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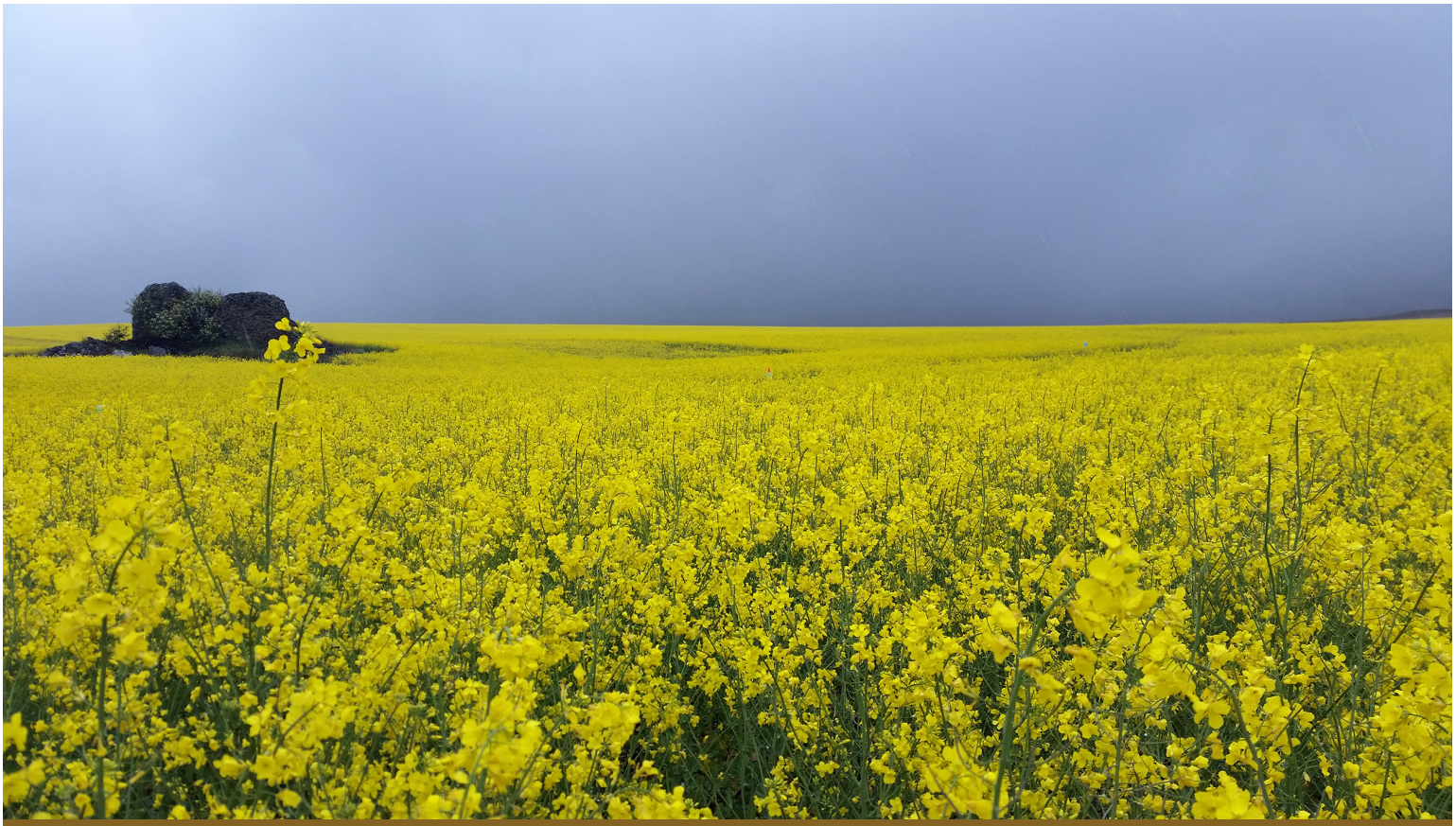

ENTERPRISE BUDGETS: WHEAT & CANOLA ROTATIONS IN EASTERN WA INTERMEDIATE RAINFALL (12-16") ZONE

Washington Oilseed Cropping Systems Series

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Abstract

The Washington State Oilseed Cropping Systems Research and Extension Project (WOCS) is funded by the Washington State Legislature to meet expanding biofuel, food, and feed demands with diversified rotations in wheat based cropping systems. The WOCS fact sheet series provides practical oilseed production information based on research findings in eastern Washington. More information can be found at: http://css.wsu.edu/biofuels/.

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Introduction

The budgets for 3-year wheat and canola rotations in eastern Washington with intermediate rainfall (12 to 16 inches) were developed to estimate enterprise costs and returns for farm operations currently growing or considering growing canola.

The budgets are available in an interactive Excel workbook showing the default cost and return scenarios. Default budget data are based on a model farm, designed to reflect a "typical" dryland farm operation in the 12 to 16 inch intermediate rainfall regions of Washington (see Budget Assumptions below).

Users can adapt the Excel workbook budgets to compare costs and returns between canola and non-canola rotations. The budgets are available online as an interactive Excel workbook: http://css.wsu.edu/biofuels/.

Inserting canola into traditional rotations may affect overall farm costs and returns due to changes in chemical use, weed control in subsequent crops, machinery operations to handle stubble, and the like. Some farmers have experienced increases in wheat yields after growing canola. To allow costs and returns to reflect canola's rotational impacts, separate budgets are included in the Excel workbook for crops in a "canola rotation" or a (non-canola) "wheat rotation" (see Excel workbook tabs 1 through 8).

- Canola Rotation: Fallow – Winter Wheat – Spring Canola
- Wheat Rotation: Fallow – Winter Wheat – Spring Wheat or Spring Barley

Crops included are Soft White Winter Wheat (SWWW), Hard Red Winter Wheat (HRWW), Soft White Spring Wheat (SWSW), Dark Northern Spring Wheat (DNS), Spring Barley (SB), and Spring Canola (SC).

How to Use the Excel Workbook Budgets

Review the Budget Assumptions sections (listed below) that were used to create the budgets. You may need to adjust these budgets as follows in order to accurately reflect your situation. The Excel workbook is available online: http://css.wsu.edu/biofuels/

Adjust crop budgets in the Excel workbook for your specific farm operation:

Inputs

Update costs on the **green Input Costs tab** and the cost will update throughout the budgets. If you use a product that is not listed on the Input Costs tab, you can add (or remove) inputs and adjust quantities used on the individual crop budgets (tabs numbered 1 through 8).

Machinery Operations

Update machinery operations on the **blue Machinery Costs tab** (scroll right through the tabs at the bottom of the Excel workbook to reach the Machinery Costs tab) and the costs will update throughout the budgets. You can adjust the number and type of machinery operations for each crop or fallow cycle (Tables 5 through 16) by adjusting the Number of Passes marked in red text for the operation that most closely matches your equipment.

The machinery information on the Machinery Complement tab (Table 3), was entered into the University of Idaho's Crop Machinery Cost Calculator to estimate cost per acre for common operations. Machinery values, depreciation, repairs, etc. for individual pieces of machinery cannot be directly adjusted in the Excel workbook for these crop budgets at this time. However, costs per acre can be overwritten in Table 4 of the Machinery Costs tab, if you know your own cost per acre for a particular operation.

Enter yield and price values in Table 1 on the **purple Summary tab**. Wheat yields can be different in the canola rotation versus the wheat rotation. Yield and price values changed on the Summary tab will update throughout the budgets.

Choose rotation scenarios and compare returns between rotations in Table 2 on the **purple Summary tab**. Make sure you have updated the individual crop budgets (tabs numbered 1 through 8) used in the rotations you have chosen (wheat and/or canola rotations) as needed.

Color Coding

The text color coding system below is used to indicate the source of the data for each budget and to show which data can be adjusted by the user.

- **Red text** can be changed without affecting the underlying equations in this cost calculator.
- **Purple text** indicates that the information is from the purple Summary tab (Table 1). For example, yield values appear on the Summary tab in red text but on the crop budget (tabs 1 through 8) in purple text; updating yields on the Summary tab will automatically update yields on the crop budgets tabs. This allows you to quickly compare net returns under different yield and price scenarios without leaving the Summary tab.
- **Green text** indicates that the information is from the green Input Cost tab and can only be adjusted in the Input Cost tab.
- **Blue text** indicates that the information is from the blue Machinery Cost tab. Please see below for more information on machinery cost assumptions and calculations.

Budget Assumptions

Since farming is inherently variable and constantly changing, we hope that the Excel workbook format will be helpful in adjusting these budgets to reflect your particular operation.

Enterprise costs and returns vary from one location to the next, and over time, for any particular farming operation. Variability stems from differences in the following:

- Capital, labor, and natural resources
- Type and size of machinery complement
- Cultural practices
- Size of farm enterprise
- Crop yields
- Input prices
- Commodity prices
- Management skill

These budgets were created in an Excel workbook format in order to facilitate adjustments for different farming operations. Please note that these budgets will help you estimate future profitability, however, they cannot predict future conditions, both in the marketplace and on your own operation.

Production practices most closely represent those in the 12 to 16 inches intermediate rainfall regions of Washington based on grower input. Seasonal operations are detailed in the **Calendar** tabs. Production practices may be similar among individual farms, but each farm has a unique set of resources with varying levels of productivity and production problems and, therefore, slightly different costs. Farm size, crop rotation, age and type of equipment, soils, and quality of management are crucial factors that influence production costs.

Economic costs are used for these costs and returns estimates. All resources are valued based on market price or opportunity cost. An opportunity cost is determined based on the next most valuable use of the resource. For example, the opportunity cost of farming land you own would be estimated as the highest rental value for that land. The cost and return estimates shown here are typical for growing grain and rotational crops in the intermediate rainfall region in Washington.

Specific Budget Assumptions

The Model Farm

These budgets represent a 3500-acre farm that follows a typical 3-year rotation of winter wheat, spring crop, followed by fallow. Spring canola may be grown in place of a spring wheat or barley. In a typical year, equal proportions would be devoted to each crop in a rotation.

Crop choices will vary by year, depending on relative crop prices and other management considerations. Average annual returns for typical rotations are listed in Table 1, Summary of Returns by Crop ($/acre) and Table 2, Summary of Returns by Rotation ($/acre) in the Summary tab.

Crop Prices

Crop prices are calculated as three-year average prices received by Washington growers based on Portland prices less an off-coast adjustment for transportation and handling.

Input Costs

Input costs (green tab) are based on the University of Idaho's annual survey of agricultural supply companies, or retail prices shared by regional distributors. Input costs in the 2013 Idaho Crop Input Price Summary are considered close estimates for input costs in Washington State. This report is available online at: http://www.uidaho.edu/cals/idaho-agbiz/crop-enterprise-budgets.

Machinery Costs

The machinery complement and per acre machinery cost estimates are in the last two tabs in the Excel workbook. A "machinery complement" is a set of common machinery and implements that would be sufficient for performing standard operations in crop production on a farm in a given region.

The machinery complement used in these budgets was constructed based on farmer and expert input, and is intended to be representative of a typical dryland farm in the 12 to 16 inches intermediate rainfall regions of Washington.

The machinery complement was entered into the University of Idaho's Crop Machinery Cost Calculator to obtain per acre machinery costs in Table 4 on the Machinery Costs (blue) tab. The per acre machinery costs for each crop and fallow cycle (Tables 5 through 16) feed into the individual crop budgets (tabs numbered 1 through 8).

Machinery fixed costs include depreciation, interest, property taxes, insurance, and housing for all machinery used by the operation. Given ownership of a specific machinery complement, these fixed costs are incurred by the overall farm operation and are incurred whether or not crops are grown.

The user's machinery costs will vary if farm size, equipment size and value, or annual hours of use differ significantly from the values used in these budgets.

Machinery cost files are available upon request. The University of Idaho Crop Machinery Cost Calculator is available at: http://www.uidaho.edu/cals/idaho-agbiz/tools.

Labor Costs

Labor to operate machinery is valued at $20.00 per hour. 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 and 30 percent for machinery labor. The base wage is based on average hourly wages reported by the Washington State Employment Security Department in the 2011 Agricultural Workforce Report.

Storage and Transportation Costs

These budgets assume all crops are sold at harvest, so no storage costs are incurred. However, monthly storage costs can be added on individual crop budget tabs if relevant to an operation. Storage rates from the Input Cost tab are per bushel, per month, based on regional elevator storage rates.

Harvest transportation costs from field to local elevator/storage (average 10 miles one-way) are included in per acre machinery cost estimates. Some farmers may own or hire larger trucks for longer distance hauling. Long-distance hauling costs can be added by the user on individual crop budget tabs by entering the hauling distance, rate per mile, and load volume. The default scenario for wheat and barley assumes a 100-mile roundtrip to either a rail or river sub-terminal, based on hired truck rates as quoted by several regional companies.

Land Costs

Land costs are based on a typical lease agreement for this region. While the owner-operator will not actually experience a land rental cost, this cost represents the minimum return owner-operators must receive to justify growing the crop themselves. To determine the profitability of crop production relative to other activities, the owner-operator may want to consider these forgone rental returns along with the usual production expenses.

A typical lease agreement in this region is a one-third land owner and two-thirds tenant crop share, with the land owner paying land taxes, one-third of the fertilizer cost, one-third of the chemical cost, and one-third of the crop insurance. The tenant covers all other production expenses.

To approximate rental cost or forgone rental returns, the default land cost is calculated as one-third gross revenue minus one-third fertilizer, pesticide, and crop insurance costs. The crop-share percentage can be adjusted by crop on the individual crop budget tabs.

This valuable tool reveals how different factors affect revenue for landlords and operators differently, such as crop and input price increases, as well as cropping choices. Note that pea, lentil, and garbanzo crop-share arrangements are typically split with a one-fourth, three-fourths cost share.

Interest Costs

Interest on operating capital is charged on total operating costs for nine months and calculated at a nominal rate of 5.75 percent. The operating interest rate can be changed on the Input Costs tab.

Other Costs

A general overhead charge of 2.5 percent of operating expenses is included to cover unallocated costs such as office expenses, phone service, legal and accounting fees, and utilities. A management fee is charged at the rate of 5 percent of gross revenue, rounded to the nearest dollar, to cover management labor. Both overhead and management fee rates can be changed on the Input Costs tab.

Conclusions

Growers using this budget should closely examine the budget assumptions and make adjustments in the Excel workbook to reflect their particular operation. Adjustments in the variable costs can easily be made without affecting the overall accuracy of the budget information.

Machinery costs are more difficult to adjust, due to the underlying complexity of machinery cost calculations. A separate machinery cost calculator program is used to develop the costs used in these budgets, which are based on specific machinery values, years of life, repair costs, machine widths, tractor horsepower, etc. The machinery cost program and datasets specific to this budget are available upon request.

References

Patterson, P.E. and K. Painter. 2013. 2013 Crop Input Cost Summary. *University of Idaho Agriculture Economics Extension* Series No. 13-03.

Washington State Employment Security Department. 2012. 2011 Agriculture Work Force Report. Labor Market and Economic Analysis.

University of Idaho. 2015. Crop Machinery Cost Calculator. *University of Idaho Extension.*

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We take full responsibility for any errors in these budgets. Please feel free to contact us with any comments or suggestions.

The Excel workbook is available online:

http://css.wsu.edu/biofuels/

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