



2015 COSTS ESTIMATES OF PRODUCING FRESH AND PROCESSING POTATOES IN WASHINGTON

By

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Preface

The results presented in this WSU publication serve as a general guide for evaluating the feasibility of producing potatoes in the Columbia Basin as of 2015, with a capital and machinery endowment suited to a 1,000-acre potato enterprise. This publication is not intended to be a definitive guide to production practices, but is helpful in estimating the physical and financial requirements of comparable plantings. Specific budget assumptions were adopted for this study, but these assumptions may not fit every situation since production costs and returns vary across farm operations, depending on the following factors:

- Capital, labor, and natural resources
- Crop yield
- Cultural practices
- Input prices
- Prices of potatoes
- Management skills
- Size of the operation
- Type and size of machinery and irrigation system

Costs can also be calculated differently depending on the intended use of the budget. To avoid unwarranted conclusions for any particular farm, readers must closely examine the assumptions made in this study, and then adjust the costs, returns, or both as appropriate for their operation.

Potato Production in Washington

Washington is the second largest producer of potatoes in the United States. In 2014, Washington growers harvested 160,000 acres of potatoes, representing 15.7% of total U.S. acres and 22.7% of total production. Potatoes are grown in Adams, Benton, Franklin, Grant, Kittitas, Lincoln, Skagit, Walla Walla, Whatcom, and Yakima counties (USDA NASS 2009). Potato production acreage has increased over the past decade, from 154,000 acres in 2005 to 165,000 acres in 2014. Planted acreage increased by 3% between 2013 and 2014 (USDA NASS 2015).

As of 2014, the majority of potato acres in Washington (69.5%) are planted to processing varieties such as Russet Burbank, Umatilla Russet, and Russet Ranger. Fresh potato production comprises 13.5% of total planted acres and is primarily planted to the Russet Norkotah variety. Other varieties for fresh or processing make up the remaining 17% (for example, 5% chipping potatoes, 12% other).

Study Objectives

This study provides information on (1) the variable and fixed costs required to produce potatoes, for the fresh or processed markets, under center pivot irrigation, and (2) the ranges of price and yield levels at which potato production would be a profitable enterprise. An Excel workbook has also been developed, which allows the user to estimate production costs and examine the impact of different input assumptions, yields, and price scenarios.

Information Sources

The data used in this production cost budget were obtained from a group of Washington potato growers. These growers represented both fresh and processing potato production in the Columbia Basin. Their production practices and requirements for labor and capital are the basis for the assumptions used in this study and represent a consensus of current production methods.

Due to the method used to generate this potato production budget, the values reported in this budget represent what growers can anticipate as their average cost of production over several years, assuming no major crop loss. However, crop loss should be considered as part of a risk management plan and we recommend that growers use the Excel Workbook provided to evaluate their own production costs and returns.

For a more detailed budget template, see *Cost of Producing Processing and Fresh Potatoes Under Center Pivot Irrigation in the Columbia Basin, Washington* (Hinman et al. 2006).

Budget Assumptions

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

1. The enterprise budgets reported are for potatoes grown under center pivot irrigation and in a crop rotation following alfalfa.
2. The varieties used in this budget are Russet Burbank potatoes that are planted for the processing market, and Russet Norkotah potatoes that are planted for the fresh market.
3. The rental rate of irrigated crop land is assumed to be \$800 per acre. This rental agreement assumes the landowner furnishes the center pivot irrigation system and the grower pays the water and power charge. The rental rate also includes property taxes and insurance.

4. Annual payable yield is estimated to be 31.5 tons per acre for processing potatoes and 30.5 tons per acre for fresh potatoes. Payable yield is measured by subtracting dirt, rot, foreign material and storage shrinkage from the harvested yield.
5. The price of potatoes represents the annual payable value. This enterprise budget accounts for potatoes that are stored until delivery in April. Thus the estimated price of potato is also tied to the April delivery out of the grower's storage.
6. Management charge is \$175 per acre. This value covers the annual salary, benefits, social security, etc. for management and administration personnel; as well as overhead that includes office supplies, professional services and other business expenses (insurance, etc.).
7. Interest on investment is 4%.

Summary of Results

Costs of production are broken down into variable and fixed costs. The variable costs reflect costs that are incurred when production takes place in a given year. The variable costs are categorized into planting, chemical and fertilizer application, irrigation, harvest, storage, and other variable costs.

Other variable costs include the interest expense incurred for a short-term operating loan or the opportunity cost of using cash from the enterprise to pay for production costs prior to selling the crop.

Fixed costs represent the costs that are incurred by the grower whether or not they decide to produce in a given year. Fixed costs include management and administration costs and the rental rate of cropland. While fixed costs cannot be avoided within a production year, they can be avoided in the long run, if the grower decides to end the potato enterprise.

Detailed information on machinery costs such as maintenance, interest costs, and depreciation are not listed in these budgets. The costs of various field activities (planting, chemical application, irrigation, and harvest) are based on purchased custom services. These services include the materials and labor for each activity and the prices are assumed to reflect depreciation, maintenance, and interest costs.

The estimated annual costs and returns for Russet Burbank potatoes, grown for the processing market, are shown in Table 1. The components of the major costs shown in this table are provided in more detail in the Excel Workbook described below. Total variable costs are estimated to be \$4,048 per acre and total fixed costs are \$962 per acre. Assuming a payable yield of 31.5 tons per acre and a price of \$165 per ton, the estimated net returns to Russet Burbank potatoes are \$187 per acre. The breakeven price required for 31.5 ton per acre of Russet Burbank is \$159.06 per ton.

The enterprise budget for Russet Norkotah potatoes grown for the fresh market is also given in Table 1. Total variable costs are estimated to be \$4,211 per acre and total fixed costs are \$962 per acre. Assuming a payable yield of 30.5 tons per acre and a marketing price of \$175 per ton, the estimated net returns for growing Russet Norkotah potatoes are \$165 per acre. The breakeven price required for a 30.5 ton per acre of Russet Norkotah is approximately \$169.61 per ton.

Table 2 and Table 3 show the per-acre profits that would be expected from different scenarios of yields and prices received for Russet Burbank and Russet Norkotah potatoes respectively. These estimates show the sensitivity of profits to potato yield and price, while holding all else constant.

Excel Workbook

Excel workbooks for these enterprise budgets are available at the WSU School of Economic Sciences Extension website: http://ses.wsu.edu/extension/enterprise_budgets/. The workbooks allow growers to modify select values to evaluate their own production costs and returns.

References

Hinman, H., M. Trent, and M. Pavsek. 2006. Cost of Producing Processing and Fresh Potatoes Under Center Pivot Irrigation in the Columbia Basin, Washington. WSU School of Economic Sciences, Farm Business Management Report. *Washington State University Extension Publication* EB2015E.

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Table 1. Costs and Returns per Acre of Producing Potatoes for the Processing and Fresh Markets

	Processing	Fresh
Estimated Production (tons/acre) ^A	31.50	30.50
Price (\$/ton) ^B	\$165.00	\$175.00
TOTAL RETURNS (\$/acre)	\$5,197.50	\$5,337.50
<i>Variable Costs</i>		
Soil Preparation & Planting ^A	\$700.00	\$760.00
Chemicals & Fertilizer ^B	\$1,480.00	\$1,560.00
Irrigation ^C	\$200.00	\$200.00
Harvest ^D	\$1,487.75	\$1,504.00
Other Variable Costs ^E	\$180.71	\$186.96
Total Variable Costs	\$4,048.46	\$4,210.96
Fixed Costs^F	\$962.00	\$962.00
TOTAL COSTS (\$/acre)	\$5,010.46	\$5,172.96
ESTIMATED NET RETURNS (\$/acre)	\$187.04	\$164.54

Notes:

A. Yield estimate excludes dirt, rot, foreign material and storage shrinkage.

B. Price represents payable value and based on delivery in April out of own storage.

C. Includes machinery and labor costs of tillage and planting, and seed cost.

D. Includes material and applications costs of fertilizer, fumigation, fungicide (includes fungicide seed treatment), insecticide, and herbicide.

E. Includes cost of water and power, and irrigation labor.

F. Includes costs of digging, hauling, cleaning and piling, and storage.

G. Includes monitoring and interest on operating capital.

H. Includes management, administration and overhead, land rent, and interest on fixed cost.

Table 2. Estimated Net Returns per Acre for Processing Potatoes (Russet Burbank)

Yield (tons/acre)	Price (\$/ton)					
	\$100	\$120	\$140	\$160	\$180	\$200
20.0	-\$2,463	-\$2,063	-\$1,663	-\$1,263	-\$863	-\$463
22.5	-\$2,332	-\$1,882	-\$1,432	-\$982	-\$532	-\$82
25.0	-\$2,201	-\$1,701	-\$1,201	-\$701	-\$201	\$299
27.5	-\$2,070	-\$1,520	-\$970	-\$420	\$130	\$680
30.0	-\$1,939	-\$1,339	-\$739	-\$139	\$461	\$1,061
32.5	-\$1,808	-\$1,158	-\$508	\$142	\$792	\$1,442
35.0	-\$1,677	-\$977	-\$277	\$423	\$1,123	\$1,823
37.5	-\$1,546	-\$796	-\$46	\$704	\$1,454	\$2,204
40.0	-\$1,415	-\$615	\$185	\$985	\$1,785	\$2,585
42.5	-\$1,284	-\$434	\$416	\$1,266	\$2,116	\$2,966

Notes:

Shaded area denotes a positive profit based on the combination of yield and price.

Yield estimate excludes dirt, rot, and foreign material.

Table 3. Estimated Net Returns per Acre for Fresh Potatoes (Russet Norkotah)

Yield (tons/acre)	Price (\$/ton)					
	\$100	\$120	\$140	\$160	\$180	\$200
20.0	-\$2,652	-\$2,252	-\$1,852	-\$1,452	-\$1,052	-\$652
22.5	-\$2,526	-\$2,076	-\$1,626	-\$1,176	-\$726	-\$276
25.0	-\$2,400	-\$1,900	-\$1,400	-\$900	-\$400	\$100
27.5	-\$2,274	-\$1,724	-\$1,174	-\$624	-\$74	\$476
30.0	-\$2,148	-\$1,548	-\$948	-\$348	\$252	\$852
32.5	-\$2,022	-\$1,372	-\$722	-\$72	\$578	\$1,228
35.0	-\$1,896	-\$1,196	-\$496	\$204	\$904	\$1,604
37.5	-\$1,771	-\$1,021	-\$271	\$479	\$1,229	\$1,979
40.0	-\$1,645	-\$845	-\$45	\$755	\$1,555	\$2,355
42.5	-\$1,519	-\$669	\$181	\$1,031	\$1,881	\$2,731

Notes:

Shaded area denotes a positive profit based on the combination of yield and price.

Yield estimate excludes dirt, rot, and foreign material.



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