

## Sustainability in a politically polarized society

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Writing about sustainability in a politically polarized society in the spring of 2017, one might expect starting from the rather extreme polarization created after the 2016 Presidential election in the United States. But as Supreme Court Justice Ruth Bader Ginsberg said, “There was a great man who once said that the true symbol of the United States is not the bald eagle. It is the pendulum. And when the pendulum swings too far in one direction it will go back.” So, instead, I start a bit earlier than what is hopefully approaching the end of the current swing. I start with a perspective on how differing worldviews got us to where we are now, and how recognizing those worldviews can help negotiate a polarized society. I follow that with an example from the climate change “debate” and how taking a broader stance on sustainability might diffuse the climate change lightning rod. I end with a discussion of what role researchers can play in shaping that discussion.

*Worldviews* - In a *Scientific American* guest blog, Annick de Witt (2016) outlines four worldviews: *traditional* or generally religion-based worldviews; *modern* worldviews in which science, rationality, and technology are central; *postmodern* worldviews that emphasize other ways of knowing, such as moral, emotional, artistic, and imaginative; and *integrative*, characterized by bringing polarized perspectives together and integrating them into a larger, more unified understanding of reality. She reports statistically significant relationships between worldview groups and their political priorities and environmental behaviors. For example, de Witt’s group found the difference between traditional/modern and postmodern/integrative worldviews was easy to recognize in the opposition between Donald Trump and Bernie Sanders

during the campaigns. They also note that older worldviews tend to wane over time, while newer worldviews tend to come into being with newer generations, explaining the disproportional support from younger people for integrative Sanders over the much more modernist Hillary Clinton. From an environmental perspective, they also found more concern about climate change, more political support for addressing it, and more sustainable behaviors among postmoderns and integratives, compared with moderns and traditionalists.

I return to the value of understanding worldviews at the end of this essay. However, the focus on climate change in the above example requires further consideration. While climate change is undoubtedly the overarching environmental issue of this generation, it has also become a lightning rod often preventing action and distracting attention from a wide range of other issues. These issues, if addressed, could also lead to addressing climate change. In fact, the climate “debate” is not at all about the science of climate change, or whether it is caused by humans or has impact. It’s a debate about willingness to accept the consequences of addressing it—consequences that are viewed quite differently from those with different worldviews. In her call to deliver on science’s social contract with society, Jane Lubchenco (1998) noted that climate change is not isolated from other human activities that are also transforming the land and sea. She points to the importance of activities like: land clearing, forestry, grazing, urbanization, mining, trawling, and dredging; altering the major biogeochemical cycles of carbon, nitrogen, water, and synthetic chemicals; and adding or removing species and genetically distinct populations through habitat alteration or loss, hunting, or fishing. These critical environmental issues, often simultaneously driving climate change (e.g., deforestation, urbanization) and exacerbated by it (e.g., loss of habitat), are more readily accepted and addressed with differing worldviews. In this regard, I am reminded of a story from a successful mayor of a conservative Midwest city. He said it was very difficult to get traction on addressing climate change mitigation or adaptation because climate had become such a hot-button topic further exacerbating the divide between worldviews. However, when he approached the issue through a sustainability lens, there was much broader acceptance and support for a wide range of related actions. That city has since become a keen example of climate-sensitive decision-making.

*Research choices and communication*—Lubchenco also points out that all of the issues listed above are “relatively well documented, but not generally appreciated in their totality, magnitude, or implications.” They are not generally appreciated because scientists have not been very good at sharing this information. Which brings me to the role of research engagement outside the ivory tower. Beyond recogniz-

ing and working with differing worldviews, researchers can make a difference in three ways: by the topics they choose to explore; how they communicate results; and through the audiences with whom they communicate. It is important to note that there is great need for research that is not immediately “useful” in the sense of solving extant problems. Those researchers occupy Bohr’s Quadrant as described in Donald Stokes’ (1977) important book, *Pasteur’s Quadrant*, where he builds categories based on the extent to which the research is a quest for knowledge (Bohr) or a desire to solve existing problems (*Edison’s Quadrant*). Those two quadrants typify the ends of what has historically been thought of as a continuum from basic to applied research. But the key point of his assessment is that there is a vast array of research that is motivated simultaneously by a search for new knowledge *and* by solving problems (*Pasteur’s Quadrant*). Most sustainability-related research falls neatly within that quadrant, and this should provide ample space for researchers, especially academics, who want to help solve problems but must also show progress in the quest for new knowledge. However, even within Pasteur’s quadrant, there are diverse ways to conduct the research and share the results. An emerging body of literature on the co-production of science and policy has grown since Michael Gibbons et al. (1994) and Gibbons (2000) framed this as “mode 2” research. Maria Carmen Lemos and Barbara Morehouse (2005) explored the characteristics of successful co-production and found that to be successful in conducting research that is both useful and used, researchers need to be aware of how that new information fits with decision makers’ current knowledge and decision processes, have a willingness to work across disciplines and with stakeholders, and have access to resources that support the interactions necessary to co-produce potential solutions.

The critical aspect of working with stakeholders presents another challenge for researchers, especially academics: the need for deep engagement to share results effectively. There have been many calls for academics to become more engaged in the public and policy discourse, including one recent call at a University of Michigan forum (Hoffman et al., 2015), where Lubchenco spoke eloquently about delivering on science’s social contract. While an increasing number of scientists go beyond publishing their results in specialized journals and work to make their insights more readily available (e.g., articles in this journal), *engagement* is the operative word, especially within this co-production framework. Effective engagement is not where a decision maker lacks certain information and the scientist simply supplies it, nor is it “speaking truth to power” after the research is done. Effective engagement is when the producers and users of information together share and explore the methods, results, and analysis of research - and this requires knowing your audience. It

also requires answering the “so what” question using plain language, employing metaphors, analogies, and personal stories (Lubchenco 2017). This is also good advice for sharing information (with the media as well as local, state, and federal managers, legislators, and staff) and serving on advisory boards or providing technical assistance.

*Advocacy* - A final note on advocacy because it is often asked, “Should scientists be advocates?” My colleague Steve Hamburg, EDF’s Chief Scientist, correctly advises, “It is always appropriate and important to advocate for your science.” But the context within which one advocates is not as simple as it appears. Roger Pielke Jr. (2007) defines “Pure Scientists,” “Science Arbiters,” “Issue Advocates,” and “Honest Brokers” in the context of whether there is a consensus defining the problem and the level of uncertainty around options. For a decision context characterized by both values consensus and low uncertainty, a scientist can choose to consider the policy implications of the work (Science Arbiter) or not (Pure Scientist). The Pure Scientist will only summarize the state of knowledge in the relevant field, whereas the Science Arbiter avoids participating in the debates, but provides answers to policymakers’ specific questions. However, it is worth noting, as Daniel Sarewitz (1996) and others have pointed out, that personal beliefs and contexts (i.e., worldviews) of both researchers and research funders make unfettered research—and pure science—a myth.

If there is a lack of consensus in both science and politics, scientists can take on one of two roles. They can be an Issue Advocate, who aligns with a particular political agenda or interest group, and whose research seeks to reduce the range of options, or be the Honest Broker, who remains neutral and whose research seeks to expand the range of options. There is also the Stealth Advocate, who appears to be the Pure Scientist but quietly provides information to aid a particular agenda. These are all legitimate roles, and there is a choice to make about the level and type of engagement. However, it is an important decision because it is not easy to move from one type of engagement to another. After engaging as an Issue Advocate on one issue, it is difficult to convince others that you are functioning as an Honest Broker on another.

To summarize, if we can recognize differing worldviews and be less invested in our own, we might be less inclined to respond to differing opinions as challenges to our assumptions about reality and allow for a more open dialogue that respects a wider range of perspectives—including, but not dwelling on, climate change as one of an array of environmental, social, and economic issues - that may also enable a broader conversation that is less threatening to those with differing worldviews. As

scientists interested in contributing to this broader conversation, we can choose to study topics in *Pasteur's Quadrant* and decide in what context and role we want to share the results of our work.

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