Soil Conservation Practices and Attitudes of Several Hundred Surveyed PNW Farmers, 1980 to 2010

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Title: Measuring socioeconomic impacts of the STEEP program in the Pacific Northwest and identifying keys to expanding adoption of soil conserving farming systems in the region

A FY 2010-2012 ID-OR-WA Project
Total funding $185,000
Objectives of Project

1. To determine impacts of the STEEP program by comparing Latah & Whitman counties results from 1980 and 2010 surveys

2. To identify key factors for expanding adoption of soil conserving farming systems in the PNW by
   • Expanding 2010 mail survey to
     a. 3 “low-adoption” counties: Latah, ID; Umatilla, OR; Whitman, WA, and
     b. 3 “high-adoption” counties: Lewis, ID; Wasco, OR; Columbia, WA
   • Personal interviews with 19 stakeholders
• The lowest direct seed counties by state were:
  Latah ID (12.8%)
  Umatilla OR (10.8%)
  Whitman WA (12.0%)

• The highest direct seed counties were:
  Lewis ID (33.4%)
  Wasco OR (69.7%)
  Columbia WA (67.9%)
Why Was This Research Needed?

1. To determine if the $30-million 1976-2010 USDA-STEEP program promoted soil conservation and socioeconomic progress in PNW.

2. To compare Kok, Papendick, & Saxton’s (2008) positive STEEP Impact Assessment with our random sample surveys of hundreds of farmers.

3. To better understand why adoption of direct seeding is uneven among PNW counties. What are keys to adoption?
January – August 2010
  o Personal interviews with 19 stakeholders. Done.

November 2010- February 2011
  o Mail survey, 584 respondents in 6 counties. Done.

February 2011– July 2012
  o Statistical analysis of survey data. Done.

January 2011-March 2013
  o Disseminate results to stakeholders. Continues.
19 interviews with stakeholders in all counties:

Traditional and Direct-seed Farmers, NRCS, Extension, Agribusiness, and a Tribal land manager.

- Common themes among stakeholders:
  - Traditional /reduced tillage is still dominant, but diverse
  - “One size does not fit all” for direct seeding
  - Persevere during direct seed transition
  - Conservation incentives from local/state/federal programs promote conservation adoption
  - Early no-till failures discouraged some neighbors
  - Vigorous d.s. education led by capable people are a key (Columbia and Wasco counties)
  - Farmer-to-farmer interaction is critical
“We have to keep our stubble height at about 9-10 inches. It’s a continual process and we still plug the drills sometimes. ...they have stuck with [no-till] but now there is no erosion. ...With no till, there is more management. “

“Question. How did you get information before you switched to direct seeding? Answer. I went to an early direct seed conference with Dusty Eddy. I went to a field day. Dusty took me under his wing. I had exposure to the direct seed growers and promoters through the direct seed individuals. “

“Q. Why do people choose not to no till? A. There are still a lot of people who do not believe in it. It’s a new way of farming and they can’t imagine not plowing. They are 3rd or 4th generation farmers farming this way.”
Personal interviews of 272 Latah ID & Whitman WA Counties farm operators & managers with min 80 ac of cropland, 89% response rate.

Findings:
- Conservation tillage reduced yields and profit
- Reduced tillage was limited and erosion serious
- No-till perceived as agronomically and economically risky
- Definitions of reduced & no-tillage varied widely
- No-till research and technology were at early stage of development

Benchmark 1980 STEEP Survey
Eligibility: As in 1980, > 80 acres cropland; farm operators/managers. Used USDA/FSA addresses of DCP payment recipients (includes landlords).

14 repeat questions from 1980 survey to measure change.

New questions to:
- identify key facilitators and/or barriers to direct seeding
- identify influential education programs & sources of information

Response: 584 completed of (2,592 sent - 778 ineligible) = minimum 32% response rate.
Total of 286 completed from Latah & Whitman counties versus 272 in 1980. Large samples!
Average Gross Annual Sales of Farms

Percentage of Respondents

- Less than $10,000
- $10,000 - $24,999
- $25,000 - $49,999
- $50,000 - $99,999
- $100,000 - $249,999
- $250,000 - $499,999
- $500,000 - $999,999
- $1,000,000 or more

Graph showing the percentage of respondents stratified by average gross annual sales.
Progress from 1980 to 2010

The use of many practices has increased...

Increase in Percent Points Adoption

<table>
<thead>
<tr>
<th>Practice</th>
<th>Increase</th>
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<tbody>
<tr>
<td>b. Min. till</td>
<td>8</td>
</tr>
<tr>
<td>c. Direct-seeding</td>
<td>32</td>
</tr>
<tr>
<td>f. Divided slopes</td>
<td>1</td>
</tr>
<tr>
<td>h. Standing stubble</td>
<td>16</td>
</tr>
<tr>
<td>i. Sediment basins/gully plugs</td>
<td>16</td>
</tr>
<tr>
<td>k. Terraces</td>
<td>7</td>
</tr>
<tr>
<td>l. Chem. fallow</td>
<td>28</td>
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</table>
Progress in adoption of direct seeding in Latah and Whitman Counties from 1980 to 2010 was striking.

- six-fold increase in 30 years from 5% to 37% (stat. significant at 0.0001 level).
- There was also stat. significant increase in min-till, stubble over winter, sediment basins/gully plugs, terraces, and chemical fallow.
# Direct Seeding by Low-Adoption Counties

<table>
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<tr>
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<tbody>
<tr>
<td>Latah, ID</td>
<td>13</td>
<td>32</td>
</tr>
<tr>
<td>Whitman, WA</td>
<td>12</td>
<td>39</td>
</tr>
<tr>
<td>Umatilla, OR</td>
<td>11</td>
<td>36</td>
</tr>
</tbody>
</table>
Our survey results show higher % low-adoption counties “now using” direct seeding in 2010 survey than % acres in 2004 CTIC data.  WHY?

- More farmers may have adopted the practice between 2004 and 2010.
- More importantly, farmers in our survey could report they were “now using” the practice regardless of the number of acres direct seeded.
- Personal interviews with farmers and others revealed farmers possess different definitions of “direct seeding.”
### High-Adoption Counties’ Pattern Differs Except for Lewis

#### Why?

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<tbody>
<tr>
<td>Wasco, OR</td>
<td>70</td>
<td>63</td>
</tr>
<tr>
<td>Columbia, WA</td>
<td>68</td>
<td>56</td>
</tr>
<tr>
<td>Lewis, ID</td>
<td>33</td>
<td>71</td>
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</table>
E. Palouse Farmers Decreased Use of Other Practices

(All but seeding to grass stat. significant)
• Survey results show eastern Palouse farmers have shifted from traditional conservation practices like throwing plow furrow uphill, seeding on contour, fall chiseling, and subsoil drainage to modern practices, especially direct seeding.
Perceived Changes in Six “Serious Problems” from Soil Erosion by Year

- **a. Loss of topsoil**: 73% in 1980, 11% in 2010
- **b. Sedimentation of local streams**: 30% in 1980, 8% in 2010
- **c. Sedimentation of larger rivers**: 14% in 1980, 6% in 2010
- **d. Long run decrease in production**: 30% in 1980, 8% in 2010
- **e. Sedimentation of roadside ditches**: 42% in 1980, 7% in 2010
- **f. Long run decrease in profitability**: 39% in 1980, 9% in 2010
$/Ac Profit Willingly Foregone to Increase Soil Conservation

% Respondents by Year
Statistically Significant Leftward Shift in 2010 vs 1980
### Perceived Change in Soil Erosion in 30 Years

<table>
<thead>
<tr>
<th>Change in Erosion</th>
<th>% Respondents, all six counties</th>
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<tbody>
<tr>
<td>Increased Substantially</td>
<td>8</td>
</tr>
<tr>
<td>Increased Slightly</td>
<td>3</td>
</tr>
<tr>
<td>Stayed Same</td>
<td>9</td>
</tr>
<tr>
<td>Decreased Slightly</td>
<td>14</td>
</tr>
<tr>
<td>Decreased Substantially</td>
<td>66!</td>
</tr>
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Perceived erosion decrease might be the answer to:

*Why* Less Concern about Erosion Problems?

*Why* Decline in Willingness to Forgo Profit for Conservation by 2010?
Having already achieved the “low hanging fruit” of affordable conservation by 2010, E. Palouse farmers might have believed that cutting erosion more was too costly. This might explain their caution in forgoing significant profit to achieve additional conservation.

Perception of great conservation progress is consistent with less concern about off-and on-farm erosion problems by 2010.
Influential Conservation Information: All Six Counties

Percentage of Respondents

- Conversations with other farmers
- Direct seed breakfasts
- Regional conferences
- Local field days, meetings, or tours

Influential Conservation Information:
All Six Counties

- Not at All Influential
- Rarely Influential
- Regularly Influential
- Very Influential
Guides for Soil Erosion Control Decisions

- Direct Seed Breakfast
- Website
- TV or Radio
- Farm magazine
- Research results suggested it
- Government incentives provided
- USDA-NRCS staff
- Conservation District
- County agent
- Other farmers
- Friend/neighbor
- Company representative

Percentage of Respondents

- Definitely a Good Guide
- Probably a Good Guide
- Not Sure
- Probably Not a Good Guide
- Definitely Not a Good Guide
Conservation Program Participation: All Six Counties

Percentage of Respondents

Conservation Program Participation:
- CRP
- CREP
- WRP
- EQIP
- CSP

Conservation District Programs
State Conservation Programs

Past Participation
Current Participation

$??
“My farm is in a 20" rainfall area. No-till and minimum till are equally effective in controlling erosion. Some no-till farmers burn every year [which is not sustainable].” **Sustainability concerns**

“No till farmers are too tunnel minded. Reduced tillage works. 2-pass.” **Compromises needed**

“I changed to direct seed due to the cost of fuel and repairs being so high. Used direct seed drills are now affordable. I lost yield but my net income improved.”

“Minimum till and no-till are great methods but start up costs make them cost prohibitive to small farms.

“Direct seeding has effectively eliminated erosion for our farm. Without direct seeding, I am not sure if I would have returned to the farm 4 years ago.”
Summing Up: My View on Causes of Growth in Direct Seeding in E. Palouse

1. Great improvements in d.s. technology due to STEEP and other research

2. Cheaper glyphosate and more expensive diesel

3. More govt. incentive programs

4. Conservation education programs
1. Policy, education and research should focus on used practices like direct seed & min-till.

2. The campaign for direct seeding has not been won in the E. Palouse, only 37% now using.

3. Effective conservation education must be based on good science.

4. Researchers should perfect d.s. systems which accommodate low-adoption regions.
5. Govt. incentives may be useful, but maybe unaffordable.

6. Unleash farmers’ creativity to develop their own effective conservation practices.

7. Enroll 37% of E. Palouse farmers now using d.s. in promoting its adoption.

8. Commend E. Palouse farmers for their conservation progress.
Personal Impacts

• Our willingness to
  
  o acquire ideas from key stakeholders in lengthy personal interviews engendered goodwill in the farming community and will facilitate outreach.
  
  o personally respond to mail survey respondents who provided input beyond the questionnaire engendered goodwill and promoted our understanding of PNW agriculture.
USDA’s Solutions to Environmental and Economic Problems project (STEEP) for funding.

The 584 generous PNW farmers who responded to our tedious 2010 mail survey, the 19 2010-11 personal interviewees, and the 274 farmers who sat still for our long 1980 personal interview.
Recent PNW Soil Conservation Education Heroes: Roland Schirman, Dusty Eddy, Dennis Roe, Robert Papendick

**Father of PNW Soil Conservation?**

**Former survey colleagues:**
Walter Butcher, John Carlson, Don Dillman, Hans Kok, Keith Saxton

**Research Assistants:**
Colette Coiner, Hillary Donlon, Rianne Kiefer, Genevieve Pickart, Monica Reyna, Jennifer Smith, Luke Stein, Andrew Wentworth

Apologies to any we have omitted
Thank You!

Questions?

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Analysis Over Six Counties of Barriers and Facilitators of Direct Seeding

Survey question asked respondents “how important is each item for your decision to PRIMARILY use either traditional tillage or direct seeding (no till)?”

• Internal validation used to determine tillage practice for each respondent (survey responses cross-checked for consistency). Twenty respondents excluded due to failing consistency test.
Significant Effects by Tillage Preference

- **FUEL COSTS** = “Very Important" → Direct Seeding

- **LABOR COSTS** =
  “Very/Somewhat Important” → Direct Seeding

- **CROP YIELD** = “Very Important” → Traditional Tillage

- **SIZE OF OPERATION** =
  “Very Important” → Traditional Tillage

- “I consider myself to be an AGGRESSIVE ADOPTER of conservation practices” = “Strongly Agree” → Direct Seeding
Conclusions

• Producers in counties with high adoption rates of direct seeding are more likely:
  • to be using non-soil disturbance farming techniques of all types including direct seeding
  • to choose their tillage practices based on concerns about fuel and labor costs,

Continued......
• to view themselves as aggressive adopters of conservation practices and less concerned with profitability of those practices,

• to view soil erosion, sedimentation, and air quality as a problem in their area.
There were no statistical differences in how direct seeders and traditional tillers viewed:

• acceptable reductions in profit per acre to reduce soil erosion

• the type of farmer-to-farmer interaction most influential in their choices