

Controversial Communication in Agricultural Extension on the Topic of Climate Change: A Summarized Review

The topic of climate change can often be a barrier to discussing important issues in agriculture. This summarized review features an overview from selected Journal of Extension articles discussing communication techniques to hopefully overcome those barriers.

The Goals of Extension (Tyson, 2014):

- Make highly technical information available to farmers and the public in an understandable form
- Provide unbiased information
- Help create a forum in which all stakeholders have an opportunity for input
- Provide education to clients
 - Supply science-based evidence regardless of political values
- Review and translate scientific research
- Maintain key relationships
- Dissect actionable information.
- Demonstrate how best to use management tools to maximize resource health, productivity, and resilience in a changing climate.

Educating With Controversial Issues (Schumacher and Lloyd, 1997)

There are a series of steps to follow when one desires to provide education on a typically controversial topic:

1. Gather all adequate and respected information necessary to back up presented material before getting involved.
2. Assume a leadership position to plan an educational event unbiased in nature.
3. Be clear in stating objectives for the meeting to help people make accurate, credible decisions.
4. Set ground rules for the meeting which encourage equal opportunity to discussion.

Example: Application of sewage sludge to farm land controversy: Extension was involved by holding conference calls for those involved, addressing all concerns and questions and creating awareness of the resources available through Extension prior to a community meeting. At the meeting, an extension agent and the local Farm Bureau director introduced the topic of waste management in a way that presented both the risks and benefits. Rules and objectives were set in place to create a positive atmosphere where learning was encouraged. Representatives from the EPA and from the sludge company were present to address any concerns which arose. By following a few easy to follow steps (above), Extension was able to conduct an educational meeting beneficial to the community.

Techniques on how to communicate:

Six Americas: technique which measures respondents' beliefs, issues involvement, behavior, and preferred societal response in relation to global warming.

Six Americas	Description
Alarmed	convinced global warming is a serious and urgent threat; most likely to change behavior
Concerned	convinced global warming is a serious threat; less likely to change behavior
Cautious	believe global warming is a problem but not a personal or urgent threat
Disengaged	give little thought to global warming; change beliefs easily; not engaged
Doubtful	believe global warming may or may not be happening
Dismissive	firmly believe global warming is not occurring; highly engaged
Leiserowitz, Maibach, Roser-Renouf, & Smith (2008)	

Example: From the article, “North Carolina Cooperative Extension Professionals' Climate Change Perceptions, Willingness, and Perceived Barriers to Programming: An Educational Needs Assessment” (Burnett et al, 2014), one understands that there have been numerous climate change surveys distributed to the public to determine the overall opinion, but one rarely hears of these surveys being distributed to Extension professionals. In order to evaluate North Carolina Extension professionals’ global warming perceptions, willingness to participate in climate change programs, and barriers to climate change program incorporation, an online survey was distributed. This survey, consisting of 48 multiple-choice questions, was sent out to nearly 650 North Carolina Cooperative Extension (NCCE) professionals: the survey design/implementation included repeated, personalized contact with all potential respondents by including North Carolina logos, introductory emails personally addressed, repeated reminders, and names of survey collaborators in order to achieve a high response rate. As part of the multiple choice questions, fifteen were targeted as “Six Americas” based. The analysis places respondents into one of six groups, ranging from alarmed to dismissive. Once the time frame of four weeks closed, results were determined: Nearly 70% of respondents were classified as alarmed, concerned or cautious (with liberals being more likely to be classified as such when compared to conservatives) with the top three barriers to climate change programming being a lack of audience interest, conflicts within available information, and lack of applied information. From the results gathered and for future action, it was determined Extension programs will need to provide training for willing agents such as continuing education programs, prepare training and education materials with an applied/adaptive focus, and adopt strategies for implementing climate change programming that will have a maximum effect.

Deliberation with Analysis: Technique which supports decision-making around complex issues.

1. Diagnose and identify likely difficulties
2. Collaborate to choose techniques that address those difficulties
3. Monitor the process
4. Iterate to overcome any further difficulties.

Example Approach: Proactively Address Climate Change and its Relationship to Agriculture
 Target Audience: Farmers and Policy Makers

Why:	What should be done:	On the other hand:
Extension is a trusted source of unbiased info as part of the land grant mission to extend research to the state's agricultural stakeholders. By developing climate change programming, topic is desensitized. Science-based information needs to be provided: agriculture is being affected by climate change. It is the Extension's job to help.	Extension should address climate change by working with scientists, agribusiness, and farmers to create climate change programming: it should include science, communication of risk/uncertainty, etc. Policymakers should receive information/education about climate change and its relationship to ag through visits to campus, printed materials, and talks at the state's Capitol.	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.

Example: “Using Stakeholder Needs Assessments and Deliberative Dialogue to Inform Climate Change Outreach Efforts” (Layman et al, 2013): A project was designed for Michigan State University Extension to assist in moving forward with climate change programming. The ultimate goal was to prepare Michigan farmers for the changing climate while protecting and preserving the environment. To achieve this goal, Extension educators and others who work closely with farmers participated in focus groups, interviews, scientific trainings and collaborative forums all to answer the key question of “How should Michigan State University Extension help Michigan field crop farmers adapt to and help mitigate a changing climate?” The deliberative analysis project consisted of three phases, the first being the attainment of stakeholder information. The objectives of phase one were to identify values and issues central to field crop agriculture and climate change while developing potential programming approaches Extension educators could use in the future to resolve such issues. To achieve the goals of phase one, focus groups were developed to answer questions regarding involvement with climate change and agriculture, how the two aspects may be linked, what topics are important to understand, and what steps should be taken to ensure education and outreach were effective. Responses were then put together into an issue guide: five approaches were developed from the responses, with each approach consisting of a target audience, rationale, and counterclaim. In phase two, Extension educators underwent training to increase their knowledge of field crop agriculture’s role in climate change and related policies: by gaining such information, educators are more able to communicate effectively with farmers on the costs and benefits of management strategies. Phase three incorporated the use of the issue guide developed in the first phase, where participants discussed the various approaches and how they each answered the key question. Participants noted it was important to address climate change through Extension programs, administrative backing was needed, and that the term “climate variability/change” should be used more accurately following approach five of the issue guide (to Proactively Address Climate Change and its Relationship to Agriculture). Participants stated that research presentations, a summary of focus group results, and a discussion guide contributed to the quality of the overall

discussion. In addition, those who attended the climate change training showed increased knowledge on all involved topics, proving that well-educated Extension agents and farmers can still gain from similar trainings. All aspects of the deliberative analysis technique (gathering stakeholder input, conducting trainings and developing a discussion guide) are considered crucial for an effective deliberative discussion.

Focus Groups: Allow researchers to collect large amounts of data in a short period of time due to in-depth group conversation.

Example: “Agricultural Producer Perceptions of Climate Change and Climate Education Needs for the Central Great Plains” (Hibbs et al, 2014): In order to assess "farmers' perceptions, attitudes, long-term goals, and other cognitive and decision-making information" regarding climate change, focus groups made up of small- and large-scale agricultural producers and professionals throughout Kansas were conducted. The participants resembled a small-scale sample of the Kansas 2007 population (primarily white males, median age of 56) and were split up into various focus groups: each focus group was asked the same questions and participation was encouraged. Within the focus groups, producers did note observing changes in available moisture, temperature, drought, storm severity and frequency patterns resulting in, “greater yield variability, less predictable maturation rates, increased need for pesticides, variation in the timing of available pasturage for livestock, and increased damage to perennial plants”. However, the majority of producers and professionals classified themselves as “Cautious” rather than concerned. The reason for lack of concern arises from questioning the scientific validity of climate change studies, producers don’t know who to trust. It was expressed that most participants trust the NOAA and the USDA. In addition, the producers stated, “[W]e don't do our production planning based on what the climate is going to do in 50 or 100 years. We base it on what's going to happen in the next three to six months... From year to year we adapt”. A desire to work with the raw climatic data itself and draw upon own conclusions, be engaged with online forums allowing open participation, and development of changeable projection models was preferred.

Issue type Analysis: The classification of issues into one of three types. Depending on the role you assume in a public issue, there are various ways to go about each type of issue (see figure)

- Type I issue: both the underlying problem and solution are clear
- Type II issues: have a clear underlying problem, but have several alternatives when it comes to a solution.
- Type III issues: have unclear underlying problems associated with them and whose solutions are yet to be discovered

	Type I	Type II	Type III
Content experts	Provide information.	Analyze proposed solutions.	Conduct issue research & analysis.
Process experts	None	Facilitate public deliberation	Frame the issue in public terms. Facilitate public deliberation.

Example: Please reference the table above which comes from “Public Issues Education: Exploring Extension's Role” (Patton and Blaine, 2001). In Type I public issues, extension professionals must provide all relevant information. Type II issues request that solutions to the underlying problem are explained along with possible consequences, allowing public input to aid in coming to a solution. Type III issues require extension specialists to research both the underlying problem and the issue itself, frame this information and present it to the public, and encourage open discussion acknowledging possible approaches. With the incident of controversy to likely increase in the future, the need for extension educators in public issues education must also increase as we move forward.

Boundary Organizations: A third part, intermediate organization that acts as the bridge between technology developers and end users. They would act in diffusion, in support of decisions, in standard setting, and in technology evaluation along with acting as catalysts of change.

Example: The goal of “The Cooperative Extension Service as a Boundary Organization for Diffusion of Climate Forecasts: A 5-Year Study” (Breuer et al, 2010) was to, “summarize and analyze the evolution of responses regarding climate of Florida Extension agents over time” in order to determine agents’ knowledge and attitudes of climate change. In addition, the boundary organization FCES (Florida Cooperative Extension Service) was impartially given attention to determine future strategies of diffusion of seasonal climate variability forecasts. The FCES can be considered a boundary organization between the SECC (Southern research consortium) and the Florida farmers. A survey consisting of 32 questions was developed and posted online in 2004 and again in 2009. Each survey’s respondents were composed of extension agents who specialized in various aspects of the agricultural sector. It was found that from 2004 to 2009, there was increase in the number of Florida extension agents who were aware of the El Nino/La Nina phenomenon, consulted weather forecasts daily and rely on climate data, and preferred translated applications of ENSO forecasts rather than the raw climatic data (as is available through AgroClimate.org). These results support the notion that the FCES is a useful and powerful boundary organization for the SECC: an upward spike in knowledge, willingness to use, and potential adaptations of climate information confirms FCES members are more climate literate than before.

Contrasting viewpoints: Thorough examination of value judgements and beliefs along with empirical evidence involved with a particular issue are focused on: its purpose is not to arrive at a policy decision, but rather have participants become more informed as an educational activity progresses.

- By examining different viewpoints, we promote enhanced perspectives and comprehension of the subject/issue at hand while enabling Extension educators to better able provide clients with a broad and general look on different perspectives of a controversial issue.
- Inoculation Theory: suggests that inducing resistance to future persuasion is obtained by giving "small doses" of the opposing view, resulting in more resistance to either extreme in the future.

Example: In the case of the “Contrasting Viewpoints on Controversial Issues” (Goodwin, 1993) study, the issue at hand was animal rights and welfare issues: its purpose was to determine the effectiveness of the “What’s the Beef/ Here’s the Beef: educational program while also demonstrating the contrasting viewpoints method. The one-hour program focuses on major

concerns within the animal rights/welfare movement related to animal agriculture, centered around two videos that examine the issue from different perspectives (“What’s the Beef” and “Here’s the Beef”). “What’s the Beef” represented the animal agriculture perspective while “Here’s the Beef” highlighted the animal activist perspective, both videos addressing the issue concerning the well-being of farm animals, the wise use of natural resources, and national food supply safety. The study was performed with over 250 county agriculture agents within the Texas Agricultural Extension Service: they were randomly assigned to either the control or experimental group, where the control group received a knowledge test prior to watching the videos and the experimental group watched the videos before the test. After the tests were complete, it was determined that “Ninety-two percent of the agents rated the educational program as effective or very effective. Ninety-seven percent of the agents also stated that they'd make use of the "What's the Beef" video and facilitator guide if it were made available to them”. However, what is important to note is that those who were a part of the control group scored significantly lower on the knowledge test (mean score of 2.31 out of 10) compared to the experimental group (mean score of 8.25 out of 10). It is also important to mention that the attitudes of those in the control group leaned slightly more towards “for animal agriculture” than those in the experimental group, whose attitudes were more in the middle between “for animal ag” and “for activism”. This part of the study reflects the "inoculation theory”. It was concluded that the “contrasting viewpoints approach may act as an educational tool, where the Extension may serve its educational mission by presenting all apparent perspectives.

Suggestions in Communicating/Educating Controversial Issues

- *Know the audience:* people look for information that is relevant to what they already know, so it is effective to use examples that mean something to the audience. We must see how they stand on the topic, address those concerns and values they have before framing the topic to encourage certain interpretations.
 - Adult learners like to apply information learned to present-day situations
- *Get their attention:* First start with why the situation is a problem, what could be responsible, and what options exist for us.
 - This issue is relevant now, not for the future- newspaper articles can be used to convey this information
 - Connect to audiences values, showing how much we care. Share stories of people in the same situation.
- *Translate the science into concrete examples:* audience wants to know the bottom line first, than if they are still interested present information on why they should care along with support/evidence.
 - Use of vivid images are more effective than lots of graphs that require more though.
 - Tie the information to what they are already know, and to what rewards may be available.
- *Effectively communicate uncertainty:* scientists like to think of uncertainty as how well something is known, but the public sees this as not knowing. We must communicate the known risks, the overall consensus, and talk about the range of possibilities for “us” and “we”.
 - Like to learn from trusted organizations (extension specialists, USDA, NOAA)

- *Tap into social identities:* Creating connections and groups is a great way for people to understand information hits home. Using a diverse group of advocates so people can have someone to connect with.
 - People would rather adapt than mitigate.
- *Encourage group participation:* allows people to share common values and experiences.
- *Minimize bias:* The goal is to provide objective, science based information so people are able to develop their own perspectives. We must first acknowledge our own bias to be transparent, while providing equal weight to differing viewpoints.
 - *Framing:* Understand that bias is impossible to avoid, but frame the message in a way that doesn't tell someone what to do (Blaine and Patton, 2000).
 - Must frame ideas to reach most amount of people: most people know climate change is happening, but don't believe it is important (so use local data).

Successful Moments of Extension Fulfilling their Mission

- According to “Education in the Face of Controversy: When Water and Politics Mix” (Welch, Braunworth, 2010), when irrigation water supplies on the Klamath Reclamation Project located on the Oregon-California border were curtailed as a result of severe drought and the need to conserve endangered/threatened fish in 2001, conflict among irrigators, Native American tribes, agencies, and conservation groups soon arose. A team comprised of extension faculty specialists, scientists, and communication specialists was presented with the challenge to prepare a report on ecological, economic, social, and policy issues relevant to the controversy. Five stages were apparent in the report development process: Planning, writing and peer review, public comment, refining, and release. In the planning stage, the report team met with all relevant parties to outline the project focusing on resolving issues of bias, credibility, and format right from the beginning. When regarding format, it was decided that a Contrasting Viewpoints model (where different perspectives are examined) would prove most efficient in this particular Type III issue: no advocacy, no attempt to achieve consensus among authors of the report. From there, the report went into stage two: writing and peer review, where team members took lead on specific “chapters” of the report and further revised each other’s pieces in order to resolve bias issues and make the material easy to understand. The public comment stage then came into play, where interested parties had the opportunity to voice their opinions and led to a more credible report. Once the report was peer-reviewed and commented on by the public, it went into the refining stage. Phrases that could be potential “red flags” to readers were rewritten, facts were rechecked and consistency was ensured by the editor and project leader: this system acted as a sort of checks-and-balances allowing the entire report itself to be in balance. Finally, the report was released: interested groups were provided with pre-release issues and interviews were scheduled with concerned parties in order to resolve possible issues or further conflicts. Although there were many strengths to this five step process, suggestions for improvement may also be made. Some authors were aligned with an interest group, not all interested parties were met with in the beginning, and additional peer review/public comment would have enhanced credibility of the report further. All in all, it was concluded that accuracy is

critical, checks and balances must be in play, public input is essential, and communicating properly is key.

- From “The Role of Extension in Controversial Studies: The Case of Interstate Dairy Compacts” (Bailey, 2002): In 1998, Missouri Extension were asked to evaluate the economic impact of a policy proposal: joining a dairy compact. Dairy compacts are designed, “to enhance local and regional milk prices” through an agreement among involved states to regulate the price of milk (setting fluid milk prices above existing federal or state prices) while affecting interstate trade in regards to dairy products. This issue was considered controversial because the U.S. Constitution prevents state laws from interfering with interstate trade unless states are joined in a compact, an exception featured in the commerce clause. In addition, while some gain, others do not: processors and retailers must pay more for milk under such a scheme, increasing the costs for consumers. Some farmers will make more revenue and expand milk production, possibly past the point of consumption. Extension got involved with this debate due to suggestions that the university faculty should be responsible for “seeking truth wherever the path leads” (Barron) and their close relationships with stakeholders. Thus, the “Missouri Study” came in to play, using a team approach to study the economics of dairy impacts. To complete the study, Extension agents developed a study committee comprised of economists and dairy representatives to provide guidance on the objectives, defined a research proposal, conducted the study, sought out comments from all involved with the committee, presented results and published the report. The results demonstrate dairy farmers within dairy compact regions receive higher farm prices due to the compact scheme and further expand production and volume of milk sold while consumers paid more than normal. Overall spending on fluid milk in the compact regions increased while consumption itself decreased: this resulted in increased butter and cheese production due to a greater amount of milk available to be used for manufacturing purposes. When looking at farmers in non-compact regions, less milk was produced and farm prices lowered. Many criticized this study, concluding it was biased and not credible due to the fact it was based off of a theoretical rather than actual compact. This information gathered allows Extension agents to design more credible reports in the future keeping their role relevant to society, if they are willing to step forward and address politically sensitive issues. Extension agents must take care to conduct studies such as the “Missouri Study” in an objective scholarly matter without alienating certain groups, taking care to address impacts on all involved in order to fulfill their mission statement of educating the public.
- When reading through “Climate Change Impacts on Agriculture and Their Effective Communication by Extension Agents” (James et al, 2014), one may note that the agricultural industry contributes at least \$200 billion to the U.S. economy each year (USGCRP, 2009) providing food and jobs to the public. However, climate change puts this industry at risk: more frequent water shortages, extreme storms, flooding, and shifts in growing seasons may prove to be detrimental. Due to the high vulnerability of agriculture to climate change, communication is key in order to get the right messages across from Extension agents to the farming community to adapt to a changing climate. Natural factors such as changes in the sun’s energy, natural climate system processes including El Nino and La Nina occurrences, and human activities which alter the concentration of atmospheric gases like the burning of fossil fuels have resulted in

increases of average air and ocean temperatures, melting of snow and ice, and a rising global sea level (Intergovernmental Panel on Climate Change's Fourth Assessment Report, 2007). But why should climate change matter to the agriculture industry? Although increased carbon dioxide concentrations boost agricultural productivity, farmers can expect to see shifts in climate/agricultural zones towards the poles, pronounced droughts and floods, rising temperatures which cause heat stress in livestock and decreased fresh water, and numerous weeds and pests which thrive under warmer temperatures and wetter climates. As an example, it's been reported by the WTO and UNEP that in low-latitude regions, even small temperature increases of less than 2 degrees Fahrenheit can lead to reductions of 5-10% in yields of cereal crops. Since so many risks come with a changing climate, it is crucial to warn farmers.

- According to the article "Cooperative Extension and Climate Change: Successful Program Delivery" (Morris et. al., 2014), farmers and foresters have already witnessed temperature and precipitation changes along with increasing frequency and intensity of extreme events such as droughts, storms, wildfires, and pests/diseases. However, debate continues: many question the validity of climate change despite much scientific consensus on its anthropogenic causes. Being as such, the topic of climate change is extremely challenging to effectively communicate. Much of society relies on the notion of "seeing is believing": if people observe the impacts of climate change first-hand, they are much more willing to accept it. This also means if the public doesn't experience climate change within their local climate, there becomes a lack of audience interest and it is highly unlikely Extension will be approached about adaptation strategies. To look at this issue of communication more closely, a North Carolina survey examine Extension professionals' "climate change perceptions, willingness to adopt climate change-related programming, and barriers to incorporating climate change" into educational programs. From the survey, it was gathered that the term "Climate change" (36%) was used more often than "climate variability" (31%) and "global warming" (18%). In addition, only 15% of respondents had participated in any climate change continuing education or professional development programs and 10% had even ever developed climate change Extension programs or materials: these results show that the North Carolina Extension falls near the bottom compared with their southeast regional counterparts. What must happen is the implementation of adaptive management- waiting for certainty prior to doing so could pose risks to resource health, carbon sequestration potential, and overall profitability. Although avoiding the topic of climate change seems to be the most viable option to avoid conflict, avoidance also fails the landowners and farmers who are most at risk. Research from the Six Americas study has suggested focusing outreach on individuals who categorize as either cautious or disengaged who lack strong convictions rather than focusing on those who are doubtful or dismissive who in turn question climate change evidence. The role of Extension should be to demonstrate how best to use management tools to maximize resource health, productivity, and resilience in a changing climate while focusing on the audience at hand- in essence, framing the right science in the right way. The article summarized the survey's findings and suggestions: develop an approach that address the clients' varied needs while providing necessary information to emphasize resource health and resilience, concentrate educational efforts on clients who lack strong opinions on climate change, and focus on the local climate impacts/threats rather than regional or national. To achieve these recommendations, Extension agents

may require additional climate science and adaptive management training. In addition, Extension should deliver the current information on climate science and embrace a grassroots approach, shifting focus toward local adaptation solutions.

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