

Using Stakeholder Needs Assessments and Deliberative Dialogue to Inform Climate Change Outreach Efforts

Abstract

Farmers represent a large group of Extension stakeholders who stand to be affected by increased climate variability and change. Yet climate change can be a polarizing topic. In order to be sensitive to this reality, meet stakeholder education needs, and carry out the land-grant mission, we used a participatory decision model known as "deliberation with analysis" to inform climate change programming around agriculture. We designed evaluation tools for each phase of the project. This method strengthened relationships with stakeholders and enabled Michigan State University to move forward with climate change programming.

Claire N. Layman
Public Policy Specialist
Michigan State
University Extension
East Lansing,
Michigan
laymanc@msu.edu

Julie E. Doll
Education and
Outreach Coordinator
Kellogg Biological
Station Long-term
Ecological Research
Program
Michigan State
University
Hickory Corners,
Michigan
jedoll@msu.edu

Cheryl L. Peters
Evaluation Specialist
Michigan State
University Extension
East Lansing,
Michigan
cpeters@anr.msu.edu

Introduction

Extension has a long and successful history of engaging with researchers across the social and natural sciences. Yet Extension programming on climate change—a focus of university research across disciplines for decades—has been noticeably absent, at least until recently. The scale and scope of climate change, as well as the topic's politically charged nature (Dunlap & McCright, 2008), are undoubtedly some reasons why Extension has not led the charge on outreach efforts. It is becoming increasingly clear, however, that waiting is not an option and that Extension has a role to play in climate change programming (Fraise, Breuer, Zierden, & Ingram, 2009).

Farmers represent a large group of Extension stakeholders who stand to be greatly affected by the changing climate. Changes in absolute values and variation in temperature, precipitation amounts and distribution patterns, cloud cover, and carbon dioxide levels affect plant growth, field practices, pests, and plant diseases (Hatfield et al., 2011; National Research Council, 2010; Tubiello, Soussana, & Howden, 2007). And, as agriculture strives to meet the needs for food, fuel, and fiber for a growing population, farmers need knowledge and skills to adapt to changes in the climate and to

help mitigate climate change. But how to design climate Extension programming for farmers, given the sensitive and complex nature of the topic?

A solid body of literature recommends using facilitated dialogue to solve complex, value-laden community problems. The National Research Council, in its publication *Public Participation in Assessment Environmental Decision Making* (2008), recommends using "deliberation with analysis" as the method that best supports decision-making around complex environmental and social issues such as climate change. Deliberation with analysis includes the following four steps:

1. "Diagnosis of the context to identify likely difficulties
2. Collaborative choice of techniques to address those difficulties
3. Monitoring of the process to see how well it is working
4. Iteration, including changes in tools and techniques if needed, to overcome difficulties" (NRC 2008).

In line with this framework, we designed a project using a modified deliberation with analysis process to move climate change programming forward for Michigan State University (MSU) Extension. Our ultimate goal was to prepare Michigan field crop farmers for the changing physical climate and to protect and preserve the quality of the environment. To do this, we targeted Extension educators who work with field crop farmers across the state. We then:

1. Conducted focus groups (facilitated discussions) and interviews with diverse agricultural stakeholders to diagnose the context
2. Held a scientific training session
3. Used a deliberative forum to allow collaboration in choosing a teaching focus and technique
4. Used a carefully planned evaluation to monitor and improve the process.

Here we present results from this four-phase design, which we believe could be adapted for other sectors of agriculture as well as all Extension program areas.

Methods

Phase 1: Gather Stakeholder Input on Climate Change and Agriculture

During July 2010 through January 2011, we gathered information from key stakeholder groups associated with field crop agriculture in Michigan. The objectives were to: 1) identify the values and issues central to field crop agriculture and climate change and 2) develop potential programming approaches that Extension educators could implement to help farmers with these issues. In total, we conducted:

- Four focus groups with Michigan field crop farmers (28 participants)
- One focus group with conservationists and environmentalists (nine participants)
- One focus group with MSU scientists and administrators (11 participants)
- One focus group with state legislative aides working on agriculture policy (seven participants)
- One interview with a wheat breeder researcher
- Interviews with field crop industry and business leaders (nine interviewees)

As an incentive for the farmer and environmentalist focus groups, we offered participants travel reimbursement (one group) or a \$50 check (the remaining groups). We framed the groups as a listening session where MSU Extension sought to learn from stakeholders how we could best meet their educational needs. The focus group format relied on group dynamics and intentional information flow from participants to moderators and included networking and facilitated discussion (Straka, Nespeca, Howell, & Irwin, 2009).

At the beginning of each focus group, we asked for permission to record the discussion and explained the purpose of the research. Institutional Review Board (IRB) approval was granted for the project. After introductions, we asked questions related to the following topics:

- Is your organization involved in climate change and agriculture?
- Are agriculture and climate change linked? If so, how?
- What are your current sources of information about climate change? If you would want more information, where would you go?
- What topics regarding climate change are important for you to understand more fully? Do you see Extension having a role in this?
- What are some steps for effective education and outreach about climate change and agriculture?

Following the interviews and focus groups, we transcribed the recordings, coded the responses, organized them into themes, and then pulled out five responses to our central research question: "How should Michigan State University Extension help Michigan field crop farmers adapt to and help mitigate a changing climate?" These responses are potential climate change programming approaches that Extension educators could pursue and span a broad spectrum, as displayed in Table 1. Each response contained a target audience, rationale, and counterclaim against taking this approach. Counterclaims are important for helping participants weigh the tradeoffs of each approach. All five approaches were printed as an "issue guide," which was used during the third phase of the project.

Table 1.

Issue Guide: How Should Michigan State University Extension Help Michigan Field Crop Farmers Adapt to and Help Mitigate a Changing Climate?

Approach 1: Do Nothing		
Target Audience: As Is		
<i>Why</i>	<i>What Should be Done</i>	<i>On the Other Hand</i>
<p>Climate Change is a polarizing topic, so Extension should stay out of the debate entirely. Farmers generally view Extension as an honest information broker. Taking on climate change, no matter how it is couched, may damage that trust, and MSUE will be seen as biased. Some farmers expressed that resources should not be shifted away from current MSUE activities to address climate change. Furthermore, MSUE already has a system to disseminate research-based information about best production methods: education about production under a changing climate focus is not needed.</p>	<p>Continue with MSUE's current structures and workgroups—including the Agriculture and Agribusiness Institute's Environmental Quality workgroup—to disseminate information about production and environmental stewardship. As MSU researches climate change mitigation and adaptive management methods, MSUE will disseminate this to farmers but not in the context of climate change.</p>	<p>Doing nothing may not align with MSUE's current directive to make Extension relevant for the 21st C; that is, to have a "green" focus. Doing nothing may prevent farmers from accessing important information about how a changing physical and policy climate may impact them—how their crop yields could increase or decrease, for example, or how they could benefit from economic incentives. Further, our land, water, and atmosphere also may suffer from this approach because farmers are not being taught how to mitigate damage.</p>
Approach 2: Be Ready, but Don't Lead		
Target Audience: Extension Educators		
<i>Why</i>	<i>What Should be Done</i>	<i>On the Other Hand</i>
<p>The mission of Extension is to "help people improve their lives through an educational process that applies knowledge to critical issues, needs, and opportunities." There is a scientific consensus that climate change is occurring and that it will affect agriculture and that agriculture contributes to both the problem and solution of climate change. Therefore,</p>	<p>All Extension educators should participate in relevant training on climate change science and policy and keep up-to-date on the topic, but they should not develop programming around it. Opportunities for educators' professional</p>	<p>As part of a land-grant institution, MSU Extension should be a leader, not a follower on disseminating information about issues that impact agriculture and the environment.</p>

<p>MSU Extension educators should be up-to-date on climate change issues and how it will affect agriculture. However, because resources are limited and climate change is not being demanded from the farmers, Extension educators should not take the lead on programming until directed to do so by stakeholders.</p>	<p>development include attending conferences, meetings, webinars, trainings offered by professional societies and eXtension, the Long-term Ecological Research project at the Kellogg Biological Station, and reading materials offered by the same.</p>	
---	--	--

Approach 3: Promote how Agriculture Is GOOD for the climate

Target Audience: General Public

<i>Why</i>	<i>What Should be Done</i>	<i>On the Other Hand</i>
<p>Some environmentalists and members of the public criticize agricultural producers for contributing to greenhouse gas emissions through nitrogen fertilizer use, soil management, methane emissions from ruminants, using petroleum-powered farm equipment, and converting forests into croplands. Yet these same people remain unaware that agriculture also mitigates climate change by growing crops that absorb carbon from the atmosphere, and that farmers frequently seek ways to be more efficient in their energy and nitrogen fertilizer use. This approach could diffuse tensions between producers and environmentalists. Further, it could increase farmers' trust in Extension and energize them to implement more climate change mitigation strategies in the future, such as planting cover crops and using no-till practices.</p>	<p>MSU Extension should promote agriculture's positive contributions toward mitigating climate change by hosting workshops sponsoring field days on farms, and writing articles targeted at the environmental community and general public. Extension should not focus on agriculture's contribution to climate change.</p>	<p>This approach could solicit criticism that MSU Extension is biased. It does not present the entire picture of the relationship between agriculture and climate change, and will not result in a direct and rapid improvement in the environment through climate mitigation management. Also, it does not prepare agriculture to adapt to any changes in the climate or to benefit from any potential benefits of climate change.</p>

Approach 4: Promote Only "Climate Good" Strategies that Directly Benefit the Farmer

Target Audience: Farmers

<i>Why</i>	<i>What Should be Done</i>	<i>On the Other Hand</i>

<p>Farmers are unlikely to adopt strategies that do not show a return on their investment; therefore, only those adaptation and mitigation strategies that have a co-benefit (such as saving on the cost of fuel or nitrogen fertilizer) should be promoted by Extension. Asking farmers to adapt practices that largely benefit the climate and not their bottom line may be met with indifference at best and alienation at worst. Further, many farmers block out the terms "global warming" and "climate change" because they feel the science may be in question, the facts shifting, and they don't know whom to believe.</p>	<p>Extension educators should focus on promoting practices that benefit the farmer's bottom line and the climate, but avoid promoting practices that do not contain a direct and immediate economic incentive. They should not use the terms "climate change" and "global warming" but rather focus on the benefits of certain practices to that farmer's production and profit.</p>	<p>A research institution should not hold back information because it is unpopular or misunderstood. If there is general scientific consensus that climate change is occurring and that it is caused, in part, by agriculture, and that agriculture will be affected by a changing climate, it is MSU Extension's obligation to teach that science to its stakeholders. The climate change discussion is happening at every level and will not be going away. Ignoring the issue or not directly addressing it does not respect the mission of MSU, Extension, or the relationship Extension has with farmers.</p>
---	--	--

Approach 5: Proactively Address Climate Change and its Relationship to Agriculture

Target Audience: Farmers and Policymakers

<i>Why</i>	<i>What Should be Done</i>	<i>On the Other Hand</i>
<p>MSU Extension remains a trusted source of unbiased research and information. It is part of the land grant mission to extend research to the state's agricultural stakeholders, regardless of the reception it may initially receive. By MSU Extension developing climate change programming, it is desensitizing the topic. Science-based information needs to be more widely disseminated to farmers as agriculture is being affected and will continue to be affected by climate change; it is the job of Extension to help farmers and the agriculture industry as a whole prepare and deal with this.</p>	<p>MSU Extension should address climate change by working directly with scientists, agribusiness, and farmers to create climate change programming. Programming should include climate change science, communicating risk and uncertainty, regulations and incentives, etc. Policymakers at the state, county, and township level also</p>	<p>Targeted climate change programming could alienate some farmers and policymakers. Also, given limited resources in time and money, MSU Extension should not take on new initiatives at this time.</p>

should receive information and education about the science of climate change and its relationship to agriculture through visits to campus, printed materials, and talks at the state's Capitol.

Phase 2: Training for Extension Educators

The second phase of the project included **training Extension educators** who worked with field crop farmers. The purpose was to increase their knowledge of the principles of field crop agriculture's role in climate change and the related policies so that they could communicate to farmers the costs, benefits, and tradeoffs of management strategies and policies. The training was held in March 2011 and consisted of scientific presentations on greenhouse gas emissions, climate science, soil science, economics, and the social dynamics of the climate debate. The authors also highlighted quotes and observations from the focus groups (identities of all participants remained confidential). A panel discussion was held with scientists and an online climate tool (*AgroClimate*, <http://agroclimate.org/>, developed by the Southeast Climate Consortium) was shared.

Phase 3: Deliberative Discussion

Immediately after the training, we held a deliberative discussion. We asked the 22 participants to pull their chairs into a circle, then distributed the issue guide and explained its development. We emphasized its use as framework for discussing the tradeoffs and benefits of each of the five approaches outlined to address the key question: How should Michigan State University Extension help Michigan field crop farmers adapt to and help mitigate a changing climate? We made clear that a sixth approach might emerge from the discussion, one that contained elements of the other approaches or that articulated an entirely new approach.

We reviewed ground rules for discussion, and then began by discussing Approach 1. One of us moderated the discussion, focusing on the benefits and tradeoffs of each approach, while the other served as recorder and timekeeper, writing participant comments on large flip-chart paper. These tools—sitting in a circle, reviewing ground rules of respectful discussion, and recording comments—are commonly used in community dialogue and deliberation, and are intended to keep the discussion on track and respectful in the face of high emotions.

For this group, the issue was not particularly contentious, and participants arrived at Approach 5 (Proactively Address Climate Change and its Relationship to Agriculture) 90 minutes into the discussion. They noted it was important to address climate change across all programming areas of MSU Extension; that administrative backing for this approach was needed; and that the term "climate variability and change" should be used to more accurately capture the shorter-term impacts

of the changing climate. They identified the need to include climate in Extension programmatic logic models and to have a vision statement that addressed Extension's role in climate change education. The group self-selected members to form a steering committee to implement their recommendations.

Evaluation of Phases 1, 2, and 3

Results of Phase 1 (gathering stakeholder input) are summarized in Table 1. Phase 2 (training Extension educators) was evaluated using a paper survey distributed at the event to collect demographic information and to assess outcomes of the training (n=18). Phase 3 (deliberative discussion) was evaluated with an online survey sent via email to participants immediately after the event (n=20). The online survey also asked questions about the overall training that included the deliberative discussion experience.

Results

Evaluation of Phase 2

The majority of survey respondents to the scientific training event were Extension educators and specialists (61%), and the remaining were farmers, researchers, postdocs, and students. Nearly all of the audience (89%) worked directly with farmers; the exceptions were a postdoc and a graduate student.

The evaluation survey assessed knowledge gained on 10 items that were related to the program objectives and content delivered during the training. Table 2 shows the topics presented and the percentage of participants who indicated their knowledge increased a little, a moderate amount, and a great deal. Due to the survey design, we know that those who reported no change in the topic knowledge knew this information prior to the training—therefore, lack of knowledge gain was not due to lack of understating the topic.

Table 2.
Results from Evaluation Survey

Training Topic Assessed on Survey	Percent of Participants Who Increased Knowledge
Basics concepts of global climate change and major natural and human influences.	94%
Historical and projected future climate trends in the Great Lakes region and some potential direct impacts on Michigan agriculture.	100%
How agriculture affects the carbon balance of landscapes and thus the carbon dioxide levels in the	100%

atmosphere.	
The roles of methane and nitrous oxide, in addition to carbon dioxide, as drivers of climate change.	94%
How tillage influences soil organic matter and water relations.	94%
Crop management options for field crop production in a changing climate.	78%
How a "cap and trade" policy would function.	94%
How to determine the potential impact of a "cap and trade" policy for carbon emissions on the agricultural sector.	94%
How nitrogen management for crops is linked with carbon markets.	94%
Basics concepts of global climate change and major natural and human influences.	89%

Survey respondents reflected on how they would apply the material they learned at the training and how they might use the information for themselves, at work, or in their communities. Respondents indicated that they would use the information to seek more professional development and that the training increased awareness of climate issues. Nearly 45% mentioned using the training information to plan programs, inform research projects, and write grants.

The most common response to using the information at work was sharing with colleagues and informing farmers. Two respondents mentioned using the information to "lobby" and "guard against unwanted accusations towards farmers as being responsible and divers for climate change." For some, shifting views on climate variability began with greater personal understanding that then grew to include wider circles of influence. All the responses to using the information in their communities related to discussing, sharing, and informing others of what they learned.

Evaluation of Phase 3

Attendees reflected on perspectives missing from the deliberative discussion event that could have added to the discussion. A coding of this open-ended question revealed that 25% believed agribusiness representatives should have been present. Other mentions included environmental groups, policymakers, additional farmers, Farm Bureau, Extension leadership, and students. One participant wrote: "I believe everyone there was open minded, willing to look at the evidence, and I believe came away with a much healthier respect for the difficult issues surrounding climate change."

Instead of asking about satisfaction with the deliberative discussion, we wanted to know the likelihood of future use of the approach. Most (84%) indicated they might use or were unsure about using a deliberative discussion approach in their future work. A smaller percentage (11%) indicated

that they would definitely use the approach, and 5% indicated that they would not use deliberative discussions in their future work.

Two themes emerged from open-ended descriptions of how the deliberative discussion was useful for developing climate change programming related to agriculture.

- 61% explained that the deliberative discussion method allowed for shared input, diverse views, and a non-threatening environment to project ideas.
- 50% thought the method shaped next steps for Extension programming, including revamping current educational materials, using common terminology, and establishing a need to educate others such as the public and stakeholders on the topic of climate change.

Evaluation of Overall Training and Deliberative Experience

Overall, the event was positively reviewed by all participants: 100% of attendees stated that they would (1) recommend the training to Extension colleagues and (2) attend a follow-up event on the topic. Eighty percent of participants provided ideas for future training topics, with most (44%) requesting further training on agronomics and climate variability. Specifically, participants requested information on what farmers need to do to adapt crop and livestock practices and examples from farmers of field-tested, proactive, and reactive strategies. Economic comparisons of climate variability planning, mitigation, and adaptation also were requested, including tools educators could provide to the agricultural community. Another 25% responded that basic education for Extension professionals is needed on climate science.

Participants stated that three aspects of the training contributed to the quality of the deliberative discussion: the research presentations, a summary of the focus group results, and the discussion guide document with the five approaches. The research presentations contributed the most to an effective discussion (78% reporting it helped a great deal and 22% reporting it was somewhat helpful). The summary of focus group findings was the second most helpful (70% said it helped a great deal and 30% somewhat helpful). The discussion guide was the most varied, with 56% indicating it helped a great deal, 32% agreeing it was somewhat helpful, and 12% believing it helped a little.

Discussion

Seeking stakeholder input—and eliciting early participation—in a decision-making process is important for a topic as complex as climate change (Center for Research on Environmental Decisions, 2009). In addition, using a deliberative dialogue approach allows people to engage in fruitful communication around contentious issues (Regan, 2007). Combining these approaches of seeking stakeholder input and deliberative dialogue helped move MSU Extension forward toward the goals of preparing Michigan field crop farmers for the changing physical climate and protecting and preserving the quality of the environment.

Overwhelmingly, the audience who attended the climate change and agriculture training showed increased knowledge gain on all topics. This is evidence that professional Extension audiences

(including farmers), many whom are already well-educated and experienced, can learn a great deal from trainings focused on climate change issues. Evaluation results suggest that future training topics should be positioned around strategies to implement the new knowledge; that more information was needed on crop and livestock management options; and that more basic information is needed to inform both educators and farmers to work toward common understanding and solutions for climate change issues. We believe that all three aspects (gathering stakeholder input via focus groups and interviews, scientific training, and the discussion guide) are needed to prepare for an effective deliberative discussion. Furthermore, the focus groups provided an unforeseen benefit: many participants reported enjoying the opportunity to discuss climate change in a safe and neutral environment. This confirms research findings that 87% of farmers prefer discussion as a learning tool (Franz, Piercy, Donaldson, Westbrook, & Richard, 2010).

A benefit of holding a deliberative discussion immediately following scientific presentations was that questions about the science did not sideline the deliberation that focused on the pragmatic trade-offs and benefits of each approach. A drawback of using the four-phase process to assess programming needs is the time and human resources required. From the time the first focus group was held until the presentation and training at Fall Conference, 15 months elapsed. An online or paper survey distributed to farmers and stakeholders at winter meetings could have resulted in more data in less time. This method, however, would not have built the support nor delivered the richness of the data that have enabled us to move ahead with institutional and stakeholder support.

Not only did participants positively evaluate the process, but also actions after the project showed its effect. Immediately following the March 2011 training and deliberative discussion, a steering committee was formed: the MSU Extension Climate Variability and Change Action Team, or CV-CAT. Members now include Extension educators and specialists across all areas of MSU Extension programming. In the fall of 2011, the CV-CAT organized a half-day session on climate change at Michigan State University's Fall Extension Conference. The session included an overview of the principles of climate change and implications on Michigan's natural systems and the built environment. At this event, educators expressed appreciation for the scientific findings on climate change, but shared that they were having difficulty finding ways to dialogue with their communities about the topic. Indeed, it is well documented that simply providing more information about climate change is not enough to create effective action (Chess & Johnson, 2007).

As a result, the CV-CAT hosted a climate change communication workshop in the spring of 2012. Mixing theory, history, tools, and practice, the training focused on the social science of climate change. It described the politicized nature of climate change (Dunlap & McCright, 2008), the importance of understanding the audience (Leiserowitz, Maibach, Roser-Renouf, & Smith, 2011), values identification (Moore & Nelson, 2010), and becoming an effective messenger of climate change information (Center for Research on Environmental Decisions, 2009; Dilling & Moser, 2007). Future plans for the CV-CAT include more in-service trainings for Extension educators, development of curriculum, and creation of a website.

Given the complexity of information and educational realities in the 21st century, we believe an approach like ours—one that assesses stakeholder needs through face-to-face interactions and then frames their responses into alternative approaches, the tradeoffs and benefits of which are

deliberated over by Extension educators and stakeholders—holds much promise for Extension programming on climate change.

Acknowledgments

We thank focus group and interview participants and our students Marci Baranski and Don Matlock. This work was supported by funding from the U.S. EPA (under grant number: NE 00E00331) and Michigan State University's Project GREEN (Generating research and Extension to meet economic and environmental needs), Michigan's Plant Agriculture Initiative housed at Michigan State University. Support for this project was also provided by the National Science Foundation's Long-term Ecological Research Program at the Kellogg Biological Station (<http://lter.kbs.msu.edu>) and by Michigan State University AgBioResearch.

References

- Center for Research on Environmental Decisions. (2009). *The psychology of climate change communication: A guide for scientists, journalists, educators, political aides, and the interested public*. New York: Columbia University. Retrieved from: <http://guide.cred.columbia.edu/>
- Chess, C., & Johnson, B. B., (2007). Information is not enough. In S.C. Moser & L. Dilling (Eds.), *Creating a climate for change: Communicating climate change and facilitating social change* (pp. 223-233). New York: Cambridge University Press.
- Dilling, L., & Moser, S. C., (2007). Introduction. In S.C. Moser & L. Dilling (Eds.), *Creating a climate for change: Communicating climate change and facilitating social change* (pp. 1-27). New York: Cambridge University Press.
- Dunlap, R. E., & McCright, A. M. (2008). A widening gap: Republican and Democratic views on climate change. *Environment: Science and Policy for Sustainable Development*, 50, 26-35.
- Fraisse, C. W., Breuer, N. E., Zierden, D., & Ingram, K. T. (2009). From climate variability to climate change: Challenges and opportunities to Extension. *Journal of Extension* [On-line], 47(2) Article 2FEA9. Available at: <http://www.joe.org/joe/2009april/a9.php>
- Franz, N. K., Piercy, F., Donaldson, J., Westbrook, J., & Richard, R. (2010). Farmer, agent, and specialist perspectives on preferences for learning among today's farmers. *Journal of Extension* [On-line], 48(3) Article 3RIB1. Available at: <http://www.joe.org/joe/2010june/rb1.php>
- Hatfield, J. L., Boote, K. J., Kimball, B. A., Ziska, L. H., Izaurralde, R. C., Ort, D., Thomson, A. M., & Wolfe, D. (2011). Climate impacts on agriculture: Implications for crop production. *Agronomy Journal*, 103, 351-370.
- Leiserowitz, A., Maibach, E., Roser-Renouf, C., & Smith, N. (2011). *Climate change in the American mind: Americans' global warming beliefs and attitudes in May 2011*. New Haven, CT: Yale Project on Climate Change Communication, Yale University and George Mason University. Retrieved from: <http://environment.yale.edu/climate/files/ClimateBeliefsMay2011.pdf>
- Moore, K. D., & Nelson, M. P. (Eds.). (2010). *Moral ground: Ethical action for a planet in peril*. San

Antonio, TX: Trinity University Press.

National Research Council. (2008). *Public participation in environmental assessment and decision making*. Washington D.C.: The National Academies Press.

National Research Council. (2010). *America's climate choices: Adapting to the impacts of climate change*. Washington D.C.: The National Academies Press.

Regan, K. (2007). A role for dialogue in communication about climate change. In S.C. Moser & L. Dilling (Eds.), *Creating a climate for change: Communicating climate change and facilitating social change* (pp. 213-221). New York: Cambridge University Press.

Straka, T., Nespeca, M., Howell, M. B., & Irwin, H. T. (2009). The focus group as a demonstration technique. *Journal of Extension* [On-line], 47(6) Article 6TOT4. Available at:

<http://www.joe.org/joe/2009december/tt4.php>

Tubiello, F. N., Soussana, J-F., & Howden, S. M. (2007). Crop and pasture response to climate change. *Proceedings of the National Academy of Sciences*, 104, 19686-19690.

Copyright © by *Extension Journal, Inc.* ISSN 1077-5315. Articles appearing in the Journal become the property of the Journal. Single copies of articles may be reproduced in electronic or print form for use in educational or training activities. Inclusion of articles in other publications, electronic sources, or systematic large-scale distribution may be done only with prior electronic or written permission of the Journal Editorial Office, joe-ed@joe.org.

If you have difficulties viewing or printing this page, please contact [JOE Technical Support](#)