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Engaging in Conversations about Climate Change with Cattle Producers

Ricky Telg
University of Florida, rwtelg@ufl.edu

Cassie Wandersee
Kansas Forest Service

David Smith
Texas A&M University

Saqib Mukhtar
University of Florida/Institute of Food and Agricultural Sciences

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Ricky Telg

University of Florida

Cassie Wandersee

Kansas Forest Service

David Smith

Texas A&M University

Saqib Mukhtar

University of Florida/Institute of Food and Agricultural Sciences

The purpose of this study was to determine whether Cooperative Extension Service agents and United States Department of Agriculture Natural Resources Conservation Service (NRCS) personnel used a dialogic model of communication in their interactions with cattle producers in the Southwest and Mountain West regarding the topic of climate change. Findings indicated that dialogic communication is being used, with a focus on discussing best management practices, avoiding the term “climate change,” and focusing on local data and weather events. The study suggests that Extension agents and NRCS personnel recognize the need to adapt their communication strategy and tactics to suit the cognitive needs and beliefs of the cattle producers with whom they converse. Additionally, findings suggest that climate change should be described in terms that are observable to cattle producers, such as weather events (drought or flooding), possibly minimizing the need to name such events as climate change.

Keywords: cattle, climate change, Extension, livestock, communication

Introduction

Animal production, which includes cattle, dairy, swine, and poultry, accounts for nearly half of the \$330 billion of agricultural commodities produced annually in the United States (U.S. Census Bureau, 2012), with beef cattle production alone amounting to \$61 billion. Agriculture systems in the United States play a significant and complex role in rural and national economic and social systems (Hatfield et al., 2014). Because of the significant role agriculture plays in economics and society, the effects of climate change, such as droughts, flooding, sea-level rise, the potential loss of pollinators, and extreme weather events pose a significant long-term threat to agricultural production (Hatfield et al., 2014).

Direct correspondence to Ricky Telg at rwtelg@ufl.edu

Moreover, livestock production contributes significantly to the factors that accelerate anthropogenic (human-caused) climate change through such things as greenhouse gas emissions, deforestation, and environmental degradation (Gerber et al., 2013). While the impact of the livestock industry occurs globally, research suggests the need to address mitigation strategies that work in local conditions and consider livestock-dependent livelihoods (Gerber et al., 2013). Ranchers, who keep livestock largely on rangelands in the United States, relying primarily on the income and actual products of meat and milk for their livelihoods, are an example of livestock-dependent producers (Food and Agriculture Organization of the United Nations [FAO], 2011).

Producers play a key role in a society that relies heavily on livestock for food security (FAO, 2011). In the United States, the majority of cattle are produced in Texas, Nebraska, and Kansas (National Cattlemen's Beef Association, 2017), where the effects of climate change are being felt by producers, largely through drought (Melillo, Richmond, & Yohe, 2014).

Climate science information can assist farmers and livestock producers with management decisions that hedge against uncertainty and risk (Wilke & Morton, 2015). Climatologists, Extension agents, and others in public education have been tasked with the challenge of providing science-based information to agricultural producers on contentious scientific topics, including climate change (Smith & Mukhtar, 2015; Wilke & Morton, 2015). Extension plays a vital communication role with producers and private agricultural advisors (Prokopy et al., 2015).

A deficit model of communication has been the traditional format used by Extension professionals and the producers they serve (Leeuwis, 2004), where the presumption is that by simply providing knowledge and information to the public, deficits in their knowledge can be filled (Brossard & Lewenstein, 2010). Previous research indicates that a deficit model of communication is less effective in communicating contentious science issues (Gross, 1994), like climate change.

It has been suggested that utilizing a dialogic model of communication, which engages the public in contentious issues like climate change (National Academies of Sciences, Engineering, and Medicine, 2017), can be effective in involving producers in two-way communication (Leeuwis, 2004). Morris, Megalos, Vuola, Adams, and Monroe (2014) recommended that for Extension educators to engage their audiences effectively, those educators should consider their audience and adapt their messages accordingly. Arbuckle et al. (2014) noted that a dialogic communication model in Extension should connect individuals with differing beliefs, knowledge and skills, linked by a common shared interest.

To build awareness and generate knowledge among Extension professionals who engage and advise livestock and poultry producers about the social, environmental, and economic implications of climate change and its particular concern for agricultural production, the United States Department of Agriculture's National Institute of Food and Agriculture (USDA NIFA) awarded a multi-institutional grant in 2011, titled the *Animal Agriculture in a Changing Climate*

(AACC) project. As part of this project, working groups were formed to identify key climate issues within their respective regions and coordinate educational outreach that targeted Extension needs and stakeholder interests. Several methods were employed to promote awareness and build capacity among Extension professionals, including fact sheets, videos, and face-to-face workshops targeted to specific animal species and production practices.

The *Cattle and Climate Conversations Workshop* was the last activity funded through the overall project and took place in October 2016 in Denver, Colorado, for Extension agents and United States Department of Agriculture's Natural Resources Conservation Service (NRCS) representatives in the Southwest and Mountain West regions of the United States who work extensively with cattle producers. The workshop's purpose was to provide attendees with information on climate change so they can be better equipped to converse with regional cattle producers about climate change. All attendees participated in focus groups held at the end of the day to examine their efforts and tactics related to communicating and educating cattle producers in the region about climate change.

The purpose of this study was to determine if Extension agents and NRCS personnel implement tenants of dialogic communication models in their interactions with cattle producers in the Southwest and Mountain West regarding the topic of climate change. The following research question directed this study: What topics or messages related to climate change do Extension agents and NRCS personnel believe they should use to engage in conversations with cattle producers?

Literature Review

As King, Baker, and Tomlison (2017) and others have demonstrated, it is vital that Extension and other public education organizations employ communication strategies and tactics based on the needs and preferences of their target audiences. Extension has traditionally used a deficit model of communication when relaying complex scientific ideas (Leeuwis, 2004). A deficit model was largely successful in the relaying of profit-based agronomic information and innovation (Ruttan, 1996) but has proven to be much less effective in the communication of complex scientific information (Leeuwis, 2004). Recognizing a significant variance in beliefs and acceptability thresholds of climate change science and information (Arbuckle et al., 2014), a dialogic model of communication has replaced the traditional deficit communication model in Extension (Leeuwis, 2004). Dialogue is a crucial aspect in the communication of contentious scientific topics. Feedback, understanding of context, and appropriate use of terminology are all components of dialogue (Burns, O'Connor, & Stocklmayer, 2003). Previous research found that agricultural producers are most receptive to tailored messages about climate change that fit their existing characteristics and beliefs (Diehl et al., 2016).

Several studies have examined the way the public and, specifically, agricultural producers prefer to discuss climate change. Whitmarsh (2009) noted terminology impacts how audiences

understand and evaluate the issue of climate change. Campbell Hibbs et al. (2014) found agricultural producers in the Central Great Plains made distinctions between climate variability and anthropogenic climate change. In a study of 16 communication and education professors who communicate with agricultural producers about climate change across the United States, participants indicated they believe “in speaking honestly” about climate change with agricultural producers (Rohling, Wandersee, Baker, & Tomlinson, 2016, p. 89).

When discussing climate change, producers are likely to be more receptive to outreach focused on adaptation rather than mitigation (Arbuckle et al., 2013). In a 2015 interview in *Scientific American* (Heikkinen, 2015), Arbuckle recommended that Extension professionals avoid the term “climate change” in their interactions with farmers, focusing instead on adaptive farming practices. Arbuckle explained farmers adapt to challenges quickly and, therefore, are more receptive to adaptive strategies (Heikkinen, 2015). King et al. (2017) examined the barriers and benefits of adopting best management practices in grazing systems in Oklahoma and Kansas. Their findings suggest that while producers experience operational and infrastructure challenges in adopting best management practices for grazing, they see the benefit of those practices through the increased sustainability of their operations (King et al., 2017). King et al. (2017) also suggested that Extension and NRCS personnel are instrumental in the successful communication of best management practices to improve water availability in the Midwest.

Methods

Three one-hour focus groups, comprised of 29 total attendees of the *Cattle and Climate Conversations Workshop*, were conducted simultaneously at the end of the first day of the workshop. A focus group is a group interview, allowing researchers to quickly explore a variety of participant opinions about an issue (Lindlof & Taylor, 2011). Participants were divided into the three groups randomly, by color dots that had been affixed to their name tags prior to the start of the workshop. The participating Extension agents’ and NRCS employees’ jobs included serving as research scientists, rangeland managers, soil scientists, an air quality engineer, and a plant materials center manager. The largest number of participants was from Texas (14), followed by Oklahoma (3), Colorado (2), and New Mexico (2). Of the 29 participants, 22 identified themselves as Extension agents or specialists, with seven being employed with the NRCS.

The moderator’s guide was drafted and vetted through multiple individuals to ensure relevance and clarity of questions. In the three focus groups, the same questions and prompts were utilized. Questions for the moderator’s guide focused on four major areas: workshop benefits and existing needs, climate beliefs and perceptions, climate conversations and frame tactics, and climate science and science communication. To examine the use of a dialogic model of communication, participants were asked questions relating to their climate-change conversations,

framing tactics, the effects of climate change their constituents were experiencing, and the process by which they determined if their constituents were prepared to discuss climate change.

Each focus group was moderated by a member of the University of Florida's Institute of Food and Agricultural Sciences' Center for Public Issues Education in Agriculture and Natural Resources (PIE Center). Focus groups were audio-recorded and transcribed to ensure accuracy of the data. Transcripts were analyzed using inductive data analysis to allow themes to emerge (Creswell, 2007). To maintain confidentiality, transcripts were coded and attributed to participants by focus group numbers (example: G1, 4 meant Focus Group 1, Participant 4). These codes were also how participants were identified in the Findings section. Focus Group 1 was comprised of nine participants, Focus Group 2 was comprised of 12 participants, and Focus Group 3 was comprised of eight participants.

Researchers coded the participants' answers according to emergent themes using the constant-comparative method (Glaser, 1992; Strauss, 1987). The quotes from the transcribed focus groups were coded and then organized into themes, based on similarities across questions (Kitzinger, 1995). Emergent themes and representative quotes relevant to this study are presented in the Findings section. Researchers created an audit trail detailing the theme formation, increasing confirmability and dependability (MacQueen, McLellan, Kay, & Milstein, 1998). Findings are limited to how the discussions were interpreted, a common limitation in qualitative research (Pauly, 1991).

Findings

Several themes related to the implementation of dialogic communication models in interactions with cattle producers emerged from the focus group sessions: stressing best management practices, avoiding charged terms, discussing tangible weather events, focusing on local effects, and focusing conversations on the current effects of climate change.

Stressing Best Management Practices

When participants were asked how they conversed with their constituents about the effects and adaption strategies related to climate change, participants across all groups agreed they typically did not discuss climate change with cattle producers. Instead, participants discussed the economic and conservation benefits of using best management practices. One Extension agent explained that she did not relate any of her conversations to climate change:

I talk about best management practices. I don't relate that to climate or anything, but I talk about saving money and what's good for the environment, what's good for their operation, what's good for their neighbors, that kind of conversation. (G2, 8)

Another Extension agent shared that adaption conversations about economic and conservation benefits could address multiple concerns for producers, without broaching the topic of climate change:

You don't have to come out and say, "Hey, if you do this, this is good for climate change." Say, "Hey, this is good for your pocketbook, this is good for your bottom line. Good for your operation, your soil, your range." Then the cherry on top might be mitigating some of that carbon footprint. (G2, 11)

Another agent, when asked about how he accommodated conversations with producers, said, "You start talking about the best management practices that will move them toward a higher plane of production, and it will benefit them economically." (G1, 4). An agent from the third focus group further stressed the importance of presenting best management practices as opposed to responses to climate change:

I don't get into the term climate change. More or less, we try to present and practice and educate the people on best management practices they need to do anyway. If they do that, they're going to be doing the right thing that they need to do for their production agricultural process. (G3, 1)

An Extension agent in the first focus group stressed that he felt it was possible and preferable to encourage adaption to the effects of climate change without discussing climate change:

I'm not going to bring up climate change. If we can show them that the productive economic benefit of doing some things that are conducive with helping with climate change, and I hate to even go there. If we can show them the economics of just being a good producer, you can make headway and not even have the conversation of climate change. (G1, 3)

Other Extension agents and NRCS representatives said they focus on the need for land stewardship and conservation, instead of focusing on climate change. One agent said, "Agriculture is, by nature, conservationist anyway. They want to conserve their land and their resources, and they want to do the best management" (G3, 1).

One Extension agent noted the following:

To me, it's about the land stewardship. I think there's so much common ground on both sides of that fence that, to me, that's the issue. I mean, I'd never start a conversation about climate. Just other than when we talk about cold and keeping the cows out of the cold and calving and stuff like that. The rest of that, to me, I do want to talk about stewardship, and stewardship of the land and of our resources. (G2, 8)

As another Extension agent said:

As producers, we do so much more with less. Like they were saying a while ago, with all the inputs or the no-till or whatever mitigation we choose, we're way better conservationists than we were in the 30s and 40s, like exponentially better. (G1, 3)

Another Extension agent noted:

It's about stewardship of the land. It's about sustainability. I think those of us who have been around a while, we shift the way we talk about things, and even with the Millennials that are now coming back to the farm or ranch, we shift again in the way we talk about that to them. I think we're talking about the same things, because it is about their bottom line. It is about the sustainability of that land and being good stewards, and that's something everybody has in common. (G2, 8)

Participants noted if they could help cattle producers conserve land resources, the producers would be mitigating the effects of climate change without knowing it. As an NRCS representative said:

I guess my viewpoint, from the NRCS point of view, is that we're asked out onto the place. It's not to talk about climate change. We're going to stop erosion; we're going to do something else. Climate change, mitigating climate change, is just an ancillary benefit to other things we do. There's no reason to bring it up. All you're going to do, chances are, is turn somebody off. There's no point in bringing it [climate change] up, from my viewpoint. (G2, 2)

Avoiding Charged Terms

Participants were asked how they specifically talked about climate change. There was almost total agreement that the term "climate change" has a negative connotation, and it would not be their first choice as a term to use in conversations with cattle producers. Participants said they were much more comfortable using "climate variability." One Extension agent explained:

Climate variability fits me better than climate change. When I hear that, I'm more receptive to it than I am climate change. . . . Climate change is one of those things you hear, and automatically, you want to turn it off because you think it's a bad thing. Climate variability is more suitable. (G3, 3)

Another agent explained cattle producers' perception of the term "climate change" this way: "Climate change sounds like it's something permanent. Variability is realistic." (G3, 4). Another Extension focus group participant explained how terms impacted the course of a conversation:

As soon as those words [climate change] spill out of someone's mouth, it seems as though the conversation turns pretty, volatile pretty quick. Being able to say something like 'variability,' I think, allows folks to consider digesting it before they shut down. (G3, 8)

Another way that participants described discussing the effects of climate change without naming the topic was through focusing on weather events that were tangible to cattle producers, primarily droughts and floods. One agent said, "From a producer's standpoint in my area, it's [climate change] not even on the radar. Ask me how to deal with drought or flood. Climate change, in the academic sense, isn't on the radar." (G1, 2). Another agent explained that "people may not believe, and I might be one of them, in climate change, but everybody believes in droughts and floods." (G3, 6)

Making Climate Change Local, Rather than Global

Many participants said they felt the effects and science of climate change were often presented on a global level to cattle producers. For cattle producers they worked with, the concept of the global effects of climate change were not relatable or understandable. Participants explained that to reach cattle producers, they framed climate change conversations on the local level. One agent explained:

All of this is a global concept, but for us to make it, for us to utilize it as a tool for education, it's got to become local. It's got to be realistic and local. It's got to be applicable and local. (G3, 8)

An NRCS employee described his perception of the available material he had access to through Extension and NRCS and the challenges of using that material with his producers:

There's a lot of stuff out there that I think both NRCS has put together, the Extension community has put together. A lot of that seems to be really national in scope, not so much on the local level. It may or may not be applicable where you're at right now. (G2, 10)

Participants also said because of the broad, global scope of climate change, they felt the cattle producers they worked with regularly might not feel that the mitigation strategies they implement on their ranches and cattle operations would have any effect on reducing or reversing the effects of climate change. As one NRCS employee explained, "The producers I work with say, 'I have a 100-acre farm. What can I do realistically that will make a change?'" (G1, 7).

Focusing on the Here and Now, Not the Future

Another way that participants framed climate change conversations was to focus on the current challenges and concerns producers had for their operations. Many said that addressing future issues, concerns, and the potential effects of climate change was not effective in communicating

with producers. As one Extension agent said, “They [cattle producers] don’t get involved in these things unless it affects them directly” (G2, 1).

Another agent noted:

I deal with the here and now because they have me out there for a reason. I’m looking at that reason to start with, and then to the contingency plans and stuff. If I see a drought, we’re going to talk about the drought. If we see a flood, we’re going to deal with the flood stuff. As far as the climate change verbiage, no, that’s not what I’m going to talk about. Sometimes we got to deal with the here and now so that we can be here in 10 years. (G1, 6)

Discussion and Conclusions

This study sought to identify what topics or messages related to climate change Extension agents and NRCS personnel believe they should use to engage in conversations with cattle producers. The findings of this study indicated Extension agents and NRCS personnel are following a dialogic model of communication to engage cattle producers on adaptation and mitigation strategies in reaction to the effects of climate change. Leeuwis (2004) suggested a dialogic model that considers the context of the topic is much more effective at reaching audiences. The findings of this study align with previous research, indicating that Extension agents and NRCS personnel who work with cattle producers do not discuss climate change as a stand-alone topic, based on the perceptions they have of producer preferences for the topic (Arbuckle et al., 2013; Campbell Hibbs et al., 2014; Diehl et al., 2016).

Participants indicated they would prefer discussing the benefits of best management practices that help producers adapt to and mitigate the impacts of climate change. King et al. (2017) found producers were aware of and receptive to messages about the benefits of best management practices in cattle grazing. Additionally, the participants’ framing of communication focused on adaptation to the effects of climate change aligned with the findings of Arbuckle et al. (2013), which found that producers prefer to discuss adaptation strategies. While Extension agents and NRCS personnel cite the overall benefits best management practices have on the mitigation of climate change, they preferred to communicate how the practices enhance profits and conserve producers’ lands.

Participants agreed across all focus groups that “climate change” was too charged and negative to use in conversations with producers. Instead, they indicated they would use a term such as “climate variability.” The use of appropriate terminology is cited as an important aspect of dialogue (Burns et al., 2003), with previous research indicating that cattle producers prefer not to use the term “climate change” (Heikkinen, 2015) and that climate change messages should be tailored to fit agricultural producers’ existing characteristics and beliefs (Diehl et al., 2016).

Participants also said, “climate change” is less tangible than observable weather events, such as drought and floods, that cattle producers must face on a regular basis. Arbuckle explained, as cited in Heikkinen (2015), that producers are accustomed to the need to constantly adapt their practices when faced with challenges. As such, participants found that communicating adaptation strategies to current weather events was better received than the long-term effects of climate change. Participants would prefer to communicate about tangible events, rather than something difficult for their clients to physically see and conceptually grasp.

Participants also indicated the presentation of climate change was a communication barrier. Many explained the climate change information they were presented with, or had access to, focused on the global effects of climate change. Wilke and Morton (2015) found that producers sought out information that would help them hedge against risk and uncertainty in their operations. The perceived preferences for local data support that finding, indicating that local information and data is key to enhancing conversations focused on adaptation and mitigation strategies.

While participants stated their constituents felt more connected to local data, they also noted that cattle producers did not feel that best management practices on their ranches would have much impact on global climate change. Therefore, participants said if they communicated about climate change to local cattle ranchers, the conversation needed to focus on how even small or local production practices could potentially mitigate climate change. Participants also indicated the cattle producers they worked with were more concerned with immediate, observable issues, rather than potential future impacts.

Limitations

Limitations to generalize the findings from this study include the geographic regions of the United States that participants represented (Southwest and Mountain West) and the subject matter area participants represented (i.e., Extension educators and NRCS representatives who engage with cattle producers). Because the participants in this study also self-selected to participate in the *Cattle and Climate Conversations Workshop*, rather than being randomly selected to participate from a larger population, the results of this study cannot be generalized beyond this group of participants.

Recommendations

Based on the findings of this study, communication and education professionals working with cattle producers should initiate conversations related to the effects of climate change by focusing on adaptive best management practices that provide economic and conservation benefits. Conversations should also focus on how best management practices conserve producers’ lands, rather than how the best management practices mitigate climate change. Participants in this study indicated that the term “climate change” should be avoided when communicating with

cattle producers, due to the term's negative connotation, a finding supported by previous research and professional recommendations (Campbell Hibbs et al., 2014; Diehl et al., 2016; Heikkinen, 2015; Whitmarsh, 2009). It is also recommended that communicators and educators recognize that using the term "climate change" may inhibit dialogic conversation.

Findings from this study indicate that describing climate change in terms that are observable to cattle producers, through examples of droughts and floods and the increased frequency and severity of events, are more acceptable to this audience. Communication and education professionals working with cattle producers should focus on the local effects of climate change and the appropriate adaptation strategies to protect against those effects, as opposed to emphasizing global effects of climate change. Similarly, discussions should be initiated on immediate impacts of cattle operations, instead of potential future scenarios. Producers also may be open to discussion of how local production practices could mitigate climate change effects through positive effects on local conservation efforts.

Additional research should be conducted on how contentious and complex topics, like climate change, can be better communicated using concrete or tangible examples with stakeholders. Because this study focused exclusively on Extension agents and NRCS personnel who worked with cattle producers in the Southwest and Mountain West, this study should be replicated with Extension agents and NRCS personnel in other geographic areas or with Extension agents in other subject matter areas who are dealing with contentious issues.

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Ricky Telg is a professor in the University of Florida's Department of Agricultural Education and Communication. He also serves as the director of the University of Florida's Center for Public Issues Education in Agriculture and Natural Resources.

Cassie Wandersee is a communications coordinator for the Kansas Forest Service.

David Smith is an Extension program specialist in Texas A&M University's Department of Biological and Agricultural Engineering.

Saqib Mukhtar is the associate dean for Extension and the agricultural program leader in the University of Florida/Institute of Food and Agricultural Sciences' Extension Administration.

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