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Potato Production and Storage Cost
Estimates for Minnesota in 1984

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INTRODUCTION

It appears that production costs will increase slightly over last year with not much of an increase in price expected at this time. This year it appears that machinery costs are up, fertilizer costs are the same, but with expectations of price increases coming, interest rates are down and labor--although priced the same in my projections--has probably dropped off somewhat compared with last year. Let's take a closer look at my projections.

Discussion of Budget Information

My potato crop production estimates shown in Appendix Tables 1 through 5 are developed for the Red River Valley. 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 1984 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 1984 crop are highly conjectural. The crop isn't planted. Acreage and yield are unknown. An individual's planting decisions should consider both the level of price expectations and the degree of confidence in those price expectations. Other competing crops may influence potato acreage and the factors affecting these crops are conjecture at this time, but need to be considered in the planning process. 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 1984 potato crop marketing year will consist of carry-over stocks plus production.

The estimated stocks of potatoes in Minnesota as of December 1, 1983 was 8.5 million cwt. or 82% of production. This is below December 1, 1982 stocks. According to the Minnesota Agricultural Statistics Service report, Minnesota's production is 10% below 1982 and 22% below 1981's crop. The decrease is because there were 2,500 less acres harvested and the average yield dropped by 10 cwt. per acre. The estimate of stocks by type show 18% red, 65% white, and 17% russet.

U.S. potato stocks are down from a year earlier. Estimated potato stocks in the 15 major fall states as of December 1, 1983 are 187 million cwt., 9% below a year ago and 3% below 1981. Of the total stocks on hand in the 11

major states, 72% are russets, 24% are whites and 4% are reds, the same as last year.

Estimated holdings in the three eastern states total 26.0 million cwt., 22% less than a year earlier. Stocks in Maine, at 18.1 million cwt., are down 17.7% from a year ago. North Dakota's stocks are 11.9% above a year ago, and Minnesota's down 5.5% and Wisconsin's down 4.3%. Holdings in the six western states total 119 million cwt., 9% less than on December 1, 1982 and 2% below two years ago. Idaho's stocks are estimated at 59.5 million cwt., 13.7% less 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 1983, 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 delays in field performance.

This year in our annual discussions with growers, we learned that many will be watching their inputs very closely. 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 \$1.00 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 1983 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. Weeds 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, fertilizers, 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 1984 cash costs 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, but this is likely to increase in 1984. 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 Costs (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 13.0% 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 costs (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 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 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 build-up 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.

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 on the expected long-run net returns.

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 6. Annual overhead costs on this storage unit are estimated to be \$53,615. 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 \$1.89, but the cost per cwt. of potatoes marketed after a 10% shrink is \$2.09.

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 (Table 7) is \$3.50 per cwt. However, if the 155 cwt. of potatoes go into storage and shrink 10%, there are only 139.5 cwt. left for sale from that acre. Production expenses were \$543.35, so the production expenses per cwt. marketed after shrink are now \$3.90. The storage costs of \$2.09 per cwt. now indicate the total costs per cwt. to be \$5.99.

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 7 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 break even 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 a grower can expect. These will be very consistent from farm to farm. However, 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 repayments and family living expenses. It is the function of management to constantly be striving to get the farm overhead costs down within reason to 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

POTATOES (7)	ROUND POTATO SEED		12 08 83		
	UNITS OR APPLIC.	QUANTITY	PRICE	TOTAL AMOUNT	CASH COSTS
RETURNS					
ROUND CERT. SEED		150.000 CWT.	4.000	600.00	
JUMBOS		15.000 CWT.	2.000	30.00	
TOTAL RETURNS				630.00	
PLANTING COSTS					
FIELD CULTIVATOR 28		.074 HR/A	53.282	3.93	1.36
SPRINGTOOTH DRAG 48		.033 HR/A	44.992	1.49	.26
ROUND POUND 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	84.826	11.36	2.16
POTATO FILLER		.174 HR/A	32.213	5.61	.27
POTATO PLANTER 6 ROW		.174 HR/A	118.727	20.67	4.52
HEAVY TRUCK	3	.174 HR/A	49.276	25.72	13.98
FERTILIZER					
ANHYDROUS AMMONIA		50.000 LBS.	.130	6.50	6.50
NITROGEN		25.000 LBS.	.220	5.50	5.50
PHOSPHORUS P2O5		50.000 LBS.	.220	11.00	11.00
POTASSIUM K2O		60.000 LBS.	100	6.00	6.00
ANHYDROUS APPLICATOR		.079 HR/A	84.976	6.68	1.67
SPRAYING COSTS					
AERIAL APPLICATION	5	3.500 ACRE	1.000	17.50	17.50
INSECTICIDE	3	8.750	1.000	26.25	26.25
FUNGICIDE	3	3.700	1.000	11.10	11.10
VINE KILLER	2	12.000	1.000	24.00	24.00
CULTIVATION					
POTATO CULT. 6 ROW	4	.109 HR/A	28.611	12.45	3.74
ROUGEING		5.000	1.000	5.00	5.00
HARVEST COST					
POTATO HVSTR SEED 2R		.618 HR/A	80.120	49.51	12.37
HEAVY TRUCK	3	.618 HR/A	49.276	91.36	49.66
DISK 21 FT		.098 HR/A	54.968	5.40	1.43
FIELD CULTIVATOR 28		.074 HR/A	53.282	3.93	1.36
OTHER COSTS					
LAND CHARGE		1667.000	.039	65.01	
LAND TAXES		1667.000	.006	10.00	10.00
LIGHT TRUCK		1.250 HR/A	20.179	25.22	11.34
FIELD + DISEASE TEST		1.000 ACRE	11.000	11.00	11.00
INSPECTION AND TAGS		150.000 CWT.	.060	9.00	9.00
PROMOTION TAXES		165.000	.030	4.95	4.95
CROP INSURANCE		630.000	.025	15.75	
INTEREST ON CASH COSTS		414.846	.065	26.96	
TOTAL COSTS				681.75	414.85
RETURNS OVER TOTAL COSTS				-51.75	
RETURNS OVER CASH COSTS				215.15	
RETURNS OVER CASH COSTS 20 PCT RETURNS REDUCTION				89.15	
RETURNS OVER CASH COSTS 50 PCT RETURNS REDUCTION				-99.85	
CASH COSTS/ACRE	414.85	MACHINE OPERATING COSTS/A	104.14		
MACHINE OWNERSHIP COST/A	114.36	FUEL USE/ACRE (GAL)	24.32		
THRU PLANT GROWING HARVEST OTHER TOTAL					
CASH COST	294.98	8.74	64.83	46.29	414.85
LABOR HOURS	1.34	.45	4.09	1.25	7.12
LABOR VALUE	8.87	2.67	25.90	7.38	44.81

APPENDIX TABLE 2

POTATOES (10)	RUSSET POTATOES SEED		12 08 83		
	UNITS OR APPLIC.	QUANTITY	PRICE	TOTAL AMOUNT	CASH COSTS
RETURNS					
RUSSET CERT. SEED		145.000 CWT	4.000	580.00	
RUSSET JUMBOS		15.000 CWT.	2.000	30.00	
TOTAL RETURNS				610.00	
PLANTING COSTS					
FIELD CULTIVATOR 28		.074 HR/A	53.282	3.93	1.36
SPRINGTOOTH DRAG 48		.033 HR/A	44.992	1.49	.26
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	84.826	11.36	2.16
POTATO FILLER		.174 HR/A	32.213	5.61	.27
POTATO PLANTER 6 ROW		.174 HR/A	118.727	20.67	4.52
HEAVY TRUCK	3	.174 HR/A	49.276	25.72	13.98
FERTILIZER					
ANHYDROUS AMMONIA		75.000 LBS.	.130	9.75	9.75
NITROGEN		25.000 LBS.	.220	5.50	5.50
PHOSPHORUS P2O5		50.000 LBS.	.220	11.00	11.00
POTASSIUM K2O		75.000 LBS.	.100	7.50	7.50
ANHYDROUS APPLICATOR		.079 HR/A	84.976	6.68	1.67
SPRAYING COSTS					
AERIAL APPLICATION	5	3.500 ACRE	1.000	17.50	17.50
INSECTICIDE	3	8.750	1.000	26.25	26.25
FUNGICIDE	4	3.700	1.000	14.80	14.80
VINE KILLER	2	8.750	1.000	17.50	17.50
CULTIVATION					
POTATO CULT. 6 ROW	3	.109 HR/A	28.611	9.34	2.81
ROUGEING		5.000	1.000	5.00	5.00
HARVEST COST					
POTATO HVSTR SEED 2R		.618 HR/A	80.120	49.51	12.37
HEAVY TRUCK	3	.618 HR/A	49.276	91.36	49.66
DISK 21 FT		.098 HR/A	54.968	5.40	1.43
FIELD CULTIVATOR 28		.074 HR/A	53.282	3.93	1.36
OTHER COSTS					
LAND CHARGE		1667.000	.039	65.01	
LAND TAXES		1667.000	.006	10.00	10.00
LIGHT TRUCK		1.250 HR/A	20.179	25.22	11.34
FIELD + DISEASE TEST		1.000 ACRE	11.000	11.00	11.00
PROMOTION TAXES		145.000	.030	4.35	4.35
INSPECTION AND TAGS		160.000 CWT.	.060	9.60	9.60
CROP INSURANCE		610.000	.025	15.25	
INTEREST ON CASH COSTS		415.860	.065	27.03	
TOTAL COSTS				680.15	415.86
RETURNS OVER TOTAL COSTS				-70.15	
RETURNS OVER CASH COSTS				194.14	
RETURNS OVER CASH COSTS 20 PCT RETURNS REDUCTION				72.14	
RETURNS OVER CASH COSTS 50 PCT RETURNS REDUCTION				-110.86	
CASH COSTS/ACRE	415.86	MACHINE OPERATING COSTS/A		103.21	
MACHINE OWNERSHIP COST/A	112.85	FUEL USE/ACRE (GAL)		23.83	
THRU PLANT GROWING HARVEST OTHER TOTAL					
CASH COST	296.93	7.81	64.83	46.29	415.86
LABOR HOURS	1.34	.34	4.09	1.25	7.01
LABOR VALUE	8.87	2.00	25.90	7.38	44.15

APPENDIX TABLE 3

POTATOES (5)	ROUND WHITE POTATOES PROCESSING			12 08 83	
	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	53.282	3.93	1.36
SPRINGTOOTH DRAG 48		.033 HR/A	44.992	1.49	.26
ROUND CERT SEED		15.000 CWT.	6.000	90.00	90.00
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	84.826	11.36	2.16
POTATO FILLER		.174 HR/A	32.213	5.61	.27
POTATO PLANTER 6 ROW		.174 HR/A	118.727	20.67	4.52
HEAVY TRUCK	3	.174 HR/A	49.276	25.72	13.98
FERTILIZER					
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		60.000 LBS.	.100	6.00	6.00
ANHYDROUS APPLICATOR		.079 HR/A	84.976	6.68	1.67
SPRAYING COSTS					
AERIAL APPLICATION	4	3.500 ACRE	1.000	14.00	14.00
INSECTICIDE		21.000	1.000	21.00	21.00
FUNGICIDE	4	3.700	1.000	14.80	14.80
SPROUT INHIB & APP		12.000	1.000	12.00	12.00
CULTIVATION					
POTATO CULT. 6 ROW	4	109 HR/A	28.611	12.45	3.74
HARVEST COST					
POTATO HRVSTR. 2 ROW		.402 HR/A	103.731	41.67	8.33
HEAVY TRUCK	3	.402 HR/A	49.276	59.43	32.31
DISK 21 FT		.098 HR/A	54.968	5.40	1.43
FIELD CULTIVATOR 28		.074 HR/A	53.282	3.93	1.36
OTHER COSTS					
LAND CHARGE		1667.000	.039	65.01	
LAND TAXES		1667.000	.006	10.00	10.00
LIGHT TRUCK		1.250 HR/A	20.179	25.22	11.34
PROMOTION TAXES		165.000	.030	4.95	4.95
CROP INSURANCE		577.500	.025	14.44	
INTEREST ON CASH COSTS		297.491	.065	19.34	
TOTAL COSTS				537.09	297.49
RETURNS OVER TOTAL COSTS				40.41	
RETURNS OVER CASH COSTS				280.01	
RETURNS OVER CASH COSTS 20 PCT RETURNS REDUCTION				164.51	
RETURNS OVER CASH COSTS 50 PCT RETURNS REDUCTION				-8.74	
CASH COSTS/ACRE	297.49	MACHINE OPERATING COSTS/A		82.74	
MACHINE OWNERSHIP COST/A	104.69	FUEL USE/ACRE (GAL)		20.06	
TOTAL COST PER CWT.	3.26				

	THRU PLANT	GROWING	HARVEST	OTHER	TOTAL
CASH COST	224.03	3.74	43.43	26.29	297.49
LABOR HOURS	1.34	.45	2.72	1.25	5.76
LABOR VALUE	8.87	2.67	17.20	7.38	36.12

APPENDIX TABLE 4

POTATOES (6)	POTATOES TABLESTOCK		12 08 83		
	UNITS OR APPLIC.	QUANTITY	PRICE	TOTAL AMOUNT	CASH COSTS
RETURNS					
ROUND RED POT.		155.000 CWT.	3.000	465.00	
TOTAL RETURNS				465.00	
PLANTING COSTS					
FIELD CULTIVATOR 28		.074 HR/A	53.282	3.93	1.36
SPRINGTOOTH DRAG 48		.033 HR/A	44.992	1.49	.26
ROUND CERT SEED		15.000 CWT.	6.000	90.00	90.00
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	84.826	11.36	2.16
POTATO FILLER		.174 HR/A	32.213	5.61	.27
POTATO PLANTER 6 ROW		.174 HR/A	118.727	20.67	4.52
HEAVY TRUCK	3	.174 HR/A	49.276	25.72	13.98
FERTILIZER					
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		60.000 LBS.	.100	6.00	6.00
ANHYDROUS APPLICATOR		.079 HR/A	84.976	6.68	1.67
SPRAYING COSTS					
AERIAL APPLICATION	5	3.500 ACRE	1.000	17.50	17.50
INSECTICIDE		21.000	1.000	21.00	21.00
FUNGICIDE	3	3.700	1.000	11.10	11.10
VINE KILLER	2	12.000	1.000	24.00	24.00
CULTIVATION					
POTATO CULT. 6 ROW	3	.109 HR/A	28.611	9.34	2.81
HARVEST COST					
POTATO HRVSTR. 2 ROW		.402 HR/A	103.731	41.67	8.33
HEAVY TRUCK	3	.402 HR/A	49.276	59.43	32.31
DISK 21 FT		.098 HR/A	54.968	5.40	1.43
FIELD CULTIVATOR 28		.074 HR/A	53.282	3.93	1.36
OTHER COSTS					
LAND CHARGE		1667.000	.039	65.01	
LAND TAXES		1667.000	.006	10.00	10.00
LIGHT TRUCK		1.250 HR/A	20.179	25.22	11.34
PROMOTION TAXES		155.000	.030	4.65	4.65
CROP INSURANCE		465.000	.025	11.62	
INTEREST ON CASH COSTS		308.055	.065	20.02	
TOTAL COSTS				543.35	308.06
RETURNS OVER TOTAL COSTS				-78.35	
RETURNS OVER CASH COSTS				156.94	
RETURNS OVER CASH COSTS 20 PCT RETURNS REDUCTION				63.94	
RETURNS OVER CASH COSTS 50 PCT RETURNS REDUCTION				-75.56	
CASH COSTS/ACRE		308.06	MACHINE OPERATING COSTS/A		81.80
MACHINE OWNERSHIP COST/A		103.18	FUEL USE/ACRE (GAL)		19.57
TOTAL COST PER CWT.		3.51			
THRU PLANT GROWING HARVEST OTHER TOTAL					
CASH COST	235.83	2.81	43.43	25.99	308.06
LABOR HOURS	1.34	.34	2.72	1.25	5.64
LABOR VALUE	8.87	2.00	17.20	7.38	35.45

APPENDIX TABLE 5

POTATOES (4)	RUSSET POTATOES PROCESSING		12 08 83		
	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	53.282	3.93	1.36
SPRINGTOOTH DRAG 48		.033 HR/A	44.992	1.49	.26
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	84.826	11.36	2.16
POTATO FILLER		.174 HR/A	32.213	5.61	.27
POTATO PLANTER 6 ROW		.174 HR/A	118.727	20.67	4.52
HEAVY TRUCK	3	.174 HR/A	49.276	25.72	13.98
FERTILIZER					
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		.079 HR/A	84.976	6.68	1.67
SPRAYING COSTS					
AERIAL APPLICATION	5	3.500 ACRE	1.000	17.50	17.50
INSECTICIDE		21.000	1.000	21.00	21.00
FUNGICIDE	4	3.700	1.000	14.80	14.80
CULTIVATION					
POTATO CULT. 6 ROW	3	.109 HR/A	28.611	9.34	2.81
HARVEST COST					
POTATO HRVSTR. 2 ROW		.402 HR/A	103.731	41.67	8.33
HEAVY TRUCK	3	.402 HR/A	49.276	59.43	32.31
DISK 21 FT		.098 HR/A	54.968	5.40	1.43
FIELD CULTIVATOR 28		.074 HR/A	53.282	3.93	1.36
OTHER COSTS					
LAND CHARGE		1667.000	.039	65.01	
LAND TAXES		1667.000	.006	10.00	10.00
LIGHT TRUCK		1.250 HR/A	20.179	25.22	11.34
PROMOTION TAXES		145.000	.030	4.35	4.35
CROP INSURANCE		558.250	.025	13.96	
INTEREST ON CASH COSTS		271.755	.065	17.66	
TOTAL COSTS				507.02	271.76
RETURNS OVER TOTAL COSTS				51.23	
RETURNS OVER CASH COSTS				286.49	
RETURNS OVER CASH COSTS 20 PCT RETURNS REDUCTION				174.84	
RETURNS OVER CASH COSTS 50 PCT RETURNS REDUCTION				7.37	
CASH COSTS/ACRE	271.76	MACHINE OPERATING COSTS/A		81.80	
MACHINE OWNERSHIP COST/A	103.18	FUEL USE/ACRE (GAL)		19.57	
TOTAL COST PER CWT	3.50				
THRU PLANT GROWING HARVEST OTHER TOTAL					
CASH COST	199.83	2.81	43.43	25.69	271.76
LABOR HOURS	1.34	.34	2.72	1.25	5.64
LABOR VALUE	8.87	2.00	17.20	7.38	35.45

APPENDIX TABLE 6

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	15.5	\$37,200
Refrigeration - 20 years	10,000	15.5	1,550
Equipment (Bobcat Pilers, etc.) 10 years	59,000	23.5	13,865
Railroad Siding Lease			<u>1,000</u>
Total Annual Overhead Costs			\$53,615

Annual Operating Costs

<u>Seed</u>		<u>Processing</u>	
Electricity 46,286 KWH @ .065	\$ 3,009	Electricity 85,714 KWH @ .065	\$ 5,571
Telephone	1,200	Telephone	2,400
Insurance 48,000 x \$7.00 x .015	5,040	Insurance 48,000 x \$4.50 x .015	3,240
Labor 5 people, 500 hrs. @ \$5.90/hr. 2 hrs./day @ \$5.90 (150 days)	14,750 1,770	Labor 4 people, 300 hrs. @ \$5.90/hr. 2 hrs./day @ \$5.90 (150 days)	7,080 1,770
Office Supplies	1,000	Office Supplies	1,000
Interest on Inventory 43,200 x \$7.00 x .065	19,656	Interest on Inventory 43,200 x \$4.50 x .065	12,636
Disinfectant	<u>500</u>	Disinfectant	300
		Sprout Inhibitor 6¢/cwt.	<u>2,880</u>
Total Operating Cost	\$ 46,925	Total Operating Cost	\$36,877
Total Annual Cost	\$100,540	Total Annual Cost	\$90,492
Total Cost/Cwt. Stored	\$ 2.09	Total Cost/Cwt. Stored	\$ 1.89
Total Cost/Cwt. Marketed 10% Shrink	\$ 2.33	Total Cost/Cwt. Marketed 10% Shrink	\$ 2.09

APPENDIX TABLE 7

1984 Breakeven Prices for the Various Potato^{1/}
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	145	165	145	155
Total Cost	\$652 ^{2/}	\$650 ^{2/}	\$537	\$507	\$543
Cost/Cwt.	\$4.35	\$4.48	\$3.25	\$3.50	\$3.50
Storage Cost/Cwt.	\$2.09	\$2.09	\$1.89	\$1.89	\$1.89
Total Cost/Cwt. Produced	\$6.44	\$6.57	\$5.14	\$5.39	\$5.39
Shrinkage Percent	10	10	10	10	10
Total Cost/Cwt. Marketed	\$7.16	\$7.30	\$5.71	\$5.99	\$5.99

^{1/} After 10% shrinkage in storage.

^{2/} Total cost credited by sale of jumbos.