

**Southwestern Idaho: Treasure Valley****Shepody Commercial Potatoes: Fumigation and No Storage**

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District II

**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 Shepody 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, 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 26 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 potatoes are harvested 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 preplant 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 herbicide applications are made to

control annual grasses and broadleaf weeds. The first, a two-way tank mix, is applied with the second cultivation. The second herbicide application is made 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. These off-growing season applications are also credited to potatoes for a total of 29 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 Shepody Commercial Potatoes: With Fumigation and No Storage, Southwestern Idaho.

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
<b>Gross Returns</b>				
Potatoes	490	cwt	\$5.20	\$2,548.00
<b>Operating Inputs</b>				
<b>Seed:</b>				
				\$361.80
G-3 Shepody Potato Seed	27	cwt	\$11.50	\$310.50
Seed Cut and Treat	27	cwt	\$1.90	\$51.30
<b>Fertilizer:</b>				
				\$281.30
Dry Nitrogen - Preplant	145	lb	\$0.50	\$72.50
Dry P2O5	145	lb	\$0.38	\$55.10
K2O	160	lb	\$0.25	\$40.00
Sulfur	60	lb	\$0.18	\$10.80
Micronutrients	2	ac	\$14.00	\$28.00
Liquid Nitrogen	90	lb	\$0.60	\$54.00
Liquid P2O5	55	lb	\$0.38	\$20.90
<b>Pesticides:</b>				
				\$410.82
Vapam 42%	50	gal	\$3.90	\$195.00
Thimet 20G	15	lb	\$2.75	\$41.25
Treflan 4HFP	0.5	qt	\$7.25	\$3.63
Dual Magnum	1	qt	\$24.75	\$24.75
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
<b>Custom &amp; Consultants:</b>				
				\$178.70
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	490	cwt	\$0.23	\$112.70
				\$0.00
<b>Irrigation:</b>				
				\$89.89
Water Assessment	1	ac	\$37.40	\$37.40
Irrigation Power-CP	29	acin	\$1.26	\$36.54
Irrigation Repairs-CP	29	acin	\$0.55	\$15.95
<b>Machinery:</b>				
				\$171.21
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	\$48.42	\$48.42
<b>Labor:</b>				
				\$156.16
Labor (machine)	7.78	hr	\$14.10	\$109.70
Labor (irrigation - cp)	2.01	hr	\$9.45	\$18.99
Labor (other)	3.29	hr	\$8.35	\$27.47
<b>Transload:</b>				
				\$47.52
Transloading Costs	490	cwt	\$0.08	\$40.67
Transloading Equipment Repair	1	ac	\$6.85	\$6.85
<b>Other:</b>				
				\$111.50
Crop Insurance	1	ac	\$38.00	\$38.00
Fees & Assessments	490	cwt	\$0.15	\$73.50
Operating Interest @ 9.5%				\$79.50
Total Operating Costs				\$1,888.40
Operating Costs per Unit				\$3.85
Net Returns Above Operating Expenses				\$659.60

Table 1. 2007 Irrigated Shepody Commercial Potatoes: With Fumigation and No Storage, Southwestern Idaho.

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
<b>Ownership Costs:</b>				
Transloading Equipment				\$42.15
Tractors & Equipment Insurance				\$6.70
Tractors & Equipment Depreciation & Interest				\$276.71
Irrigation Equipment Depreciation & Interest				
Land *				\$525.00
Overhead				\$47.00
Management Fee				\$127.00
<b>Total Ownership Costs</b>				\$1,024.56
<b>Ownership Costs per Unit</b>				\$2.09
<b>Total Costs per Acre</b>				\$2,912.96
<b>Total Cost per Unit</b>				\$5.94
Returns to Risk				-\$364.96

Notes:

\* Includes irrigation system ownership costs.

**Breakeven Analysis:**

	- 10%	Base	+ 10%
		Yield	
<u>Price</u>	441	490	539
Operating Cost Breakeven	\$4.28	\$3.85	\$3.50
Ownership Cost Breakeven	\$2.32	\$2.09	\$1.90
Total Cost Breakeven	\$6.61	\$5.94	\$5.40
		Price	
<u>Yield</u>	\$4.68	\$5.20	\$5.72
Operating Cost Breakeven	403.5	363.2	330.1
Ownership Cost Breakeven	218.9	197.0	179.1
Total Cost Breakeven	622.4	560.2	509.3

**Table 2. Monthly Summary of Cash Expenses per Acre**

**EBB2-Po2-07**

	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
<b>Preharvest:</b>																
Chop Straw	8.77															8.77
Disk	6.14	6.14														12.29
Fertilize	121.40									73.00						194.40
Irrigate	4.09									20.11	68.26	60.53	17.60			170.59
Rip		25.34														25.34
Mark Rows			8.14						48.07							56.20
Fumigate			201.01													201.01
Crop Insurance										38.00						38.00
Assessments										37.40						37.40
Repairs										15.95						15.95
Seed Hauling										2.17						2.17
Plant									435.59							435.59
Cultivate										48.02						48.02
Aerial Application											18.28	46.69	34.50			99.47
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
<b>Total Preharvest Costs</b>	<b>142.78</b>	<b>33.85</b>	<b>211.51</b>	<b>2.37</b>	<b>2.37</b>	<b>2.37</b>	<b>2.37</b>	<b>2.37</b>	<b>579.55</b>	<b>143.50</b>	<b>88.90</b>	<b>126.59</b>	<b>52.11</b>			<b>1390.62</b>
<b>Harvest:</b>																
Roll Vines													5.40			5.40
Vine Kill													29.89			29.89
Dig													78.92			78.92
Crop Hauling															70.37	70.37
Loading															160.22	160.22
Assessments															73.50	73.50
<b>Total Harvest Costs</b>													<b>114.21</b>		<b>304.09</b>	<b>418.30</b>
Interest on Operating Capital	1.13	1.40	3.07	3.09	3.11	3.13	3.15	3.17	7.75	8.89	9.59	10.60	11.91	11.91	-2.41	79.50
<b>Operating Costs per Acre</b>	<b>143.91</b>	<b>35.25</b>	<b>214.58</b>	<b>5.46</b>	<b>5.48</b>	<b>5.50</b>	<b>5.51</b>	<b>5.53</b>	<b>587.30</b>	<b>152.39</b>	<b>98.50</b>	<b>137.18</b>	<b>178.23</b>	<b>11.91</b>	<b>301.68</b>	<b>1888.42</b>
<b>Cash Ownership</b>																
General Overhead	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92				47.00
Land Rent									525.00							525.00
Management Fee	10.58	10.58	10.58	10.58	10.58	10.58	10.58	10.58	10.58	10.58	10.58	10.58				127.00
Trans. Eq. Owner.														42.00		42.00
Property Insurance									6.70							6.70
<b>Cash Ownership Costs</b>	<b>14.50</b>	<b>14.50</b>	<b>14.50</b>	<b>14.50</b>	<b>14.50</b>	<b>14.50</b>	<b>14.50</b>	<b>539.50</b>	<b>21.20</b>	<b>14.50</b>	<b>14.50</b>	<b>14.50</b>		<b>42.00</b>		<b>747.70</b>
<b>Total Cash Costs per Acre</b>	<b>158.41</b>	<b>49.75</b>	<b>229.08</b>	<b>19.96</b>	<b>19.98</b>	<b>20.00</b>	<b>20.01</b>	<b>545.03</b>	<b>608.50</b>	<b>166.89</b>	<b>113.00</b>	<b>151.68</b>	<b>178.23</b>	<b>53.91</b>	<b>301.68</b>	<b>2636.12</b>

**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	90	15.68	0.36	0.00	1.74	0.00	1.74	17.78	
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)

	343.00	392.00	441.00	490.00	539.00	588.00	637.00
3.64	-530	-388	-246	-105	37	178	320
4.16	-351	-184	-17	150	317	484	651
4.68	-173	20	212	405	597	790	982
5.20	5	223	442	660	878	1096	1314
5.72	184	427	671	914	1158	1401	1645
6.24	362	631	900	1169	1438	1707	1976
6.76	541	835	1129	1424	1718	2013	2307

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

	343.00	392.00	441.00	490.00	539.00	588.00	637.00
3.64	-1277	-1136	-994	-853	-711	-569	-428
4.16	-1099	-932	-765	-598	-431	-264	-97
4.68	-920	-728	-535	-343	-150	42	235
5.20	-742	-524	-306	-88	130	348	566
5.72	-564	-320	-77	167	410	654	897
6.24	-385	-116	153	421	690	959	1228
6.76	-207	87	382	676	971	1265	1560

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

	343.00	392.00	441.00	490.00	539.00	588.00	637.00
3.64	-1545	-1407	-1268	-1129	-990	-851	-712
4.16	-1366	-1203	-1039	-874	-710	-545	-380
4.68	-1188	-999	-809	-620	-430	-239	-49
5.20	-1010	-795	-580	-365	-149	66	282
5.72	-831	-591	-351	-110	131	372	613
6.24	-653	-387	-121	145	411	678	945
6.76	-475	-183	108	400	691	984	1276

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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