Comment

BRIDGING THE GAP BETWEEN SCIENCE AND POLICY:
THE IMPORTANCE OF MUTUAL RESPECT, TRUST AND THE ROLE OF MEDIATORS

Establishing a climate change information source addressing local aspects of a global issue. A case study in New York State

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ABSTRACT: This case study describes the development of a climate change information system for New York State, one of the physically largest states in the United States. Agriculture (including dairy production and vineyards) and water-related tourism are large parts of the state economy, and both are expected to be affected dramatically by climate change. The highly politicized nature of the climate change debate in America makes the delivery of science-based information even more urgent and challenging. The United States does not have top-down science communication policies, as many countries do; this case will describe how diverse local and state agencies, corporations, NGOs, and other actors collaborated with university researchers to create a suite of products and online tools with stable, science-based information carefully crafted and targeted to avoid politicization and facilitate education and planning for community, agricultural and business planners and state policy makers who are making decisions now with 20 to 50 year time frames.

Conceptual issues

For more than 15 years, researchers and practitioners in PCST have been calling for science communication that emerges from community needs, rather than being imposed by elite experts. This movement goes by multiple names: "bottom-up," "upstream," "community-based," "public engagement".[1,2,3,4,5,6]

During the same period the need to communicate science-based information about climate change, in particular, has increased along with the accelerating pace of global warming itself.[7] Adding to the urgency, traditional government channels in the United States have not made climate change a policy priority. For example, President Barrack Obama has not given a major speech on climate change shortly after since taking office. His White House home page, which highlights 19 priority issues for the administration, includes such things as civil rights, urban policy, taxes, energy and the environment, but climate change is not listed as a top-line policy priority.

In the United States climate change has become politically polarizing to the point where the main Republican candidates for President in the 2012 primary race all expressed skepticism of the scientific consensus that climate change exists or that it is caused primarily by human activity. The Republican presidential nominee, Mitt Romney, acknowledges climate change but not its source: "My view is that we don't know what's causing climate change on this planet," he said in 2011, a significant backpedal from his days as Governor of Massachusetts when he acknowledged the problem and agreed with scientific consensus about its human origins.

In the public sphere, from 2007 to 2010 there was a general decline in the number of Americans who said they believe in climate change and its human causes. Only in the most recent surveys – starting in late 2011 – has there been a slight reversal in the downward trend with several national polls showing an uptick in the number of Americans reporting they believe in climate change.[8] Still, a small but significant portion of the population, 10%, remains completely dismissive of the science of climate change, while another 15% say they are doubtful.[9] Even trickier for the communicators of science and technology, eight

out of 10 Americans who don't think global warming is occurring believe that *scientists* are overstating evidence about climate change *for their own interest* and even 3 in 10 who do believe in climate change agree scientists overstate the danger.[10]

In this charged atmosphere, communicating the science of climate change to both support and inform policy making at state, regional and local levels, where much of policy action is now taking place in the absence of national leadership, has particular challenges as the most basic appeals to reason can cause a boomerang effect, particularly with audiences who self-identify as political conservatives.[11]

In America, research about public perception of climate change and climate change communication has become widespread as social scientists attempt to explain the public's reluctance to accept consensus science.[12,13,14,15,16,17,18,19,20,21,22,23] While some researchers have traced public skepticism to the politicization of climate change on the national stage,[24] others stress socio-psychological factors. For example, terror management theory suggests that people dismiss or deny information that leads to an overload of bad news that makes them feel overly concerned or worried about the future.[25]

The lack of leadership by elected national officials and public confusion about climate change has only increased the need for accurate information upon which decision makers can rely

Many universities and others engaged in climate change research have stepped up efforts to communicate the results of research, particularly in the policy arena. Numerous agencies, non-governmental organizations and groups have called for better climate change communication to inform the general public and stakeholders.[26,27,28,29,30]

In many countries, science communication policies are organized by national agencies run or substantially supported by the government.[31,32,33] However the United States has a significant cultural commitment to local autonomy and deep political antipathy to centrally-organized government actions. This cultural context has a major impact on public communication of science,[34] preventing coordinated national responses. In the current atmosphere, most of the movement around climate change communication is occurring at regional, state and local levels where policy makers, businesses and citizens are faced with making decisions about capital expenditures, land-use planning and other actions with long-range timelines that simply cannot ignore climate impacts, some of which are already occurring. In upstate New York, for example, the U.S. National Ocean and Atmospheric Administration (NOAA) has documented 67% increase in extreme weather events in the past two decades and that trend is expected to continue under even optimistic climate change scenarios. Dealing with flood-related emergencies, and rebuilding devastated communities, largely falls to local and state governments.

Policy makers in many states, towns and cities, along with business leaders, realize that climate change will have enough of an impact on their economies and populations that they need to prepare for those changes now. State governments with threatened coastlines (such as California, Florida, and Louisiana) and/or big capital project expenditures are already incorporating climate change scenarios into their planning out of necessity. For instance, in New York City recent expansions to the subway system included the perspective of climate scientists, who helped transportation officials weigh the expense of installing air conditioners in subway platforms against the threat to public health from the expected increase in hot summer days.

To help guide planning and preparedness, the state government in New York recently commissioned a thorough examination by scientists at three leading universities of climate change's expected impacts on the state.[35] The exhaustive study, known as ClimAID, looked at eight economic and social engines for the state: water resources, coastal zones, ecosystems, agriculture, energy, transportation, telecommunications and public health. The report is being used by state officials, local community planners, citizens, and media reporters who are making decisions or preparing stories about climate-related issues.

In this paper, we detail how a particular bottom-up, regionally-based network of policy-linked groups came together in the wake of ClimAID to prepare climate change information that is targeted to a particular region. In this case, the "region" is New York State.

The New York Case

Context

Although many people from outside the United States know of New York City, which has a population of about 8 million, the city occupies just one corner of the entire state. The state is the third most

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populous in the country, with a population of about 20 million, and an economy of about US$1.1 trillion. Agriculture is a significant contributor to its economy, with the state ranking in the top five in the country for many major crops, including second in dairy, which totals nearly US $3 billion in sales. One of its major sub-regions, "Long Island," is a 120-mile (190-km) long island, which is heavily populated on one end near New York City and quite agricultural at the other end where population density is less intense. With low-lying coastal areas, Long Island is particularly vulnerable to flooding or increased severe weather events that are associated with climate change. In "upstate New York" – home to a flourishing US $6 billion wine industry (including tourism), dairy farms and apple orchards – the prediction is for increasing extremes, with more precipitation coming in severe weather events (2 inches [5 cm] of rain in 48 hours) during spring, winter and fall, less snow cover, and drier summers. Farmers and agricultural producers may be able to adapt to these changes, and in some cases even prosper from longer growing seasons, but initially the climate changes will be extremely challenging. For instance, this past spring an early warming was followed by a late frost, which decimated the state's apple crop, with losses expected in the 50 % range. America's farmers are already dealing with the effects of climate change. In a recent poll by Iowa State University of farmers in America's Midwest, which has large monocrop agribusinesses, 68 % of the farmers who returned the survey agreed that climate change is already occurring.[36]

Key stakeholder groups in need of accurate information include decision makers involved in transportation, watershed and water resource management, disaster preparedness, recreation and tourism. As is common in the United States, in many communities, these policymakers work their policy jobs only part-time; they also identify themselves as farmers, business owners, land owners, land managers, and consumers. Thus communicating with these groups is simultaneously communicating with policymakers. With such a diverse group of stakeholders in need of fact-based information, a coalition of public, private, and non-governmental organizations created a network of information and information providers headquartered at Cornell University. This network includes the Cornell Cooperative Extension (CCE) system.

Using the Extension System for Information Delivery

Even in the United States, few people understand the Extension system. Each state has its own Extension system, which is typically a collaboration among a central government-funded state university and individual counties, though funding for extension systems varires from state to state. In New York, for example, there are 57 counties and much of the control for the extension offices, including many budget issues, rests with the county, not with the university. A main goal of Extension is to link the latest research to individual communities and to disperse research-based solutions in a speedy and effective manner to policymakers and other stakeholders through a system that links research and communities together. Historically, Extension has primarily focused on agricultural and natural resource management policymaker and stakeholder groups.

While agricultural producers are certainly a target audience for climate change information because of their important economic role in New York, there is a large pool of stakeholders in policy-making and decision-making capacities across the state who need access to cutting-edge information on the state's vulnerability to climate change in order to facilitate the development of adaptation strategies informed by both local experience and scientific knowledge. Additionally, the politically sensitive nature of climate change necessitates a two-way flow of information so that scientists understand the subtleties decision-makers face when trying to adopt "climate smart" policies in the face of general skepticism of the science underpinning it. A traditional top-down extension approach – essentially, the "deficit model" where science is dispensed and assumed to be absorbed by a waiting and willing audience – is not an effective model. To address these issues, in New York in 2010 a diverse community of decision makers in the state recognized the need to coordinate climate change information and distribution. They created a team with diverse perspectives to share information and resources and to craft materials that could speak to the variety of audiences who might need them – community planners, farmers, landowners – in an accessible language.

For the climate change group, called a "Program Work Team" (or PWT, a formal mechanism within the Extension system), the informational and educational materials draw on both communication experience and communication research to use "frames" designed to maximize absorption (storytelling, narrative, focus on economic development, adaptation, "local" content), and to minimize boomerang effects and other negative reactions. (Boomerang effects occur when audiences react to a message in exactly the opposite

direction intended by the communicators[37].) Members of the team self-selected or were recruited over a period of six months, with a special emphasis placed on finding broad representation. Members include:

- University faculty members and researchers
- University extension and outreach staff
- Government agency staff
  - New York state agencies
    - New York State Department of Agriculture and Markets
    - New York State Department of Environmental Conservation
    - New York State Energy Research and Development Authority
    - New York State Department of State
  - Regional offices of US federal government agencies
    - National Oceanic and Atmospheric Administration, Northeast Region
  - City officials
  - Town and Village planners
  - Community organizers
- Stakeholder organizations
  - Agricultural organizations
    - American Farmland Trust
  - Forestry organizations
    - New York Forest Owners Association
- Stakeholders
  - Farmers
  - Landowners
  - Citizens
- NGOs
  - The Nature Conservancy,
  - National Wildlife Federation
  - New York State Sea Grant
  - Cary Institute

Delivery System

To reach key audiences, the PWT developed a delivery system that utilizes a website, regional and statewide conferences, trade shows, webinars, fact sheets and informational materials, and Cornell Cooperative Extension, with offices in 57 counties.

Information resources were developed with the focus on creating viable message frames, rooted in research. To this end, the materials stress:

- *Economic development.* Frame chosen because it is good business to plan for the future;
- *Safe and Secure Energy Supplies.* Frame chosen because focusing on adaptation strategies takes advantage of the fact that among the general public, there is widespread support for energy alternatives. A vast majority, 74 %, support more spending on alternative energy; while 79% support requiring better fuel efficiency for vehicles.
- *Health Care.* Frame chosen because human impacts tend to be less polarizing than environmental frames;
- *Morality and Ethics.* Frame chosen because it appeals to faith-based audiences; and
- *Energy Conservation.* Frame chosen because, by a 5-1 margin, Americans think changing their lifestyle to reduce carbon emissions, would actually improve or have no impact on their quality of life. [38]

Additionally, all materials, including fact sheets, a central website, state-wide reports, multimedia, links to other resources and other educational and informational materials focus messaging on narrative style and localized content.

Messages

Importantly, these materials were written and designed with significant feedback from the broad stakeholder base (policymakers, community planners, farmers, resource managers) represented by the team. For instance a fact sheet on farmer strategies for climate preparedness drew on the experiences of those working directly with farmers; it is broken out by themes such as "too much water, too little water" and it highlights opportunities for new crops, as well as challenges for existing ones. The website under development capitalizes on recent weather events to make the connection to climate change that viewers can more readily understand. Similarly, "What's up with the weather?" is an online feature that highlights regional weather events – a flood, a drought, a hurricane – and discusses them in the context of climate change, providing information to consumers and policy makers both. In rural America, the two are not infrequently one and the same. As an example, in the small, rural town outside of Ithaca, NY where one of this paper's authors lives, the elected town mayor's main paying job is inseminating dairy cows while the elected town board is dominated by dairy farmers and large landowners of agriculture or forested properties. According to recent data from the Yale University Project on Climate Change Communication,[39] underscoring the pre-existing link in people's minds between specific weather events and the effects of climate change can be a powerful tool for demonstrating the reality and importance of climate change (even if the link between the specific event and global climate change is uncertain). In fact, about half of Americans now point to personal observations of temperature changes and weather as the main reasons they believe global warming is taking place.[40] Connecting weather to climate change is not without risk, as weather patterns swing from year-to-year and no single year's weather, or weather event, can be linked to climate change.

  Nevertheless, the education value of linking something people are experiencing with future forecasts is a powerful tool. For example, during March 2012, high-temperature records were broken across the United States, including many in New York, which experienced the earliest spring bud date in recorded history, according to the U.S. National Weather Service. This is the sort of weather event predicted to increase in New York, and providing the information through the online feature makes it available to policymakers and others in an accessible format.

  The information materials also focus on adaptation or "preparedness" in New York State – a shift away from mitigation that underscores the current reality that even under the "best case scenario," one in which greenhouse gas emissions are addressed and curtailed and other mitigation behaviour adopted, there will be unavoidable impacts in the next decades. A rise of 4+ degrees (F) is forecast for New York state by 2080, for example, even under the most optimistic scenarios.[41] Methods for updating and coordinating the information include feedback from product users, such as extension agents, community leaders, government agency officials, farmers and others. The Program Work Team meets regularly, several times a year, to review progress and revise documents. The PWT assesses the appeal and responsiveness of materials at state-wide events, such as "Empire Farm Days," a popular three-day event for farmers and agricultural producers (especially well-attended by people who simultaneously serve in policymaking roles), and extension conferences and events across the region. As far as we know, no other packet of information targeted for rural audiences exists in America in such an easily-digested, narrative form. Because so many rural policymakers serve in part-time capacities, providing information for landowners and consumers (among others) is also an effective way of reaching policymakers. So far, the success has been high, with anecdotal evidence suggesting information retention rates are high and dismissal of evidence low. One reason is the tie to local events. For instance, images are carefully selected to connect readers to their local environment.[42]

Conclusion

A significant conclusion from the research literature is that no one solution is possible for public communication needs, especially in policy contexts. The point of the "public engagement" discussion is that policymakers must include local needs and local knowledge in any discussion. But for a topic like climate change, which is global in scale, how can communicators implement this understanding in local contexts, so that appropriate information is available to all participants including policymakers?

  What we've shown here is how one particular local context – New York State – has responded to this problem. Some of the solutions involve researchers developing knowledge specific to the location, in this

case, the state, at policymakers' request (for example, the ClimAID report, which was financed by the New York State Research and Development Authority). Other solutions involve creating a flexible but coordinated network of information providers and information distributors, with links both to policymakers and other stakeholders in local communities and to national and international networks. This structure recognizes the value of local knowledge, while simultaneously accepting an existing social, political, and policymaking structure in which resources and decision making are concentrated in government institutions. This real-world solution combines the information delivery approach of the deficit model with the community-based information desire and input into policy discussion that is at the root of the engagement model.

As yet, we don't have good metrics for understanding the strengths and ongoing challenges of this particular approach to "glocal" (global/local) information sharing. Anecdotal data tells us we're doing well in comparison with doing nothing, but we don't know how what we're doing compares with other approaches to solving the problem. Both we and others must continue existing work exploring methods for comparing various efforts, as well as developing new methods and models.

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