

# Staff Papers Series

Staff Paper P83-3

January 1983

Potato Production and Storage Cost  
Estimates for Minnesota in 1983

by

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## INTRODUCTION

Minnesota typically ranks ninth in terms of income from potato production. 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 on 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 1983 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 1983 crop are highly conjectural. The crop isn't planted. Acreage and yields 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 1983 potato crop marketing year will consist of carryover stocks plus production.

The estimated stocks of potatoes in Minnesota as of December 1, 1982 was 9.0 million cwt. or 78% of production (see Table 1). This is 1% below December 1, 1981 stocks. According to the Minnesota Agricultural Statistics

Table 1  
Minnesota and North Dakota Fall Potatoes: Acreage, Yield, Production, and Stocks

Area	Color	State	1982 Crop			Dec. 1, 1981		December 1, 1982	
			Harvested Acreage	Yield (Cwt.)	Production (000 Cwt.)	Stocks 1980 Crop (000 Cwt.)	Stocks 1982 Crop (000 Cwt.)	Percent of Total Stocks	
Red River Valley	Red	Minnesota	10,000	157	1,570	1,390	1,080	18	
		North Dakota	27,160	145	3,940	3,450	3,330	26	
		Valley	37,160	148	5,510	4,840	4,410	23	
Red River Valley	White	Minnesota	28,000	149	4,160	4,370	3,900	65	
		North Dakota	72,090	154	11,120	8,832	7,485	58	
		Valley	100,090	153	15,280	13,202	11,385	61	
Red River Valley	Russet	Minnesota	8,000	146	1,170	740	1,020	17	
		North Dakota	15,750	139	2,190	1,518	1,985	16	
		Valley	23,750	141	3,360	2,258	3,005	14	
State	Total	Minnesota	46,000	150	6,900	6,500	6,000	32	
		North Dakota	115,000	150	17,250	13,800	12,800	68	
		Valley	161,000	150	24,150	20,300	18,800	100	
State	Total	Minnesota	14,500	155	2,250	1,930	1,710	19	
		North Dakota	31,000	149	4,620	4,510	4,320	48	
		Valley	18,500	251	4,620	2,660	2,970	33	
		Total	64,000	180	11,520	9,100	9,000	100	

Source: Minnesota Agricultural Statistics Service, December 1982.

Service report, Minnesota's production is 13% below 1981, but 16% above 1980's crop. The decrease is because there were 6,000 less acres harvested and the average yield dropped by 10 cwt. per acre. The estimate of stocks by type show 19% red, 48% white, and 33% russet, an increase of 3% in russets and a 3% drop in reds from last year.

Stocks of potatoes in the North Dakota-Minnesota Red River Valley area are estimated at 18.8 million cwt. which is 7% below one year ago. Stocks by type are estimated at 23% red, 61% white, and 14% russet. Total production in the Valley is down 14% from last year.

U.S. potato stocks are up from a year earlier. Estimated potato stocks in the 15 major fall states as of December 1, 1982 are 202 million cwt., 5% above a year ago and 17% more than 1980. Of the total stocks on hand in the 11 major states, 72% are russets, 24% whites and 4% reds.

Estimated holdings in the three eastern states total 32.2 million cwt., 5% greater than a year earlier and 19% above 1980. Stocks in Maine, at 21.0 million cwt., are down slightly from a year ago. North Dakota's stocks are 17% below a year ago, Minnesota down 8% and Wisconsin up 11%. Holdings in the six western states total 127 million cwt., 5% more than on December 1, 1981, and 15% above two years ago. Idaho's stocks are estimated at 67.0 million cwt., 8% more than a year earlier. Holdings in Washington and Oregon are about the same as last year.

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 1982, 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 turning time at the ends and other delay in field performance.

This year in our annual discussions with growers, we learned that many will be cutting back on inputs where they can. Indications are that they are going to more closely monitor fertilizer and pesticide applications. The budgets are developed to show this change in production practices.

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. Fuel costs (diesel) are estimated to be \$1.12 per gallon.

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 1982 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 1983 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. Unskilled labor for tillage and truck driving is valued at \$5.85 per hour, and skilled labor for planting, spraying and harvesting is valued at \$7.80 per hour. These rates include a 30% charge over the wage rate to include workman's compensation, social security, insurance and other employee benefits.

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 is until harvest is six months. Interest costs are calculated accordingly using a 14.5% 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 market 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 farm overhead charges such as farm organization dues, use of the pickup truck, building and storage cost (except machinery housing which is included on 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 Considerations: 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 resources.

Long-Run Considerations: The crop 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 1983 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 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 of the expected long-run net returns.



Table 2

1983 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	130 cwt.	160 cwt.	165 cwt.	145 cwt.	155 cwt.
Price	\$3.70	\$30.00	\$4.00	\$4.50	\$3.50	\$3.85	\$3.00
Returns	167	510	550*	799*	578	558	465
Cash Costs	76	150	408	409	285	266	303
Returns-Cash Costs	91	360	142	389	292	292	162
80% Returns-Cash Costs	57	258	32	230	177	180	69
50% Returns-Cash Costs	7	105	-133	-10	4	13	-71
Net Returns	3	155	-118	125	59	62	-69

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

### 1983 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 \$55,245. 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 \$1.98, but the cost per cwt. of potatoes marketed after a 10% shrink is \$2.20.

### 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 \$3.44 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 \$533.62, so the production expenses per cwt. marketed after shrink are now \$3.83. The storage costs of \$2.20 per cwt. now indicate the total cost per cwt. to be \$6.03.

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.

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

Table 4

Breakeven Prices for the Various Potato Production  
Budgets When Marketed Out of Storage 1/

	<u>Round White Seed</u>	<u>Russet Seed</u>	<u>Round White Processing</u>	<u>Russet Processing</u>	<u>Tablestock Potatoes</u>
Cwt./Acre	130	160	165	145	155
Total Cost	\$638 <u>2/</u>	\$595 <u>2/</u>	\$519	\$496	\$534
Cost/Cwt.	\$4.91	\$3.72	\$3.14	\$3.42	\$3.44
Storage Cost/Cwt.	\$2.25	\$2.25	\$1.98	\$1.98	\$1.98
Total Cost/Cwt. Produced	\$7.16	\$5.97	\$5.12	\$5.40	\$5.42
Shrinkage Percent	10	10	10	10	10
Total Cost/Cwt. Marketed	\$7.95	\$6.63	\$5.69	\$6.00	\$6.02

1/ After 10% shrinkage in storage.

2/ Total Cost reduced by credit for sale of jumbos.

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 POTATO SEED		11 16 82	
	UNITS OR APPLIC.	QUANTITY	PRICE	TOTAL AMOUNT	CASH COSTS
<b>RETURNS</b>					
ROUND CERT. SEED		130.000 CWT.	4.000	520.00	
ROUND JUMBOS		15.000 CWT.	2.000	30.00	
TOTAL RETURNS				550.00	
<b>PLANTING COSTS</b>					
FIELD CULTIVATOR 28		.074 HR/A	48.756	3.59	1.39
SPRINGTOOTH DRAG 48		.033 HR/A	62.034	2.05	.31
ROUND FOUND SEED		18.000 CWT.	8.000	144.00	144.00
POT SEED TREATMENT		18.000 CWT.	.450	8.10	8.10
POT. SEED CUTTING		18.000 CWT	.600	10.80	10.80
POTATO ROW MARKER 6R		.134 HR/A	83.204	11.14	2.31
POTATO FILLER		.174 HR/A	31.670	5.51	.25
POTATO PLANTER 6 ROW		.174 HR/A	116.129	20.22	4.61
HEAVY TRUCK	3	.174 HR/A	46.786	24.42	13.22
<b>FERTILIZER</b>					
ANHYDROUS AMMONIA		50.000 LBS.	.130	6.50	6.50
NITROGEN		25.000 LBS.	.220	5.50	5.50
PHOSPHORUS P205		50.000 LBS.	.220	11.00	11.00
POTASSIUM K20		60.000 LBS.	.100	6.00	6.00
ANHYDROUS APPLICATOR		.112 HR/A	54.084	6.07	1.69
<b>SPRAYING COSTS</b>					
AERIAL APPLICATION	5	3.300 ACRE	1.000	16.50	16.50
INSECTICIDE	3	8.330	1.000	24.99	24.99
FUNGICIDE	3	3.500	1.000	10.50	10.50
VINE KILLER	2	12.000	1.000	24.00	24.00
<b>CULTIVATION</b>					
POTATO CULT. 6 ROW	4	.109 HR/A	28.038	12.20	3.99
ROUGEING		5.000	1.000	5.00	5.00
<b>HARVEST COST</b>					
POTATO HVSTR SEED 2R		.618 HR/A	77.639	47.97	12.66
HEAVY TRUCK	3	.618 HR/A	46.786	86.74	46.95
DISK 21 FT		.098 HR/A	53.261	5.23	1.47
FIELD CULTIVATOR 28		.074 HR/A	48.756	3.59	1.39
<b>OTHER COSTS</b>					
LAND CHARGE		1667.000	.039	65.01	
LAND TAXES		1667.000	.006	10.00	10.00
LIGHT TRUCK		1.250 HR/A	18.960	23.70	10.57
FIELD + DISEASE TEST		1.000 ACRE	11.000	11.00	11.00
INSPECTION AND TAGS		144.000 CWT.	.060	8.64	8.64
PROMOTION TAXES		157.000	.030	4.71	4.71
CROP INSURANCE		550.000	.025	13.75	
INTEREST ON CASH COSTS		408.080	.072	29.59	
TOTAL COSTS				668.04	408.08
RETURNS OVER TOTAL COSTS				-118.04	
RETURNS OVER CASH COSTS				141.92	
RETURNS OVER CASH COSTS 20 PCT RETURNS REDUCTION				31.92	
RETURNS OVER CASH COSTS 50 PCT RETURNS REDUCTION				-133.08	
CASH COSTS/ACRE	408.08	MACHINE OPERATING COSTS/A		100.84	
MACHINE OWNERSHIP COST/A	107.59	FUEL USE/ACRE (GAL)		24.37	
<b>THRU PLANT GROWING HARVEST OTHER TOTAL</b>					
CASH COST	291.69	8.99	62.48	44.92	408.08
LABOR HOURS	1.38	.45	4.09	1.25	7.17
LABOR VALUE	8.82	2.65	25.25	7.31	44.02

Appendix Table 2

SOIL AREA 12 (10)		RUSSET POTATOES SEED		11 16 82	
	UNITS OR APPLIC.	QUANTITY	PRICE	TOTAL AMOUNT	CASH COSTS
<b>RETURNS</b>					
RUSSET CERT. SEED		160.000 CWT	4.500	720.00	
RUSSET JUMBOS		35.000 CWT.	2.250	78.75	
<b>TOTAL RETURNS</b>				<b>798.75</b>	
<b>PLANTING COSTS</b>					
FIELD CULTIVATOR 28		.074 HR/A	48.756	3.59	1.39
SPRINGTOOTH DRAG 48		.033 HR/A	62.034	2.05	.31
RUSSET FOUND SEED		18.000 CWT.	8.000	144.00	144.00
POT SEED TREATMENT		18.000 CWT.	.450	8.10	8.10
POT. SEED CUTTING		18.000 CWT	.600	10.80	10.80
POTATO ROW MARKER 6R		.134 HR/A	83.204	11.14	2.31
POTATO FILLER		.174 HR/A	31.670	5.51	.25
POTATO PLANTER 6 ROW		.174 HR/A	116.129	20.22	4.61
HEAVY TRUCK	3	.174 HR/A	46.786	24.42	13.22
<b>FERTILIZER</b>					
ANHYDROUS AMMONIA		75.000 LBS.	.130	9.75	9.75
NITROGEN		25.000 LBS.	.220	5.50	5.50
PHOSPHORUS P205		50.000 LBS.	.220	11.00	11.00
POTASSIUM K20		75.000 LBS.	.100	7.50	7.50
ANHYDROUS APPLICATOR		.112 HR/A	54.084	6.07	1.69
<b>SPRAYING COSTS</b>					
AERIAL APPLICATION	5	3.300 ACRE	1.000	16.50	16.50
INSECTICIDE	3	8.330	1.000	24.99	24.99
FUNGICIDE	4	3.500	1.000	14.00	14.00
VINE KILLER	2	8.750	1.000	17.50	17.50
<b>CULTIVATION</b>					
POTATO CULT. 6 ROW	3	.109 HR/A	28.038	9.15	3.00
ROUGEING		5.000	1.000	5.00	5.00
<b>HARVEST COST</b>					
POTATO HVSTR SEED 2R		.618 HR/A	77.639	47.97	12.66
HEAVY TRUCK	3	.618 HR/A	46.786	86.74	46.95
DISK 21 FT		.098 HR/A	53.261	5.23	1.47
FIELD CULTIVATOR 28		.074 HR/A	48.756	3.59	1.39
<b>OTHER COSTS</b>					
LAND CHARGE		1667.000	.039	65.01	
LAND TAXES		1667.000	.006	10.00	10.00
LIGHT TRUCK		1.250 HR/A	18.960	23.70	10.57
FIELD + DISEASE TEST		1.000 ACRE	11.000	11.00	11.00
INSPECTION AND TAGS		144.000 CWT.	.060	8.64	8.64
PROMOTION TAXES		176.000	.030	5.28	5.28
CROP INSURANCE		798.750	.025	19.97	
INTEREST ON CASH COSTS		409.401	.072	29.68	
<b>TOTAL COSTS</b>				<b>673.62</b>	<b>409.40</b>
<b>RETURNS OVER TOTAL COSTS</b>				<b>125.13</b>	
<b>RETURNS OVER CASH COSTS</b>				<b>389.35</b>	
<b>RETURNS OVER CASH COSTS 20 PCT RETURNS REDUCTION</b>				<b>229.60</b>	
<b>RETURNS OVER CASH COSTS 50 PCT RETURNS REDUCTION</b>				<b>-10.03</b>	
<b>CASH COSTS/ACRE</b>	<b>409.40</b>	<b>MACHINE OPERATING COSTS/A</b>		<b>99.84</b>	
<b>MACHINE OWNERSHIP COST/A</b>	<b>106.20</b>	<b>FUEL USE/ACRE (GAL)</b>		<b>23.88</b>	
<b>THRU PLANT GROWING HARVEST OTHER TOTAL</b>					
CASH COST	293.44	8.00	62.48	45.49	409.40
LABOR HOURS	1.38	.34	4.09	1.25	7.06
LABOR VALUE	8.82	1.99	25.25	7.31	43.36

Appendix Table 3

SOIL AREA 12 ( 5 )	ROUND WHITE POTATOES PROCESSING			11 16 82	
	UNITS OR APPLIC.	QUANTITY	PRICE	TOTAL AMOUNT	CASH COSTS
<b>RETURNS</b>					
ROUND WHITE POT.		165.000 CWT.	3.500	577.50	
TOTAL RETURNS				577.50	
<b>PLANTING COSTS</b>					
FIELD CULTIVATOR 28		.074 HR/A	48.756	3.59	1.39
SPRINGTOOTH DRAG 48		.033 HR/A	62.034	2.05	.31
RND WHT PROC 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	.600	9.00	9.00
POTATO ROW MARKER 6R		.134 HR/A	83.204	11.14	2.31
POTATO FILLER		.174 HR/A	31.670	5.51	.25
POTATO PLANTER 6 ROW		.174 HR/A	116.129	20.22	4.61
HEAVY TRUCK	3	.174 HR/A	46.786	24.42	13.22
<b>FERTILIZER</b>					
NITROGEN		25.000 LBS.	.220	5.50	5.50
ANHYDROUS AMMONIA		75.000 LBS.	.130	9.75	9.75
PHOSPHORUS P205		50.000 LBS.	.220	11.00	11.00
POTASSIUM K20		60.000 LBS.	.100	6.00	6.00
ANHYDROUS APPLICATOR		.112 HR/A	54.084	6.07	1.69
<b>SPRAYING COSTS</b>					
AERIAL APPLICATION	4	3.300 ACRE	1.000	13.20	13.20
INSECTICIDE		20.000	1.000	20.00	20.00
FUNGICIDE	4	3.500	1.000	14.00	14.00
SPROUT INHIB & APP		12.000	1.000	12.00	12.00
<b>CULTIVATION</b>					
POTATO CULT. 6 ROW	4	.109 HR/A	28.038	12.20	3.99
<b>HARVEST COST</b>					
POTATO HRVSTR. 2 ROW		.402 HR/A	99.405	39.93	8.40
HEAVY TRUCK	3	.402 HR/A	46.786	56.42	30.54
DISK 21 FT		.098 HR/A	53.261	5.23	1.47
FIELD CULTIVATOR 28		.074 HR/A	48.756	3.59	1.39
<b>OTHER COSTS</b>					
LAND CHARGE		1667.000	.039	65.01	
LAND TAXES		1667.000	.006	10.00	10.00
LIGHT TRUCK		1.250 HR/A	18.960	23.70	10.57
PROMOTION TAXES		165.000	.030	4.95	4.95
CROP INSURANCE		577.500	.025	14.44	
INTEREST ON CASH COSTS		284.822	.072	20.65	
TOTAL COSTS				518.84	284.82
<b>RETURNS OVER TOTAL COSTS</b>				58.66	
<b>RETURNS OVER CASH COSTS</b>				292.68	
<b>RETURNS OVER CASH COSTS 20 PCT RETURNS REDUCTION</b>				177.18	
<b>RETURNS OVER CASH COSTS 50 PCT RETURNS REDUCTION</b>				3.93	
CASH COSTS/ACRE	284.82	<b>MACHINE OPERATING COSTS/A</b>		80.17	
MACHINE OWNERSHIP COST/A	98.36	<b>FUEL USE/ACRE (GAL)</b>		20.12	
TOTAL COST PER CWT.	3.14				

	THRU PLANT	GROWING	HARVEST	OTHER	TOTAL
CASH COST	213.50	3.99	41.81	25.52	284.82
LABOR HOURS	1.38	.45	2.72	1.25	5.80
LABOR VALUE	8.82	2.65	16.78	7.31	35.55



Appendix Table 4

SOIL AREA 12 ( 4 )		RUSSET POTATOES PROCESSING		11 16 82	
	UNITS OR APPLIC.	QUANTITY	PRICE	TOTAL AMOUNT	CASH COSTS
<b>RETURNS</b>					
U.S.NO.1 RUSSET		145.000 CWT	3.850	558.25	
<b>TOTAL RETURNS</b>				<b>558.25</b>	
<b>PLANTING COSTS</b>					
FIELD CULTIVATOR 28		.074 HR/A	48.756	3.59	1.39
SPRINGTOOTH DRAG 48		.033 HR/A	62.034	2.05	.31
RUSSET CERT SEED		11.000 CWT.	7.000	77.00	77.00
POT SEED TREATMENT		11.000 CWT.	.450	4.95	4.95
POT. SEED CUTTING		11.000 CWT	.600	6.60	6.60
POTATO ROW MARKER 6R		.134 HR/A	83.204	11.14	2.31
POTATO FILLER		.174 HR/A	31.670	5.51	.25
POTATO PLANTER 6 ROW		.174 HR/A	116.129	20.22	4.61
HEAVY TRUCK	3	.174 HR/A	46.786	24.42	13.22
<b>FERTILIZER</b>					
NITROGEN		25.000 LBS.	.220	5.50	5.50
ANHYDROUS AMMONIA		75.000 LBS.	.130	9.75	9.75
PHOSPHORUS P2O5		50.000 LBS.	.220	11.00	11.00
POTASSIUM K2O		75.000 LBS.	.100	7.50	7.50
ANHYDROUS APPLICATOR		.112 HR/A	54.084	6.07	1.69
<b>SPRAYING COSTS</b>					
AERIAL APPLICATION	5	3.300 ACRE	1.000	16.50	16.50
INSECTICIDE		20.000	1.000	20.00	20.00
FUNGICIDE	4	3.500	1.000	14.00	14.00
<b>CULTIVATION</b>					
POTATO CULT. 6 ROW	3	.109 HR/A	28.038	9.15	3.00
<b>HARVEST COST</b>					
POTATO HRVSTR. 2 ROW		.402 HR/A	99.405	39.93	8.40
HEAVY TRUCK	3	.402 HR/A	46.786	56.42	30.54
DISK 21 FT		.098 HR/A	53.261	5.23	1.47
FIELD CULTIVATOR 28		.074 HR/A	48.756	3.59	1.39
<b>OTHER COSTS</b>					
LAND CHARGE		1667.000	.039	65.01	
LAND TAXES		1667.000	.006	10.00	10.00
LIGHT TRUCK		1.250 HR/A	18.960	23.70	10.57
PROMOTION TAXES		145.000	.030	4.35	4.35
CROP INSURANCE		558.250	.025	13.96	
INTEREST ON CASH COSTS		266.324	.072	19.31	
<b>TOTAL COSTS</b>				<b>496.47</b>	<b>266.32</b>
<b>RETURNS OVER TOTAL COSTS</b>				61.78	
<b>RETURNS OVER CASH COSTS</b>				291.93	
<b>RETURNS OVER CASH COSTS 20 PCT RETURNS REDUCTION</b>				180.28	
<b>RETURNS OVER CASH COSTS 50 PCT RETURNS REDUCTION</b>				12.80	
CASH COSTS/ACRE	266.32	MACHINE OPERATING COSTS/A		79.17	
MACHINE OWNERSHIP COST/A	96.97	FUEL USE/ACRE (GAL)		19.63	
TOTAL COST PER CWT	3.42				
<b>THRU PLANT GROWING HARVEST OTHER TOTAL</b>					
CASH COST	196.60	3.00	41.81	24.92	266.32
LABOR HOURS	1.38	.34	2.72	1.25	5.69
LABOR VALUE	8.82	1.99	16.78	7.31	34.89

Appendix Table 5

SOIL AREA 12 ( 6 )		POTATOES TABLESTOCK		11 16 82	
	UNITS OR APPLIC.	QUANTITY	PRICE	TOTAL AMOUNT	CASH COSTS
<b>RETURNS</b>					
ROUND RED POT.		155.000 CWT.	3.000	465.00	
<b>TOTAL RETURNS</b>				<b>465.00</b>	
<b>PLANTING COSTS</b>					
FIELD CULTIVATOR 28		.074 HR/A	48.756	3.59	1.39
SPRINGTOOTH DRAG 48		.033 HR/A	62.034	2.05	.31
ROUND CERT SEED		15.000 CWT.	6.500	97.50	97.50
POT SEED TREATMENT		15.000 CWT.	.450	6.75	6.75
POT. SEED CUTTING		15.000 CWT.	.600	9.00	9.00
POTATO ROW MARKER 6R		.134 HR/A	83.204	11.14	2.31
POTATO FILLER		.174 HR/A	31.670	5.51	.25
POTATO PLANTER 6 ROW		.174 HR/A	116.129	20.22	4.61
HEAVY TRUCK	3	.174 HR/A	46.786	24.42	13.22
<b>FERTILIZER</b>					
NITROGEN		25.000 LBS.	.220	5.50	5.50
ANHYDROUS AMMONIA		75.000 LBS.	.130	9.75	9.75
PHOSPHORUS P205		50.000 LBS.	.220	11.00	11.00
POTASSIUM K20		60.000 LBS.	.100	6.00	6.00
ANHYDROUS APPLICATOR		.112 HR/A	54.084	6.07	1.69
<b>SPRAYING COSTS</b>					
AERIAL APPLICATION	5	3.300 ACRE	1.000	16.50	16.50
INSECTICIDE		20.000	1.000	20.00	20.00
FUNGICIDE	3	3.500	1.000	10.50	10.50
VINE KILLER	2	8.750	1.000	17.50	17.50
<b>CULTIVATION</b>					
POTATO CULT. 6 ROW	3	.109 HR/A	28.038	9.15	3.00
<b>HARVEST COST</b>					
POTATO HRVSTR. 2 ROW		.402 HR/A	99.405	39.93	8.40
HEAVY TRUCK	3	.402 HR/A	46.786	56.42	30.54
DISK 21 FT		.098 HR/A	53.261	5.23	1.47
FIELD CULTIVATOR 28		.074 HR/A	48.756	3.59	1.39
<b>OTHER COSTS</b>					
LAND CHARGE		1667.000	.039	65.01	
LAND TAXES		1667.000	.006	10.00	10.00
LIGHT TRUCK		1.250 HR/A	18.960	23.70	10.57
PROMOTION TAXES		132.000	.030	3.96	3.96
CROP INSURANCE		465.000	.025	11.62	
INTEREST ON CASH COSTS		303.134	.072	21.98	
<b>TOTAL COSTS</b>				<b>533.62</b>	<b>303.13</b>
<b>RETURNS OVER TOTAL COSTS</b>				-68.62	
<b>RETURNS OVER CASH COSTS</b>				161.87	
<b>RETURNS OVER CASH COSTS 20 PCT RETURNS REDUCTION</b>				68.87	
<b>RETURNS OVER CASH COSTS 50 PCT RETURNS REDUCTION</b>				-70.63	
CASH COSTS/ACRE	303.13	MACHINE OPERATING COSTS/A		79.17	
MACHINE OWNERSHIP COST/A	96.97	FUEL USE/ACRE (GAL)		19.63	
TOTAL COST PER CWT.	3.44				
<b>THRU PLANT GROWING HARVEST OTHER TOTAL</b>					
CASH COST	233.80	3.00	41.81	24.53	303.13
LABOR HOURS	1.38	.34	2.72	1.25	5.69
LABOR VALUE	8.82	1.99	16.78	7.31	34.89