Midwestern Farmers' Six Perspectives on Climate Change: Toward Effective Communication Strategies for Adaptation and Mitigation

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Developing Effective Climate Change Communication for Farmers

Calls for adaptation and mitigation strategies in response to climate change-related threats to agriculture are mounting (e.g., Climate Change Position Statement Working Group 2011). Emerging research points to differences among farmers regarding beliefs about climate change, perceptions of risks that it presents, capacity to adapt, and attitudes toward actions that maintain productivity and protect local and global environments (Arbuckle et al. 2013). To date, however, such differences (and similarities) are poorly understood and by and large have not been taken into account in extension programming.

A growing body of research shows that traditional extension approaches based on the top-down, deficit model of science communication are largely ineffective in the agri-environmental realm (Nowak 2013), and that iterative, participatory problem-solving approaches that deliberately link actors whose beliefs, knowledge and skills may differ but who have shared interests (e.g., scientists, extension professionals, and farmers) can be more effective (Leeuwis 2004; Morton and Brown 2011). However, pursuit of such interactive approaches requires in-depth knowledge of audiences' perspectives on the issues to be addressed.

Methods

Accordingly, this research employed latent class analysis (LCA) to analyze data from a survey of 4,778 farmers from across the Corn Belt (Arbuckle et al. 2013)[a] in order to gain a better understanding of how farmers differ and/or are similar in terms of their knowledge, experience, and attitudes regarding climate change and agriculture. Specifically, we report the results of LCA models run with 34 variables measuring dimensions of five conceptual categories:

- ***Beliefs*** about climate change;
- Perceptions of ***risks*** associated with climate change;
- Experience with ***hazards***, such as floods and drought;
- Personal self-***efficacy***, or confidence in ability to adapt; and,
- Support for adaptation and mitigation ***action*** in response to threats.

LCA is an iterative procedure that identifies clusters in multivariate data by fitting latent class models with increasing numbers of latent classes (Magidson and Vermunt 2004). Looking to Maibach et al.'s (2011) *Global Warming's Six Americas* research, we use LCA to characterize differences among farmers. However, we also seek to understand how subgroups of farmers may be *similar.* Better understanding of both differences and similarities will be critical for development of engagement strategies that resonate with specific as well as broader populations of farmers.

Six Perspectives on Climate Change

Our model selection process fitted models ranging from 3 to 15 latent classes. The six-class model provided satisfactory model fit statistics while maintaining distinction among the classes and adequate interpretability. Figure 1 presents the distribution across the classes.

[a]The survey was conducted through a partnership with the NIFA-funded Useful to Usable (U2U) project,

Figure 1. Estimated class membership proportions for the six-class models.

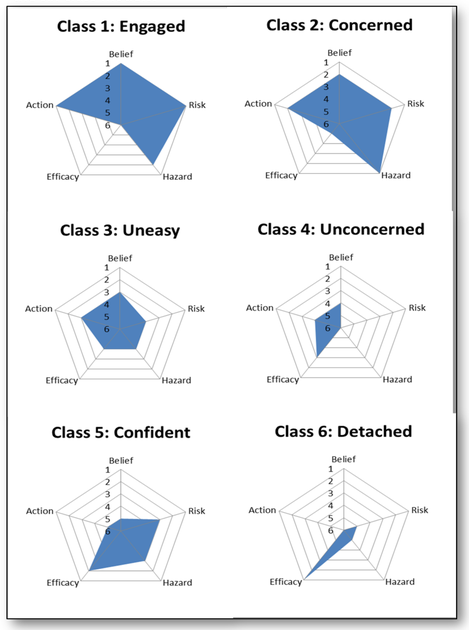

Figure 2. Classes ranked by standardized class mean values for each conceptual category

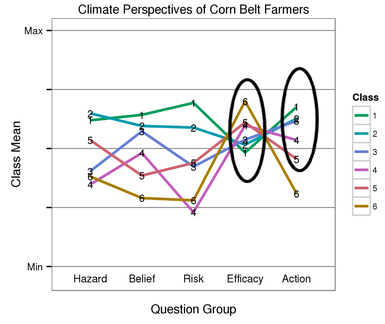

Figure 3. Seeking common ground: Standardized class means for each category of variables.

Differences

Radar charts in Figure 2 show class ranks on each of the five categories of variables: *beliefs* (about climate change), *risk* (perceptions), *hazard* (experience with extreme weather), *efficacy* (confidence in capacity to adapt), and support for *action*.

Class 1: The Engaged (14%)

- Most likely to believe that climate change is occurring and due to human activity
- Most concerned about potential impacts of climate change
- Second-highest levels of experienced hazard
- Lowest levels of confidence in capacity to cope (self-efficacy)
- Most supportive of adaptive and mitigative actions

Class 2: The Concerned (25%)

- High average scores for the belief, perceived risk, and support for action categories
- Highest levels of experienced hazard, and the second lowest self-efficacy scores.

Class 3: The Uneasy (25%)

- Fairly balanced across the categories, but leans toward belief in climate change and support for action.

Class 4: The Unconcerned (14%)

- Lowest levels of concern about potential impacts of climate change and lowest levels of experienced hazard
- Third in self-efficacy, more confidence in ability to adapt than classes 1-3.

Class 5: The Confident (18%)

- Second highest efficacy score, confident in capacity to adapt to changes on their own
- Tended not to believe in climate change or support adaption and mitigation action

Class 6: The Detached (5%)

- Lowest belief, second lowest on risk and hazard
- Highest self-efficacy scores
- Lowest support for action

Similarities

Despite differences characterized by the LCA analysis, there are similarities between classes that might help to guide engagement of broader audiences of farmers (Figure 3).

- Classes are most similar in terms of their confidence in their capacity to adapt
- Classes 1-5 supported potential action in response to increased weather variability similarly

Farmers Think about Climate Change in Different Ways

The 39% of farmers that comprise classes 1 (the Engaged) and 2 (the Concerned) believed climate change is happening, were worried about the potential impacts, and were supportive of individual and collective action to address risks and causes. The 25% of farmers in class 3 (the Uneasy) appear to be less concerned, but nonetheless tended to believe climate change is occurring and were supportive of adaptation and mitigation at levels similar to those of classes 1 and 2. Communication specific to adaptive responses to climate change would likely resonate with members of these classes.

The 37% of farmers who make up classes 4-6 tended not to believe that climate change is occurring, expressed much less concern about potential risks, were more confident in their capacity to adapt, and were less apt to support action. Outreach that is directly focused on responses to climate change would not likely resonate with farmers in these classes.

Similarities in terms of confidence in adaptive capacity and support for action in response to "increased weather variability" point to potential openings for engagement across classes. Our results suggest that approaches that 1) treat farmers as active problem solvers rather than passive recipients of information and 2) use terminology and narratives that focus on adaptation to "weather variability" rather than "climate change" may be better received by broader farmer audiences.

References

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