



Southwestern Idaho: Treasure Valley

Russet Burbank Commercial Potatoes: Fumigation and No Storage

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Background and Assumptions

The University of Idaho's costs and returns estimates are based on economic costs, not accounting costs. All resources are valued at a market rate or "opportunity cost". Input prices are taken from the U of I's annual survey of agricultural supply companies. The selling price is a historical average, not a current year's price. The cost estimate shown here is typical for growing irrigated Russet Burbank commercial potatoes in southwestern Idaho when ground is fumigated. Production practices most closely resemble those in Canyon, Elmore, Owyhee, and Payette counties. Although production practices may be similar for individual farms, each farm has a unique set of resources with different levels of productivity, different production problems, and therefore different costs. Farm size, crop rotation, age and type of equipment, and the quality and intensity of management are all crucial factors that influence costs.

The Model Farm

This costs and returns estimate models a 1,000-acre farm with 250 acres in potatoes. In addition to potatoes, the farm grows 250 acres of corn, 150 acres of alfalfa seed, 250 acres of grain, and 100 acres of dry beans. The farm uses a center pivot irrigation system and surface water delivered to the farm from an irrigation district. The district charges a flat fee per acre for water. Irrigation power costs are only for pressurization (no lift) and are based on current Idaho Power rates.

Production Practices

After the stubble from the preceding grain crop is chopped or removed, the potato ground is irrigated, disked, ripped twice, disked a second time and fumigated in the fall. In April the ground is marked-out and then planted using two 4-row planters with 36-inch row spacing. The seeding rate is 22 hundredweight (cwt) per acre with an additional 5 percent (1 cwt) included to account for waste. Potatoes are cultivated twice in May. The second cultivation is with a basin tillage tool. In September potato vines are rolled and sprayed with a desiccant. Potatoes harvest begins three weeks later using a 2-row harvester, a 2-row windrower, and four 10-wheeler trucks. Potatoes are hauled from the field to a central location where they are transferred to a semi trailer and transported to the processor by a custom hauler. Most fertilizer is custom applied in two pre-plant applications, one in the fall before fumigation and one in the spring before planting. A starter fertilizer containing nitrogen, phosphate, and micronutrients is applied at mark-out. Additional nitrogen is applied postplant through the irrigation system. The weed program uses cultural, mechanical (tillage and cultivation), and chemical control methods. Two postemergence herbicides are used for control of

annual grasses and broadleaf weeds. The first herbicide is applied with the second cultivation. The second herbicide is applied by chemigation. For insect control, a systemic insecticide is banded at planting, and two contact insecticides are applied by air. Four fungicide applications are made for blight control, starting in late June. Two applications are made by custom air spray while two are made by chemigation. Potatoes receive 24 inches of water during the growing season: 3 inches in May, 7 inches in June, 9 inches in July, and 5 inches in August. Two inches of water is applied before fall tillage and another three inches are used to apply/incorporate the fumigant. One inch of water is applied prior to harvest. These off-growing season applications are also credited to potatoes for a total of 30 inches.

Resources: Machinery, Land, Labor, and Capital

Table 3 lists the tractors, trucks, and other equipment used to produce potatoes, along with their operating and ownership costs. Transloading equipment is not listed. Except for trucks, machinery is valued at 75 percent of replacement cost new, Table 3. The truck's price includes the cost of a used truck and 75 percent of the cost of a new self-unloading bed. In the years between equipment price surveys, done approximately every five years, machinery prices are adjusted using USDA's Farm Machinery Prices Paid Index. The land charge is cash rent and covers the ownership costs (depreciation, interest, and insurance) of the irrigation system. A machinery labor charge is made for all field operations except those performed on a custom basis. Custom operations are listed separately. The non-machine labor accounts for extra planting and harvesting field labor. Labor to operate machinery is valued at \$14.10 per hour, while irrigation and non-machine labor are valued at \$9.45 and \$8.35, respectively. Labor rates include a base wage plus a percentage for Social Security, Medicare, unemployment insurance, and other labor overhead expenses. Labor overhead amounts to 15 percent for non-machine labor, 25 percent for irrigation labor, and 30 percent for machinery labor. A management fee, 5 percent of gross returns, is included as an ownership cost. Interest on operating capital is charged from the time an input is applied until the month of harvest and is calculated at a nominal rate of 9.5 percent. Interest on intermediate term capital is calculated using a rate of 8.75 percent. A general overhead charge, calculated at 2.5 percent of operating expenses, is included to cover unallocated whole-farm costs such as office expenses, legal and accounting fees, and utilities. Fees paid by the grower, listed under other operating costs, include: promotion fees paid to the Idaho Potato Commission and the National Potato Board, inspection fees paid to the Idaho Department of Agriculture, and membership fees paid to grower organizations. The consultant fee includes soil and petiole sampling and irrigation scheduling.

Table 1. 2007 Irrigated Russet Burbank Commercial Potatoes: Fumigation and No Storage, Southwestern Idaho.

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
Gross Returns				
Potatoes	505	cwt	\$5.20	\$2,626.00
Operating Inputs				
Seed:				
G-3 Burbank Potato Seed	23	cwt	\$10.75	\$247.25
Seed Cut and Treat	23	cwt	\$1.90	\$43.70
Fertilizer:				
Dry Nitrogen - Preplant	160	lb	\$0.50	\$80.00
Dry P2O5	190	lb	\$0.38	\$72.20
K2O	180	lb	\$0.25	\$45.00
Sulfur	80	lb	\$0.18	\$14.40
Micronutrients	2	ac	\$14.00	\$28.00
Liquid Nitrogen	150	lb	\$0.60	\$90.00
Liquid P2O5	55	lb	\$0.38	\$20.90
Pesticides:				
Vapam 42%	50	gal	\$3.90	\$195.00
Thimet 20G	15	lb	\$2.75	\$41.25
Sencor DF	0.75	lb	\$14.35	\$10.76
Eptam 7E	2.0	qt	\$7.05	\$14.10
Dithane F45	3.2	qt	\$4.55	\$14.56
Ridomil/Bravo	2	lb	\$16.55	\$33.10
Amistar	2.5	oz	\$5.55	\$13.88
Monitor 4E	0.75	qt	\$29.25	\$21.94
Bravo Weather Stik	0.66	qt	\$11.75	\$7.76
Fulfill	2.75	oz	\$5.95	\$16.36
Reglone	1	qt	\$24.50	\$24.50
Custom & Consultants:				
Custom Fertilize	2	ac	\$8.00	\$16.00
Consultant	1	ac	\$17.00	\$17.00
Custom Air Spray-10G	3	ac	\$11.00	\$33.00
Custom Hauling	505	cwt	\$0.23	\$116.15
				\$0.00
Irrigation:				
Water Assessment	1	ac	\$37.40	\$37.40
Irrigation Power-CP	30	acin	\$1.26	\$37.80
Irrigation Repairs-CP	30	acin	\$0.55	\$16.50
Machinery:				
Fuel - Gas	1.69	gal	\$3.00	\$5.07
Fuel - Diesel	38.38	gal	\$2.65	\$101.71
Lube	1	ac	\$16.01	\$16.01
Machinery Repairs	1	ac	\$48.11	\$48.11
Labor:				
Labor (machine)	7.78	hr	\$14.10	\$109.70
Labor (irrigation - cp)	2.07	hr	\$9.45	\$19.56
Labor (other)	3.29	hr	\$8.35	\$27.47
Transload:				
Transloading Costs	505	cwt	\$0.08	\$41.92
Transloading Equipment Repair	1	ac	\$7.05	\$7.05
Other:				
Crop Insurance	1	ac	\$38.00	\$38.00
Fees & Assessments	505	cwt	\$0.15	\$75.75
Operating Interest @ 9.5%				\$78.57
Total Operating Costs				\$1,877.42
Operating Costs per Unit				\$3.72
Net Returns Above Operating Expenses				\$748.58

Table 1. 2007 Irrigated Russet Burbank Commercial Potatoes: Fumigation and No Storage, Southwestern Idaho.

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
Ownership Costs:				
Transloading Equipment				\$44.00
Tractors & Equipment Insurance				\$6.65
Tractors & Equipment Depreciation & Interest				\$274.74
Irrigation Equipment Depreciation & Interest				
Land *				\$525.00
Overhead				\$46.00
Management Fee				\$131.00
Total Ownership Costs				\$1,027.39
Ownership Costs per Unit				\$2.03
Total Costs per Acre				\$2,904.81
Total Cost per Unit				\$5.75
Returns to Risk				-\$278.81

Notes:

* Includes irrigation system ownership costs.

Breakeven Analysis:

	- 10%	Base Yield	+ 10%
<u>Price</u>	454.5	505	555.5
Operating Cost Breakeven	\$4.13	\$3.72	\$3.38
Ownership Cost Breakeven	\$2.26	\$2.03	\$1.85
Total Cost Breakeven	\$6.39	\$5.75	\$5.23
		<u>Price</u>	
<u>Yield</u>	\$4.68	\$5.20	\$5.72
Operating Cost Breakeven	401.2	361.0	328.2
Ownership Cost Breakeven	219.5	197.6	179.6
Total Cost Breakeven	620.7	558.6	507.8

Table 2. Monthly Summary of Cash Expenses per Acre

EBB2-Po1-07

	Aug 06	Sep 06	Oct 06	Nov 06	Dec 06	Jan 07	Feb 07	Mar 07	Apr 07	May 07	Jun 07	Jul 07	Aug 07	Sep 07	Oct 07	Total
Preharvest:																
Chop Straw	8.77															8.77
Disk	6.14	6.14														12.29
Fertilize	149.60									78.00						227.60
Irrigate	3.94									19.86	80.26	72.57	29.60	1.83		208.05
Rip		25.34														25.34
Mark Rows			8.14						48.37							56.50
Fumigate			200.76													200.76
Crop Insurance									36.00							36.00
Assessments									37.40							37.40
Repairs									16.50							16.50
Seed Hauling									2.17							2.17
Plant									364.44							364.44
Cultivate										30.41						30.41
Aerial Application											18.28	46.81	34.64			99.74
Consultant												17.00				17.00
General Pickup Use	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37				28.40
Total Preharvest Costs	170.82	33.85	211.27	2.37	2.37	2.37	2.37	2.37	507.24	130.64	100.90	138.74	64.24	1.83		1371.38
Harvest:																
Roll Vines														5.40		5.40
Vine Kill														29.89		29.89
Dig														78.92		78.92
Crop Hauling															70.37	70.37
Loading															165.11	165.11
Assessments															75.75	75.75
Total Harvest Costs														114.21	311.23	425.45
Interest on Operating Capital	1.35	1.62	3.29	3.31	3.33	3.35	3.37	3.39	7.40	8.44	9.24	10.33	10.84	11.76	-2.46	78.56
Operating Costs per Acre	172.18	35.47	214.56	5.68	5.70	5.72	5.73	5.75	514.64	139.08	110.14	149.08	75.09	127.80	308.77	1875.39
Cash Ownership																
General Overhead	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83				46.00
Land Rent									525.00							525.00
Management Fee	10.92	10.92	10.92	10.92	10.92	10.92	10.92	10.92	10.92	10.92	10.92	10.92				131.00
Trans. Eq. Owner.	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67				44.00
Property Insurance									6.65							6.65
Cash Ownership Costs	18.42	18.42	18.42	18.42	18.42	18.42	18.42	543.42	25.07	18.42	18.42	18.42				752.65
Total Cash Costs per Acre	190.59	53.89	232.98	24.10	24.11	24.13	24.15	549.17	539.71	157.49	128.56	167.49	75.09	127.80	308.77	2628.04

Table 3. Machinery and Equipment Costs per Hour

Description	Purchase Price	Years to Trade	Salvage Value	Hours Used	<-Non-Cash-> Ownership		<-----Cash-----> Ownership		<-----Operating----->			Total Costs/Hr.
					Cap. Rec.	Insur.	Taxes	Repairs	Fuel & Lube	Total Oper.		
4-wheeler	6500	10	1920	165	4.51	0.11	0.00	0.10	4.52	4.62	9.24	
Basin Tillage Tool	25000	15	2400	35	72.71	1.68	0.00	1.29	0.00	1.29	75.68	
Pickup 1 - 3/4 ton	37000	8	12913	300	15.43	0.35	0.00	4.05	13.80	17.85	33.63	
Pickup 2 - 3/4 ton	37000	8	12913	300	15.43	0.35	0.00	4.05	12.19	16.24	32.02	
Planter 1 - 4R Po	34000	12	4709	70	53.96	1.17	0.00	6.31	0.00	6.31	61.44	
Planter 2 - 4R Po	34000	12	4709	70	53.96	1.17	0.00	6.31	0.00	6.31	61.44	
Planter Filler	14000	15	1344	70	20.18	0.47	0.00	1.74	0.00	1.74	22.39	
Potato Harvester	57000	10	10080	120	57.71	1.19	0.00	9.21	0.00	9.21	68.11	
Potato Windrower	47000	10	8312	120	47.58	0.98	0.00	7.59	0.00	7.59	56.16	
R Cultivator-4R PO	4600	15	442	115	4.05	0.09	0.00	0.99	0.00	0.99	5.13	
Sprayer - 30'	3800	15	365	90	4.26	0.10	0.00	1.59	0.00	1.59	5.94	
Straw Chopper	17000	15	1632	45	38.18	0.88	0.00	2.54	0.00	2.54	41.60	
Tandem Disk - 20'	22000	15	2112	100	22.35	0.51	0.00	3.75	0.00	3.75	26.61	
Tank/injector	2700	15	259	90	3.03	0.07	0.00	0.65	0.00	0.65	3.75	
Tool Bar w/Shovels	1600	15	154	80	2.03	0.05	0.00	0.26	0.00	0.26	2.33	
Tractor - 160hp	113000	15	21999	185	59.90	1.55	0.00	1.49	28.30	29.79	91.24	
Tractor - 185hp	121000	15	23557	300	39.54	1.02	0.00	2.58	32.72	35.30	75.86	
Tractor - 200hp	134000	15	26087	400	32.86	0.85	0.00	3.81	35.37	39.18	72.89	
Truck 1 - 5 ton	55000	15	10708	400	13.50	0.35	0.00	8.22	2.03	10.25	24.10	
Truck 2 - 5 ton	55000	15	10708	400	13.50	0.35	0.00	8.22	2.03	10.25	24.10	
Truck 3 - 5 ton	55000	15	10708	400	13.50	0.35	0.00	8.22	2.03	10.25	24.10	
Truck 4 - 5 ton	55000	15	10708	400	13.50	0.35	0.00	8.22	2.03	10.25	24.10	
V-Ripper - 12'	9900	15	950	105	9.53	0.22	0.00	2.71	0.00	2.71	12.46	
Vine Roller	2500	15	240	60	4.21	0.10	0.00	0.31	0.00	0.31	4.61	

Net Returns Per Acre Above Operating Costs For Potatoes
Yield (cwt/acre)

	353.50	404.00	454.50	505.00	555.50	606.00	656.50
3.64	-497	-344	-190	-37	116	269	423
4.16	-313	-134	46	225	405	584	764
4.68	-129	76	282	488	694	900	1105
5.20	55	287	519	751	983	1215	1447
5.72	238	497	755	1013	1272	1530	1788
6.24	422	707	991	1276	1560	1845	2129
6.76	606	917	1228	1538	1849	2160	2471

Net Returns Per Acre Above Cash Costs For Potatoes
Yield (cwt/acre)

	353.50	404.00	454.50	505.00	555.50	606.00	656.50
3.64	-1249	-1096	-943	-790	-637	-483	-330
4.16	-1066	-886	-707	-527	-348	-168	11
4.68	-882	-676	-470	-265	-59	147	352
5.20	-698	-466	-234	-2	230	462	694
5.72	-514	-256	2	261	519	777	1035
6.24	-330	-46	239	523	808	1092	1377
6.76	-146	164	475	786	1097	1407	1718

Net Returns Per Acre Above Total Costs For Potatoes
Yield (cwt/acre)

	353.50	404.00	454.50	505.00	555.50	606.00	656.50
3.64	-1515	-1365	-1215	-1065	-914	-763	-612
4.16	-1331	-1155	-979	-802	-625	-448	-271
4.68	-1147	-945	-742	-539	-336	-133	71
5.20	-964	-735	-506	-277	-47	182	412
5.72	-780	-525	-270	-14	242	497	753
6.24	-596	-315	-33	248	530	813	1095
6.76	-412	-105	203	511	819	1128	1436

The practices and chemicals specified here are based on survey information representative of typical operations. They are not recommendations. Because of constantly changing labels, laws, and regulations, the University of Idaho can assume no liability for the consequences of use of chemicals specified here. In all cases, read and follow the directions and precautionary statements on the specific pesticide product label. To simplify information, trade names have been used. No endorsement of named products is intended nor is criticism implied of similar products not mentioned.

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