

**Research Proposal for the Agricultural Research Foundation
Oregon Wheat Commission**

Title: Economic implications of climate change policy on Oregon agriculture

Investigator(s): Professors William K. Jaeger and Susan Capalbo, Department of Agricultural and Resource Economics (AREc)

Cooperator(s): John Antle, Andrew Plantinga, AREc

Funding History: None

Abstract:

This proposal seeks to improve what we know about the effects of climate change policies on farmers in the Pacific Northwest. With an expectation of a national climate change policy in the near future, farmers will be well-served to understand it's likely effects and how they can best respond. This project would address three main issues:

First, the project will assemble information to aid farmers in monitoring their production on a 'carbon-footprint' basis as well as cost accounting, as a way to prepare for policies aimed at reducing net carbon emissions. Crop enterprise budgets for selected commodities will be "augmented" to include the carbon implications of a set of production activities. This information will be used to analyze how alternative practices would affect both carbon emissions and net revenues.

Second, the study will perform an economic assessment of how a cap on carbon emissions (or a carbon tax) will affect costs and revenues for Oregon agriculture, with an initial focus on the wheat/small grains sectors. Although impacts are being estimated at the national level with economic models, regional specific analysis would improve the resolution and detail about what can be expected as climate policy is designed and implemented. It is anticipated that this work could include the potential effects of mitigation and offset programs to sequester carbon in much of PNW agriculture and forestry, although our initial efforts will focus on the small grains.

Third, an economic evaluation will be undertaken of potential policy interventions that would help farmers adjust in ways that both meet the goals of climate policy (carbon emissions reductions), and do so in ways that minimize harm to farmers and their communities.

A report addressing each of these three components will be produced including spreadsheets for specific crop enterprise-carbon budgets. We anticipate that this will be a "phase 1" project, and that additional analysis building on this effort will be needed.

Objectives:

The objectives of this project correspond to each of the three issues described above. For the first issue, the objective is to create user-friendly crop enterprise budget tools that enable producers to evaluate the economic and carbon-emissions effects of a range of changes in practices. This may include alternative tillage, chemicals, or energy-intensive practices.

The objective for the second issue is to provide a reliable estimate of the net effect on producers of the likely changes that would occur with the implementation of a carbon policy. These changes include changes in energy costs and crop prices, as well as potential gains from carbon offsets. Many of these types of changes are summarized in testimony by the USDA Chief Economist Joseph Glauber's before the House Agricultural Committee December 3, 2009.

(<http://agriculture.house.gov/testimony/111/h120309/Glauber1.pdf>)

The objective for the third issue is to identify potential policy actions that could be taken to mitigate the adverse economic effects of carbon policy, or ways to facilitate reductions in carbon emissions at a lower cost. This effort would hope to evaluate a number of alternatives, and to provide evidence of their relative cost, effectiveness, and beneficial effects to producers.

Procedures:

The analysis will involve several stages. Existing studies, data and analysis will be compiled. This will include a literature review and assembly of existing research, modeling tools, and similar studies in other regions. For each of the three issues to be addressed, close consultation with producers will be necessary to identify the range of alternative practices and policy interventions that appear most promising. The second stage will involve creating the augmented enterprise budgets and carbon accounting, also with detailed consultation with growers and with researchers working on similar issues in other regions of the country. Existing models used for national analysis may be built upon to estimate local effects. Scenarios will draw on existing research and expertise in AREc, notably John Antle and Andrew Plantinga. The third issue will draw on results from the first two aspects of the study. Evaluation of policy interventions can make use of the spreadsheets created and market effects to evaluate how each would differ as a result of a particular intervention. These analyses will be calibrated for a small number of locations.

Timelines:

July 2010-Sept 2010: Stage one efforts as defined above

August 2010-December 2010: Stage two augmented enterprise budgets

January 2011-June 2011: Stage three efforts on economic evaluation of policy scenarios

June 2011: Final report

A total of 1.0 months of faculty time is requested from the OWC plus one month of research assistance. This effort is part of a larger effort to address the implications of climate change in many sectors of OR agriculture and resource-based sectors by faculty in AREc.

Justification:

This work has potential benefits to growers, industry and society in the short-term and the long term. A central observation in economics is that producers (and consumers) dislike uncertainty because it makes decisions more difficult, thus raising costs or lowering benefits. This research is aimed at providing information and tools to producers so that they can better anticipate and respond to the changes that are expected due to

biofuels, after growers and processors have made significant investments. The lesson in this case is to connect the economics and cost-effectiveness at both the commercial level and the policy level to avoid unanticipated and undesirable surprises where possible.

Second, Susan Capalbo, John Antle, and Andrew Plantinga have been actively involved in national and regional policy research related to the potential for carbon sequestration in agriculture and forestry, how existing and proposed policies are likely to affect the ability of US agriculture and food sector to adapt to climate change, and the role of the public sector to facilitate agricultural adaptation to climate change. John Antle has been directly involved in authorship of many papers on climate change in agriculture, including IPCC reports. Antle and Plantinga will serve in an advisory role for this project.

Third, Susan Capalbo and other faculty at AREc are working with colleagues in Washington and Idaho and revising enterprise budgets tools to reflect an emphasis on carbon reductions and changes in net returns.

References:

Antle, J.M., “Adaptation of Agriculture and the Food System to Climate Change: Policy Issues”, Testimony to House Agriculture Subcommittee, Dec 2009

Antle, J.M., S.M. Capalbo, E.T. Elliott, and K.H. Paustian. (2004). “Adaptation, Spatial Heterogeneity, and the Vulnerability of Agricultural Systems to Climate Change and CO₂ Fertilization: An Integrated Assessment Approach.” *Climatic Change* 64(3):289-315.

Jaeger, W.K., R. Cross and T. Egelkraut, 2007. “Biofuels Potential in Oregon: Background and Evaluation of Options.” Special Report #1078. Oregon State University Extension Service. July 2007. (<http://extension.oregonstate.edu/catalog/pdf/sr/sr1078.pdf>)

Jaeger, W.K. and R. Siegel, 2008. “Economics of Oilseed Crops and Their Biodiesel Potential in Oregon’s Willamette Valley. Special Report 1081. Oregon State University Extension Service, May 2008. (<http://extension.oregonstate.edu/catalog/pdf/sr/sr1081.pdf>)

Jaeger, W.K. and T. Egalkraut, 2009. The Cost Effectiveness of Biofuels Given Multiple Objectives. Paper presented at the Western Economics Association International, Vancouver, BC, June 2009, and at the 2009 AERE Workshop: *Energy and the Environment*, June 18-20.