



Climate change and agriculture: What do stakeholders need?

Georgine Yorgey (yorgey@wsu.edu) WSU, Leigh Bernacchi UI, Chad Kruger WSU, J.D. Wulffhorst UI, Sylvia Kantor WSU, and Kristy Borrelli UI

In order to ensure that REACCH effectively addresses perceived stakeholder concerns about climate change and agriculture, we engaged with a variety of individuals and groups concerned with this topic.

- Dryland and irrigated producers with more than 50 acres in wheat were surveyed by mail in winter of 2012–2013. Additional in-depth interviews are being conducted with a subset of producers who are experimenting with new technologies or management practices.
- Crop advisors, farmer associations, individuals working at government agencies, and environmental groups were interviewed.
- Members of the project's stakeholder advisory committee were surveyed and continue to provide input in an advisory capacity. This group includes industry representatives and teachers, in addition to the groups mentioned above.

These activities have enhanced our understanding of stakeholders' opinions and needs around the topic of agriculture and climate change in the inland Pacific Northwest. Key findings are described below and summarized at the conclusion.

IMPACT

Our stakeholder engagement activities suggest that REACCH can serve stakeholders' needs by focusing on mitigation activities that offer co-benefits and on production practices that may serve as a buffer against the effects of a changing climate. The project can also provide information to help producers evaluate the amount of risk that various aspects of future climate change present and understand the implications for their farming operations, especially with regard to water supply, economic risks, and risks regarding regulation.

Attitudes and beliefs:

The majority of surveyed producers have observed weather changes in their lifetime (80%). However, they were less likely to agree that climate change is human-caused (Figure 1). During interviews, individuals in farmer associations and government agencies suggested that these mixed attitudes have led to producers being generally more interested in strategies

that could help them adapt to climate change than in activities that might mitigate climate change. Interest in mitigation arose mainly when such activities provided other co-benefits. For example, although improved residue management can provide climate benefits by storing carbon in the soil as organic matter, producers were mainly interested in the soil quality and soil water storage improvements it provides.

Surveyed producers were generally uncertain about the risks that climate change poses. When asked how great or small a risk

is posed to their farming operations by less reliable precipitation, long-term drought, cost of inputs, climate change policies, or unstable crop prices, many (30–70%, depending on the specific risk) said they did not know (Figure 2). Meanwhile, a smaller but still sizeable group (20–40%) said these factors represented a high level of risk. During interviews, individuals from farmer associations and agricultural government agencies reiterated significant concern about precipitation and water availability. They also discussed uncertainty about the direct and indirect impacts of possible climate-related regulation on the agricultural sector.

Surveyed farmers indicated less concern about two other risks: fewer days with frozen soil and increased intensity of precipitation. The largest group (35–40%) thought these factors represented a moderate level of risk to their operations. An additional 20–35% suggested they were a high risk, while very few (0–10%) said they did not know.

Adapting to climate change: If faced with warming temperatures, reductions in summer precipitation, and increases in winter precipitation by 2050–2080, survey results indicated that the majority of producers (more than 75%) did not think they would need to make more than small changes to their farming operations (Figure 3). Additional analysis (not shown here) suggests that producers who use conservation tillage are particularly likely to think that they will not need to make big changes to their tillage practices. It is possible that producers feel that conservation tillage improves soil quality in ways that can serve as a buffer against the impacts of climate change, in the form of more organic matter and better water-holding capacity. Planned future work will analyze the distribution of responses across agroecological zones in the region and seek to better understand why producers feel that big changes are not necessary.

Research interests: Diverse groups of stakeholders identified specific areas of research they thought would be useful in adapting to or mitigating climate change. Topics that were mentioned frequently, by several types of stakeholders, included:

- **Crop varieties**, including heat- and drought-tolerant varieties and those well suited for no till
- **Water quantity**, including water supply and demand in irrigated and dryland systems, efficiency, and conservation
- **Agricultural practices**, including precision agriculture, alternative crops, cover crops, and residue management
- **Nutrient management**, including changing nutrient needs, nutrient recovery from wastes, and protocols for crediting nutrient management improvements
- **Soil carbon**, including methods for increasing, measurement, and potential benefit for adaptation to climate change

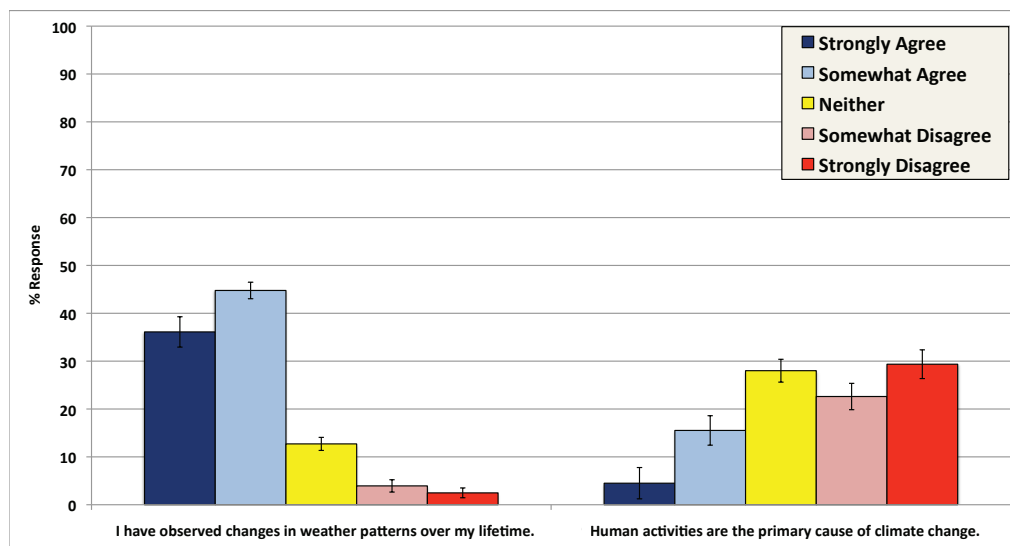


Figure 1. Most respondents have observed weather pattern changes over their lifetimes, but were less likely to agree that humans are the primary cause of these changes.

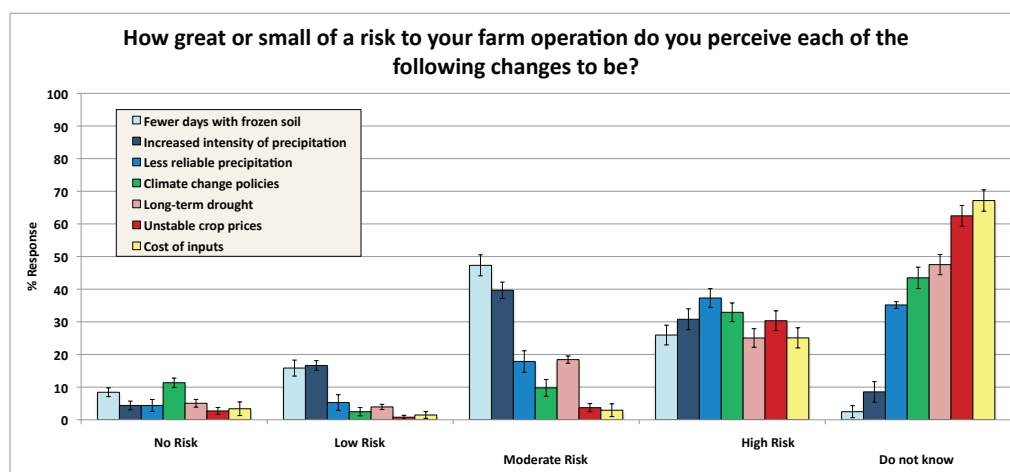


Figure 2. Many respondents are aware of the moderate to high risks of climatic changes, especially with respect to temperature and precipitation. Most producers are uncertain as to the effects of policy changes and economic impacts.

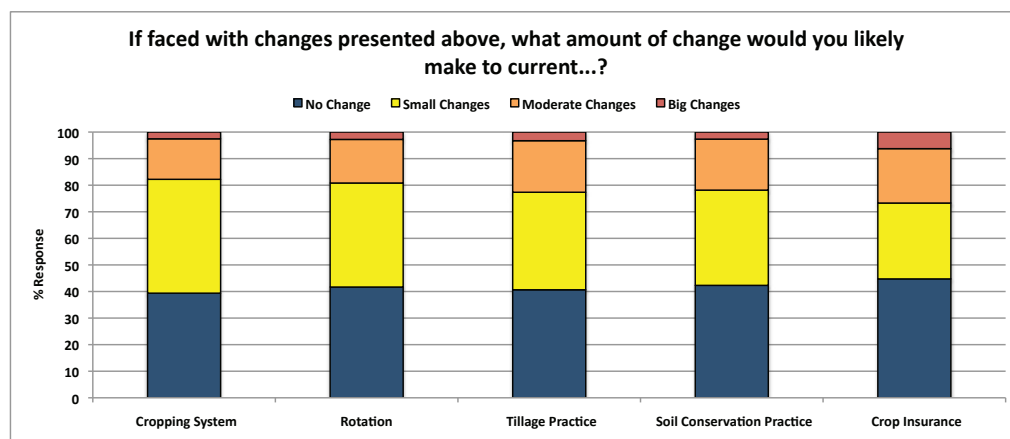


Figure 3. Most respondents do not anticipate a need for more than small changes to their farming operations in response to climate change. While producers are least likely to make changes to their cropping system and rotation, they are more likely to respond to potential climate changes through modified tillage practices and crop insurance.

Where to from here? Stakeholders have suggested several ways in which REACCH can serve their needs. REACCH should identify and emphasize mitigation activities that offer co-benefits. For adaptation, REACCH should continue to develop, support and promote production practices that may serve as a buffer against the effects of a changing climate. The project should also provide information to help producers evaluate the amount of risk that different aspects of future climate change present and understand the implications for their farming operations, especially with regard to water supply, economic risks, and risks

regarding regulation. When available evidence suggests that risks are significant, efforts should seek to identify strategies that could reduce risk. Finally, REACCH should prioritize the dissemination of information about the specific research topics identified by stakeholders. Some of this information is available through existing research, or will be available from ongoing work that is part of REACCH. Other concerns may need to be addressed in future research.