Finding a place for Climate Science in the Rural West

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Challenges

Many rural Westerners are intimately attuned to weather and climate variability through livelihoods tied to production agriculture and resource management. One of the main challenges facing them as they relate to climate change science and policy is how to integrate new information about the risks of climate change into livelihood strategies already challenged by variability and uncertainty from a myriad of other sources, including economic, environmental, regulatory, and social, among others.

In addition, their livelihood strategies are shaped, not only by economic goals, but also by ties to place and identity (Coles and Scott 2009). Since extreme climate variability driven by topography and strong connections to large-scale patterns like the El Nino-Southern Oscillation is the norm across the Western U.S., recent climatic shifts related to climate change (e.g. warming temperatures) haven’t necessarily stood out as unusual and caused concern for many Westerners. Their own depth of experience with weather and climate variability may actually contribute to skepticism of climate change as it has been framed by mainstream discourse, which focuses on human causation, apocalyptic future scenarios, and the reduction of greenhouse gas emissions as the primary means to address it (Brugger, 2010).

Meanwhile, the approach of the federal agencies charged with addressing climate change domestically has been to conduct and fund research on fundamental climate science with limited and under-resourced strategies on communicating research findings to the public or even assessing applied research needs in the first place (Kloprogge and Van der Sluijs, 2006; McNie, 2007). Underlying this approach is the assumption that, given sufficient information about the potential impacts of climate change, people will take action to mitigate or prepare for it. This has been referred to as the “loading dock” approach to linking science and society (Cash et al., 2006), because scientists decide what information is needed, produce it, and leave it on the loading dock for decision makers to pick up and use, without any interaction between them.

Even when this approach is modified so that scientists do some translation of the science for the public, the relationship is still one-way. Under this approach, the fact that little progress has been made in the U.S. in addressing climate change is interpreted to indicate a need for even more scientific research on climate change and more and better-communicated information about it (McNie, 2007).
In this paper we suggest a different interpretation: that the lack of progress is a result of shortcomings of the “loading dock” approach itself. We begin by pointing out some of these shortcomings and how they make it challenging for rural Westerners to integrate new information about the risks of climate change into their livelihood strategies. Then we consider how Cooperative Extension provides an example of a “boundary organization” (Guston, 2001) that can overcome these shortcomings to find a place for climate science in the rural West.

Finally, we describe a case study in Arizona that will work through Cooperative Extension to draw on the understanding of weather and climate and the implicit adaptation strategies that rural Westerners already have to inform federal climate change research and policy.

To begin with, more than three decades of research in psychology on risk perception and decision making challenges a major assumption of the “loading dock” approach to linking climate science and rural residents: the assumption that the latter will find information about climate change useful and act on it. This research has established that people have two distinct systems for processing information used to make judgments or decisions: the feeling-based affective system and the reasoning-based analytical system (Weber, 2006).

The two systems typically operate in parallel and interact with each other, but the affective system, which is engaged by real world experience, has much more influence on decisions under risk and uncertainty than the analytical processing system, which is engaged by descriptions of risk. The former is hardwired, automatic, and fast, while the latter uses analytic algorithms and rules that must be learned and practiced and requires processing time and conscious effort. This leads to significant differences between experience-based and description-based perceptions of the long-term risk that climate change represents. As a result, people are more likely to be concerned about it if they have personally experienced its effects, if they believe it will affect them personally in the near future, or if they associate it with real victims. They are also more likely to be concerned if, by virtue of their education and training, they place greater reliance on descriptions of risk than the general public.

Rural agricultural producers, in particular, rely heavily on past experience to assess current conditions and make management decisions for the future. They seldom plan very far in advance because they know from experience how quickly conditions can change. If they are still in business, this strategy has worked for them so far. They are not likely to change behaviors and risk livelihoods that generate, not just economic income, but personal identity and the ability to remain rooted in place, based solely on descriptions of the potential risk of climate change (Coles and Scott, 2009).

Behavioral decision research has also shown that as worry about one type of risk increases, concerns about other risks goes down (Weber, 2006). This suggests that people have a limited capacity for worrying about issues, which researchers refer to as “a finite pool of worry,” and that the effects of worry can lead to emotional numbing. Since rural producers already face uncertainty and immediate risk from a variety of sources, the risk of climate change may be too far down on the list for them to respond to information about it. This research suggests that, in order for rural producers to find information about climate change useful, it would need to resonate with their own experience and integrate into, not add on to, the ways they already manage for risk. In order to be able to produce this kind of information, scientists would need to have some understanding of their perspectives and concerns.

A second shortcoming of the “loading dock” approach to linking climate science and rural Westerners derives from the nature of climate science. Climate science exemplifies what Ravetz (1999) calls “post-normal science”: “issue-driven science relating to environmental debates,” in which “facts are uncertain, values in dispute, stakes high, and decisions urgent (199: 649).” The “loading dock” approach is based on the dominance in traditional science of “hard” facts over “soft” values; whereas in post-normal science, “hard” value commitments may have to be made based on “soft” facts (Kloprogge and Van der Sluijs, 2006).

Its proponents argue that the approach to linking post-normal science and society must be participatory, inclusive, and deliberative. This
is not only more democratic, it also improves the quality, creativity, and effectiveness of decisions because it draws on a broader representation of knowledge and values to coproduce a body of knowledge that “reflects the pluralistic and pragmatic context of its use” and “builds common ground among competing beliefs and values for the environment” (Robertson and Hull 2003: 399). Participatory processes of environmental decision making are more effective because they help prevent situations where scientists working alone produce information not considered relevant and useful by decision makers (McNie, 2007). They are also more effective because participants are more likely to accept information if they are involved in defining problems and solutions (Jacobs et al., 2010; McNie, 2007). The concept of post-normal science suggests that in order for rural Westerners to find information about climate change useful, they must be involved in coproducing it.

However, a critical issue in participatory processes of environmental decision making is the additional time, effort, and resources required to carry them out, including the processes of identifying stakeholders and establishing trust and effective communication among them before actual deliberation can even begin (e.g. McNie, 2007; Salter et al., 2010). Another problem that has been identified is the difficulty of evaluating the outcomes of these processes since they include process outcomes, such as group learning, in addition to more concrete products (Salter et al., 2010).

A third shortcoming of the “loading dock” approach to linking climate science and rural producers is that it fails to recognize the major insight of science and technology studies: that science is not completely independent of the context in which it was produced, but is inescapably politically, culturally and economically inflected (McNie, 2007). As a result, people may associate scientific information with the context in which it is produced. Since people are more likely to accept information from those they trust (McNie, 2007), if they perceive that it is produced in a context that differs from their own, they may consider the information illegitimate and not be willing to accept it.

This recognition is basic to understanding why climate change is such a highly charged political issue in the U.S. Surveys show that a large percentage of the U.S. population is skeptical of climate science (Leiserowitz, 2010), and skepticism is especially prevalent among those with conservative political views (Maibach et al., 2009). The dominant framing of climate change focuses on the reduction of greenhouse gas emissions as the primary approach to addressing it, which implies massive government intervention. It also focuses on the imminent global peril that climate change represents, which leaves little room for political disagreement with this approach. For conservatives who are typically apprehensive of government intervention, skepticism of climate science may be the only way to express political disagreement (Brugger, 2010). Rural residents are more likely than the U.S. population at large to hold conservative views. They prize the independence and self-reliance necessary to make do in a rural setting that lacks many of the amenities found in urban areas, adding to their mistrust of government intervention.

In addition, they may associate climate science with the cultural background of those disseminating it. The latter are predominantly urban, educated, and hold values that differ from those of rural residents, who often find their perspectives and concerns looked down on by the former (Brugger, 2011). These insights of science and technology studies suggest that in order to link climate science and rural Westerners, it will be necessary to increase mutual trust and respect between scientists, policymakers and stakeholders who are the intended consumers of applied research and will ultimately be impacted by policy responses.

**Opportunities**

One approach to linking science and society that has been suggested by critics of the “loading dock” approach is the use of boundary organizations (e.g. Cash, 2001; NRC, 2009; McNie, 2007). They are called boundary organizations because they manage the “boundary” between science and society: a boundary which is necessary to prevent the politicization of science and scientization of politics (Guston, 2001), but across which information must flow in both directions in order to avoid the shortcomings of the “loading dock” approach. Boundary organizations perform three boundary-managing functions: translating informa-
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These functions address the first shortcoming of the “loading dock” approach to linking climate science and rural producers because two-way communication enhances the likelihood that scientists will produce information that responds to rural producers’ needs. They address the second shortcoming because involving stakeholders in two-way communication will increase the quality and effectiveness of decisions. As standing organizations, boundary organizations can also help to reduce the time and effort needed to establish a participatory environmental decision making process for each specific issue. However, it will still require time for members of the boundary organization to build up enough mutual trust and respect to be accepted on both sides of the boundary as legitimate mediators and also for the knowledge coproduced in this way to be accepted on both sides.

Cooperative Extension has been cited as an example of a boundary organization that has successfully linked agricultural science, policy, and producers (e.g. Cash, 2001; Lynch et al., 2008). There has been much debate about the future of Cooperative Extension and the role it should play in the 21st century. We suggest that Cooperative Extension is uniquely positioned to serve as a boundary organization for linking climate science, policy, and rural society.

For nearly a century, Cooperative Extension has built up institutional knowledge and programs that facilitate two-way communication across the science-society boundary. In the process, it has also built up the social capital – the trust, respect, and cooperation between its members and stakeholders on both sides of the boundary – that is essential for coproduction of climate knowledge that rural residents will find legitimate and useful. It already maintains the network of relationships between university scientists, federal, state, and county agencies, and rural residents that a boundary organization needs to function, eliminating the time, effort, and expense needed to establish a new boundary organization or participatory decision-making process to address climate change.

This organizational and personal social capital is indispensable for assuring that climate scientists, policymakers, and rural residents will accept Extension personnel as legitimate mediators between them and will accept their coproduced knowledge and information. Cooperative Extension accomplishes these functions in a way unique to it: by having scientific specialists at the state land-grant university who focus on placed-based science, and by having agents who live in each county statewide and are able to develop experiential knowledge of local conditions, ongoing relationships with rural residents, and a deep understanding of local issues and concerns. Having agents and specialists who are “in place,” gives Cooperative Extension a singular advantage for finding a place for climate science in the rural West.

Climate programs could be integrated into already existing programs aimed at agricultural production, resource management, youth development, consumer, family, and health sciences, and community and economic development. However, new investments and increased funding will be needed in order for Cooperative Extension to be able to live up to this potential and meet the challenges of this emerging and pressing issue.

Conclusion

These challenges and opportunities inform a study we are carrying out as part of the 2010-2013 National Climate Assessment, a report to national leaders on the status of the federal research program on global change, required every four years by law, which is used to inform federal climate policy.

Our study has two goals:

1. To learn how federal agencies could provide climate-related information and programs that would better meet the needs of rural Arizonans.
2. To assess the role that Cooperative Extension can play in this process.

In pursuit of the first goal, we will use qualitative research methods to investigate how people in rural Arizona understand, respond to, and plan for weather and climate in their daily lives. This will provide insight into the understanding of weather and climate and the im-

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plicit adaptation strategies that rural Westerners already have that can be transferred across the climate science-rural producer boundary to indicate research directions and types of information that rural producers would find useful.

In pursuit of the second goal, we will work with Cooperative Extension to coordinate the research in each of Arizona’s fifteen counties and include both Extension personnel and their clients in the research. This will allow us to explore the potential of Cooperative Extension to play a key role in linking climate science and rural society by examining how Arizona Cooperative Extension currently functions and drawing on the results of the qualitative research to identify specific ways it is positioned to mediate the challenges and opportunities that the issue of climate change presents for rural Westerners.

References


RECOMMENDED READING

Arizona Cooperative Extension extension.arizona.edu

National Research Council americasclimatechoices.org

Read their publication, “America’s Climate Choices”

The National Climate Assessment globalchange.gov/what-we-do/assessment