Research Poster

Agricultural Magazines' Coverage of Climate Change in Relation to Agricultural Commodity and Geographic Location

Ginger Orton, Dr. Courtney Meyers, Dr. Laura Fischer, & Dr. David Doerfert

Texas Tech University

Box 42131
Lubbock, TX 79409
806-742-2816
gorton@ttu.edu

Agricultural Magazines' Coverage of Climate Change in Relation to Agricultural Commodity and Geographic Location

Introduction/ Need for Research

Climate change will both impact agriculture and present the need to adapt to its impacts (Thornton et al., 2018). While agricultural production in the United States only accounts for around 10% of greenhouse gas (GHG) emissions, there is potential for agriculture to contribute even less and remove GHGs from the atmosphere (EPA, 2021). Popular mitigation practices that reduce emissions include conservation tillage, cover cropping, nutrient management, and agroforestry (USDA, 2021). Many of these agricultural practices also store, or sequester, carbon in the soil, thus harnessing carbon dioxide's heat-trapping ability. These climate-smart agricultural practices vary widely by operation type and the geographic location of the farm. For example, while corn production and beef production both have the capacity to mitigate emissions, how they would do so varies. Similarly, climate change impacts on farms vary by region with some being prone to flooding and some to drought (Wuebbles & Hayhoe, 2004). Because of agriculture's unique capacity to address climate change, farmers have been acknowledged to play a key role in reducing America's net emissions through agricultural carbon sequestration practices (White House, 2021), and these practices have already been incentivized by the private market for early adopters (Hillyer, 2020).

Arbuckle et al. (2015), Morrison et al. (2017), and Rejesus et al. (2013) found a minority of farmers perceive climate change as being human caused; therefore, they may be unlikely to adopt behavior in the name of reducing climate change. Extension-centric research suggests communication efforts that connect climate change with example farms and that include geographically relevant messaging points (e.g., specific weather disasters) may be more effective at fostering a belief in climate change and adoption of climate-smart practices amongst farmers (Davidson et al., 2019; Rohling et al., 2016; Telg et al., 2018). The current study addresses AAAE Research Priority 7 regarding complex, interdisciplinary problems such as climate change through its investigation of how climate change is presented in farmer-targeted communication efforts. This study reviewed agricultural magazines' coverage of climate change to address the following research questions: 1) To what extent do articles mention a specific agricultural commodity in relation to climate change? 2) To what extent do articles mention a geographic location in relation to climate change?

Conceptual Framework

Agricultural communications research has recognized that messages tailored to farmers' existing characteristics and perceptions are most well-received when discussing climate change (Diehl et al., 2016; Telg et al., 2020). Despite the understanding that media viewing habits and the nature of media coverage can influence how people think about issues through the agenda-setting process (Dearing et al., 1996), no other American research has investigated the nature of climate change messages in agricultural media. Furthermore, media coverage of topics with high novel news value, like climate change, saturate the agenda-setting process and are of heightened academic and strategic communication interest. While message frames can describe the general nature of the story, systematically documenting sub-topics in messages can more specifically record the exact nature of coverage and provide deeper understanding (Asplund et al., 2013).

Methodology

For farmers across technological generations, agricultural magazines have been found to be the most widely used source (Agri Media Committee, 2018). We performed a quantitative content analysis (Van Gorp, 2010) on 271 articles from *Beef* (*n* = 89), *Farm Journal* (*n* = 66), and *Farm Industry News* (*n* = 116) magazines containing the search terms "climate change," "emissions," "climate variability," "climate," or "global warming" from 2000-2020. We first created and piloted a codebook used by three independent coders to systematically record 14 variables of interest, with the current study reporting on two of those variables: *geography* and *commodity. Geography* was qualitatively recorded (i.e., written exactly as present) for each article as the mention of any geographical location relevant to climate change. *Commodity* was also qualitatively recorded as any agricultural commodity or sector the article connected to climate change. Both variables were recorded verbatim, and data was analyzed *post hoc* for apparent groups to calculate frequencies for apparent locations and commodities. Identifying these variables qualitatively allowed us to account for novel commodities or geographic areas.

Findings

Eighty-two (30%) articles mentioned geographic location, while 189 did not. California appeared in the most articles (*n* = 21), followed by Iowa (*n* = 14), Kansas (*n* = 9), Texas (*n* = 9), the Corn Belt (*n* = 7), Midwest (*n* = 7), Nebraska (*n* = 6), Minnesota (*n* = 6), Illinois (*n* = 5), China (*n* = 5), Europe (*n* = 4), and other (*n* = 33). The "other" category contained geographic areas mentioned two times or less in the sample and includes: Asia, Africa, Australia, and Antarctica; Canada, China, France, Ghana, India, Japan, North Korea, and Zimbabwe; Alabama, Alaska, Delaware, Georgia, Idaho, Indiana, Louisiana, New York South Dakota, and Wisconsin. Regarding *commodity*, less than half (*n* =124, 46%) of articles referenced one. The most frequently mentioned was corn (*n* = 33), followed by cattle (*n* = 28), livestock (*n* = 23), beef (*n* = 21), soybeans (*n* = 20), dairy (*n* = 10), wheat (*n* = 9), meat (*n* = 6), rice (*n* = 6), forestry (*n = 5),* sorghum (*n* = 3), wine (*n* = 3), and other (*n* = 9). The following other commodities were recorded qualitatively with a frequency of less than two and were not grouped together because of their distinct differences: almonds, barley, oats, grain, lentils, switchgrass, alfalfa, fruit, nuts, pistachios, walnuts, cotton, vegetables, tomatoes, peas, grapes, Christmas trees, swine, bison, poultry, cassava, cherries, oilseed, ethanol, and biofuels. Some of these (i.e. hogs, bison, poultry) could have been grouped under the livestock category but were not because this category only included articles that explicitly used the word "livestock. Notably, the inclusion of *Beef* magazine influenced cattle's recognition as a major commodity in the sample.

Conclusions/ Recommendations

Overall, less than half of articles in the sample mentioned a commodity. In line with corn and livestock's presence, the USDA (2021) declared corn as America's most widely produced feed grain and cattle as the biggest source of cash from the sale of U.S. farm commodities. Corn has also become increasingly relevant with the interest in ethanol and other biofuels as one way to mitigate climate change. Only a minority (30%) of articles in the sample included a geographic reference, with California then Iowa appearing most. Their inclusion reflects media attention to places with high agricultural output. Notably, 40% of the sample did not mention a commodity or a geographic area. Considering this, agricultural communicators have the opportunity to tailor climate change communication to farmers based on commodities and local geographic references so farmers can better relate to them or more clearly imagine the impacts (Diehl et al., 2016; Telg et al., 2020). This study supports the need for future message testing research on tailored messages and the exploration of audience segmentation within the agricultural community.

References

Agri Media Committee. (2018). *Agri Media Council Media Channel Study.* https://history.siia.net/Divisions/Connectiv-Business-Information-Association/Resources/Publications

Arbuckle, J. G., Morton, L. W., & Hobbs, J. (2015). Understanding farmer perspectives on climate change adaptation and mitigation: The roles of trust in sources of climate information, climate change beliefs, and perceived risk. *Environment and Behavior*, *47*(2), 205–234. https://doi.org/10.1177/0013916513503832

Davidson, D. J. (2019). Just don't call it climate change: Climate-skeptic farmer adoption of climate-mitigative practices. *Environmental Research Letters: Lett. 14.* https://doi.org/10.1088/1748-9326/aafa30

Dearing, J. W., Rogers, J. W., & Rogers, Everett M. (1996). *Agenda-setting.* Sage.

Hillyer, G. (2020, September 1). *We'd like to mention: A new carbon crop opportunity.* Progressive Farmer. https://www.dtnpf.com/agriculture/web/ag/magazine/article/2020/09/01/new-carbon-crop-opportunity

Morrison, M., Hine, D. W., & D'Alessandro, S. (2017, October 26). Communicating about climate change with farmers. *Oxford Research Encyclopedia of Climate Science,* 1-31. https://doi.org/10.1093/acrefore/9780190228620.013.41

Rohling, K., Wandersee, C., Baker, L. M., & Tomlinson, P. (2016). Communicating climate change: A qualitative study exploring how communicators and educators are approaching climate-change discussions. *Journal of Applied Communications, 100*(3). https://doi.org/10.4148/1051-0834.1232

Rejesus, R.M., Hensley, M. M., & Mitchell, L. D. (2013). U.S. agricultural producer perceptions of climate change. *Journal of Agricultural and Applied Economics, 45*(4), 701–718. http://dx.doi.org/10.22004/ag.econ.157312

Telg, R., Wandersee, C., Smith, D., & Mukhtar, S. (2020). Engaging in conversations about climate change with cattle producers. *Journal of Human Sciences and Extension*, *8*(1), 32-45. https://www.jhseonline.com/article/view/998

Thornton, P., Dinesh, D., Cramer, L., Loboguerrero, A. M., & Campbell, B. (2018). Agriculture in a changing climate: Keeping our cool in the face of the hothouse. *Outlook on Agriculture, 47*(4), 283-290. https://doi.org/10.1177/0030727018815332

USDA. (2021). *Ag and food sectors and the economy.* https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/ag-and-food-sectors-and-the-economy.aspx

Van Gorp. (2010). Strategies to take subjectivity out of framing analysis. In P. D'Angelo & J. A. Kuypers (Eds.), *Doing news frame analysis* (pp. 84-109). Routledge.

White House. (2021). *Fact sheet: President Biden takes executive actions to tackle the climate crisis at home and abroad, create jobs, and restore scientific integrity across federal government*. https://www.whitehouse.gov/briefing-room/statements-releases/2021/01/27 /

Wuebbles, D. J., & Hayhoe, K. Climate change projections for the United States Midwest. *Mitigation and Adaptation Strategies for Global Change, 9,* 335-363. https://doi.org/10.1023/B:MITI.0000038843.73424.de