2015 COSTS ESTIMATES OF PRODUCING FRESH AND PROCESSING POTATOES IN WASHINGTON

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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.

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 for growing Russet Burbank 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/](http://ses.wsu.edu/extension/enterprise_budgets/). The workbooks allow growers to modify select values to evaluate their own production costs and returns.

**References**


USDA NASS. 2015. Quick Stats Lite.

**Acknowledgements**

The authors wish to thank the Washington State Potato Commission for funding this study, and participating Extension Publication reviewers for their helpful comments. Assistance provided by potato growers in developing the enterprise budget is also greatly appreciated.
Table 1. Costs and Returns per Acre of Producing Potatoes for the Processing and Fresh Markets

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

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)

<table>
<thead>
<tr>
<th>Yield (tons/acre)</th>
<th>$100</th>
<th>$120</th>
<th>$140</th>
<th>$160</th>
<th>$180</th>
<th>$200</th>
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<tr>
<td>20.0</td>
<td>-$2,463</td>
<td>-$2,063</td>
<td>-$1,663</td>
<td>-$1,263</td>
<td>-$863</td>
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<td>22.5</td>
<td>-$2,332</td>
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<td>25.0</td>
<td>-$2,201</td>
<td>-$1,701</td>
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<td>-$701</td>
<td>-$201</td>
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<tr>
<td>27.5</td>
<td>-$2,070</td>
<td>-$1,520</td>
<td>-$970</td>
<td>-$420</td>
<td>$130</td>
<td>$680</td>
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<td>30.0</td>
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<td>32.5</td>
<td>-$1,808</td>
<td>-$1,158</td>
<td>-$508</td>
<td>$142</td>
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<td>35.0</td>
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<td>-$977</td>
<td>-$277</td>
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<tr>
<td>37.5</td>
<td>-$1,546</td>
<td>-$796</td>
<td>-$46</td>
<td>$704</td>
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<td>40.0</td>
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<td>42.5</td>
<td>-$1,284</td>
<td>-$434</td>
<td>$416</td>
<td>$1,266</td>
<td>$2,116</td>
<td>$2,966</td>
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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)

<table>
<thead>
<tr>
<th>Yield (tons/acre)</th>
<th>$100</th>
<th>$120</th>
<th>$140</th>
<th>$160</th>
<th>$180</th>
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<td>-$1,852</td>
<td>-$1,452</td>
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<td>22.5</td>
<td>-$2,526</td>
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</table>

Notes:
Shaded area denotes a positive profit based on the combination of yield and price.
Yield estimate excludes dirt, rot, and foreign material.