Integrating Environmental Accounting into AgTools™

Jenna Way
Zach Millang
2014 REACCH Internship Project
Oregon State University

Funded through Award #2011-68002-30191 from USDA National Institute for Food and Agriculture
What is *AgTools*\textsuperscript{TM}?

- Evaluates the **profitability** and **feasibility** of different management strategies and cropping systems, at the individual farm level.

- **Suite of Software Programs:**
  - *AgProfit*- Determines how changes in input costs, output costs, and yields affect profitability (20 years)
  - *AgLease*- Establishes equitable crop shares
  - *AgFinance*- Analyzes liquidity, solvency, and repayment capacity (10 years)
Internship Project

• **Literature Review**
  o Environmental effects of agricultural practices
  o Direct seed vs. conventional tillage wheat production (PNW)

• **AgTools™ Analysis**
  o Direct seed vs. conventional till winter wheat-summer fallow rotation, less than 12 inch precipitation zone
  o Annual cropping vs. winter-wheat and summer fallow with and without climate change
Literature Review

- **AgEnvironment Components and Tools**
  - GHG Emissions, soil erosion, water use, herbicides, pesticides, and fertilizers
  - GHG Emissions- Cool Farm Tool
  - Soil Erosion- USDA Rusle2 and WEPP
  - Pesticides- Cornell University EIQ Equation

**Direct Seed vs. Conventional Till WW-SF Production**

- No-till production requires about 4 additional herbicide applications (Esser).
- No-till early averages a higher yield (~70bu/acre) but late no-till produces 20% less (Esser).
- No Till allows for fewer trips across the field resulting in less fuel consumption (Perry).
### Winter Wheat-Summer Fallow
**Direct Seed vs. Conventional Till**
**Less than 12 inch Precipitation**

<table>
<thead>
<tr>
<th></th>
<th>Direct Seed</th>
<th>Conservation Tillage</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Net Returns</strong></td>
<td>$378.99</td>
<td>$259.24</td>
<td>$119.75</td>
</tr>
<tr>
<td><strong>Net Present Value</strong></td>
<td>$306.80</td>
<td>$218.06</td>
<td>$88.74</td>
</tr>
<tr>
<td><strong>Sensitivity Analysis</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Net Returns</strong></td>
<td>$245.11</td>
<td>$259.24</td>
<td>($14.13)</td>
</tr>
<tr>
<td><strong>Net Present Value</strong></td>
<td>$220.95</td>
<td>$218.06</td>
<td>$2.89</td>
</tr>
</tbody>
</table>
W. Wheat-Summer Fallow vs. Annual Cropping Before and After Climate Change

• **Before Climate Change**
  o **W. Wheat-Summer Fallow**
    - **12-18 inch** precipitation zone
    - Randomized *historical yields* (Sherman County)
  o **Annual Cropping: W. Wheat, Camelina, Canola, Peas**
    - Market sensitivity analysis- varying yields and net returns

• **After Climate Change**
  o **W. Wheat-Summer Fallow**
    - **18-24 inch** precipitation zone
    - *Projected yields* from Global Climate Models (Umatilla County)
      - Increase Fertilizer costs and sprays, insert insecticides and fungicide
  o **Annual Cropping: W. Wheat, Camelina, Canola, Peas**
    - Market Sensitivity analysis- varying yields and net returns
    - Increased yields and fertilizer costs
Research Takeaways

• **Research takes time**
  - Changes routes
  - Have to narrow scope
  - Takes time to find answers and apply them
  - Hard to not get caught up on little things

• **We learned the research process**
Sources


Questions?