Proposal for 2004 - 2005
Northwest Columbia Plateau Wind Erosion / Air Quality Project

Objective 10: Evaluating the Profitability and Social Benefits of Alternative Farming Systems for Air Quality Control

Title: Economics of Wind Erosion Control

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Objectives
1. To continue evaluating economic profitability and riskiness of wind erosion control cropping systems at Ralston and Lind.
2. To compute yields and quality necessary for no-till spring cropping systems to breakeven economically with WW-fallow at various prices and 2002 Farm Bill provisions.
3. As wind erosion forecasts are available from project engineers, to use these to compute the cost effectiveness of public cost sharing for conservation cropping systems tested in experiments. This will permit identifying economic BMP’s for farmers and policymakers.
4. To use regression estimates of yield and protein response to N to determine profit maximizing N fertilization of hard red spring wheat considering both protein and yield.
5. To examine farm and farmer factors associated with adoption of no-till and minimum-till.
6. To disseminate results to growers and others through talks and published materials.

Recent Accomplishments
Profitable fertilization of hard red spring wheat for yield and protein: During 2003 new research results were reported with cooperators Dave Huggins and Bill Pan on the profitable fertilization of hard red spring wheat (HRSW) for different wheat prices, nitrogen prices, and protein price premiums and discounts. The data utilized were drawn from field experiments by Huggins. To show the effects of changing economic conditions on optimal N fertilization, the analysis considered high and low grain and N prices and five premium/discount (P/D) structures. The P/D structures were based on ten years of historical Port of Portland price data. Premiums and discounts are in cents/bu per ¼ percent above or below 14% protein. All predicted profit maximizing N, protein, and yield levels were within the experimental data range. Patterns of optimal fertilization also conformed to expected patterns of economic response. For example, within any wheat and N price combination, increasing P/D incentives for protein increased optimal N. At the two lowest P/D structures examined, which provided the least reward for high protein, it was most profitable to fertilize for slightly less than 140 g
kg\(^{-1}\) expected protein. These results indicate that it is not always profitable to use “14% protein” as an N fertilization goal. Overall, profit maximizing yields varied only modestly with changes in both N and wheat price in this data set.

Wheat price and N price at lower P/D structures have a larger impact on optimal N and resulting protein levels than at higher P/D structures. As P/D structures increase they provide greater incentive for higher protein levels. While optimal N rates increase significantly in response to increased P/D incentives, only a modest increase was observed in resulting protein levels.

**No-till spring cropping**

*Ralston and Horse Heaven Hills No-Till HRSW Experiments:* No-till continuous HRSW rotations are clearly an environmental success. Engineers’ have predicted that no-till continuous spring grains can reduce dust emissions by 94% during severe wind events compared to conventional wheat-fallow. But seven and six years experimental results at Ralston and the Horse Heaven Hills have shown that the continuous no-till HRSW systems tested have not been economically competitive with a tillage winter wheat/fallow. Seven-year and six-year average net returns for no-till HRSW systems lagged conventional SWWW/fallow net returns by over $40/ac. Furthermore, the spring cropping systems exhibited significantly more economic downside risk in dry years.

*Ritzville no-till spring cropping experiment:* Economic results for the Ritzville Project because differed slightly from the 2002 annual report due to use of updated costs. This five-year experiment was conducted by Bill Schillinger from 1997 to 2001 on the Ron Jirava farm near Ritzville, Washington. Annual rainfall at the site averaged 11.4 inches. The three no-till spring cropping systems compared in this experiment were a 4-yr safflower/yellow mustard/soft white spring wheat (SWSW)/SWSW rotation, a 2-yr SWSW/barley rotation, and continuous SWSW.

Among no-till spring crops, continuous no-till SWSW had the highest average net return at $4.90/ac, followed by SWSW/Spring Barley and Safflower/Yellow Mustard/SWSW/SWSW at -$4.90/ac and -$12.73/ac, respectively. The 5-yr average net return of continuous SWSW of $4.90/ac was judged statistically equivalent to that of SWWW-fallow of $8.71/ac. Equivalent average profitability between a no-till spring grains system and SWWW/fallow is a very welcome result in this region given the $40 shortfall in annual profitability of previous research comparisons of no-till HRSW to SWWW/fallow.

*Adoption of wind erosion control practices:* During 2003 the final statistical analysis and interpretation of survey results on adoption of conservation practices by Adams, Benton, Douglas, Grant, and Franklin County farmers in central Washington was published. The final results confirmed preliminary results reported in earlier reports. Farmers adopting more than one practice tended to have larger farms, more education, and more exposure to wind erosion control education programs. Results showed that innovative farmers who adopt conservation tillage often experiment with several conservation practices. Defining nonadopters as adopters of zero wind erosion control practices gave better results in distinguishing innovative adopters than defining adopters as nonadopters of the specific practice being investigated.

*Wind erosion control and conservation cropping systems in the southern prairies of Canada:* During August-December of 2003 the P.I. was on professional leave with Agriculture and Agri-Food Canada in Lethbridge, Alberta. Among other work, the P.I. and local colleagues
compared conservation cropping systems in the U.S. and Canada. Canada has made progress in reducing wheat-summer fallow rotations, largely by switching to no-till diversified spring crop rotations. Cropping diversity, measured by the Gini coefficient, showed neither the United States nor Canada dominated in diversity along their northern plains border during most of the period, 1975-99. However, in the 1990's, American farmers lagged Canadian farmers in adopting alternative crops.

Canada has had greater success in profitably incorporating broadleaf oilseeds, especially canola, into rotations with spring wheat. Indeed canola sometimes “carries” spring wheat economically, whereas winter wheat is the economic mainstay in U.S. Pacific Northwest rotations. Pulses have also moved northward and eastward. Until the late 1970’s, eastern Washington and northern Idaho dominated the North American lentil market. Since then much of the acreage for this desirable rotation crop has expanded in Alberta and Saskatchewan, and in recent years to North Dakota. Canadian farmers and scientists attribute part of their success with no-till to the use of beneficial and profitable broadleaf crops in rotations. There are good agro-climatic reasons for the success of these crops in Canadian prairies. For example, moisture is less of a constraint than is temperature in much of the prairies, whereas the opposite is usually true in the inland Pacific Northwest. Canadians have made good progress in adopting cultural practices appropriate to their conditions, such as swathing prior to harvesting. They have also been successful in breeding varieties adapted to their conditions and now appear to have the potential to reap substantial cost savings with Roundup ready canola.

Canada’s success with conservation tillage in diversified crop rotations reinforces the incentives for research to develop or identify alternative crops and cultural practices adapted to Pacific Northwest conditions.

**Planned Research for 2004-2005**

1. To continue economic analysis of wind erosion control cropping systems at Ralston and complete economic summary of Phase I of Ralston project. With the transition from Phase I to II of the Ralston spring cropping crop, it is the time to complete the analysis of economic performance of Phase I.

2. To initiate economic analysis of irrigated cropping systems project at Lind. Sufficient years data have accumulated at the irrigated cropping systems project at Lind to initiate economic analysis of the field treatments. Cooperating farmers have expressed interest in the economics of alternatives to burning and plowing continuous irrigated wheat.

3. As wind erosion forecasts are available from project engineers, use these to compute the cost effectiveness of public cost sharing for conservation cropping systems tested in experiments. This will permit identifying economic BMP’s for farmers and policymakers.

4. To summarize continuing insights on successful conservation cropping systems from the southern Canadian prairies. The P.I. will complete a year’s professional leave in southern Alberta by early August 2004. Insights will be shared from farming systems in the southern Canadian prairies on successful direct-seeding in diverse grain and broadleaf rotations. Insights on conservation policy, erosion control, weed control, nutrient management, and cost of production control will also be shared.

5. To complete publication and interpretation of economic results on optimal nitrogen fertilization of hard red spring wheat and on no-till soft white spring wheat cropping systems.

6. To disseminate results to growers and others through talks and published materials.