Southwestern Idaho
Russet Burbank Potatoes with Fumigation: Production & Storage Costs

Ben Eborn and Paul E. Patterson

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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 based on the data collected annually by the University of Idaho from agricultural supply companies. The selling price for the commodity is typically an historical average price, not a current year's projected price. The cost estimate shown here is typical for growing Russet Burbank potatoes with fumigation under irrigation in southwestern Idaho. The costs shown in Tables 1 – 6 include the costs to grow, harvest and sort potatoes. The total cost per cwt shown at the bottom of Table 1 is the cost to the end of the piler boom. Transportation costs to a processor or fresh pack facility are not included. Storage costs are shown in Table 7.

Production practices are based on data from potato growers in Canyon, Elmore, and Owyhee counties, crop consultants and extension personnel in western Idaho. Production practices depicted in this publication are not University of Idaho recommendations. 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 1,600-acre farm with 500 acres in potatoes, 500 acres in corn, 250 acres in alfalfa, 250 acres in grain and 100 acres of dry beans or alfalfa seed.

The farm uses a center pivot irrigation system and surface water delivered to the farm from an irrigation district. The irrigation district charges a flat fee per acre for water. Irrigation power use is based only on pressurization (no lift). Power costs per acre-inch of water applied are calculated using 2015 Idaho Power Schedule 24 Agricultural Irrigation Service rates. Power costs per acre-inch for water pumped from different depths and for different irrigation systems is included in Idaho's annual Input Crop Input Cost Summary located at: http://www.uidaho.edu/idaho-agbiz

Production Practices

Tillage practices assume the previous crop is corn. After corn harvest the potato ground is disked and ripped prior to fall fumigation and bedding. In March the ground is tilled, marked-out and planted using two 4-row planters with 36-inch row spacing. The seeding rate is 24 hundredweight (cwt) per acre. Potatoes are cultivated once in May with a basin tillage tool. In September potato vines are mechanically removed. Potatoes harvest begins three weeks later using a 4-row harvester and five 10-wheeler trucks. Potatoes are hauled from the field to a central location where they are sorted before being transferred to a semi-trailer for transport to a processor or fresh pack shed; or placed into on-farm grower owned storage. The costs associated with this second option are shown in Table 7. Prior to this year, there were separate storage and non-storage costs and returns estimates.

Most fertilizer is custom applied in one pre-plant broadcast application in the fall and a top dressing after planting in the spring. A starter fertilizer is applied at row mark-out and additional nitrogen is applied during the summer through the irrigation system. Mechanical (tillage and cultivation) and chemical methods are used for weed control. Three herbicides are applied to control annual grasses and broadleaf weeds. The first herbicide is applied by chemigation and the second two- way tank mix is applied at cultivation. For insect control, a systemic insecticide is banded at planting, and six foliar insecticides are applied by air or chemigation during the growing season. Eight fungicides are applied for disease control, including the seed treatment. One fungicide is soil applied at planting and six foliar applications are made either by air or by chemigation. Some insecticides and fungicides are tank mixed when applied by air. Potatoes receive 30 inches of water during the growing season: 3 inches in May, 8 inches in June, 11 inches in

July, 8 inches in August, and 1 inch in September. One additional inch of water is applied prior to harvest for a total of 32 inches of water.

Machinery

Table 4 lists the field equipment and their hourly operating costs, while Table 5 lists the equipment and their annual costs. Equipment used in sorting or storing potatoes is not included. Machinery ownership capital recovery cost is based on 75% of the replacement cost of a new piece of equipment, except for trucks. Truck prices are for a used vehicle with a new self-unloading bed. Capital recovery combines depreciation and interest into a single value. To keep machinery prices current between years when a comprehensive survey is conducted, machinery prices are adjusted using USDA's Farm Machinery Prices Paid Index. Equipment prices are collected approximately every five years.

The University of Idaho uses the budget generator program Budget Planner from the University of California-Davis to produce the various tables shown in this publication. Machinery operating and ownership costs are calculated based on engineering equations in this program. Machinery operating costs include fuel, lubricants and repairs.

Labor and Management

The cost of labor used in this publication includes a base wage, plus a percentage to account for various payroll taxes (FICA, SUTA & FUTA), and workman's compensation, as well as benefits such as paid vacation/personal leave days, health insurance and bonuses. Labor is classified by the type of work performed. Labor classifications, labor rates and payroll overhead are shown below.

Labor Values

Labor Class	Base Rate	Payroll Overhead	Effective Rate
General Farm Labor	$9.25	15%	$10.65
Truck Drivers	$12.50	15%	$14.14
Equipment Operators	$14.80	25%	$18.50
Irrigation Labor			
Set Move: HL & WL	$10.10	30%	$13.15
Continuous Move: CP & L	$14.80	25%	$18.50

Set Move includes: handlines and wheellines
Continuous Move includes: center pivots and linear move
Payroll overhead for set move systems includes housing

Based on the speed, width and overall field efficiency, *Budget Planner* calculates equipment operator labor hours for all field operations except those performed on a custom basis. Custom operations are listed separately. General farm labor accounts for extra field labor used during planting or harvest. A management fee based on approximately 5% of the total production costs is included. Prior to this year, the basis of the 5% charge was expected revenue.

Capital, Land and Overhead Costs

Interest on operating capital is charged from the time an input is applied until harvest and is calculated at a nominal rate of 5.75 percent. Interest on intermediate term capital, primarily equipment, is calculated using a rate of 5.5 percent. A general overhead charge, calculated at approximately 2.5 percent of operating expenses, is included to cover unallocated whole-farm costs such as office expenses, legal and accounting fees, cell phones, internet service and utilities. Irrigation power is shown as a separate cost item and is not included as part of general farm 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, listed under custom operating costs, includes soil and petiole sampling and irrigation scheduling.

Land rent is based on a one-year cash lease for potatoes and covers the ownership costs (depreciation, interest, and insurance) of the irrigation system. Because the charge for water, irrigation system repairs and irrigation power costs are listed separately, the land rent may appear low because the land owner in many circumstances pays some or even all these expenses.

Budget Format

Table 1 shows both expected revenue, based a specified yield and price, and expenses. Expenses are broken into two main categories: operating and ownership. Operating expenses are those that typically vary with the level of production and involve inputs that are used in a single production cycle. Ownership expenses include a systematic cost recovery over the useful life for inputs used in the production process that have a useful life of more than one year. Machinery and land costs fall into this category. Operating inputs are organized by category. In addition to the cost per unit and cost per acre for each input, a total cost is given for each category. Table 1 also gives a total of all operating, ownership and total costs per acre, as well as these same cost categories per cwt based on a field-run yield basis.

Table 2 begins with the base production cost per hundredweight from Table 1. This includes the cost to grow, harvest and sort potatoes. It's the cost of potatoes "to the end of the piler boom". It shows the base cost of potato production on both a field-run basis from Table 1 and a paid-yield basis, assuming a 95% paid yield.

Storage ownership and repair costs per hundredweight are added to the base cost of growing, harvesting and sorting potatoes. Storage ownership costs are based on annual ownership costs (depreciation and interest) divided by the storage capacity of the storage facility, assuming 90% utilization. Ownership costs do not change based on the length of storage.

Potato storage operating costs increase based on the length of storage. Storage operating costs are calculated on a monthly basis and include: interest, shrink, sanitation chemicals, sprout inhibitor and electricity. Sorting labor is included in the base budget. Table 2 shows the cumulative storage costs per month from October through June. Storage costs are calculated to the end of the month. The cumulative cost is added to the base production cost, storage ownership cost and repair costs to give a total cost per hundredweight by month for the entire storage season.

Potatoes stored beyond June would likely need refrigeration. The cost of refrigeration was not included in the cost of the storage system used to calculate the annual storage ownership and repair costs.

University of Idaho costs and returns estimates for both crops and livestock can be found at:

https://www.uidaho.edu/cals/idaho-agbiz

Author
Ben Eborn is a University of Idaho Extension agricultural economist.

Disclaimer
The practices and chemicals specified in the publication are not recommendations. Always read and follow the directions printed on the pesticide label. Due to constantly changing pesticide laws and labels, some pesticides may have been cancelled or had certain uses prohibited. The use of trade names for various products simplifies presentation of this material and should not be considered an endorsement, nor is any criticism implied of similar products not mentioned.

University of Idaho Extension

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Table A-1. 2017 Costs to grow, harvest and sort Southwestern Idaho

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
Gross Returns				
Potatoes	500.00	cwt	7.75	$3,875.00
Total Gross Returns				**$3,875.00**
Operating Inputs				
Seed:				**$375.60**
G-3 Russet Burbank Seed	24.00	cwt	13.90	333.60
Seed Cutting	24.00	cwt	1.75	42.00
Fertilizer:				**$405.85**
Dry Nitrogen - Preplant	175.00	lb	0.40	70.00
Dry P2O5	220.00	lb	0.38	83.60
K2O	255.00	lb	0.31	79.05
Sulfur	115.00	lb	0.22	25.30
Liquid Nitrogen	135.00	lb	0.50	67.50
Liquid P2O5	65.00	lb	0.56	36.40
Micronutrients & Foliars	2.00	acre	22.00	44.00
Pesticides & Chemicals:				**$575.30**
Vapam HL 42%	42.00	gal	5.50	231.00
Seed Treatment	24.00	cwt	0.65	15.60
Admire Pro	8.00	fl oz	1.25	10.00
Moncut 70DF	0.80	lb	29.80	23.84
Eptam 7E	4.00	pt	6.30	25.20
Metribuzin 75DF	0.75	lb	11.90	8.93
Prowl 3.3EC	2.00	pt	5.15	10.30
Quadris Flowable	8.00	fl oz	1.50	12.00
Endura (2x)	7.00	oz	4.55	31.85
Revus Top (2x)	12.00	fl oz	2.25	27.00
Bravo Weather Stik (2x)	3.00	pt	5.60	16.80
Manzate Pro-Stick	2.00	lb	3.85	7.70
Gavel 75DF	2.00	lb	8.50	17.00
Fulfill WDG	5.50	oz	6.50	35.75
Brigadier (2x)	12.00	fl oz	1.40	16.80
Movento	5.00	fl oz	8.30	41.50
Agri-Mek .75SC (2x)	7.00	fl oz	2.25	15.75
Beleaf 50SG	2.80	oz	10.10	28.28
Custom & Consultants:				**$135.25**
Custom Fumigate - Deep Injection	1.00	acre	45.00	45.00
Custom Fertilize: 400 - 800 lbs	1.00	acre	8.00	8.00
Custom Fertilize: 0 - 400 lbs	1.00	acre	7.25	7.25
Custom Air Spray - 5 gal	5.00	acre	9.00	45.00
Consultant & Soil/Pet. Test	1.00	acre	30.00	30.00
Irrigation:				**$130.07**
Water Assessment	1.00	acre	53.50	53.50
Irrigation Repairs - Center Pivot	31.00	acre-inch	0.53	16.43
Irrigation Power - Center Pivot	31.00	acre-inch	1.94	60.14
Machinery:				**$153.08**
Fuel - Gas	5.32	gal	2.55	13.57
Fuel - Farm Diesel	22.37	gal	2.35	52.57
Fuel - Road Diesel	2.32	gal	2.85	6.61
Lube	1.00	$	11.01	11.01
Machinery Repairs	1.00	$	69.32	69.32
Labor:				**$237.33**
Equipment Operator Labor	4.78	hrs	19.70	94.17
Truck Driver Labor	3.60	hrs	15.35	55.26
Irrigation Labor - Center Pivot	1.28	hrs	19.70	25.22
Irrigation Labor - Chem-Fert	1.20	hrs	19.70	23.64
General Farm Labor	3.44	hrs	11.35	39.04
Sorting:				**$75.00**
Sorting Labor	500.00	cwt	0.115	57.50
Sorting Equipment Repairs & Power	500.00	cwt	0.035	17.50
Other:				**$155.50**
Crop Insurance	1.00	acre	70.00	70.00
Fees & Assessments	475.00	cwt	0.18	85.50
Interest on Operating Capital at 6.25%				$83.84
Total Operating Costs				**$2,326.81**
Operating Costs per Unit				**$4.65**
Net Returns Above Operating Costs				**$1,548.19**

Table A-1. 2017 Costs to grow, harvest and sort Southwestern Idaho

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre
Ownership Costs:				
Tractors & Equipment Insurance				6.15
Tractors & Equipment Depreciation & Interest				208.00
Potato Handling Equipment Deprec. & Interest				79.00
Land*				700.00
Overhead				58.00
Management Fee				177.00
Total Ownership Costs				**$1,228.15**
Ownership Costs per Unit				**$2.46**
Total Costs per Acre				**$3,554.96**
Total Cost per Unit				**$7.11**
Returns to Risk				**$320.04**

Notes:

*Includes irrigation system ownership costs.
Blue font indicates an increase.
Red font indicates a decrease.
A green font indicates a change in product or procedure to derive the cost.
Procedural changes can result in different costs than were published the previous year.

Breakeven Analysis:	- 5%	Base	+ 5%
		Yield	
Price	**475**	**500**	**525**
Operating Cost Breakeven	$4.90	$4.65	$4.43
Ownership Cost Breakeven	$2.59	$2.46	$2.34
Total Cost Breakeven	$7.48	$7.11	$6.77
		Price	
Yield	**$7.36**	**$7.75**	**$8.14**
Operating Cost Breakeven	316.0	300.2	285.9
Ownership Cost Breakeven	166.8	158.5	150.9
Total Cost Breakeven	482.8	458.7	436.9

Table A-2. 2017 Cost per cwt to grow, harvest, sort and store Southwestern Idaho Russet Burbank potatoes with fumigation based on both field-run and paid yield.

	Storage Costs	Field Run Cost per Cwt	Paid Yield Cost per Cwt
Field-Run Yield		500.00	
Paid Yield %	95%		475.0
Base Cost to Grow, Harvest & Sort		**$7.11**	**$7.48**
Storage System Annual Ownership Costs	$0.365	$0.365	$0.384
Base Cost + Storage Ownership Costs		$7.47	$7.87
Storage System Annual Repairs	$0.042	$0.042	$0.044
Base + Storage System Ownership & Repairs		$7.52	$7.91

	Cumulative Storage Op. Costs	Cumulative Base + All Storage Costs	Cumulative Base + All Storage Costs
October	$0.228	$7.74	$8.15
November*	$0.408	$7.92	$8.34
December	$0.497	$8.01	$8.44
January	$0.590	$8.11	$8.53
February	**$0.681**	**$8.20**	$8.63
March	$0.772	$8.29	$8.72
April	$0.969	$8.49	$8.93
May	$1.081	$8.60	$9.05
June	$1.214	$8.73	$9.19

Data entered directly by user. All other values are calculated.
Calculated values.

* Indicates month when sprout inhibitor applied.

Base cost of production includes cost to grow, harvest & sort potatoes, both operating and ownership. Ownership costs for potato handling equipment are included in the base cost of production.

Storage system includes: storage facility, air system, and the equipment used to place.

Storage operating costs include: repairs (shown separately), plus monthly operating costs: labor, power, chemicals, interest, shrink & insurance.

Storage costs do not include the cost of removing potatoes from storage.

Cumulative storage operating expenses are calculated to the end of the month.