Jake Trygstad

Dr. Bastiaan Vanacker

Science and Society

26 Oct 2022

Carbon Emissions and Livestock

While the earth's climate has fluctuated through time, climatologists believe that the current warming trend is a global climate crisis that is "different because it is clearly the result of human activities since the mid-1800s, and is proceeding at a rate not seen over many recent millennia" (Earth Science). This warming is the result of the greenhouse effect, which is the concentration of gasses, largely carbon dioxide, methane, nitrous oxide, and halocarbons, that trap thermal energy in the atmosphere, warming the planet (Collins). The increased omission of these gasses results from industrial practices like burning fossil fuels and coal, agriculture, and other activities (Earth Science). Humans are seeing the effects of climate change now; "glaciers and ice sheets are shrinking, river and lake ice is breaking up earlier, plant and animal geographic ranges are shifting, and plants and trees are blooming sooner" (Earth Science). Greenhouse gases have already warmed the planet by nearly 2 degrees Fahrenheit, but scientists predict that our future emission rate will determine the long-term effects' severity. If action is not taken to reduce the greenhouse effect, models predict reduced efficiency of carbon dioxide removal, rising sea levels, thawing in polar regions, heatwaves, and increased frequency and intensity of hurricanes and typhoons. Proposals to combat climate change include eliminating fossil fuels, consuming less, being efficient, and going vegetarian" (Collins).

One major emitter of greenhouse gases into the atmosphere is livestock animals, who "contribut[ing] between 14 and 22 percent of the 36 billion tons of 'CO2-equivalent' greenhouse

gases… each year" (Fiala). Cows produce methane during their digestive process, which is "28 times more potent at warming the atmosphere" (Mitloehner) than carbon dioxide, and belch it into the atmosphere. They also produce more "hidden environmental costs: transportation, refrigeration and fuel for farming, as well as methane emissions" (Fiala), which contribute further. "Raising animals also requires a large amount of feed per unit of body weight" (Fiala), and the carbon emissions from feed farming add to the total meaning that "producing the annual beef diet of the average American emits as much greenhouse gas as a car driven more than 1,800 miles (Fiala). There are also concerns about land efficiency and cattle, as "more than 80% of farmland is used for livestock but it produces just 18% of food calories and 37% of protein (Carrington). As the global population increases, so has the demand for cattle, and scientists are working to reduce cows' emissions and farm more sustainably.

One of the most frequent recommendations to combat livestock emissions is that consumers either completely avoid meat and dairy products or reduce the frequency of consumption. The United Nations "describes plant-based diets as a major opportunity for mitigating and adapting to climate change," using the market to decrease cattle breeding through decreased demand (Schiermeier). It is estimated that "if everyone on the planet ate vegan, greenhouse gas emissions from the food system could be cut by more than half; a planet of vegetarians would trim food emissions by 44 percent" (Borunda). Decreased livestock consumption would likely also decrease deforestation, which damages the natural carbon dioxide transformation cycle, and soil degradation. Although decisions about diet tend to be very personal and difficult to affect from a global health standpoint, campaigns tend to focus on "inform[ing] people so that they can make choices that align with their needs and values (Borunda), as even small changes over a population can make a difference.

There is a strong scientific consensus that meat consumption and livestock have an effect on climate change, but economic concerns and voices that believe their effect is overestimated complicate the discourse. Many researchers are working to reduce cows' emissions by farming more sustainably and changing the way we feed livestock, either in opposition to the idea that reducing meat consumption is effective at reducing climate change or in conjunction with it. It has been shown that changing cows' diets could somewhat reduce their emissions by "improving feed quality… reproductive efficiency… [and] productivity" (Food). Some point to already increased beef productivity as an indicator that efforts should be focusing on genetic engineering, pointing out that "In the 1970s, 140 million head of cattle were needed to meet demand. Now, just 90 million… [and] those 90 million cattle are producing more meat" (Mitloehner). Non-dietary suggestions tend to point out the personal and religious difficulties with asking the public to reduce meat consumption, as well as its infeasibility for certain low-income communities. Scientific advancements in livestock breeding and management are generally most effective when combined with recommendations to cut down meat consumption, as they are an alternative for those that cannot abstain (Quinton). While there is scientific consensus that livestock affects climate change, there is some disagreement on the solutions and severity.

Method

Sample

In order to understand the extent to which the media has used the scientific consensus around livestock's connection to climate change to affect consumer behavior, I performed a content analysis of news articles that present data on livestock and carbon emissions. To determine the sample of analysis, I selected 25 articles from 13 popular news sources on the topic. I selected these papers based on circulation data, with all papers being within the top 20 in

America. I accessed the *New York Times, The Wallstreet Journal,* and the *Chicago Tribune* through Loyola Library's database, and for the remaining 10 sources, I gained access through their individual sites. For each source, I searched for the terms "Livestock and Climate", and selected the stories that most specifically addressed climate change in relation to diet. The majority of the articles I examined were in a traditional news format, while I did include two opinion section articles that primarily focused on presenting data.

Analysis

In collecting my sample articles, I read each news story in full with my analysis questions in mind and transferred my findings to a spreadsheet. I identified four questions to help determine the extent to which each article attempted to mobilize the reader toward diet changes in order to combat climate change. My first question was: Does the article explicitly recommend reducing meat consumption as part of fighting climate change? Further, in articles where recommendations to reduce meat consumption are not explicitly stated, does the article advocate in an implicit way, by presenting significantly more data in support, or does it reject the idea? I performed the second part of this analysis by looking at the language in the article to determine if the article had a significant lean toward or away from reduced meat consumption.

The second and third questions I focused on were whether or not the articles that did advocate for reduced meat consumption 1) gave a specific recommendation on how much or what kind of meat to reduce in their diet and 2) gave a recommendation on what to replace the meat in their diet with to meet the reduction goal. My point in comparing the recommendations (or lack thereof) in these articles is based on the assumption that more specificity in describing how to reduce one's meat consumption will increase the efficacy of their environmentalist message. As these articles focus on trying to persuade the readers' behavior around eating, I

believe that being more prescriptive about the techniques of reducing meat consumption will lead to engagement being more likely.

My fourth and last question focused on sorting the stories that recommended reduced meat consumption into four categories that display how actionable the article's recommendations are, relating to the specificity of the goal and the actions needed to meet it: Least effective, somewhat effective, effective, very effective. The articles in the least effective category did not make recommendations. The articles in the somewhat effective category made either a goal or a recommendation. The articles in the effective category made both a goal and a recommendation to meet the goal but lacked some specificity in either category. The articles in the very effective category made specific and actionable goals and recommendations to meet them. My hope in examining the specificity of the goals and recommendations in the articles is once again based on the assumption that more specificity in describing how to reduce one's meat consumption will increase the efficacy of their environmentalist message.

Results

Table 1 outlines whether or not the articles advocated for any reduction of meat consumption, explicitly or implicitly. Out of the 25 articles that were surveyed, 24 of them suggested that the reader reduce their meat consumption in some way, which is a vast majority of 96% (Table 1). This is likely because most of the articles were attempting to describe a scientific consensus among climatologists and animal scientists, and they presented the existing data in support of that claim. The single article that did not advocate for the reduction of meat consumption (Table 1), an article by the New York Times entitled *The Meat Business, a Big Contributor to Climate Change*, was focused on the economic impact on the meat industry from the COVID-19 pandemic in conjunction with concerns about the climate. Although the article

did present some of the environmental challenges of the meat industry, it was not focused on environmental change, so it did not advocate for reduced consumption. Overall, the vast majority of articles on the topic of meat's connection to climate change advocate for reduced consumption, likely as a result of the scientific consensus on the topic.

Table 1

Whether or not the Articles Advocated for Reduction of Meat Consumption explicitly or implicitly

	Articles that Advocated Reduction	**Articles that did not Advocate Reduction**
Total Number	24	1
Percentage of Sample	96%	4%

Table 2

Content of the Articles that Advocated for Reduced Meat Consumption

	With Goal	**Without Goal**	**With Recommendationon**	**Without Recommendation**
Total Number	**10**	**14**	**15**	**9**
Percentage of Sample	**41.7%**	**58.3%**	**62.5%**	**37.5%**

Table 2 outlines the percentage of the articles that advocated for the reduction of meat consumption (24) included a goal or a recommendation for the reader to reduce their carbon emissions through their diet. 10 of the 24 stories that advocated reduced consumption featured a goal for their audience to strive for relating to what they should or should not eat (Table 2). Two articles gave a specific percentage of meat that their readers should cut from their diet, with the

Chicago Tribune advocating for an 18% reduction in all meat consumption, the *Washington Post* advocating for a 50% reduction in red meat consumption, and an article from the *Wallstreet Journal* advocated 100% veganism. Goals also included more general calls to cut back on some amount of meat and calls to replace red meat with some sort of substitute food. The 41.7% of the articles that offer a goal give the reader context to understand how much they may have to change their diet in order to have an impact on the climate, which may make it easier for the reader to adjust. On the other hand, the 58.3% of articles that advocated for reduced consumption but did not give context for how much meat to cut back, making them generally less actionable for the reader as they do not provide a clear vision of a diet that protects the planet from increased carbon emissions. (Table 2).

Also in Table 2 are the percentages of the articles that did or did not offer a recommendation to the reader about how they could reduce their meat/red meat consumption to either meet a specific goal or generally cut back. A majority of 62.5% of the articles gave some form of recommendation on either what foods to replace their usual meat/red meat consumption with or presented some form of schedule for readers to follow in reducing their consumption (Table 2). Recommendations make the goal of reducing meat consumption more actionable to the consumer, as it breaks the objective down into small adjustments. This is a more focused way to change the consumers' behavior, and it reduces the added labor of an additional search that may reduce the likelihood of a reader's participation. The 37.5% of the sample that did not provide any recommendations on how to reduce meat consumption are less actionable and create an extra barrier for an interested party to change their consumption behavior (Table 2).

Notably, in Table 2, there are a higher number of articles with recommendations, at 62.5%, than there are articles that set goals for the consumer, at 41.7% of the sample. This means

that there are a significant number of articles that offer recommendations toward a goal that has not been clearly specified, other than a vague idea of reducing meat consumption. This is likely not as effective at persuading a consumer to change their eating habits as articles that contain a goal and recommendations to meet the goal, as they can work in conjunction and present a unified plan for the reader.

Further, Table 3 outlines the effectiveness of the articles surveyed that advocated for reduced meat consumption at persuading readers to adjust their eating habits, which I have sorted relating to the specificity and presence of their goals and recommendations. 29.2% of the articles surveyed were least ineffective at convincing the reader because they did not contain a goal or recommendations, leaving the reader with no understanding of how to help reduce the carbon emissions of livestock despite the articles' stance on the issue (Table 3). A few of these articles, like one from the *Washington Post*, used dietary concerns as part of a larger examination of how one can reduce carbon emissions from livestock. These articles focused on land management, feeding practices, and shipping alongside dietary concerns, but left the reader with no actionable plan to make a personal difference in their emissions.

Similarly, 37.5% of the articles that advocated for reduced meat consumption were somewhat effective at specifically mobilizing the audience toward personal diet changes because they lacked either a goal or recommendations. Articles that feature a goal but not a specific strategy on how to meet the dietary goal are less effective because they create an extra step for the consumer toward reducing their emissions when they could have learned the tactics from the same article. If the article included tactics and not a goal, the call to action in the piece is not as effective because the audience does not immediately know the extent to which they would have

to cut down consumption or to what particular end. Although, because they contain some sort of actionable items, these articles are somewhat effective at provoking change in the reader.

The 20.8% of articles that advocated for reduced meat consumption were effective because they contained both a goal and recommendations to meet the goal (Table 3). The combination of these two qualifications creates an effective call to action because the recommendations support the goal, and the goal is the vision that the recommendations work toward. Although, articles in this category lack some amount of specificity in their recommendations or goals. For instance, one article from *CNN* advocates for a general cutback in red meat consumption from its readers, but does not provide a specific amount to cut back. The tool that this article provides is to focus on plant-based foods, but without clear metrics for success, it may be less actionable to some readers. The 12.5% of the advocate articles that are very effective have an increased level of specificity of goals and tactics, like the *Chicago Tribune*, which advocates for an 18% decrease in red meat consumption by switching to plants or seafood or poultry (*Chicago Tribune).* This is a very effective article because it provides a unified plan for reducing the reader's carbon emissions that is actionable.

Table 3

Effectiveness of the Articles that Advocated for Reduced Meat Consumption; related to Specificity

	Least Effective	Somewhat Effective	Effective	Very Effective
Total Number	7	9	5	3
Percentage of Sample	29.2%	37.5%	20.8%	12.5%

Discussion

In examining how the news media turns scientific consensus into actionable plans to affect individual behavior in their readers, this data shows that more than half of the articles in support of reducing meat consumption are less than effective at providing a clear framework for the reader to pursue that goal. With the general severity of the scientific consensus around livestock and climate change, it may be that news media outlets must consider the efficacy of their articles' if they seek to influence the consumers' behavior. One frequent deterrent of persuasiveness was the inclusion of either a goal or a recommendation about eating habits without their counterpart. When a goal is presented without a plan to achieve it, the reader could feel that they are less able to complete the goal because they lack the necessary knowledge. Similarly, recommendations without a goal are somewhat unfocused and could make the audience feel unsure about the ends to which they are working. These two things in companion are likely most persuasive in changing consumer behavior and should be utilized as a pair in articles that advocate the reduction of meat consumption.

Although, the data makes it quite clear that a vast majority of articles follow the scientific consensus around livestock and climate change. This points to an effective understanding by journalists of the science around climate change and the media's ability to accurately communicate scientific findings to the reader. Science journalism at this moment has fulfilled its duty to the public and now must focus on how to apply the scientific consensus to behavioral ideas that are digestible, actionable, and understandable to the general public to fight climate change.

Works Cited

Borunda, Alejandra. “How small changes to our diet can benefit the planet.” *National Geographic*, 27 December 2021, https://www.nationalgeographic.com/environment/article/how-small-changes-to-our-diet-can-benefit-the-planet. Accessed 16 November 2022.

Carrington, Damian. “Avoiding meat and dairy is 'single biggest way' to reduce your impact on Earth.” *The Guardian*, 31 May 2018, https://www.theguardian.com/environment/2018/may/31/avoiding-meat-and-dairy-is-single-biggest-way-to-reduce-your-impact-on-earth. Accessed 16 November 2022.

Collins, William, et al. “The Physical Science behind Climate Change.” *Scientific American*, 6 October 2008, https://www.scientificamerican.com/article/science-behind-climate-change/. Accessed 16 November 2022.

Earth Science Communications Team at NASA's Jet Propulsion Laboratory. “Global Climate Change: Vital Signs of the Planet.” *Home – Climate Change: Vital Signs of the Planet*, Nasa, 16 November 2022, https://climate.nasa.gov/. Accessed 16 November 2022.

the Earth Science Communications Team at NASA's Jet Propulsion Laboratory. “Scientific Consensus | Facts.” *Climate Change*, Nasa, 16 November 2022, https://climate.nasa.gov/scientific-consensus/. Accessed 16 November 2022.

Fiala, Nathan. “How Meat Contributes to Global Warming.” *Scientific American*, 1 February 2009, https://www.scientificamerican.com/article/the-greenhouse-hamburger/. Accessed 16 November 2022.

Foer, Jonathan Safran, et al. “Are Cows Climate Killers?” *Our World*, 01 04 2013, https://ourworld.unu.edu/en/are-cows-climate-killers. Accessed 16 November 2022.

Food and Agriculture Organization of the United Nations. “Livestock solutions for climate change.” *Food and Agriculture Organization of the United Nations*, 2017, https://www.fao.org/3/i8098e/i8098e.pdf. Accessed 16 November 2022.

Mitloehner, Frank. “Livestock and Climate Change | College of Agricultural and Environmental Sciences.” *College of Agricultural and Environmental Sciences*, 29 April 2016, https://caes.ucdavis.edu/news/articles/2016/04/livestock-and-climate-change-facts-and-fiction. Accessed 16 November 2022.

Quinton, Amy. “Cows and climate change.” *UC Davis*, 27 June 2019, https://www.ucdavis.edu/food/news/making-cattle-more-sustainable. Accessed 16 November 2022.

Schiermeier, Quirin. “Eat less meat: UN climate-change report calls for change to human diet.” *Nature.com*, Nature (Nature), 17 January 2019, https://www.nature.com/articles/d41586-019-02409-7. Accessed 16 November 2022.