Objective 8: On-Farm Testing of Best Management Practices to Control Wind Erosion

Personnel:  
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Other Partners/Cooperators: Wheat Grower and Crop Improvement Associations in Adams and Lincoln counties.

Objectives

The objective of my project is to expand the use of on-farm testing to accelerate the development and grower adaptation of wind erosion “Best Management Practices” that improve profitability, erosion control and soil productivity in low and intermediate rainfall areas of Adams and Lincoln Counties in eastern Washington. This work includes minimum tillage and no-till or direct seed systems, and more intensive crop rotations.

Project Overview and Output

Ninety on-farm tests on 30 different farms incorporating over 900 acres focused on reducing the “risk” and improving the knowledge base of direct seeding, annual cropping, and reducing tillage based fallow systems have been completed since the inception of the project in 1998. During this period, over 3,500 growers, agriculture field personnel and researchers have attended and participated in my program’s various outreach education such as field days and workshops with over 7,700 contact hours recorded. These on-farm tests, focused on the outlined objectives, are the basis for my programs outreach education.

Major Findings or Project Impacts

I. Annual Cropping and Direct Seed Systems

1. Hard Red Spring Wheat Management Project: Research at Ralston Project showed hard red spring wheat (HRSW) to be competitive with winter wheat-tillage fallow at 14% grain protein. Grower’s expressed frustration producing 14% grain protein consistently.  
- I combined Northwest Columbia Plateau PM$_{10}$ Project funding with WSU Vogel and Doris and Otto Amen Dryland Research funds to produce sixteen on-farm tests examining multiple aspects of HRSW production over 3 years.
- Presentations were made regionally at the Pacific Northwest Farm Forum, and grower presentations were also made locally. HRSW on-farm trials were highlighted at the
Northern Lincoln County Field Day and Wilke Field Day. The work was published in the Department of Crop and Soils Technical Report (Esser, 2002). Individual trials results were published in the annual On-Farm Testing Results. A HRSW Production Extension Publication is planned.

- This project has helped develop a production model that reduces the risk associated with HRSW production and increases the opportunity for economic returns. HRSW averaged 14% grain protein at Ritzville Warehouse in 2004.

1. **Direct Seed vs. Conventionally Seeded Spring Cereal Project**: Growers have a strong interest to know and understand how direct seeded spring cereal compared with conventional tillage based spring seeding.
   - Six on-farm tests were conducted over three years to examine the agronomic and economic differences of direct seeded vs. conventional tillage for spring cereal production.
   - Presentations were made locally at multiple grower presentations. These series of tests were also highlighted at the Northern Lincoln County Field Tour. Individual trials results were published in the annual On-Farm Testing Results (Esser, 1998; Esser, 1999; Esser, 2000).
   - This project concluded that there was no agronomic or economic benefit or loss producing a spring cereal in a direct seed system vs. a conventional tillage based system. This is a critical first step in increasing the understanding and reducing the risk associated with direct seeding and annual cropping.

2. **Other Important Direct Seeded and Annual Cropping Projects**:
   - Rick Brunner improved his bottom line $5,700 annually through direct seeding his spring wheat and barley at correct rates (Esser, 2002). The impact of this is not only the profit but it will allow Rick and his neighbors to continue examining direct seeding practices.
   - I’m working with Mark Sheffels with a series of on-farm test over 5 years examining the benefit/detriment of incorporating mustard into a continuous cereal based cropping system.
   - A series of six on-farm tests at two locations over three years has demonstrated that fall nitrogen fertilization for spring cereal production provided no agronomic gain or loss compared to spring fertilization (Tonks and Esser, 2004) This allows farmers to capitalize when fertilizer prices are low in the fall and reduce their spring workload.
   - Eighty seven percent of those who responded over the past two years said that the education provided and knowledge gained at the Northern Lincoln County Field Tour was the best use or very good use of their time and none of the 95 growers responded with poor or waste of time.
   - Eighty percent of the growers attending the workshop “Direct Seeding 101” learned new information and they expressed changing their farming practices.
   - I teamed with Herb Hinman, Tom Platt and grower/cooperators to develop annual cropping and direct seed enterprise budgets for Adams County (Hinman and Esser, 1999) and Lincoln County (Esser et al., 2003; Platt et al., 2003). These budgets are an important tool
to help growers understand the costs associated with different cropping systems so they can make more informed decisions regarding wind erosion BMP’s.

II. Recrop Winter Wheat and Chemical Fallow Direct Seed Systems

My on-farm test, other University research, and grower experience agree direct seeded annual cropping has provided some tremendous opportunities, however during dry years the risk is extremely high. My project is currently examining the feasibility of incorporating more winter wheat into a direct seed system to reduce risk and increase profits and grower adoption of direct seed and other conservation systems.

1. Recrop Winter Wheat Project: This is one method growers have proposed to reduce spring work loads for more timely spring seeding and reduce the overall risk associated with direct seeding.
   - I combined Northwest Columbia Plateau PM_{10} Project funding with Doris and Otto Amen Dryland Research funds and multiple in-kind contributions to establish on-farm tests located on three farms over a 3-year period.
   - This data was presented nationally at the American Society of America regionally at the Pacific Northwest Direct Seed Conference and at multiple local grower meetings. On-farm tests summaries were published in the annual On-Farm Tests Results (Esser, 2003) and regionally in Wheat Life® and Ag Horizons. Recrop on-farm tests were also highlighted at the Northern Lincoln County Field Day and included on a tour stop during the Soil and Water Conservation Society’s Annual Conference.
   - Winter wheat following spring wheat was at least $40/ac more profitable than each of the other four treatments, including winter wheat following chemical fallow. Winter wheat following barley had lower test weight because of volunteer barley. Good winter wheat stand establishment and lower weed populations were gained with mustard and pea incorporated into rotation, but low yields and general lack of profitability in comparison to the cereal crops more than offset these benefits.

1. Chemical Fallow Winter Wheat Project: This is one more method growers have proposed to diversify their direct seeded cropping system, reduce spring work loads for more timely spring seeding and reduce the overall risk associated with direct seeding.
   - I established on-farm tests examining different aspects of chemical based summer fallow.
   - Different aspects of this project has been featured during the Northern Lincoln County Field Tour and Lind Field Day and presented at the Washington State Weed Association Meeting. Data and on-farm test results have also been included in various local growers meeting.
   - In an ongoing test, chemical based summer fallow winter wheat produced yields equal to tillage based summer fallow winter wheat with less costs, and delayed seeding of chemical fallow reduced yield by nearly 20% (Esser, 2004). If similar results can be obtained over years this will have a significant impact on wind erosion and air quality through increased adoption of direct seed systems. Very good/excellent broadleaf weed control was observed with both the Roundup/Spartan and Roundup/Valor treatments during the chemical fallow period and decreased the need for subsequent herbicide applications (Esser, 2003).