Research Highlights from Objective Team 4 - Economics and Social

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Goals and Activities

Determine social and economic factors influencing agricultural management, technology adoption, and development of policy to improve production efficiency while mitigating greenhouse gas emissions.

- Assess alternative production systems for adapting to and mitigating climate change to meet NIFA targets for reduced emissions and increased efficiency.
- Employ social and economic surveys to understand the factors governing alternative system adoption.
- Fund graduate students and summer interns to support these efforts.

Milestone/Deliverable	Status	Completion Date
Milestones:		
Longitudinal producer surveys (years 1-4)	Years 1-3 complete, Year 4 ongoing	End of Year 5
Key informant interviews	In progress	End of Year 5
General public survey	Survey complete and data being analyzed	Survey complete, analysis in progress
Agricultural producer survey	Survey complete and data being analyzed	End of Year 5 (and beyond)
Deliverables:		
Spatial representation of adoption likelihood incorporating socioeconomic variability	In progress	End of Year 5
Socio-geographic functions for N, water, energy use shifts due to crop, policy, climate	Can deliver by end of year 5 with collaboration from other teams	End of Year 5

Graduate Students

Hilary Donlon Davis (UI) Master's student, advised by Kate Painter (UI)

Longitudinal survey of wheat growers in the inland Pacific Northwest
This longitudinal survey is a four-year survey of growers and their wheat production practices, collecting information for the crop years 2011 to 2014. The survey is used to inform REACCH scientists about production practices in the four agroecological classes (AECs). Data from this survey cover topics ranging from insects to economics. Economic budgets have been made for each of the 4 years of collected data. Her primary focus is to compare economic variables between the AECs. Another output from this collected data will be extension enterprise budgets for the three dryland AECs.

Jenna Way (OSU) Master's student, advised by Clark Seavert (OSU)

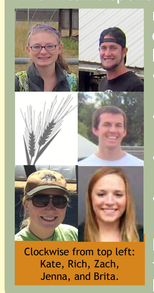
Evaluating environmental and economic tradeoffs in agriculture.
We are developing an environmental module for AgTools™. The aim is to help agricultural producers incorporate environmental factors into their decision making process. AgTools is a decision support tool for agricultural producers that analyzes the profitability and feasibility of alternative cropping systems and management decisions. Jenna is working on a new module called AgEnvironment which ideally will incorporate climate impacts on yields as well as environmental impacts of changes in management practices, allowing users to evaluate environmental and economic trade-offs.

Xiaojuan Zheng (OSU) PhD student advised by Jeff Reimer (OSU)

Integrating representative agriculture pathways into a general equilibrium model Xiaojuan is developing a general equilibrium economic model to make macro-economic projections concerning the REACCH study area wheat economy. She employs economic and agronomic assumptions from upon the Representative Agricultural Pathways (RAPs) developed by others in the project. She allows for three general types of drivers for the future of the Pacific Northwest wheat economy and related sectors: input prices, export demand, and yield changes, and estimates their future impact on variables such as wheat prices, exports, and farm welfare.

2014 Summer Interns

The interns spent their summer learning about REACCH and climate change in the region, and worked on projects with team 4 members. At the end of the summer they each presented their intern project (listed below) at a seminar on the U of I campus.



Clockwise from top left: Kate, Rich, Zach, Jenna, and Brita.

- Richard Manuli - Obstacles Implementing Oil-Seeds in Biofuel Production in the PNW.
- Caitlyn Mack - Strengths Weaknesses, Opportunities and Threats analysis of the CA Low Carbon Fuels Standard.
- Zachery Millang and Jenna Way - Integrating Environmental Accounting into AgTools™.
- Brita Olsen - Impact of Climate on Wheat Production in Idaho: A Survey of Three Decades of Crop Progress and Condition Reports

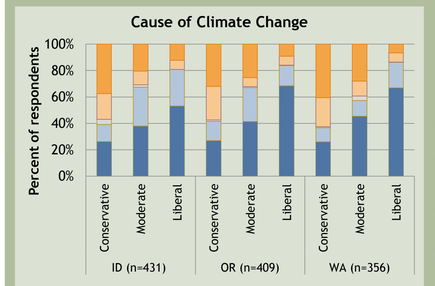
Each intern also produced a blog for REACCH, sharing their summer internship experience. The blogs can be accessed at https://www.reacchpna.org/blog.

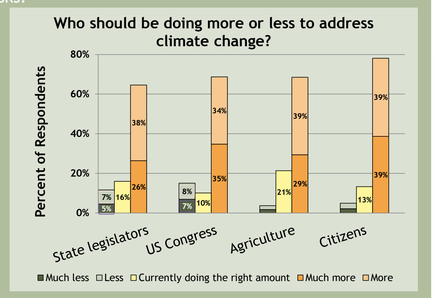
Research Highlights

General Public Survey

REACCH conducted a telephone (mobile and landlines) survey of the general public in rural and urban counties across ID, OR, and WA in 2012 yielding 1,298 responses at a 43% cooperation rate. Statistical weighting techniques were applied to the data via gender and age variables to ensure high levels of representativeness at the full-study and sub-analysis levels. This survey effort contributes to understanding the baseline of climate perceptions in the region. As such, it could inform institutional adaptations, marketing related to trends in consumer preferences related to production practices, and how urban and rural populations interpret food security risks.

Based on the results, the general public responses indicate a 'spectrum of responsibility' for managing climate change. This translates as citizens (more than 60% or respondents) wanting to see more action to address climate change through legislation at both the state and federal levels, via the agricultural community, and through individual choices (see figure to the right).

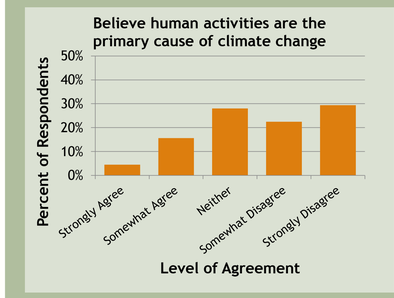




To understand more of the profile about climate change beliefs within the PNW population, we analyzed belief in the source of climate change across state and political views. Results indicate a clear continuum of beliefs - including 'natural', 'humans', and both as causes - across the region and across political views (see figure to the left). The baseline results create an opportunity to support the agricultural industry and stakeholders in understanding consumer beliefs and perspectives as mitigation and adaptation policies emerge.

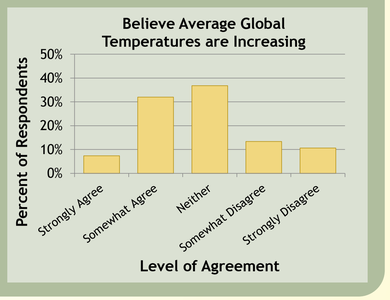
Agricultural Producer Survey

With survey design help from the Social Science Research Unit of the University of Idaho, we administered a mail survey to nearly 2000 agricultural producers within REACCH counties. The survey was mailed between November 2012 and March 2013 to producers who grew more than 50 acres of wheat in 2011 (as identified by the National Agricultural Statistics Service.) The survey included perceptions of climate change, management practices, and demographics, as well as maps on which to mark parcels farmed. We received 900 completed and eligible surveys, resulting in an overall response rate of 46%.



We also asked about their belief in whether climate change is caused by human activities. The trend in these results (see figure above) shows a different pattern, with a slight majority (52%) of the respondents expressing at least *some disagreement* with the statement: "human activities are the primary cause of climate change." While 20% indicated some agreement with the statement, More than a quarter of respondents (28%) indicated they neither agreed nor disagreed with the statement. These results imply a prevailing view among those surveyed that climate change originates from natural causes.

Producers were asked about a variety of climate change related issues they have observed or experienced. For instance, we asked about belief in temperature change on an agreement-disagreement scale about the statement "Average global temperatures are increasing". Results yielded a fairly normal distribution with over a third (37%) of respondents indicating 'neither' and 24% noting some level of *disagreement* with the statement (see figure below). A slightly greater percentage (39%) indicated some level of *agreement*, however, most responses fell within the "somewhat agree" category.

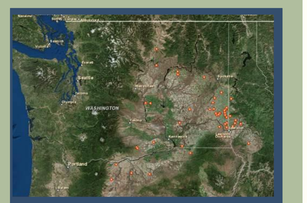


Climate Change Learning Modules

REACCH members are working with Oregon State University Ecampus to deliver climate change information through flexible online learning modules. The goal is to help individuals understand the physical facts of climate change, the potential impacts, and possible adaptation and mitigation strategies from an economic and policy perspective.

Longitudinal Producer Survey

The longitudinal survey consists of in-person interviews with a set of 47 wheat producers representing the varied producing regions in the REACCH study area. In addition to providing detailed economic data on yields, production practices, and machinery, these growers answered questions from other REACCH scientists on a wide range of topics, from pest problems to opinions on Extension and climate change. Growers were grouped by agroecological class (AEC), a classification system based on cropping intensity: dryland annual cropping; transition, with two years in crops and one year in fallow; grain-fallow; and irrigated annual cropping. These growers were chosen because they are early adopters of technology, leaders in their communities, and frequent collaborators with university researchers. There are 20 growers in the Annual AEC, 11 in the Transition AEC, 14 in the Grain-Fallow AEC, and 2 in the irrigated class.



Location of growers interviewed

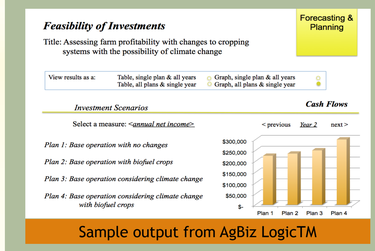
Summary of AEC characteristics from the longitudinal survey data

Agroecological Class (AEC)	Average Precipitation (in/year)	Rotation	3-Year Winter Wheat Yield Average (bu/ac)
Annual	21	winter wheat, spring grain, legume	92
Transition	16	winter wheat, spring grain, fallow	82
Grain-Fallow	12	winter wheat, fallow	56
Irrigated	6	varies	142

AgBiz Logic™

REACCH researchers at OSU in cooperation with the Oregon Climate Research Institute and the Climate Hub are developing a web-based decision support tool for assessing the impacts of climate change and associated adaptive and mitigative management practices. AgBiz Logic™ will incorporate AgEnvironment™ into the existing suite of software programs (AgProfit™, AgLease™, and AgFinance™) which provides web-based modules, and information to farmers, ranchers, and land use managers to better understand the financial and environmental trade-offs associated with alternative management decisions— at the field or farm scale. Incorporating AgEnvironment into the existing set of modules will also assist growers to visualize and understand the range of changes (exposure to risk) to their net returns and to understand connections to both onsite and offsite environmental changes. This assessment tool provides the foundation of a truly integrated assessment and trade-off framework for assessing technology changes and changes in external drivers such as climate, water availability, and policy.

We are also exploring options to incorporate down-scaled climate and crop yield information from crop models (which objective team 1 are working on) specific to the respondents' farming area from to create a real-time context for long term and short term management decisions.



Sample output from AgBiz LogicTM

Farmer-to-Farmer Case Studies featuring Innovative practices of local growers

The REACCH region has many excellent farmers at the forefront for adapting tillage, residue management, crop rotations, soil organic amendments, and resource use efficiency that has enabled them to thrive when faced with risk. In order to enhance the resiliency of cereal-based farmers in the inland Pacific Northwest members from several REACCH teams worked together to interview a number of these innovative dryland farmers, and have featured them in a series of case studies. The case studies aim to inspire other farmers and provide them with details that could inform their decisions regarding adoption of new strategies on their farms. As they become available, materials will be posted at www.casestudies.reacchpna.org.

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