoes (about 0.3%). Cash receipts from potato production is typically about 1% of the state's total cash receipts from farm marketings, depending on the year and potato prices.

Discussion of Budget Information

This section will discuss the crop production estimates which are shown in Appendix Tables 1 through 5. These budgets are developed for the Red River Valley in Minnesota. The reader should keep in mind that these budgets are projections and are subject to the many variables and uncertainties that can take place before and while the 1982 potato crop is produced and marketed. The yields used in the budgets are estimated using previous production records and the expectations of the farmers who provided their production information to me.

Expected Prices: The hardest variable to estimate is that of price. These budgets are set up as production budgets. They do not contain storage costs. Therefore, the price used in the budgets is an expected harvest price. This allows the grower to separate the decision of what to grow from that of when and how to market.

Mid-winter projections of cash market prices for the 1982 crop are highly conjectural. The crop isn't planted. Acreage and yield are unknown. Demand for many crops depends heavily on foreign markets. An individual's planting decisions should consider both the level of price expectations and the degree of confidence in those price expectations. Government programs limit the downside price risk on wheat and feedgrains, and somewhat limit the upside price possibilities as well. All of these variables must be considered and analyzed as best as possible to estimate the resulting impact on potato production acreage and expected prices.

Supply for the 1982 potato crop marketing year will consist of carryover stocks plus production.

The estimated stocks of potatoes in Minnesota as of January 1, 1982 was 8.1 million cwt. or 61% of production (see Table 1). This is 16% above January 1, 1981 but 15% below January 1, 1980. According to the Minnesota Agricultural Statistics Service report, disappearance during December, 1981 totaled 1.0 million cwt. which was 29% less than one year ago when 1.4 million cwt. were moved. The estimate of stocks by type show 22% red, 48% white, and 30% russet.

Stocks of potatoes in the North Dakota-Minnesota Red River Valley area are estimated at 18.0 million cwt. which is 33% above one year ago and 5% above two years ago. Total disappearance during December, 1981 totaled 3.0 million cwt. compared to 2.5 million cwt. in 1980. Stocks by type are estimated at 25% red, 63% white, and 12% russet.

U.S. potato stocks are up from a year earlier. Estimated potato stocks in the 15 major fall states as of January 1, 1982 are 160 million cwt., 9% above January 1 a year ago but 9% less than on January 1, 1980. Of the total stocks on hand in the 11 major states, 73% are russets, 23% whites and 4% reds.

Estimated holdings in the three eastern states total 24.8 million cwt., 10% greater than a year earlier but 16% below January 1, 1980. Stocks in Maine, at 18.0 million cwt., are up 10% from a year ago. In the six central states estimated stocks are 33.9 million cwt., 30% greater than a year earlier and 1% above January 1, 1980. North Dakota's stocks are 37% above a year ago while Minnesota and Wisconsin are up 16% and 44%, respectively. Holdings in the six western states total 101 million cwt., 3% more than on January 1, 1981 but 10% below two years ago. Idaho's stocks are estimated at 51.0 million cwt., 4% less than a year earlier. Holdings in Washington and Oregon are up 14% and 12%, respectively, compared with January 1, 1981.

The price forecasts used in the budgets are to provide a benchmark with which to assess harvest price potential as the season unfolds. They are built on crop carryover estimates in December 1981, on possible planted acreage and an estimate of crop yield. As planting time approaches, growers will refine these price estimates and compare the expected net returns from potatoes with other pricing alternatives and other crop production possibilities.

Cropping Costs and Cash Flow Expenses: The per acre costs (shown in the budgets) are developed on the basis of commercial production. Field performance rates are also indicated for the machine sizes given. Field operations are assumed to be done in a timely fashion. Cash flow expenses of field operations include diesel fuel, plus an allowance for lubrication and use-related repairs. Performance rates include discounts for the usual efficiency factors which account for turing time at the ends and other delays in field performance.

Table 1

Minnesota and North Dakota Fall Potatoes: Acreage, Yield, Production, and Stocks

Area	Color	State	1981 Crop			Jan. 1, 1981 Stocks 1980 Crop (000 Cwt.)	January 1, 1982	
			Harvested Acreage	Yield (Cwt.)	Production (000 Cwt.)		Stocks 1981 Crop (000 Cwt.)	Percent of Total
Red River Valley	Red	Minnesota	11,500	170	1,960	980	1,280	22
		North Dakota	28,800	164	4,730	2,314	3,175	26
		Valley	40,300	166	6,690	3,294	4,455	25
White	White	Minnesota	32,500	163	5,290	3,200	3,820	66
		North Dakota	77,000	178	13,685	5,251	7,500	61
		Valley	109,500	173	18,975	8,451	11,320	63
Russet	Russet	Minnesota	5,000	167	835	420	700	12
		North Dakota	9,200	186	1,710	1,335	1,525	13
		Valley	14,200	179	2,545	1,755	2,225	12
Total	Total	Minnesota	49,000	165	8,085	4,600	5,800	32
		North Dakota	115,000	175	20,125	8,900	12,200	68
		Valley	164,000	172	28,210	13,500	18,000	100
State	Red White Russet Total	Minnesota	16,000	168	2,690	1,410	1,780	22
		North Dakota	36,000	158	5,686	3,530	3,890	48
		Valley	18,000	274	4,924	2,060	2,430	30
		Total	70,000	190	13,300	7,000	8,100	100

Source: Minnesota Agricultural Statistics Service, January 1982.

Machinery costs are included as "machinery function costs" -- that is, the average total costs, on an annual basis, for the tractor and machine (overhead and operating) including operating labor to work one acre. The machines are assumed fully-utilized on the farm. For each machine, the figure under the "UNITS OF APPLIC" column indicates how many times it is used on one acre. The "QUANTITY" column is the time, in hours, required per acre--hours per acre. The figure in the "PRICE" column is the total cost to operate the tractor plus the machine, including labor, for one hour. The "TOTAL AMOUNT" column is the result of multiplying the first three columns together. The "CASH COSTS" column for a machine is the estimated value of fuel, oil and repairs for the tractor and/or implement. Labor costs are not included in cash costs.

Purchased Seed, Fertilizer and Chemicals: Other cost items indicate the number of units and the cost per unit. Quantities and rates indicated in the budgets are based upon recommended practices. Adjustments to individual farm conditions from these recommendations may be necessary. For instance, soil tests and fertilizer carryover from 1981 may suggest different fertilizer recommendations. Potassium and phosphate levels are approximately equal to removals adjusted for the availability of naturally available fertilizer ingredients in the soils.

Herbicide carryover considerations must be considered in terms of which crops are feasible on individual fields. Weed problems must also be considered. Specific chemicals used as herbicides and insecticides were grouped to attain a per acre cost.

Cash Expense Per Acre: Cash expenses are those costs associated specifically with the crop being considered and are incurred only with the production of that crop.

Costs indicated in the budgets are based on recommended practices for a good producer. Adjustments to individual farm conditions may be necessary with varying fertility situations, chemical use, and planting practices.

Cash costs estimate the out-of-pocket cash operating expenses and include estimates for fuel, oil, repairs, fertilizer, seed, chemicals, and land taxes. These costs are basic to any analysis of short-term adjustments to increase profitability.

In the short-run each grower seeks to maximize his returns over cash costs. This in turn provides the greatest amount towards fixed assets, family living expenses and hired labor.

Land and Other Overhead Costs: The actual 1982 cash cost of land will vary greatly among individual operators due to varying land rental arrangements and land finance structures.

The land values used in the budgets are based on recent relationships between land prices and cash rents in Minnesota. The ratio of rent to current land value is estimated between 3.5 and 4.5%. Such a ratio for cropland suggests that land renting for \$75 per acre would sell for \$1,667 to \$2,142 per acre. In the budgets a cash rent of \$75 per acre was used with a land value of \$1,667 per acre.

Average land taxes are estimated at .6% of the current market value of land. The net return for land is 3.9% of current market value. The land tax estimates are included in the cash expense category, and the net return to land is included as the overhead cost (called "land charge").

Labor is considered an overhead cost in the production process. This is the case with both operator and family labor and full-time hired labor. Special labor hired seasonally for a specific crop should be considered a cash cost. The budgets in the appendix tables assume the use of operator and family labor.

Crop Loss Cost (Insurance): The calculated crop loss cost can be viewed as either the cash expense of carrying crop insurance or the discount in returns necessary to make fair comparisons between crops under conditions where crop insurance is not carried.

Interest on Cash Expense: It is assumed that cash flow crop expenses are borrowed to grow the crop. The average time this money is on loan until harvest is six months. Interest costs are calculated accordingly using a 16% annual rate.

The column "CASH COSTS" estimates the out-of-pocket cash operating expenses incurred on one acre of the indicated crop. The cash costs include estimates for fuel, oil, repairs, fertilizers, seed, chemicals and crop insurance. These costs as mentioned earlier, are basic to any analysis of short-term adjustments to increase profitability in the farming operation.

Costs not Included: The budgets are developed on an industry cost format. The total costs indicated are all costs, cash and otherwise, required to plant, produce, harvest and haul the crop to storage. Storage costs are not included. This allows the producer to separate the marketing costs associated with different marketing strategies from the production costs. No charge is included for general farm overhead.

The returns over total costs shown are the total returns minus the indicated total costs. The total costs include: land, labor, machinery and other specific costs as listed in the budget. The total cost figure does not include other total farm overhead charges such as farm organization dues, use of the pickup truck, building and storage cost (except machinery housing which is included in machine cost) or the labor and fuel used for off-field purposes. The returns over cash costs allow the budget user to estimate his return over cash costs which goes to pay for land, labor, machinery and management.

Fuel and Labor Needed

At the bottom of each budget is an estimate of fuel use per acre in diesel fuel equivalents. Multiply this figure by 1.39 to estimate gasoline equivalents if gasoline powered tractors are used. Also included are the amount of hours and value of actual field labor, and the portion of annual machinery overhead and operating expenses charged to the budget.

Credit: If credit is limiting, a grower may need to consider crops with lower cash cost requirements and crops that have a high degree of assurance of enough cash return to cover the cash expense incurred. Some crops are more resistant to drought than others--others may be more disease resistant. It is necessary to consider the net cash flow if yields are less than planned. Estimates are given in the line "RETURNS OVER CASH COSTS" and include the value if attaining the listed returns, a 20% reduction in returns, and a 50% reduction in returns. Reduction in returns may occur because of changes in either/or both price and yield.

Other "Givens": Most growers want as high a return over cash costs in a given year as safety in maintaining their cash flow or liquidity position will allow. As the cropping season approaches, the available moisture, labor, machine capacity and past cropping history must be taken as given. Diversification may be necessary for some to decrease risk and/or give the highest return in the face of their particular set of "givens".

Long-Run Considerations: The crops showing the greatest return over cash expenses in a given year may or may not be the most profitable in the long-run. When due consideration is made for the differences in machinery overhead costs, in disease and pest buildup risks and in soil erosion considerations associated with one sequence of crops versus another, there will be situations where long-term profitability may not necessarily be the same as that associated with providing the best cash flow position and the best short-run profitability for a given set of resources of land, labor and machinery.

Using the Budget Information for Decision-Making

The main purpose of a budget is for planning. And at this time of the year a grower must decide what and how much (acreage) to grow. In the Red River Valley of Minnesota the most predominant crop is wheat. Another important crop is sugarbeets. Both of these crops can be substituted for potatoes. In Table 2, I have provided a shortcut analysis of the potato budgets, as shown in Appendix Tables 1 through 5, and compared them with the 1982 budgets for wheat and sugarbeets for the Red River Valley in Minnesota.

Making the decision of what to grow in the upcoming year is a short-run planning situation which looks at maximizing the returns over cash costs for the total farming operation. Of course this is subject to constraints

Table 2

1982 Budget Comparisons of Wheat, Sugarbeets and Potatoes for the
Red River Valley in Minnesota on a Per Acre Basis

Crop	Wheat	Sugarbeets	Round White Seed	Russet Seed	Round White Processing	Russet Processing	Tablestock
Yield	45 bu.	17 ton	150 cwt.	140 cwt.	165 cwt.	145 cwt.	155 cwt.
Price	\$3.75	\$26.00	\$5.50	\$5.50	\$3.50	\$3.85	\$3.75
Returns	169	442	790*	735*	578	558	581
Cash Costs	68	163	404	394	325	288	332
Returns-Cash Costs	101	279	386	341	253	270	249
80% Returns-Cash Costs	67	191	228	194	137	159	133
50% Returns-Cash Costs	16	58	-9	-27	-36	-9	-42
Net Returns	9	75	147	107	26	50	24

* Includes the sale of jumbos and "Bs" at other prices. See Appendix Tables 1 and 2 for specifics.

such as land suitability, input availability, sufficient machinery capacity, adequate operating capital, etc. In the long-run the grower must look at covering all of his costs, which means adequate payment to his fixed factors of production (land, labor, capital and management). Also when considering a new crop or a change in production practices, the grower should make his analysis on the expected long-run net returns.

1982 Storage Costs

In order to estimate potato storage costs, I have used a 48,000 cwt. four bin house with refrigeration and other needed equipment for potato handling. The breakdown of costs is shown in Table 3. Annual overhead costs on this storage unit are estimated to be \$55,441. The operating costs are calculated separately for seed and processing potatoes. Using processing potatoes as an example, the estimated total cost per cwt. into storage is \$1.99, but the cost per cwt. of potatoes marketed after a 10% shrink is \$2.21.

Total Costs with Marketing from Storage

I find it easiest to estimate total costs by converting all costs to a per cwt. marketed basis. This then correctly considers the shrinkage which occurs in storage. The budgets indicate yields available for sale at harvest or yield going into storage. The resulting breakeven price for tablestock potatoes (Appendix Table 4) is \$3.59 per cwt. However, if the 155 cwt. of potatoes goes into storage and incurs a 10% shrink, there are only 139.5 cwt. left for sale from that acre. Production expenses were \$557.00, so the production expenses per cwt. marketed after shrink are now \$3.99. The storage costs of \$2.21 per cwt. now indicate the total costs per cwt. to be \$6.20.

A breakeven analysis has to consider the shrink factors. I have used 10% in calculations but this can vary considerably. In order to adjust for the shrink factor, you must divide the costs before shrink by one minus the shrink factor ($1 - .10$). Table 4 shows the breakeven price for the various potato production budgets when marketing out of storage and incurring shrinkage. These are the total costs or the prices that would be needed to breakeven given the stated assumptions on production and storage costs and shrinkage.

In Retrospect

In this analysis, I have estimated the cash operating costs and the overhead costs separately. The cash operating costs for each crop can be expected to be very close to what every grower can expect. These will be very consistent from farm-to-farm as they are itemized in the budgets.

Table 3

1982 Estimated Potato Storage Costs

12,000 Cwt. Bin
 (48,000 Cwt. House)
 Stored 6 Months
 New Cost/Cwt. \$5.00

<u>Item</u>	<u>Total Cost</u>	<u>Annual Percent</u>	<u>Annual Cost</u>
Building (4 bin) 20 years	\$240,000	17.17	\$41,208
Refrigeration - 20 years	10,000	17.17	1,717
Equipment (Bobcat Pilers, etc.) 10 years	47,000	26.63	<u>12,516</u>
Total annual overhead costs			\$55,441

Annual Operating Costs

<u>Seed</u>		<u>Processing</u>	
Electricity 46,286 KWH @ .0525	\$ 2,430	Electricity 85,714 KWH @ .0525	\$ 4,500
Telephone	2,000	Telephone	2,000
Insurance 48,000 x \$7.00 x .015	5,040	Insurance 48,000 x \$5.00 x .015	3,600
Labor 5 men 300 hrs @ \$5.20/hr 2 hrs/day @ \$5.20 (150 days)	7,800 1,560	Labor 4 men 300 hrs @ \$5.20/hr 2 hrs/day @ \$5.20 (150 days)	6,240 1,560
Office Supplies	1,000	Office Supplies	1,000
Interest on Inventory 43,200 x \$7.00 x .08	24,192	Interest on Inventory 43,200 x \$5.00 x .08	17,280
Disinfectant	<u>500</u>	Disinfectant	<u>300</u>
Total Operating Cost	44,522	Total Operating Cost	39,840
Total Annual Cost	99,963	Total Annual Cost	95,281
Total Cost/Cwt. Stored	2.08	Total Cost/Cwt. Stored	1.99
Total Cost/Cwt. Marketed 10% Shrink	2.31	Total Cost/Cwt. Marketed 10% Shrink	2.21

Table 4
Breakeven Prices for the Various Potato Production
Budgets When Marketed out of Storage*

	<u>Round White Seed</u>	<u>Russet Seed</u>	<u>Round White Processing</u>	<u>Russet Processing</u>	<u>Tablestock Potatoes</u>
Cwt./Acre	150	140	165	145	155
Total Cost	\$643	\$628	\$552	\$509	\$557
Cost/Cwt.	\$ 4.29	\$ 4.49	\$ 3.34	\$ 3.51	\$ 3.59
Storage Cost/Cwt.	\$ 2.08	\$ 2.08	\$ 1.99	\$ 1.99	\$ 1.99
Total Cost/Cwt. Produced	\$ 6.37	\$ 6.57	\$ 5.33	\$ 5.50	\$ 5.58
Shrinkage Percent	10	10	10	10	10
Total Cost/Cwt. Marketed	\$ 7.08	\$ 7.30	\$ 5.92	\$ 6.11	\$ 6.20

* After 10% shrinkage in storage.

The biggest variations will come in the area of estimated overhead costs. The estimates for overhead costs are what I would expect to be average for the industry. However, from farm to farm there will be wide variations in overhead costs due to the individual grower's situation and debt load. For example, the young farmer starting out is probably facing cash rent payments and/or principal and interest payments on purchased land and high machinery expenditures. Growers with higher debt loads and high repayment rates may find the returns over listed cash operating costs insufficient to meet scheduled debt repayments.

On the other hand, the established grower with his land paid for and most machinery and equipment paid for will find the returns over cash operating costs to be more than adequate to meet his cash debt payments and family living expenses. It is the function of management to constantly be striving to get the farm overhead costs down within reason so that the debt load can be reduced to the point where all the factors of production (land, labor, capital and management) could expect a normal return. Management of the overhead costs is as important as the management devoted to the production and marketing functions.

APPENDIX TABLES

Appendix Table 1

SOIL AREA 12 (7)		ROUND WHITE POT. SEED		01 15 82	
	UNITS OR APPLIC.	QUANTITY	PRICE	TOTAL AMOUNT	CASH COSTS
RETURNS					
ROUND CERT. SEED		130.000 CWT.	5.500	715.00	
JUMBOS POT.		10.000 CWT.	2.000	20.00	
B SIZED ROUND		10.000 CWT.	5.500	55.00	
TOTAL RETURNS				790.00	
PLANTING COSTS					
FIELD CULTIVATOR 28		.074 HR/A	49.262	3.63	1.39
SPRINGTOOTH DRAG 48		.033 HR/A	63.571	2.10	.31
ROUND FOUND SEED		18.000 CWT.	7.000	126.00	126.00
POT SEED TREATMENT		18.000 CWT.	.450	8.10	8.10
POT. SEED CUTTING		18.000 CWT	.300	5.40	5.40
POTATO ROW MARKER 4R		.201 HR/A	57.859	11.62	2.98
POTATO PLANTER 4 ROW		.261 HR/A	82.128	21.44	6.08
HEAVY TRUCK	3	.261 HR/A	57.966	45.39	27.31
FERTILIZER					
ANHYDROUS AMMONIA		50.000 LBS.	.130	6.50	6.50
NITROGEN		25.000 LBS.	.220	5.50	5.50
PHOSPHORUS P2O5		100.000 LBS.	.220	22.00	22.00
POTASSIUM K2O		60.000 LBS.	.100	6.00	6.00
ANHYDROUS APPLICATOR		.112 HR/A	54.727	6.14	1.69
SPRAYING COSTS					
AERIAL APPLICATION	5	3.500 ACRE	1.000	17.50	17.50
INSECTICIDE	2	21.000	1.000	42.00	42.00
FUNGICIDE	4	3.500	1.000	14.00	14.00
VINE KILLER	2	12.000	1.000	24.00	24.00
CULTIVATION					
POTATO CULT. 4 ROW	4	.163 HR/A	25.272	16.50	5.92
ROUGEING		3.000	1.000	5.00	5.00
HARVEST COST					
POTATO HRVSTR. 2 ROW		.402 HR/A	83.651	33.60	7.37
HEAVY TRUCK	3	.402 HR/A	57.966	69.91	42.06
DISK 21 FT		.098 HR/A	54.187	5.32	1.47
FIELD CULTIVATOR 28		.074 HR/A	49.262	3.63	1.39
OTHER COSTS					
LAND CHARGE		1667.000	.039	65.01	
LAND TAXES		1667.000	.006	10.00	10.00
FIELD + DISEASE TEST		1.000 ACRE	10.000	10.00	10.00
PROMOTION TAXES		150.000	.030	4.50	4.50
CROP INSURANCE		790.000	.025	19.75	
INTEREST ON CASH COSTS		404.488	.080	32.36	
TOTAL COSTS				642.91	404.49
RETURNS OVER TOTAL COSTS				147.09	
RETURNS OVER CASH COSTS				385.51	
RETURNS OVER CASH COSTS 20 PCT RETURNS REDUCTION				227.51	
RETURNS OVER CASH COSTS 50 PCT RETURNS REDUCTION				-9.49	
CASH COSTS/ACRE	404.49	MACHINE OPERATING COSTS/A		97.99	
MACHINE OWNERSHIP COST/A	91.71	FUEL USE/ACRE (GAL)		32.01	
THRU PLANT GROWING HARVEST OTHER TOTAL					
CASH COST	316.76	10.92	52.30	24.50	404.49
LABOR HOURS	1.94	.68	2.72	0	5.34
LABOR VALUE	11.12	3.53	14.94	0	29.59

Appendix Table 2

SOIL AREA 12
(10)RUSSET POTATOES
SEED

01 15 82

	UNITS OR APPLIC.	QUANTITY	PRICE	TOTAL AMOUNT	CASH COSTS
RETURNS					
RUSSET CERT. SEED		120.000 CWT	5.500	660.00	
JUMBOS POT.		10.000 CWT.	2.000	20.00	
B-SIZED RUSSET		10.000 CWT.	5.500	55.00	
TOTAL RETURNS				735.00	
PLANTING COSTS					
FIELD CULTIVATOR 28		.074 HR/A	49.262	3.63	1.39
SPRINGTOOTH DRAG 48		.033 HR/A	63.571	2.10	.31
RUSSET FOUND SEED		18.000 CWT.	6.500	117.00	117.00
POT SEED TREATMENT		18.000 CWT.	.450	8.10	8.10
POT. SEED CUTTING		18.000 CWT	.300	5.40	5.40
POTATO ROW MARKER 4R		.201 HR/A	57.859	11.62	2.98
POTATO PLANTER 4 ROW		.261 HR/A	82.128	21.44	6.08
HEAVY TRUCK	3	.261 HR/A	57.966	45.39	27.31
FERTILIZER					
ANHYDROUS AMMONIA		75.000 LBS.	.130	9.75	9.75
NITROGEN		25.000 LBS.	.220	5.50	5.50
PHOSPHORUS P205		100.000 LBS.	.220	22.00	22.00
POTASSIUM K20		100.000 LBS.	.100	10.00	10.00
ANHYDROUS APPLICATOR		.112 HR/A	54.727	6.14	1.69
SPRAYING COSTS					
AERIAL APPLICATION	5	3.500 ACRE	1.000	17.50	17.50
INSECTICIDE	2	21.000	1.000	42.00	42.00
FUNGICIDE	4	3.500	1.000	14.00	14.00
VINE KILLER	2	8.750	1.000	17.50	17.50
CULTIVATION					
POTATO CULT. 4 ROW	3	.163 HR/A	25.272	12.37	4.44
ROUGEING		5.000	1.000	5.00	5.00
HARVEST COST					
POTATO HRVSTR. 2 ROW		.402 HR/A	83.651	33.60	7.37
HEAVY TRUCK	3	.402 HR/A	57.966	69.91	42.06
DISK 21 FT		.098 HR/A	54.187	5.32	1.47
FIELD CULTIVATOR 28		.074 HR/A	49.262	3.63	1.39
OTHER COSTS					
LAND CHARGE		1667.000	.039	65.01	
LAND TAXES		1667.000	.006	10.00	10.00
FIELD + DISEASE TEST		1.000 ACRE	10.000	10.00	10.00
PROMOTION TAXES		140.000	.030	4.20	4.20
CROP INSURANCE		735.000	.025	18.38	
INTEREST ON CASH COSTS		394.457	.080	31.56	
TOTAL COSTS				628.05	394.46
RETURNS OVER TOTAL COSTS				106.95	
RETURNS OVER CASH COSTS				340.54	
RETURNS OVER CASH COSTS 20 PCT RETURNS REDUCTION				193.54	
RETURNS OVER CASH COSTS 50 PCT RETURNS REDUCTION				-26.96	
CASH COSTS/ACRE		394.46	MACHINE OPERATING COSTS/A		96.51
MACHINE OWNERSHIP COST/A		89.95	FUEL USE/ACRE (GAL)		31.27
THRU PLANT GROWING HARVEST OTHER TOTAL					
CASH COST	308.51	9.44	52.30	24.20	394.46
LABOR HOURS	1.94	.51	2.72	0	5.17
LABOR VALUE	11.12	2.65	14.94	0	28.71

Appendix Table 3

SOIL AREA 12 (5)		ROUND WHITE POTATOES PROCESSING		01 15 82	
	UNITS OR APPLIC.	QUANTITY	PRICE	TOTAL AMOUNT	CASH COSTS
RETURNS					
ROUND WHITE POT.		165.000 CWT.	3.500	577.50	
TOTAL RETURNS				577.50	
PLANTING COSTS					
FIELD CULTIVATOR 28		.074 HR/A	49.262	3.63	1.39
SPRINGTOOTH DRAG 48		.033 HR/A	63.571	2.10	.31
ROUND CERT SEED		15.000 CWT.	5.500	82.50	82.50
POT SEED TREATMENT		15.000 CWT.	.450	6.75	6.75
POT. SEED CUTTING		15.000 CWT	.300	4.50	4.50
POTATO ROW MARKER 4R		.201 HR/A	57.859	11.62	2.98
POTATO PLANTER 4 ROW		.261 HR/A	82.128	21.44	6.08
HEAVY TRUCK	3	.261 HR/A	57.966	45.39	27.31
FERTILIZER					
NITROGEN		25.000 LBS.	.220	5.50	5.50
ANHYDROUS AMMONIA		75.000 LBS.	.130	9.75	9.75
PHOSPHORUS P205		100.000 LBS.	.220	22.00	22.00
POTASSIUM K2O		60.000 LBS.	.100	6.00	6.00
ANHYDROUS APPLICATOR		.112 HR/A	54.727	6.14	1.69
SPRAYING COSTS					
AERIAL APPLICATION	4	3.500 ACRE	1.000	14.00	14.00
INSECTICIDE		35.000	1.000	35.00	35.00
FUNGICIDE	4	3.500	1.000	14.00	14.00
SPROUT INHIB & APP		12.000	1.000	12.00	12.00
CULTIVATION					
POTATO CULT. 4 ROW	4	.163 HR/A	25.272	16.50	5.92
HARVEST COST					
POTATO HRVSTR. 2 ROW		.402 HR/A	83.651	33.60	7.37
HEAVY TRUCK	3	.402 HR/A	57.966	69.91	42.06
DISK 21 FT		.098 HR/A	54.187	5.32	1.47
FIELD CULTIVATOR 28		.074 HR/A	49.262	3.63	1.39
OTHER COSTS					
LAND CHARGE		1667.000	.039	65.01	
LAND TAXES		1667.000	.006	10.00	10.00
PROMOTION TAXES		165.000	.030	4.95	4.95
CROP INSURANCE		577.500	.025	14.44	
INTEREST ON CASH COSTS		324.938	.080	26.00	
TOTAL COSTS				551.58	324.94
RETURNS OVER TOTAL COSTS				25.82	
RETURNS OVER CASH COSTS				252.56	
RETURNS OVER CASH COSTS 20 PCT RETURNS REDUCTION				137.06	
RETURNS OVER CASH COSTS 50 PCT RETURNS REDUCTION				-36.19	
CASH COSTS/ACRE	324.94	MACHINE OPERATING COSTS/A		97.99	
MACHINE OWNERSHIP COST/A	91.71	FUEL USE/ACRE (GAL)		32.01	
TOTAL COST PER CWT.	3.34				
THRU PLANT GROWING HARVEST OTHER TOTAL					
CASH COST	251.76	5.92	52.30	14.95	324.94
LABOR HOURS	1.94	.68	2.72	0	5.34
LABOR VALUE	11.12	3.53	14.94	0	29.59

Appendix Table 4

SOIL AREA 12 (4)		RUSSET POTATOES PROCESSING		01 15 82	
	UNITS OR APPLIC.	QUANTITY	PRICE	TOTAL AMOUNT	CASH COSTS
RETURNS					
U.S.NO.1 RUSSET		145.000 CWT	3.850	558.25	
TOTAL RETURNS				558.25	
PLANTING COSTS					
FIELD CULTIVATOR 28		.074 HR/A	49.262	3.63	1.39
SPRINGTOOTH DRAG 48		.033 HR/A	63.571	2.10	.31
RUSSET CERT SEED		11.000 CWT.	5.000	55.00	55.00
POT SEED TREATMENT		11.000 CWT.	.450	4.95	4.95
POT. SEED CUTTING		11.000 CWT	.300	3.30	3.30
POTATO ROW MARKER 4R		.201 HR/A	57.859	11.62	2.98
POTATO PLANTER 4 ROW		.261 HR/A	82.128	21.44	6.08
HEAVY TRUCK	3	.261 HR/A	57.966	45.39	27.31
FERTILIZER					
NITROGEN		25.000 LBS.	.220	5.50	5.50
ANHYDROUS AMMONIA		75.000 LBS.	.130	9.75	9.75
PHOSPHORUS P205		100.000 LBS.	.220	22.00	22.00
POTASSIUM K2O		100.000 LBS.	.100	10.00	10.00
ANHYDROUS APPLICATOR		.112 HR/A	54.727	6.14	1.69
SPRAYING COSTS					
AERIAL APPLICATION	5	3.500 ACRE	1.000	17.50	17.50
INSECTICIDE		35.000	1.000	35.00	35.00
FUNGICIDE	4	3.500	1.000	14.00	14.00
CULTIVATION					
POTATO CULT. 4 ROW	3	.163 HR/A	25.272	12.37	4.44
HARVEST COST					
POTATO HRVSTR. 2 ROW		.402 HR/A	83.651	33.60	7.37
HEAVY TRUCK	3	.402 HR/A	57.966	69.91	42.06
DISK 21 FT		.098 HR/A	54.187	5.32	1.47
FIELD CULTIVATOR 28		.074 HR/A	49.262	3.63	1.39
OTHER COSTS					
LAND CHARGE		1667.000	.039	65.01	
LAND TAXES		1667.000	.006	10.00	10.00
PROMOTION TAXES		145.000	.030	4.35	4.35
CROP INSURANCE		558.250	.025	13.96	
INTEREST ON CASH COSTS		287.857	.080	23.03	
TOTAL COSTS				508.51	287.86
RETURNS OVER TOTAL COSTS				49.74	
RETURNS OVER CASH COSTS				270.39	
RETURNS OVER CASH COSTS	20 PCT	RETURNS REDUCTION		158.74	
RETURNS OVER CASH COSTS	50 PCT	RETURNS REDUCTION		-8.73	
CASH COSTS/ACRE	287.86	MACHINE OPERATING COSTS/A		96.51	
MACHINE OWNERSHIP COST/A	89.95	FUEL USE/ACRE (GAL)		31.27	
TOTAL COST PER CWT	3.51				
THRU PLANT GROWING HARVEST OTHER TOTAL					
CASH COST	216.76	4.44	52.30	14.35	287.86
LABOR HOURS	1.94	.51	2.72	0	5.17
LABOR VALUE	11.12	2.65	14.94	0	28.71

Appendix Table 5

SOIL AREA 12
(6)

POTATOES
TABLESTOCK

01 15 82

	UNITS OR APPLIC.	QUANTITY	PRICE	TOTAL AMOUNT	CASH COSTS
RETURNS					
ROUND RED POT.		155.000 CWT.	3.750	581.25	
TOTAL RETURNS				581.25	
PLANTING COSTS					
FIELD CULTIVATOR 28		.074 HR/A	49.262	3.63	1.39
SPRINGTOOTH DRAG 48		.033 HR/A	63.571	2.10	.31
ROUND CERT SEED		15.000 CWT.	5.500	82.50	82.50
POT SEED TREATMENT		15.000 CWT.	.450	6.75	6.75
POT. SEED CUTTING		15.000 CWT.	.300	4.50	4.50
POTATO ROW MARKER 4R		.201 HR/A	57.859	11.62	2.98
POTATO PLANTER 4 ROW		.261 HR/A	82.128	21.44	6.08
HEAVY TRUCK	3	.261 HR/A	57.966	45.39	27.31
FERTILIZER					
NITROGEN		25.000 LBS.	.220	5.50	5.50
ANHYDROUS AMMONIA		75.000 LBS.	.130	9.75	9.75
PHOSPHORUS P205		100.000 LBS.	.220	22.00	22.00
POTASSIUM K2O		60.000 LBS.	.100	6.00	6.00
ANHYDROUS APPLICATOR		.112 HR/A	54.727	6.14	1.69
SPRAYING COSTS					
AERIAL APPLICATION	5	3.500 ACRE	1.000	17.50	17.50
INSECTICIDE		35.000	1.000	35.00	35.00
FUNGICIDE	4	3.500	1.000	14.00	14.00
VINE KILLER	2	8.750	1.000	17.50	17.50
CULTIVATION					
POTATO CULT. 4 ROW	3	.163 HR/A	25.272	12.37	4.44
HARVEST COST					
POTATO HRVSTR. 2 ROW		.402 HR/A	83.651	33.60	7.37
HEAVY TRUCK	3	.402 HR/A	57.966	69.91	42.06
DISK 21 FT		.098 HR/A	54.187	5.32	1.47
FIELD CULTIVATOR 28		.074 HR/A	49.262	3.63	1.39
OTHER COSTS					
LAND CHARGE		1667.000	.039	65.01	
LAND TAXES		1667.000	.006	10.00	10.00
PROMOTION TAXES		155.000	.030	4.65	4.65
CROP INSURANCE		581.250	.025	14.53	
INTEREST ON CASH COSTS		332.157	.080	26.57	
TOTAL COSTS				556.93	332.16
RETURNS OVER TOTAL COSTS				24.32	
RETURNS OVER CASH COSTS				249.03	
RETURNS OVER CASH COSTS 20 PCT RETURNS REDUCTION				132.84	
RETURNS OVER CASH COSTS 50 PCT RETURNS REDUCTION				-41.53	
CASH COSTS/ACRE	332.16	MACHINE OPERATING COSTS/A		96.51	
MACHINE OWNERSHIP COST/A	89.95	FUEL USE/ACRE (GAL)		31.27	
TOTAL COST PER CWT.	3.59				
THRU PLANT GROWING HARVEST OTHER TOTAL					
CASH COST	260.76	4.44	52.30	14.65	332.16
LABOR HOURS	1.94	.51	2.72	0	5.17
LABOR VALUE	11.12	2.65	14.94	0	28.71