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2006 Cost of Producing Processing and Fresh Potatoes under Center Pivot Irrigation Columbia Basin, Washington

By

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Photo: Extension, T&R Farms, WA, Terrence Day

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Enterprise costs and returns vary from one farm to the next and over time for any particular farm. Variability stems from differences in:

- Capital, labor, land, and management resources
- Type and size of machinery complement
- Cultural practices
- Size of farm and enterprise
- Crop yields
- Input prices
- Commodity prices

Costs can also be calculated differently depending on the intended use of the cost estimate. The information in this publication serves as a general guide for potatoes grown on a modern, well-managed Columbia Basin farm. To avoid drawing unwarranted conclusions for any particular enterprise, the reader must closely examine the assumptions used. If they are not appropriate for the situation at hand, you should adjust the costs and/or returns.

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2006 Cost Of Producing Processing and Fresh Potatoes under Center Pivot Irrigation, Columbia Basin, Washington

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INTRODUCTION

The enterprise budgets presented in this publication are based on potatoes produced in the Bureau of Reclamation's Columbia Basin Project. The project area is in the "big bend" of the Columbia River in eastern Washington. Rainfall ranges from 6-10 inches annually; thus, crops depend on irrigation water pumped from behind the Grand Coulee Dam. Irrigation coupled with a growing season of 140 to 200 days, makes it possible to grow a multitude of crops.

In 2005, Washington State produced 95.5 million cwt. of potatoes on 154,000 acres, an increase of 2 percent from the 2004 production of 93.8 million cwt.[2] Of the potatoes sold in Washington, in the year 2005, approximately 13% were sold on the fresh market while the remaining 87% were sold to the processing market.[3]

The general objective of this study is to develop enterprise budgets for both fresh and processing fall potatoes. The specific objectives include:

1. Identify production practices representative of well-managed potato enterprises grown under center pivot irrigation in the Columbia Basin.

2. Provide estimates of capital requirements, production costs, and break-even prices.

3. Provide current and prospective producers with a procedure for analyzing the profitability of producing potatoes.

SOURCES OF INFORMATION

In 2001, a committee of Columbia Basin potato producers, considered representative of well-managed farms, provided two WSU area extension educators and a WSU economist with the production practices and requirements for labor, equipment, and supplies considered to be the latest developments in producing potatoes in the Columbia Basin. Local farm suppliers provided price information on materials and other services commonly used by farmers. Machinery costs were based on current purchase prices and rates of annual use considered typical by the producer committee. From this

[1] Extension Economist, Grant-Adams Area Extension Educator, and Extension Horticulturalist, respectively, Washington State University Extension.
[2] National Agricultural Statistics Service.
[3] Washington State Potato Commission, April 26, 2006.

information, a cost of production study, used by area producers in negotiating price contracts with potato buyers, was published as a WSU extension bulletin.[4]

In early 2006, a WSU area extension educator, a WSU horticultural extension specialist, a WSU extension economist, and an area potato producer reviewed the 2001 extension bulletin for changes in production practices since that time. After the initial review of changes in production practices, other producers in the area were also contacted for their input and comments. As in 2001, local farm suppliers provided price information on materials, machinery, and services.

BUDGET ASSUMPTIONS

The following assumptions were made in developing the potato enterprise data:

1. The enterprise budgets reported are for potatoes, following alfalfa, grown under one or more 125-acre center pivot irrigation systems.

2. Russet Burbank potatoes are planted for the processing market and Russet Norkotah potatoes are planted for the fresh market.

3. All land is assumed to be rented at $450 per acre.

4. The landowner furnishes the center pivot system and the operator pays the irrigation charge amounting to $43 per acre. For processing potatoes, annual irrigation repairs are estimated at $14 per acre and irrigation power charges are estimated at $55 per acre (28 acre inches). For fresh potatoes, annual irrigation repairs are estimated at $12 per acre and irrigation power charges are estimated to be $45 per acre (22.5 acre inches). These power costs are representative of the surveyed farmers in Grant County, Washington. Costs are generally higher in other Columbia Basin counties.

5. Estimated annual yield per acre is estimated at 29.5 tons for processing potatoes and 27 tons for fresh potatoes.

6. The interest rate is 9.0%.

7. There are no marketing or storage costs included in these budgets.

DISCUSSION OF BUDGET INFORMATION

Budget information for each crop is reported in a set of eight tables. Tables 1 through 5 followed by a “P” are budget tables for “processed” potatoes. Tables 1 through 5

[4] Hinman, Herbert, Gary Pelter, Erik Sorensen, 2001 Cost of Producing Processing and Fresh Potatoes Under Center Pivot Irrigation, Columbia Basin, Washington, EB1906, Washington State University Extension, April 2001.

followed by an “F” are budget tables for “fresh” marketed potatoes. Tables 6, 7, and 8 refer to both processing and fresh potatoes. A summary of the information in each table follows.

Tables 1P and 1F, Schedule of Operations and Estimated Costs per Acre.

Tables 1P and 1F outline the schedule of field operations by month, the type of machinery and labor use, the hours of machine use per acre, and total production costs for processed and fresh potatoes, respectively.

Production costs are divided into two categories: (1) fixed costs, which include machinery ownership, land costs, and management; and (2) variable costs, which are associated with operating machinery, hiring labor, and purchasing services and materials. Total cost is the sum of fixed and variable costs.

Machinery fixed costs include depreciation, interest on the investment, property taxes, insurance, and housing costs. These costs are incurred whether or not a crop is grown and do not vary with the size of the enterprise, given the ownership of a specific machinery complement. Machinery fixed costs for a specific field operation are determined by multiplying the machine hours per acre times the per-hour fixed cost. The per-hour fixed costs, shown in Table 7, are determined by dividing the total annual fixed cost by the annual hours of machinery use over all enterprises for the representative farm.

Land fixed cost is equal to the cash rent typical of the area which is $450 per acre for land eligible to grow potatoes. Much of the land used for potato production is rented. Even if producers own their land, the prevailing rental rate is an opportunity cost or foregone return for not renting out the land.

An opportunity cost of $150 per acre for management is also listed in Tables 1P and 1F. This is representative of what the producer committee felt was a fair return to their management.

Variable costs depend directly on the number of crop acres and type of enterprise. These costs include labor, fuel, oil, repairs, fertilizer, chemicals, custom work, interest on operating capital, and overhead (telephone, utilities, legal, accounting, organization dues, etc.).

Tables 2P and 2F, Materials and Services Used by Operation.

Tables 1P and 1F list the “Schedule of Operations and Estimated Cost per Acre…,” for the production year. The “Service” and “Materials” columns of this table list dollar amounts spent on services and materials used with individual operations. Tables 2P and 2F list services and/or materials used by operation, the quantities used, and the estimated prices paid for materials and services during the production year analyzed in this study for processed and fresh potatoes, respectively.

Tables 3P and 3F, Itemized Costs per Acre.

Tables 3P and 3F are itemized summaries of the costs presented by field operation in Tables 1P and 1F, respectively. Most items are self-explanatory. However, "Tractor Interest" and "Machinery Interest" warrant explanations. These costs represent the opportunity cost (returns foregone by investing in machinery rather than in alternative investments) or interest paid to finance this equipment. The cost is calculated on the average annual value of the machinery over its lifetime multiplied by a 9.0% interest rate:

$$\frac{\text{Purchase Price + Salvage Value}}{2} \times 9.0\ \%$$

Tables 4P and 4F, Break-Even Selling Price per Ton.

Tables 4P and 4F present four selling price levels needed for different levels of cost recovery for processing and fresh potatoes, respectively.

The first break-even price is the price necessary to cover total variable costs – those costs that occur only if the crop is produced. If the price is below this level, the crop is uneconomic to produce, even in the short-run, because the added costs of production are greater than the added returns.

The second break-even price is the price necessary to cover total cash costs, including land rent. If the land is owned, its rental value would not be listed as a cash cost, but as an opportunity cost as discussed later. This price may be viewed as the price necessary to survive in the short run.

The third break-even price is the price required to cover total cash cost plus depreciation on machinery. This price allows the producer to stay in business over the long-run. When farmers fail to include the opportunity costs associated with the investment in land and machinery when calculating their total cost break-even price, they are overstating the profitability of farming relative to alternative uses of their own resources.

The fourth break-even price is the price the owner-operator must receive to cover all out-of-pocket expenses, plus realize a fair return to labor, operating capital, and equity capital invested in land and machinery. At prices below this level the owner-operator will not earn a return on labor and capital contributions equivalent to that assumed for this study. Realization of a price above this break-even level means that in addition to covering all cash and opportunity costs, the operator will get a return to the risk taken in producing the crop.

Table 5P and 5F, Break-Even Selling Price per Ton of Potatoes Produced at Different Yield Levels.

Tables 5P and 5F are summaries of prices producers would need to receive at different yield levels if they were to break even by covering all cash and opportunity costs.

Table 6, Machinery Complement.

Table 6 identifies the machinery complement used to derive machinery costs. It includes the type of machines used on the representative farm, their current replacement value (new or used), years of use before trade-in, salvage value at trade-in, annual repair cost, and annual hours of use.

Table 7, Hourly Machinery Costs.

The data in Table 6 are used to estimate per-hour fixed and variable costs appearing in Table 7. Machinery fixed costs include depreciation and interest on investment, property taxes, and insurance – costs that do not vary with the crop grown or the number of acres produced. Current replacement costs are used for all machinery and equipment. While this assumption may result in an overstatement of production costs, it is an indication of the enterprise's ability to generate the earnings needed to replace depreciable assets. Continuing increases in prices paid for machinery and equipment mean that depreciation claimed on assets purchased before price advances understates the amount of capital currently required to replace assets. When an enterprise is evaluated to determine its long-run viability, it is important to consider its ability to replace depreciable assets. Note that interest on investment represents an 9.0% opportunity cost to the enterprise. These are earnings foregone by investing money in the machinery complement rather than the next best alternative. This may also represent the interest paid on funds borrowed to finance machinery purchases.

Machinery variable costs include machine repair, fuel, and lubrication – costs that vary with the crop grown or the number of acres of crop produced.

Table 8, Input Prices.

Prices used for fuel, fertilizer, chemicals, seed, custom services, labor, and other inputs are listed in Table 8.

CONCLUDING NOTE

To use these budgets, readers need to fully comprehend the procedures and assumptions used in this study and interpret the results accordingly. The authors and producers who organized this data recognize that these budgets do not represent any one particular operation. The budgets should be used as a general guide to help derive budgets for individual operations. Moreover, this publication does not recommend production practices. Rather, it presents current technology used to produce potatoes in the Columbia Basin. It should further be noted that the resulting figures in these budget estimates do not include storage and marketing costs. The Appendix presents a discussion on how producers may use these budgets to generate “financial budgets” for their own operation. In addition, instructions are provided for downloading Excel spreadsheets that can be used to develop customized producer budgets.

TABLE 1P. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR PRODUCING PROCESSING POTATOES UNDER CENTER PIVOT IRRIGATION, COLUMBIA BASIN, WASHINGTON.*

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST: FUEL, LUBE, & REPAIRS	VARIABLE COST: LABOR	VARIABLE COST: SERVICE	VARIABLE COST: MATER.	VARIABLE COST: INTER.	TOTAL VARIABLE COST	TOTAL COST
						$	$	$	$	$	$	$	$
NEMA & SOIL TEST	CUSTOM TEST	OCT	2005	.00	.00	.00	.00	.00	5.00	.00	.00	5.00	5.00
RIP FIELD	300HP-WT, 8 SHANK RIPPER	OCT	2005	.13	.14	5.39	7.54	2.47	.00	.00	.00	10.02	15.41
FUMIGATE**	THROUGH SPRINKLER	OCT	2005	.00	.00	.00	.00	.00	15.00	131.25	.00	146.25	146.25
NEMA TEST	CUSTOM TEST	NOV	2005	.00	.00	.00	.00	.00	1.10	.00	.09	1.19	1.19
MONITOR CROP***	CONSULTANT	SEA	2006	.00	.00	.00	.00	.00	35.00	.00	1.58	36.58	36.58
FERTILIZE	CUSTOM DOUBLE SPREAD APPLIC.	MAR	2006	.00	.00	.00	.00	.00	11.50	234.53	12.92	258.95	258.95
TILL FIELD	300HP-WT, 17'CHISEL/18'PACKER	APR	2006	.14	.17	6.27	8.59	3.08	.00	.00	.53	12.19	18.46
MARK OUT FIELD	150HP-WT, 6-ROW MARKER BAR	APR	2006	.14	.17	5.89	4.50	3.08	.00	.00	.34	7.92	13.81
HAUL SEED	CUSTOM HAULING	APR	2006	.00	.00	.00	.00	.00	9.89	.00	.45	10.34	10.34
LOAD SEED	SEED LOADER	APR	2006	.23	.28	6.02	2.69	5.08	.00	.00	.35	8.12	14.14
PLANT****	200HP-WT, 6R-POTATO PLANTER	APR	2006	.23	.28	22.23	14.23	5.08	.00	345.00	16.39	380.70	402.93
INSECTICIDE	INSECTICIDE APPLICATOR W/PLANT	APR	2006	.23	.00	1.51	.78	.00	.00	72.00	3.28	76.06	77.57
FUNGICIDE	FERT/FUNG APPLIC. W/PLANTING	APR	2006	.23	.00	1.65	.76	.00	.00	48.82	2.23	51.82	53.47
IRRIGATE	CENTER PIVOT, 28 AC. IN.	SEA	2006	.00	1.00	.00	.00	18.00	116.50	.00	6.05	140.55	140.55
DRAG OFF	150HP-WT, 24' HARROW	MAY	2006	.07	.08	3.78	2.85	1.51	.00	.00	.16	4.53	8.30
RESERVOIR TILL	200HP-WT, 6R-DAMMER/DIKER	MAY	2006	.16	.19	7.94	6.46	3.46	.00	.00	.37	10.29	18.23
COVER SPRAY	CUSTOM AERIAL	MAY	2006	.00	.00	.00	.00	.00	8.00	18.00	.98	26.97	26.97
HERBIGATE	THROUGH SPRINKLERS	JUN	2006	.00	.00	.00	.00	.00	4.50	30.82	1.06	36.38	36.38
FERTIGATE	THROUGH SPRINKLERS	JUN	2006	.00	.00	.00	.00	.00	.00	63.25	1.90	65.15	65.15
FUNGIGATE	THROUGH SPRINKLERS	JUN	2006	.00	.00	.00	.00	.00	4.50	10.89	.46	15.85	15.85
COVER SPRAY	CUSTOM AERIAL	JUN	2006	.00	.00	.00	.00	.00	8.00	22.90	.93	31.83	31.83
FERTIGATE	THROUGH SPRINKLERS	JUL	2006	.00	.00	.00	.00	.00	.00	53.05	1.19	54.25	54.25
FUNGIGATE	THROUGH SPRINKLERS	JUL	2006	.00	.00	.00	.00	.00	4.50	38.81	.97	44.28	44.28
COVER SPRAY	CUSTOM AERIAL	JUL	2006	.00	.00	.00	.00	.00	8.00	47.50	1.25	56.75	56.75
COVER SPRAY	CUSTOM AERIAL	JUL	2006	.00	.00	.00	.00	.00	8.00	52.39	1.36	61.75	61.75
FUNGIGATE	THROUGH SPRINKLERS	JUL	2006	.00	.00	.00	.00	.00	4.50	38.81	.97	44.28	44.28
BORDER MAINTENCE	150HP-WT, 13' TANDEM DISK	JUL	2006	.01	.01	.59	.41	.27	.00	.00	.02	.70	1.29
FERTIGATE	THROUGH SPRINKLERS	AUG	2006	.00	.00	.00	.00	.00	.00	53.05	.80	53.85	53.85
CHEMIGATE	THROUGH SPRINKLERS	AUG	2006	.00	.00	.00	.00	.00	4.50	27.09	.47	32.06	32.06
MITICIDE	CUSTOM AERIAL	AUG	2006	.00	.00	.00	.00	.00	8.00	24.05	.48	32.54	32.54
COVER SPRAY	CUSTOM AERIAL	AUG	2006	.00	.00	.00	.00	.00	8.00	46.39	.82	55.21	55.21
FUNGIGATE	THROUGH SPRINKLERS	AUG	2006	.00	.00	.00	.00	.00	4.50	16.38	.31	21.19	21.19
BORDER MAINTENCE	150HP-WT, 13' TANDEM DISK	AUG	2006	.01	.01	.59	.41	.27	.00	.00	.01	.69	1.28
DEFOLIATE	CUSTOM GROUND APPLICATION	SEP	2006	.00	.00	.00	.00	.00	10.00	27.56	.28	37.84	37.84
PULL/PACK	300HP-WT	SEP	2006	.50	.60	11.72	25.16	10.80	.00	.00	.27	36.23	47.94
DIG POTATOES	200HP-WT, 3R-POTATO HARVESTER	SEP	2006	.50	1.20	42.40	28.96	21.60	.00	.00	.36	50.94	93.33
HAUL POTATOES	CUSTOM HAUL	SEP	2006	.00	.00	.00	.00	.00	266.43	.00	2.00	268.43	268.43
PICKUP, MANAGEMT	3/4 TON	ANN	2006	.80	.00	7.10	9.28	.00	.00	.00	.42	9.70	16.80
PICKUP, IRRIGATN	3/4 TON	ANN	2006	.40	.00	2.48	4.66	.00	.00	.00	.21	4.87	7.35
OVERHEAD	UTILITIES,LEGAL,ACCT.,ETC.	ANN	2006	.00	.00	.00	.00	.00	110.11	.00	.00	110.11	110.11
LAND COST	NET RENT	ANN	2006	.00	.00	450.00	.00	.00	.00	.00	.00	.00	450.00
MANAGEMENT	$150 PER ACRE	ANN	2006	.00	.00	150.00	.00	.00	.00	.00	.00	.00	150.00
TOTAL PER ACRE				3.81	4.15	725.56	117.29	74.69	655.53	1402.53	62.26	2312.33	3037.89

*STORAGE AND MARKETING COSTS NOT INCLUDED.

**GROUND APPLICATION WOULD RESULT IN AN INCREASE OF APPROXIMATELY $30 PER ACRE. WHEN A NEMATODE PROBLEM EXISTS, AN ADDITIONAL FUMIGATION OF 20 GALLONS OF TELONE II @ $11.96 PLUS $50 GROUND APPLICATION, PER ACRE, WILL BE REQUIRED.

***CONSULTANT INCLUDES PEST, NUTRIENT AND SOIL MOISTURE MONITORING, AND PETIOLE ANALYSIS.

****SEED INCLUDES FUNGICIDE TREATMENT AND CUTTING.

Table 2P. Materials and Services Used by Operation for Producing Processing Potatoes.

Operation		Material and/or Service
Nema&Soil Test	September	Custom test @ $5.00/acre
Fumigate	October	Application cost @ $15.00/acre 37.5 gals. of metham sodium @ $3.50/gal.
Nema Test	November	Custom test @ $1.10/acre
Monitor Crop[1]	Season	Private consultant @ $35.00/acre
Fertilize	March	Custom double spread application @ $11.50/acre 125 lbs. of nitrogen (dry) @ $.434/lb. 230 lbs. of phosphate (dry) @ $.299/lb. 350 lbs. of potash @ $.248/lb. 80 lbs. of sulfur @ $.171/lb. 5 lbs. of zinc @ $1.36/lb. 1.5 lbs. of boron @ $2.82/lb.
Haul Seed	April	1.15 tons of seed per acre @ $8.60/ton
Plant	April	23.0 cwt. of seed per acre @ $15.00/cwt.[2]
Insecticide	April	20 lbs. of Temik @ $3.60/lb.
Fungicide	April	6.2 oz. of Ridomil Gold @ $7.12/oz. 2.0 oz. of Quadris @ $2.34/oz.
Irrigate	Season	Irrigation water @ $43.00/acre Irrigation power @ $55.00/acre Irrigation repair @ $14.00/acre Fertigator rent @ $4.50/acre
Cover Spray	May	Aerial application @ $8.00/acre 2 lbs. of mancozeb @ $3.00/lb. 4 lbs. of sulfur fungicide @ $1.50/lb. 5 lbs. of foliar nutrient @ $1.20/lb.
Herbigation	June	Application cost @ $4.50/acre 0.5 lbs. of metribuzin @ $19.29/lb. 1.0 oz. Matrix @ $16.68/oz. 1.0 pint Eptam @ $4.50/pint

Table 2P. Materials and Services Used by Operation for Producing Processing Potatoes (continued).

Operation		Material and/or Service
Fertigate	June	100 lbs. of nitrogen (liq.) @ $.471/lb. 30 lbs. of phosphate (liq.) @ $.428/lb. 17 lbs. of sulfur (liq.) @ $.195/lb.
Fungigate	June	Application cost @ $4.50/acre 1.5 pints of chlorothalonil @ $7.26/pint
Cover Spray	June	Aerial application @ $8.00/acre 2 lbs. of Polyram @ $2.93/lb. 5 lbs. of foliar nutrient @ $1.20/lb. 4 lbs. of sulfur fungicide @ $1.50/lb. 1 pint of dimethoate @ $5.04/pint
Fertigate	July	80 lbs. of nitrogen (liq.) @ $.471/lb. 30 lbs. of phosphate (liq.) @ $.428/lb. 13 lbs. of sulfur (liq.) @ $.195/lb.
Fungigate	July	Application cost @ $4.50/acre 8 ozs. of Omega @ $3.49/oz. 1.5 pints of chlorothalonil @ $7.26/pint
Cover Spray	July	Aerial application @ $8.00/acre 2 lbs. of mancozeb @ $3.00/lb. 1 qt. of Monitor @ $29.50/qt. 4 lbs. of sulfur fungicide @ $1.50/lb. 5 lbs. of foliar nutrient @ $1.20/lb.
Cover Spray	July	Aerial application @ $8.00/acre 1.5 pints of chlorothalonil @ $7.26/pint 1 qt. of Monitor @ $29.50/qt. 4 lbs. of sulfur fungicide @ $1.50/lb. 5 lbs. of foliar nutrient @ $1.20/lb.

Table 2P. Materials and Services Used by Operation for Producing Processing Potatoes (continued).

Operation		Material and/or Service
Fungigate	July	Application cost @ $4.50/acre 8 ozs. of Omega @ $3.49/oz. 1.5 pints of chlorothalonil @ $7.26/pint
Fertigate	August	80 lbs. of nitrogen (liq.) @ $.471/lb. 30 lbs. of phosphate (liq.) @ $.428/lb. 13 lbs. of sulfur (liq.) @ $.195/lb.
Chemigate	August	Application cost @ $4.50/acre 2 lbs. of Polyram @ $2.93/lb. 0.25 lbs. of Super-Tin @ $41.50/lb. 2.7 ozs. of Leverage @ $4.02/oz.
Miticide	August	Aerial application @ $8.00/acre 8.5 ozs. of Oberon @ $2.83/oz.
Cover Spray	August	Aerial application @ $8.00/acre 1.5 pints of chlorothalonil @ $7.26/pint 1 qt. of Monitor @ $29.50/qt. 4 lbs. of sulfur fungicide @ $1.50/lb.
Fungigate	August	Application cost @ $4.50/acre 2 lbs. of mancozeb @ $3.00/lb. 0.25 lbs. of Super-Tin @ $41.50/lb.
Defoliate	September/ October	Ground application @ $10.00/acre 1 qt. of Reglone @ $27.56/qt.
Haul	September/ October	Custom haul @ $8.60/ton (29.5 ton yield + 5% dirt)
Overhead	Annual	5.0% of variable cost

[1]Consultant includes pest, nutrient and soil moisture monitoring, and petiole analysis.
[2]Seed includes fungicide treatment and cutting.

TABLE 3P. ITEMIZED COSTS PER ACRE OF PRODUCING PROCESSING POTATOES UNDER CENTER PIVOT IRRIGATION, COLUMBIA BASIN, WASHINGTON.*

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
VARIABLE COSTS		$		$	
NEMA&SOIL TEST	ACRE	5.00	1.00	5.00	_____
METHAM SODIUM	GAL.	3.50	37.50	131.25	_____
FUMIGATE APPLICATION	ACRE	15.00	1.00	15.00	_____
NEMA TEST	ACRE	1.10	1.00	1.10	_____
CONSULTANT	ACRE	35.00	1.00	35.00	_____
PHOSPHATE (DRY)	LB.	.299	230.00	68.77	_____
POTASH (DRY)	LB.	.248	350.00	86.80	_____
NITROGEN (DRY)	LB.	.434	125.00	54.25	_____
SULFUR (DRY)	LB.	.171	80.00	13.68	_____
ZINC (DRY)	LB.	1.36	5.00	6.80	_____
BORON (DRY)	LB.	2.82	1.50	4.23	_____
CUSTOM FERTILIZE	ACRE	11.50	1.00	11.50	_____
POTATO SEED	CWT.	15.00	23.00	345.00	_____
CUSTOM HAULING (SEED)	TON	8.60	1.15	9.89	_____
NITROGEN (LIQ)	LB.	.471	260.00	122.46	_____
PHOSPHATE (LIQ)	LB.	.428	90.00	38.52	_____
SULFUR (LIQ)	LB.	.195	43.00	8.39	_____
FERTIGATOR RENT	ACRE	4.50	1.00	4.50	_____
TEMIK	LB.	3.60	20.00	72.00	_____
RIDOMIL GOLD	OZ.	7.12	6.20	44.14	_____
QUADRIS	OZ.	2.34	2.00	4.68	_____
MANCOZEB	LB.	3.00	6.00	18.00	_____
FOLIAR NUTRIENT	LB.	1.20	20.00	24.00	_____
SULFUR FUNGICIDE	LB.	1.50	20.00	30.00	_____
POLYRAM	LB.	2.93	4.00	11.72	_____
DIMETHOATE	PINT	5.04	1.00	5.04	_____
CHLOROTHALONIL	PINT	7.26	7.50	54.45	_____
METRIBUZIN	LB.	19.29	.50	9.64	_____
MATRIX	OZ.	16.68	1.00	16.68	_____
EPTAM	PINT	4.50	1.00	4.50	_____
OMEGA	OZ.	3.49	16.00	55.84	_____
MONITOR	QT.	29.50	3.00	88.50	_____
OBERON	OZ.	2.83	8.50	24.05	_____
SUPER-TIN	LB.	41.50	.50	20.76	_____
LEVERAGE	OZ.	4.02	2.70	10.85	_____
REGLONE	QT.	27.56	1.00	27.56	_____
CUSTOM AERIAL	ACRE	8.00	6.00	48.00	_____
FUNGIGATE APPLICATION	ACRE	4.50	5.00	22.50	_____
HERBIGATE APPLICATION	ACRE	4.50	1.00	4.50	_____
DEFOLIANT APPLICATION	ACRE	10.00	1.00	10.00	_____
CUSTOM HAULING (HARV)	TON	8.60	30.98	266.43	_____
LABOR	HOUR	18.00	4.15	74.69	_____
IRRIGATION WATER	ACRE	43.00	1.00	43.00	_____
IRRIGATION POWER	ACRE	55.00	1.00	55.00	_____
IRRIGATION REPAIR	ACRE	14.00	1.00	14.00	_____
MACHINERY REPAIRS	ACRE	46.46	1.00	46.46	_____
MACHINE FUEL/LUBE	ACRE	70.83	1.00	70.83	_____
INTEREST ON OP. CAP.	ACRE	62.26	1.00	62.26	_____
OVERHEAD	ACRE	110.11	1.00	110.11	_____

TOTAL VARIABLE COST				2312.33	_____

TABLE 3P. CONTINUED

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
FIXED COSTS		$		$	
MACHINE DEPRECIATION	ACRE	64.80	1.00	64.80	_____
MACHINE INTEREST	ACRE	44.10	1.00	44.10	_____
MACHINE INSURANCE	ACRE	2.94	1.00	2.94	_____
MACHINE TAXES	ACRE	8.82	1.00	8.82	_____
MACHINE HOUSING	ACRE	4.90	1.00	4.90	_____
MANAGEMENT FEE	ACRE	150.00	1.00	150.00	_____
LAND RENT	ACRE	450.00	1.00	450.00	_____
TOTAL FIXED COST				725.56	_____
TOTAL COST				3037.89	_____

*STORAGE AND MARKETING COSTS NOT INCLUDED.

TABLE 4P. BREAK-EVEN SELLING PRICE PER TON OF PROCESSING POTATOES PRODUCED UNDER CENTER PIVOT IRRIGATION, COLUMBIA BASIN, WASHINGTON.*

	COST PER ACRE	YOUR FARM	BREAK-EVEN PRICE ($/TON)	YOUR FARM
	$	$	(29.5 TONS)	$
1. TOTAL VARIABLE COST	2,312.33	_____	78.38	_____
PLUS: MACHINERY INSURANCE	2.94	_____		
MACHINERY TAXES	8.82	_____		
LAND RENT	450.00	_____		
2. TOTAL CASH COSTS	2,774.09	_____	94.04	_____
PLUS: MACHINERY DEPRECIATION	64.80	_____		
3. TOTAL CASH COST & DEPRECIATION	2,838.89	_____	96.23	_____
PLUS: MACHINERY INTEREST	44.10	_____		
MACHINERY HOUSING	4.90	_____		
MANAGEMENT	150.00	_____		
4. TOTAL COST	3,037.89	_____	102.98	_____

*STORAGE AND MARKETING COSTS NOT INCLUDED IN THESE CALCULATIONS.

TABLE 5P. BREAK-EVEN SELLING PRICE PER TON OF PROCESSING POTATOES PRODUCED AT DIFFERENT YIELD LEVELS.*

YIELD LEVEL (TONS/ACRE)	BREAK-EVEN PRICE ($/TON)
25	119.81
27	111.63
29	104.59
31	98.45
33	93.06
35	88.29

*STORAGE AND MARKETING COSTS NOT INCLUDED IN THESE CALCULATIONS.

TABLE 1F: SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR PRODUCING FRESH POTATOES UNDER CENTER PIVOT IRRIGATION, COLUMBIA BASIN, WASHINGTON.*

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST	TOTAL COST
							FUEL, LUBE, & REPAIRS	LABOR	SERVICE	MATER.	INTER.		
						$	$	$	$	$	$	$	$
NEMA & SOIL TEST	CUSTOM TEST	OCT	2005	.00	.00	.00	.00	.00	5.00	.00	.00	5.00	5.00
RIP FIELD	300HP-WT, 8 SHANK RIPPER	OCT	2005	.13	.14	5.39	7.54	2.47	.00	.00	.00	10.02	15.41
FUMIGATE**	THROUGH SPRINKLER	OCT	2005	.00	.00	.00	.00	.00	15.00	131.25	.00	146.25	146.25
NEMA TEST	CUSTOM TEST	NOV	2005	.00	.00	.00	.00	.00	1.10	.00	.09	1.19	1.19
MONITOR CROP***	CONSULTANT	SEA	2006	.00	.00	.00	.00	.00	35.00	.00	1.58	36.58	36.58
FERTILIZE	CUSTOM DOUBLE SPREAD APPLIC.	MAR	2006	.00	.00	.00	.00	.00	11.50	234.53	12.92	258.95	258.95
TILL FIELD	300HP-WT, 17'CHISEL/18'PACKER	APR	2006	.14	.17	6.27	8.59	3.08	.00	.00	.53	12.19	18.46
MARK OUT FIELD	150HP-WT, 6-ROW MARKER BAR	APR	2006	.14	.17	5.89	4.50	3.08	.00	.00	.34	7.92	13.81
HAUL SEED	CUSTOM HAULING	APR	2006	.00	.00	.00	.00	.00	9.89	.00	.45	10.34	10.34
LOAD SEED	SEED LOADER	APR	2006	.23	.28	6.02	2.69	5.08	.00	.00	.35	8.12	14.14
PLANT****	200HP-WT, 6R-POTATO PLANTER	APR	2006	.23	.28	22.23	14.23	5.08	.00	345.00	16.39	380.70	402.93
INSECTICIDE	INSECTICIDE APPLICATOR W/PLANT	APR	2006	.23	.00	1.51	.78	.00	.00	91.92	4.17	96.87	98.39
FUNGICIDE	FERT/FUNG APPLIC. W/PLANTING	APR	2006	.23	.00	1.65	.76	.00	.00	48.82	2.23	51.82	53.47
IRRIGATE	CENTER PIVOT, 22.5 AC. IN.	SEA	2006	.00	1.00	.00	.00	18.00	104.50	.00	5.51	128.01	128.01
DRAG OFF	150HP-WT, 24' HARROW	MAY	2006	.07	.08	3.78	2.85	1.51	.00	.00	.16	4.53	8.30
RESERVOIR TILL	200HP-WT, 6R-DAMMER/DIKER	MAY	2006	.16	.19	7.94	6.46	3.46	.00	.00	.37	10.29	18.23
HERBIGATE	THROUGH SPRINKLERS	JUN	2006	.00	.00	.00	.00	.00	4.50	9.64	.42	14.57	14.57
FERTIGATE	THROUGH SPRINKLERS	JUN	2006	.00	.00	.00	.00	.00	.00	63.25	1.90	65.15	65.15
COVER SPRAY	CUSTOM AERIAL	JUN	2006	.00	.00	.00	.00	.00	8.00	22.90	.93	31.83	31.83
FUNGIGATE	THROUGH SPRINKLERS	JUN	2006	.00	.00	.00	.00	.00	4.50	10.89	.46	15.85	15.85
FERTIGATE	THROUGH SPRINKLERS	JUL	2006	.00	.00	.00	.00	.00	.00	53.05	1.19	54.25	54.25
COVER SPRAY1	CUSTOM AERIAL	JUL	2006	.00	.00	.00	.00	.00	8.00	47.50	1.25	56.75	56.75
COVER SPRAY2	CUSTOM AERIAL	JUL	2006	.00	.00	.00	.00	.00	8.00	52.39	1.36	61.75	61.75
BORDER MAINTENCE	150HP-WT, 13' TANDEM DISK	JUL	2006	.01	.01	.59	.41	.27	.00	.00	.02	.70	1.29
FUNGIGATE1	THROUGH SPRINKLERS	JUL	2006	.00	.00	.00	.00	.00	4.50	16.23	.47	21.20	21.20
FERTIGATE	THROUGH SPRINKLERS	AUG	2006	.00	.00	.00	.00	.00	.00	53.05	.80	53.85	53.85
BORDER MAINTENCE	150HP-WT, 13' TANDEM DISK	AUG	2006	.01	.01	.59	.41	.27	.00	.00	.01	.69	1.28
DEFOLIATE*****	CUSTOM GROUND APPLICATION	SEP	2006	.00	.00	.00	.00	.00	10.00	27.56	.28	37.84	37.84
PULL/PACK	300HP-WT	SEP	2006	.50	.60	11.72	25.16	10.80	.00	.00	.27	36.23	47.94
DIG POTATOES	200HP-WT, 3R-POTATO HARVESTER	SEP	2006	.50	1.20	42.40	28.96	21.60	.00	.00	.38	50.94	93.33
HAUL POTATOES	CUSTOM HAUL	SEP	2006	.00	.00	.00	.00	.00	243.81	.00	1.83	245.64	245.64
PICKUP, MANAGEMT	3/4 TON	ANN	2006	.80	.00	7.10	9.28	.00	.00	.00	.42	9.70	16.80
PICKUP, IRRIGATN	3/4 TON	ANN	2006	.40	.00	2.48	4.66	.00	.00	.00	.21	4.87	7.35
OVERHEAD	UTILITIES,LEGAL,ACCT.,ETC.	ANN	2006	.00	.00	.00	.00	.00	96.53	.00	.00	96.53	96.53
LAND COST	NET RENT	ANN	2006	.00	.00	450.00	.00	.00	.00	.00	.00	.00	450.00
MANAGEMENT	$150 PER ACRE	ANN	2006	.00	.00	150.00	.00	.00	.00	.00	.00	.00	150.00
TOTAL PER ACRE				3.81	4.15	725.56	117.29	74.69	569.83	1208.01	57.27	2027.09	2752.65

*STORAGE AND MARKETING COSTS NOT INCLUDED.

**GROUND APPLICATION WOULD RESULT IN AN INCREASE OF APPROXIMATELY $30 PER ACRE. WHEN A NEMATODE PROBLEM EXISTS, AN ADDITIONAL FUMIGATION OF 20 GALLONS OF TELONE II @ $11.96 PLUS $50 GROUND APPLICATION, PER ACRE, WILL BE REQUIRED.

***CONSULTANT INCLUDES PEST, NUTRIENT AND SOIL MOISTURE MONITORING, AND PETIOLE ANALYSIS.

****SEED INCLUDES FUNGICIDE TREATMENT AND CUTTING.

*****DEFOLIATION REQUIRED ABOUT 50% OF THE TIME.

Table 2F. Materials and Services Used by Operation for Producing Fresh Potatoes.

Operation		Material and/or Service
Nema&Soil Test	September	Custom test @ $5.00/acre
Fumigate	October	Application cost @ $15.00/acre 37.5 gals. of metham sodium @ $3.50/gal.
Nema Test	November	Custom test @ $1.10/acre
Monitor Crop[1]	Season	Private consultant @ $35.00/acre
Fertilize	March	Custom double spread application @ $11.50/acre 125 lbs. of nitrogen (dry) @ $.434/lb. 230 lbs. of phosphate (dry) @ $.299/lb. 350 lbs. of potash @ $.248/lb. 80 lbs. of sulfur @ $.171/lb. 5 lbs. of zinc @ $1.36/lb. 1.5 lbs. of boron @ $2.82/lb.
Haul Seed	April	1.15 tons of seed per acre @ $8.60/ton
Plant	April	23.0 cwt. of seed per acre @ $15.00/cwt.[2]
Insecticide	April	8.0 ozs. of Platinum @ $11.49/oz.
Fungicide	April	6.2 oz. of Ridomil Gold @ $7.12/oz. 2.0 oz. of Quadris @ $2.34/oz.
Irrigate	Season	Irrigation water @ $43.00/acre Irrigation power @ $45.00/acre Irrigation repair @ $12.00/acre Fertigator rent @ $4.50/acre
Herbigation	June	Application cost @ $4.50/acre 0.5 lbs. of metribuzin @ $19.29/lb.

Table 2F. Materials and Services Used by Operation for Producing Fresh Potatoes (continued).

Operation		Material and/or Service
Fertigate	June	100 lbs. of nitrogen (liq.) @ $.471/lb. 30 lbs. of phosphate (liq.) @ $.428/lb. 17 lbs. of sulfur (liq.) @ $.195/lb.
Cover Spray	June	Aerial application @ $8.00/acre 2 lbs. of Polyram @ $2.93/lb. 5 lbs. of foliar nutrient @ $1.20/lb. 4 lbs. of sulfur fungicide @ $1.50/lb. 1 pint of dimethoate @ $5.04/pint
Fungigate	June	Application cost @ $4.50/acre 1.5 pints of chlorothalonil @ $7.26/pint
Fertigate	July	80 lbs. of nitrogen (liq.) @ $.471/lb. 30 lbs. of phosphate (liq.) @ $.428/lb. 13 lbs. of sulfur (liq.) @ $.195/lb.
Cover Spray	July	Aerial application @ $8.00/acre 2 lbs. of mancozeb @ $3.00/lb. 1 qt. of Monitor @ $29.50/qt. 4 lbs. of sulfur fungicide @ $1.50/lb. 5 lbs. of foliar nutrient @ $1.20/lb.
Cover Spray	July	Aerial application @ $8.00/acre 1.5 pints of chlorothalonil @ $7.26/pint 1 qt. of Monitor @ $29.50/qt. 4 lbs. of sulfur fungicide @ $1.50/lb. 5 lbs. of foliar nutrient @ $1.20/lb.

Table 2F. Materials and Services Used by Operation for Producing Fresh Potatoes (continued).

Operation		Material and/or Service
Fungigate	July	Application cost @ $4.50/acre 2 lbs. of Polyram @ $2.93/lb. 0.25 lbs. of Super-Tin @ $41.50/lb.
Fertigate	August	80 lbs. of nitrogen (liq.) @ $.471/lb. 30 lbs. of phosphate (liq.) @ $.428/lb. 13 lbs. of sulfur (liq.) @ $.195/lb.
Defoliate[3]	September/ October	Ground application @ $10.00/acre 1 qt. of Reglone @ $27.56/qt.
Haul	September/ October	Custom haul @ $8.60/ton (27 ton yield + 5% dirt)
Overhead	Annual	5.0% of variable cost

[1]Consultant includes pest, nutrient and soil moisture monitoring, and petiole analysis.
[2]Seed includes fungicide treatment and cutting.
[3]Defoliation required about 50% of the time.

TABLE 3F. ITEMIZED COSTS PER ACRE OF PRODUCING FRESH POTATOES UNDER CENTER PIVOT IRRIGATION, COLUMBIA BASIN, WASHINGTON.*

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
VARIABLE COSTS		$		$	
NEMA&SOIL TEST	ACRE	5.00	1.00	5.00	_____
METHAM SODIUM	GAL.	3.50	37.50	131.25	_____
FUMIGATE APPLICATION	ACRE	15.00	1.00	15.00	_____
NEMA TEST	ACRE	1.10	1.00	1.10	_____
CONSULTANT	ACRE	35.00	1.00	35.00	_____
PHOSPHATE (DRY)	LB.	.299	230.00	68.77	_____
POTASH (DRY)	LB.	.248	350.00	86.80	_____
NITROGEN (DRY)	LB.	.434	125.00	54.25	_____
SULFUR (DRY)	LB.	.171	80.00	13.68	_____
ZINC (DRY)	LB.	1.36	5.00	6.80	_____
BORON (DRY)	LB.	2.82	1.50	4.23	_____
CUSTOM FERTILIZE	ACRE	11.50	1.00	11.50	_____
POTATO SEED	CWT.	15.00	23.00	345.00	_____
CUSTOM HAULING (SEED)	TON	8.60	1.15	9.89	_____
NITROGEN (LIQ)	LB.	.471	260.00	122.46	_____
PHOSPHATE (LIQ)	LB.	.428	90.00	38.52	_____
SULFUR (LIQ)	LB.	.195	43.00	8.39	_____
FERTIGATOR RENT	ACRE	4.50	1.00	4.50	_____
PLATINUM	OZ.	11.49	8.00	91.92	_____
RIDOMIL GOLD	OZ.	7.12	6.20	44.14	_____
QUADRIS	OZ.	2.34	2.00	4.68	_____
SULFUR FUNGICIDE	LB.	1.50	12.00	18.00	_____
POLYRAM	LB.	2.93	4.00	11.72	_____
FOLIAR NUTRIENT	LB.	1.20	15.00	18.00	_____
DIMETHOATE	PINT	5.04	1.00	5.04	_____
CHLOROTHALONIL	PT.	7.26	3.00	21.78	_____
METRIBUZIN	LB.	19.29	.50	9.64	_____
MONITOR	QT.	29.50	2.00	59.00	_____
MANCOZEB	LB.	3.00	2.00	6.00	_____
SUPER-TIN	LB.	41.50	.25	10.38	_____
REGLONE	QT.	27.56	1.00	27.56	_____
CUSTOM AERIAL	ACRE	8.00	3.00	24.00	_____
FUNGIGATE APPLICATION	ACRE	4.50	2.00	9.00	_____
HERBIGATE APPLICATION	ACRE	4.50	1.00	4.50	_____
DEFOLIANT APPLICATION	ACRE	10.00	1.00	10.00	_____
CUSTOM HAULING (HARV)	TON	8.60	28.35	243.81	_____
LABOR	HOUR	18.00	4.15	74.69	_____
IRRIGATION WATER	ACRE	43.00	1.00	43.00	_____
IRRIGATION POWER	ACRE	45.00	1.00	45.00	_____
IRRIGATION REPAIR	ACRE	12.00	1.00	12.00	_____
MACHINERY REPAIRS	ACRE	46.46	1.00	46.46	_____
MACHINE FUEL/LUBE	ACRE	70.83	1.00	70.83	_____
INTEREST ON OP. CAP.	ACRE	57.27	1.00	57.27	_____
OVERHEAD	ACRE	96.53	1.00	96.53	_____

TOTAL VARIABLE COST				2027.09	_____

TABLE 3F. CONTINUED

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
FIXED COSTS		$		$	
MACHINE DEPRECIATION	ACRE	64.80	1.00	64.80	_____
MACHINE INTEREST	ACRE	44.10	1.00	44.10	_____
MACHINE INSURANCE	ACRE	2.94	1.00	2.94	_____
MACHINE TAXES	ACRE	8.82	1.00	8.82	_____
MACHINE HOUSING	ACRE	4.90	1.00	4.90	_____
MANAGEMENT FEE	ACRE	150.00	1.00	150.00	_____
LAND RENT	ACRE	450.00	1.00	450.00	_____
TOTAL FIXED COST				725.56	_____
TOTAL COST				2,752.65	_____

*STORAGE AND MARKETING COSTS NOT INCLUDED.

TABLE 4F. BREAK-EVEN SELLING PRICE PER TON OF FRESH POTATOES PRODUCED IN THE COLUMBIA BASIN UNDER CENTER PIVOT IRRIGATION.

	COST PER ACRE	YOUR FARM	BREAK-EVEN PRICE ($/TON)	YOUR FARM
	$	$	(27 TONS)	_____$
1. TOTAL VARIABLE COST	2,027.09	_____	75.08	
PLUS: MACHINERY INSURANCE	2.94	_____		
MACHINERY TAXES	8.82	_____		
LAND RENT	450.00	_____		
2. TOTAL CASH COSTS	2,488.85	_____	92.18	_____
PLUS: MACHINERY DEPRECIATION	64.80	_____		
3. TOTAL CASH COST & DEPRECIATION	2,553.65	_____	94.58	_____
PLUS: MACHINERY INTEREST	44.10	_____		
MACHINERY HOUSING	4.90	_____		
MANAGEMENT	150.00	_____		
4. TOTAL COST	2,752.65	_____	101.95	_____

*STORAGE AND MARKETING COSTS NOT INCLUDED IN THESE CALCULATIONS.

TABLE 5F. BREAK-EVEN SELLING PRICE PER TON OF FRESH POTATOES PRODUCED AT DIFFERENT YIELD LEVELS.*

YIELD LEVEL (TONS/ACRE)	BREAK-EVEN PRICE ($/TON)
23	118.03
25	109.35
27	101.95
29	95.57
31	90.02
33	85.14

* STORAGE MARKETING COSTS NOT INCLUDED IN THESE CALCULATIONS.

Table 6. Machinery Data.

Machine Name	Purchase Price	Years of Use	Salvage Value	Annual Repair Cost	Annual Hours of Use	Fuel Use per Hour
300HP-WT	158,000	10	57,000	13,750	1,000	12D
200HP-WT	134,000	10	50,000	5,100	700	9D
150HP-WT	102,000	10	22,600	1,700	450	8D
100HP-WT	72,000	10	18,000	1,500	450	6D
Seed Loader	20,000	10	4,375	1,250	120	.3G
Pickup, Management	30,000	4	12,000	1,000	800	3G
Pickup, Irrigation	12,000	6	2,500	1,000	400	3G
16.5' Ripper	30,700	15	2,000	2,000	200	
18' Packer	5,600	10	675	450	200	
24' Harrow	10,000	15	500	300	50	
17' Chisel Chopper	25,000	15	4,000	1,500	200	
13' Tandum Disc	16,000	10	3.260	950	200	
6R-Marker Bar	6,000	10	500	500	150	
6R-Dammer/Diker	25,000	15	3,000	850	150	
6R-Potato Planter	38,000	6	7,000	3,100	120	
3R-Potato Harvester	90,000	10	12,000	5,800	250	
Insecticide Applicator	4,775	10	0	400	120	
Fertilizer/ Fungicide Liquid Applicator	5,200	10	0	390	120	

TABLE 7. HOURLY MACHINERY COSTS.

MACHINERY	PURCHASE PRICE	YEARS TO TRADE	ANNUAL HOURS	DEPREC-IATION	INTER-EST	INSUR-ANCE	TAXES	HOUSING	TOTAL FIXED COST	REPAIR	FUEL AND LUBE	TOTAL VARIABLE COST	TOTAL COST
	$			COST PER HOUR									
300HP-WT	158,000.00	10	1000	10.10	9.68	.65	1.94	1.08	23.43	13.75	36.57	50.32	73.75
200HP-WT	134,000.00	10	700	12.00	11.83	.79	2.37	1.31	28.30	7.29	27.43	34.71	63.01
150HP-WT	102,000.00	10	450	17.64	12.46	.83	2.49	1.38	34.81	3.78	24.38	28.16	62.97
100HP-WT	72,000.00	10	450	12.00	9.00	.60	1.80	1.00	24.40	3.33	18.29	21.62	46.02
SEED LOADER	20,000.00	10	120	13.02	9.14	.61	1.83	1.02	25.61	10.42	1.03	11.45	37.07
PICKUP, MANAGEMENT	30,000.00	4	800	5.63	2.36	.16	.47	.26	8.88	1.25	10.35	11.60	20.48
PICKUP, IRRIGATION	12,000.00	6	400	3.96	1.63	.11	.33	.18	6.21	2.50	9.14	11.64	17.85
16.5' RIPPER	30,700.00	15	200	9.57	7.36	.49	1.47	.82	19.70	10.00	.00	10.00	29.70
6R-MARKER BAR	6,000.00	10	150	3.67	1.95	.13	.39	.22	6.35	3.33	.00	3.33	9.69
18'PACKER	5,600.00	10	200	2.46	1.41	.09	.28	.16	4.41	2.25	.00	2.25	6.66
24'HARROW	10,000.00	15	50	12.67	9.45	.63	1.89	1.05	25.69	6.00	.00	6.00	31.69
17'CHISEL CHOPPER	25,000.00	15	200	7.00	6.53	.44	1.31	.73	15.99	7.50	.00	7.50	23.49
13'TANDUM DISK	16,300.00	10	200	6.52	4.40	.29	.88	.49	12.58	4.75	.00	4.75	17.33
6R-DAMMER/DIKER	25,000.00	15	150	9.78	8.40	.56	1.68	.93	21.35	5.67	.00	5.67	27.02
6R-POTATO PLANTER	38,000.00	6	120	43.06	16.88	1.13	3.38	1.88	66.31	25.83	.00	25.83	92.14
3R-POTATO HARVESTER	90,000.00	10	250	31.20	18.36	1.22	3.67	2.04	56.50	23.20	.00	23.20	79.70
INSECTICIDE APPLIC.	4,775.00	10	120	3.98	1.79	.12	.36	.20	6.45	3.33	.00	3.33	9.78
FERT/FUNG APPLIC.	5,200.00	10	120	4.33	1.95	.13	.39	.22	7.02	3.25	.00	3.25	10.27

Table 8. Input Prices.

Item	Unit	Price
		$
Fuel		
Gasoline	Gallon	3.00
Diesel	Gallon	2.65
Fertilizer		
Nitrogen (dry)	Pound	.434
Nitrogen (liquid)	Pound	.471
Phosphate (dry)	Pound	.299
Phosphate (liquid)	Pound	.428
Potash (dry)	Pound	.248
Sulfur (dry)	Pound	.171
Sulfur (liquid)	Pound	.195
Zinc (dry)	Pound	1.36
Boron (dry)	Pound	2.82
Foliar Nutrient (dry)	Pound	1.20
Chemicals		
Metham Sodium	Gallon	3.50
Metribuzin	Pound	19.29
Mancozeb	Pound	3.00
Chlorothalonil	Pint	7.26
Monitor	Quart	29.50
Sulfur Fungicide	Pound	1.50
Temik	Pound	3.60
Platinum	Ounce	11.49
Polyram	Pound	2.93
Super-Tin	Pound	41.50
Reglone	Quart	27.56
Ridomil Gold	Ounce	7.12
Telone II	Gallon	11.96
Quadris	Ounce	2.34
Oberon	Ounce	2.83
Omega	Ounce	3.49
Dimethoate	Pint	5.04
Matrix	Ounce	16.68
Eptam	Pint	4.50
Leverage	Ounce	4.02

Table 8. Input Prices. (continued)

Item	Unit	Price
		$
Custom Rates		
Fertilizer Double Spread Application	Acre	11.50
Aerial Application	Acre	8.00
Herbigate Application	Acre	4.50
Fungigate Application	Acre	4.50
Fumigant Application (water)	Acre	15.00
Fumigant Application (ground)	Acre	50.00
Defoliant Application (ground)	Acre	10.00
Hauling:		
Potato Seed	Ton	8.60
Potatoes	Ton	8.60
Irrigation		
Irrigation Water	Acre	43.00
Irrigation Repair(Processing Potatoes)	Acre	14.00
Irrigation Power (28 ac. in.)	Acre	55.00
Irrigation Repair(Fresh Potatoes)	Acre	12.00
Irrigation Power (22.5 ac. in.)	Acre	45.00
Rental of Fertigation Equipment	Acre	4.50
Misc. Inputs		
Land Rent	Acre	450.00
Potato Seed[1]	Cwt.	15.00
Nema & Soil Test	Acre	5.00
Nema Test	Acre	1.10
Consultant[2]	Acre	35.00
Labor	Hour	18.00
Management	Acre	150.00

[1]Seed includes fungicide treatment and cutting.
[2]Consultant includes pest, nutrient and soil moisture monitoring, and petiole analysis.

APPENDIX

Understanding and Using WSU Potato Enterprise Budgets

The purpose of these potato budgets is to estimate the costs and returns of producing potatoes in the Columbia Basin for research and policy purposes and to provide producers and their credit providers with a tool to use in determining the financial requirements of the enterprise.

These budgets were assembled by a group of progressive producers in this region, together with the area extension educator, a WSU extension horticulturalist, and a WSU extension economist. The resulting enterprise budgets do not represent any one particular farm and must be modified by individual producers to fit their situation. However, the resulting budgets are reasonable estimates for the area.

Producers reviewing these budgets will likely state their own costs are lower than those presented. Furthermore, others outside the industry may question the cost estimates and "break-even" prices as growers are producing potatoes despite these estimates. To adequately address these concerns and questions, one must understand the difference between "economic" and "financial" budgets and how an economic budget can be used to develop a financial budget. This distinction will help growers determine it they are indeed operating a profitable enterprise for the long term. If they are eroding their equity, they may want to re-examine their enterprise.

WSU enterprise budgets are economic budgets. The budget shown in Table 9, "Itemized Costs of Producing Processing Potatoes …," is essentially the same budget shown in Table 3P, page 10, of this bulletin. For this budget, it was assumed that the potatoes were grown under one or more 125-acre center pivot irrigation systems. The potato yield for this budget is assumed to be 29.5 tons.

In this budget the total cost per acre to produce an acre of potatoes is $3,038. In order to break even, the producer must clear $102.98 per ton, net of storage and marketing costs. Any price received above $102.98 per ton is a return to the producer for risk incurred in producing the crop.

While individual producers may differ relative to the type and amount of inputs and the yield, the main sources of confusion are the cost of owned capital, labor, management, and land. To fully understand these potato budgets, one must understand the concept of opportunity costs.

Opportunity cost is the revenue lost by not investing in the next best similar risk alternative. For instance, if a producer invests $50,000 of equity capital in equipment, the producer gives up the alternative of investing this money or paying off a current loan. Thus, if the producer is to realize an "economic" profit, the equipment investment must realize a return greater than that associated with the next best alternative. If the next best alternative happens to be paying off a current loan with 9% annual interest,

TABLE 9. ITEMIZED COSTS OF PRODUCING PROCESSING POTATOES UNDER CENTER PIVOT IRRIGATION IN THE COLUMBIA BASIN, 2006.

ECONOMIC BUDGET

	UNIT	COST/ UNIT	QUANTITY	COST/ ACRE	COST/ 125 ACRES
VARIABLE COSTS		$		$	$
NEMA & SOIL TEST	ACRE	5.00	1.00	5.00	625.00
METHAM SODIUM	GAL.	3.50	37.50	131.25	16,406.25
FUMIGATE APPLICATION	ACRE	15.00	1.00	15.00	1,875.00
NEMA TEST	ACRE	1.10	1.00	1.10	137.50
CONSULTANT	ACRE	35.00	1.00	35.00	4,375.00
PHOSPHATE (DRY)	LB.	0.30	230.00	68.77	8,596.25
POTASH (DRY)	LB.	0.25	350.00	86.80	10,850.00
NITROGEN (DRY)	LB.	0.43	125.00	54.25	6,781.25
SULFUR (DRY)	LB.	0.17	80.00	13.68	1,710.00
ZINC (DRY)	LB.	1.36	5.00	6.80	850.00
BORON (DRY)	LB.	2.82	1.50	4.23	528.75
CUSTOM FERTILIZER	ACRE	11.50	1.00	11.50	1,437.50
POTATO SEED	CWT.	15.00	23.00	345.00	43,125.00
CUSTOM HAULING (SEED)	TON	8.60	1.15	9.89	1,236.25
NITROGEN (LIQ)	LB.	0.47	260.00	122.46	15,307.50
PHOSPHATE (LIQ)	LB.	0.43	90.00	38.52	4,815.00
SULFUR (LIQ)	LB.	0.20	43.00	8.39	1,048.13
FERTIGATOR RENT	ACRE	4.50	1.00	4.50	562.50
TEMIK	LB.	3.60	20.00	72.00	9,000.00
RIDOMIL GOLD	OZ.	7.12	6.20	44.14	5,518.00
QUADRIS	OZ.	2.34	2.00	4.68	585.00
MANOZEB	LB.	3.00	6.00	18.00	2,250.00
FOLIAR NUTRIENT	LB.	1.20	20.00	24.00	3,000.00
SULFUR FUNGICIDE	LB.	1.50	20.00	30.00	3,750.00
POLYRAM	LB.	2.93	4.00	11.72	1,465.00
DIMETHOATE	PINT	5.04	1.00	5.04	630.00
CHLOROTHALONIL	PINT	7.26	7.50	54.45	6,806.25
METRIBUZIN	LB.	19.29	0.50	9.65	1,205.63
MATRIX	OZ.	16.68	1.00	16.68	2,085.00
EPTAM	PINT	4.50	1.00	4.50	562.50
OMEGA	OZ.	3.49	16.00	55.84	6,980.00
MONITOR	QT.	29.50	3.00	88.50	11,062.50
OBERON	OZ.	2.83	8.50	24.06	3,006.88
SUPER-TIN	LB.	41.50	0.50	20.75	2,593.75
LEVERAGE	OZ.	4.02	2.70	10.85	1,356.75
REGLONE	QT.	27.56	1.00	27.56	3,445.00
CUSTOM AERIAL	ACRE	8.00	6.00	48.00	6,000.00
FUNGIGATE APPLICATION	ACRE	4.50	5.00	22.50	2,812.50
HERBIGATE APPLICATION	ACRE	4.50	1.00	4.50	562.50
DEFOLIANT APPLICATION	ACRE	10.00	1.00	10.00	1,250.00
CUSTOM HAULING (HARV)*	TON	8.60	30.98	266.39	33,298.13

LABOR	HOUR	18.00	4.15	74.70	9,337.50
IRRIGATION WATER	ACRE	43.00	1.00	43.00	5,375.00
IRRIGATION POWER	ACRE	55.00	1.00	55.00	6,875.00
IRRIGATION REPAIR	ACRE	14.00	1.00	14.00	1,750.00
MACHINERY REPAIRS	ACRE	46.46	1.00	46.46	5,807.50
MACHINE FUEL/LUBE	ACRE	70.83	1.00	70.83	8,853.75
INTEREST ON OP. CAP.	ACRE	62.26	1.00	62.26	7,782.50
OVERHEAD	ACRE	110.11	1.00	110.11	13,763.68
TOTAL VARIABLE COST				**2,312.30**	**289,037.18**
FIXED COSTS		**$**		**$**	**$**
MACHINE DEPRECIATION	ACRE	64.80	1.00	64.80	8,100.00
MACHINE INTEREST	ACRE	44.10	1.00	44.10	5,512.50
MACHINE INSURANCE	ACRE	2.94	1.00	2.94	367.50
MACHINE TAXES	ACRE	8.82	1.00	8.82	1,102.50
MACHINE HOUSINE	ACRE	4.90	1.00	4.90	612.50
MANAGEMENT	ACRE	150.00	1.00	150.00	18,750.00
LAND RENT	ACRE	450.00	1.00	450.00	56,250.00
TOTAL FIXED COST				**725.56**	**90,695.00**
TOTAL COST				**3,037.86**	**379,732.18**

YIELD PER ACRE	29.50	**TONS**
PRICE	100.00	**PER TON**
NET RETURNS	(87.86)	**PER ACRE**
NET RETURNS	(10,982.18)	**PER TOTAL ACREAGE**
VARIABLE COST BREAK-EVEN PRICE	78.38	**PER TON**
TOTAL COST BREAK-EVEN PRICE	102.98	**PER TON**

*5% DIRT.

economic profits are not realized until a net return greater than $4,500 is realized by the equipment investment. Thus, the potato enterprise budgets reflect an interest cost on both owned and borrowed capital.

The same is true for operator labor and management, and owned land. In calculating labor and management costs, operator labor and management are valued at their opportunity cost of being hired out to a neighboring farmer, or the dollar amount it would cost to hire someone else to do the labor and management being furnished by the producer. For owned land, the opportunity cost included in the potato budgets is represented by the rate for which the producer could rent the land.

In order to determine producers' costs without these opportunity costs (i.e., financial costs), adjustments must be made to the "economic" potato budgets presented in this bulletin. Let us assume, for example, a producer in the Columbia Basin agrees with all the per acre potato budget figures for processing potatoes grown under center pivot irrigation except for the overhead, interest, management, machinery, labor, and land costs. The owner-operator farms a total of 1,000 acres and produces 250 acres of potatoes on land that is rented. The producer also owns all equipment and furnishes all management on the farm and does approximately 25% of all labor. The producer purchases approximately $90,000 of machinery each year and currently has outstanding machinery loans of $325,000 on which 8.5% interest is being paid. To make things simple, it is assumed that the farm equipment is used equally throughout the 1,000 acres regardless of the crops produced. The producer also carries approximately $320,000 in operating loans for an average of 6 months per year at 8.5% annual interest and estimates an annual overhead expense for the entire farm of approximately $75,000 per year. The cost of the operating loans and overhead are also to be allocated equally over the 1,000 acres.

Table 10 presents a financial budget for the producer in the example above. To create this table, which is a modification of Table 9, all opportunity costs on equity capital and unpaid operator labor and management are eliminated. Overhead and machinery and building replacement costs are replaced with the actual costs. Management cost was eliminated since the operator furnishes all management. In addition, opportunity costs on equity capital and operator labor were eliminated; only the actual interest and labor costs were included. In the case of machinery, the principal payments on the loans are covered by the annual "Machinery Purchases" cost figure.

The resulting budget is the financial (cash) cost of producing potatoes on a per acre basis for the producer in this example. This budget indicates the total financial cost per acre to produce an acre of potatoes under center pivot irrigation to be $2,794. To break even the producer must clear $94.72 per ton, net of storage and marketing cost. Any returns above these costs are returns to the operator's management, labor, equity capital, and risk. In the above example, at a price of $100 per ton, the producer is returning $155.90 per acre to management, labor, equity capital, and risk, before income and social security taxes are deducted.

This example illustrates how producers who have sizable equity in their farm business can often "survive" at prices below those determined as break-even prices by "economic" crop enterprise budgets. However, if the enterprise is not covering full costs of production (financial and opportunity), the owner-operator is not earning a return on labor, management, and capital contributions equivalent to what could be generated by the producer's labor, management, and capital contributions if invested in the next best similar risk alternative.

TABLE 10. ITEMIZED COSTS OF PRODUCING PROCESSING POTATOES UNDER CENTER PIVOT IRRIGATION IN THE COLUMBIA BASIN, 2006.
FINANCIAL BUDGET

	UNIT	COST/ UNIT	QUANTITY	COST/ ACRE	COST/ 250 ACRES
VARIABLE COSTS		$		$	$
NEMA & SOIL TEST	ACRE	5.00	1.00	5.00	1,250.00
METHAM SODIUM	GAL.	3.50	37.50	131.25	32,812.50
FUMIGATE APPLICATION	ACRE	15.00	1.00	15.00	3,750.00
NEMA TEST	ACRE	1.10	1.00	1.10	275.00
CONSULTANT	ACRE	35.00	1.00	35.00	8,750.00
PHOSPHATE (DRY)	LB.	0.30	230.00	68.77	17,192.50
POTASH (DRY)	LB.	0.25	350.00	86.80	21,700.00
NITROGEN (DRY)	LB.	0.43	125.00	54.25	13,562.50
SULFUR (DRY)	LB.	0.17	80.00	13.68	3,420.00
ZINC (DRY)	LB.	1.36	5.00	6.80	1,700.00
BORON (DRY)	LB.	2.82	1.50	4.23	1,057.50
CUSTOM FERTILIZER	ACRE	11.50	1.00	11.50	2,875.00
POTATO SEED	CWT.	15.00	23.00	345.00	86,250.00
CUSTOM HAULING (SEED)	TON	8.60	1.15	9.89	2,472.50
NITROGEN (LIQ)	LB.	0.47	260.00	122.46	30,615.00
PHOSPHATE (LIQ)	LB.	0.43	90.00	38.52	9,630.00
SULFUR (LIQ)	LB.	0.20	43.00	8.39	2,096.25
FERTIGATOR RENT	ACRE	4.50	1.00	4.50	1,125.00
TEMIK	LB.	3.60	20.00	72.00	18,000.00
RIDOMIL GOLD	OZ.	7.12	6.20	44.14	11,036.00
QUADRIS	OZ.	2.34	2.00	4.68	1,170.00
MANOZEB	LB.	3.00	6.00	18.00	4,500.00
FOLIAR NUTRIENT	LB.	1.20	20.00	24.00	6,000.00
SULFUR FUNGICIDE	LB.	1.50	20.00	30.00	7,500.00
POLYRAM	LB.	2.93	4.00	11.72	2,930.00
DIMETHOATE	PINT	5.04	1.00	5.04	1,260.00
CHLOROTHALONIL	PINT	7.26	7.50	54.45	13,612.50
METRIBUZIN	LB.	19.29	0.50	9.65	2,411.25
MATRIX	OZ.	16.68	1.00	16.68	4,170.00
EPTAM	PINT	4.50	1.00	4.50	1,125.00
OMEGA	OZ.	3.49	16.00	55.84	13,960.00
MONITOR	QT.	29.50	3.00	88.50	22,125.00
OBERON	OZ.	2.83	8.50	24.06	6,013.75
SUPER-TIN	LB.	41.50	0.50	20.75	5,187.50
LEVERAGE	OZ.	4.02	2.70	10.85	2,713.50
REGLONE	QT.	27.56	1.00	27.56	6,890.00
CUSTOM AERIAL	ACRE	8.00	6.00	48.00	12,000.00
FUNGIGATE APPLICATION	ACRE	4.50	5.00	22.50	5,625.00
HERBIGATE APPLICATION	ACRE	4.50	1.00	4.50	1,125.00
DEFOLIANT APPLICATION	ACRE	10.00	1.00	10.00	2,500.00
CUSTOM HAULING (HARV)*	TON	8.60	30.98	266.39	66,596.25

LABOR**	HOUR	18.00	3.11	55.98	13,995.00
IRRIGATION WATER	ACRE	43.00	1.00	43.00	10,750.00
IRRIGATION POWER	ACRE	55.00	1.00	55.00	13,750.00
IRRIGATION REPAIR	ACRE	14.00	1.00	14.00	3,500.00
MACHINERY REPAIRS	ACRE	46.46	1.00	46.46	11,615.00
MACHINE FUEL/LUBE	ACRE	70.83	1.00	70.83	17,707.50
INTEREST ON OP. CAP***	ACRE	13.60	1.00	13.60	3,400.00
OVERHEAD	ACRE	75.00	1.00	75.00	18,750.00
TOTAL VARIABLE COST				**2,209.81**	**552,452.00**
FIXED COSTS		**$**		**$**	**$**
MACH. PURCHASE****	ACRE	90.00	1.00	90.00	22,500.00
MACH. LOAN INTER.*****	ACRE	27.63	1.00	27.63	6,907.50
MACHINE INSURANCE	ACRE	2.94	1.00	2.94	735.00
MACHINE TAXES	ACRE	8.82	1.00	8.82	2,205.00
MACHINE HOUSING	ACRE	4.90	1.00	4.90	1,225.00
MANAGEMENT	ACRE		1.00	-	-
LAND RENT	ACRE	450.00	1.00	450.00	112,500.00
TOTAL FIXED COST				**584.29**	**146,072.50**
TOTAL COST				**2,794.10**	**698,524.50**

YIELD PER ACRE	29.50	**TONS**
PRICE	100.00	**PER TON**
NET RETURNS	155.90	**PER ACRE**
NET RETURNS	38,975.50	**PER TOTAL ACREAGE**
VARIABLE COST BREAK-EVEN PRICE	74.91	**PER TON**
TOTAL COST BREAK-EVEN PRICE	94.72	**PER TON**

*5% DIRT.
**4.15 HOURS x .75 = 3.11 HOUR/ACRE
***($320,000 x 8.5% x .5 YR)/1000 ACRES = $13.60
****$90,000/1000 = $90/ACRE
*****($325,000 x 8.5%)/1000 = $27.63/ACRE

Potato Cost Excel Workbook

The Potato Cost Workbook with the economic budget spreadsheets for both processing and fresh potatoes, including the financial budget for processing potatoes, can be downloaded from the WSU Farm Management web site at http://www.farm-mgmt.wsu.edu/; select "Publication Links," then "Irrigated Crops." Or, you may go directly to the irrigated crops page at http://www.farm-mgmt.wsu.edu/irr.htm. The workbook is listed directly below the extension bulletin. To download the Potato Cost Workbook, click on the Excel file. Let the workbook come up in the selected program and save this workbook in a specified folder on your hard drive.

Once the Potato Cost Workbook is downloaded, go to the folder in which you stored this file on your hard drive and use it to generate budgets that better fit your own personal needs. It is recommended, however, that you make the original Potato Cost Workbook a "read-only" file by right-clicking on the Potato Cost Workbook file name, left-clicking on "Properties," "General," "Read-only," and "OK." Making the file a "read-only" file will preserve the workbook in its original form. If you want to save new data, simply save it under another file name.

These spreadsheets are illustrated in Tables 9 and 10. For each spreadsheet the shaded cells are protected cells and the non-shaded cells are unprotected, or data cells. In this original workbook all line items are filled with data in both the variable and fixed cost sections. However, any of the spreadsheets can be easily unprotected and lines added or modified by the user by simply clicking on "Tools," "Protection," and "Unprotect Sheet."

If you have problems downloading or using the Potato Cost Workbook, contact Herb Hinman at hinman@wsu.edu or by phone at 509-335-2855.

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Use pesticides with care. Apply them only to plants, animals, or sites listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is a violation of the law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

This is available online only at: http://www.farm-mgmt.wsu.edu/irr.htm

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