

Building the Capacity of Coastal Communities to Adapt to Climate Change through Participatory Action Research:

Lessons Learned from the New England Climate Adaption Project

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Climate change adaptation presents a complex and increasingly urgent planning challenge for coastal communities. To prepare for and manage climate change risks, coastal cities and towns will need increased capacity and resources. This article argues that participatory action research (PAR) offers academics a way to help build the capacity of at-risk communities to respond to climate change. I use the experience of the New England Climate Adaptation Project to illustrate, exploring the advantages and challenges of “research as capacity building” and providing guidance for those wishing to do this kind of work. The intent of this article is to encourage a conversation between communities and scholars about how to use research to support local adaptation planning.

Introduction

In the aftermath of Hurricane Sandy and other recent natural disasters, the vulnerability of coastal cities and towns to climate change has become an increasingly urgent concern, particularly given the visibility of sea level rise and projections of more frequent extreme storms. While the necessity of climate change adaptation is widely recognized by academics and among many public officials in at-risk communities, very few cities and towns along the U.S. coast—other than major metropolitan areas such as New York City and San Francisco—have begun to take action to prepare for climate change (Adger et al., 2007; Ford et al., 2011; NRC, 2010). Some of the reasons for this lack of action include the long-term nature of climate change risks; uncertainty about how best to prepare for an uncertain future climate; technical and financial resource limitations; lack of public support and pressure on public officials; and challenges associated with coordinating among stakeholders and different levels of decision-making (Moser and Boykoff, 2013a; Ekstrom and Moser, 2013; Susskind, 2010).

To overcome these challenges and barriers and meaningfully move forward with preparing for climate change, coastal communities will require enhanced capacity and resources. For example, they may require greater ability to access and make sense of complex climate projections and risk assessment information

(Dilling and Romsdahl, 2013) as well as capacity to undertake necessary technical analyses and integrate climate information into planning and policy decisions (Susskind, 2010). Similarly, they will need ongoing access to easily understandable and policy-relevant adaptation options (Moser and Boykoff, 2013a). Further, at-risk communities may require new approaches for educating and engaging stakeholders and the public (Susskind and Rumore, 2013). Effective adaptation will also require that communities be equipped to conduct ongoing monitoring and evaluation of the effectiveness of their adaptation efforts (Moser and Boykoff, 2013a).

In light of these capacity needs, adaptation efforts at the local level will necessarily require the involvement

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of and coordination among national, state, and local governments, as well as a variety of sectors (NRC, 2010; Susskind, 2010). Researchers and academics, too, have an important role to play. Beyond providing science and research to inform adaptation, I argue, academics and researchers can advance local climate change adaptation efforts through collaborative, action-oriented research that enhances the capacity of local communities. Such “participatory action research,” also can help researchers produce knowledge that is more salient, legitimate, and credible for local stakeholders and directly useful for decision-making. I illustrate this through the example of the New England Climate Adaptation Project, a two-year, collaborative research initiative testing the use of role-play simulations as a public engagement tool while also advancing local-level adaptation. The intent of this article is twofold: first, to call for greater collaboration among researchers and stakeholders to undertake “research as capacity building” as a way to assist communities in preparing for and managing climate change risks; and, second, to proffer some concrete recommendations to guide researchers and stakeholders in cultivating and conducting this kind of participatory action research.

Participatory Action Research: Research as Capacity Building

There is a widely recognized need to improve decision-support and better link knowledge to action to inform adaptation planning and decision-making (Matso, 2012; Moser and Boykoff, 2013b; NRC, 2009, 2010). It has been argued that, to do this, research needs to do a better job of addressing decision-maker needs and producing knowledge that is salient, credible, and legitimate to stakeholders (Jacobs et al., 2005; Preston et al, 2013; see also Cash et al, 2003). Such work importantly calls attention to the need to produce knowledge that directly addresses stakeholder needs and is policy-relevant, suggesting that doing so requires more active engagement with decision-makers and the intended users of the knowledge being produced (Jacobs et al, 2005; Matso, 2012; NRC, 2010).

I argue that, in addition to working with stakeholders to produce information that is more useful to decision-making, researchers can and should collaborate with communities and groups to build their capacity to utilize scientific information and to improve their local situations. Such “research as capacity building” requires going beyond simply consulting with stakeholders; it requires the effective and meaningful engagement of stakeholders and intended knowledge users in the entire process of knowledge production and interpretation. While a significant divergence from traditional academic research, such collaborative, action-oriented research—or participatory action research (PAR)—can support positive change in communities while simultaneously generating useable research-based knowledge (Greenwood and Levin, 2007; Reason and Bradbury, 2008).

PAR necessarily involves stakeholders directly in defining research questions, developing and implementing research approaches, and making sense of research findings. It does not privilege any type of research methods or approaches over others; it can be quantitative and/or qualitative, employing surveys, interviews, statistical analyses, observation, and other credible data collection and analysis approaches. PAR, while able to produce generalizable findings that can help inform decisions and actions elsewhere, is fundamentally context-specific; a main objective of PAR is to produce practical solutions and to increase the capacity of communities and groups to create their own positive social change (Greenwood and Levin, 2007).

Below, I provide an overview of the New England Climate Adaptation Project and illustrate the project’s participatory and action-oriented nature. I then explain some of the key lessons learned from this experience about doing PAR to help build the capacity of coastal communities to prepare for and manage climate change risks.

The New England Climate Adaptation Project: A Case Study

The New England Climate Adaptation Project (NECAP) is a two-year collaborative research effort involving the Massachusetts Institute of Technology Science Impact Collaborative (MIT SIC), the not-for-profit Consensus Building Institute (CBI), the National Estuarine Research Reserve System (NERRS), and four partner coastal New England municipalities. Funded by a research grant from the NERRS Science Collaborative,¹ NECAP is testing the effectiveness of science-based role-play simulations as a tool for educating the public about climate change risks and building widespread support for adaptation efforts (see NECAP, 2014; Rumore, 2013; Susskind and Rumore, 2013).

The project team includes a range of academics, local decision-makers, and practitioners. In addition to faculty and graduate students from MIT’s Department of Urban Studies and Planning, the NECAP staff includes two stakeholder engagement and consensus building specialists from CBI, Coastal Training Program Coordinators from each of the four NERRS reserves we are working with, technical climate change experts at the University of New Hampshire, and partner public officials from each involved town or city, including planners and town managers. For each of the four municipalities we are working with, one MIT Master in City Planning student is matched up with the local Coastal Training Program Coordinator and municipal partners. As the Project Manager and “Collaboration Lead” for the project, I am responsible for facilitating and ensuring coordination, communication, and collaboration across all project partners and research sites.

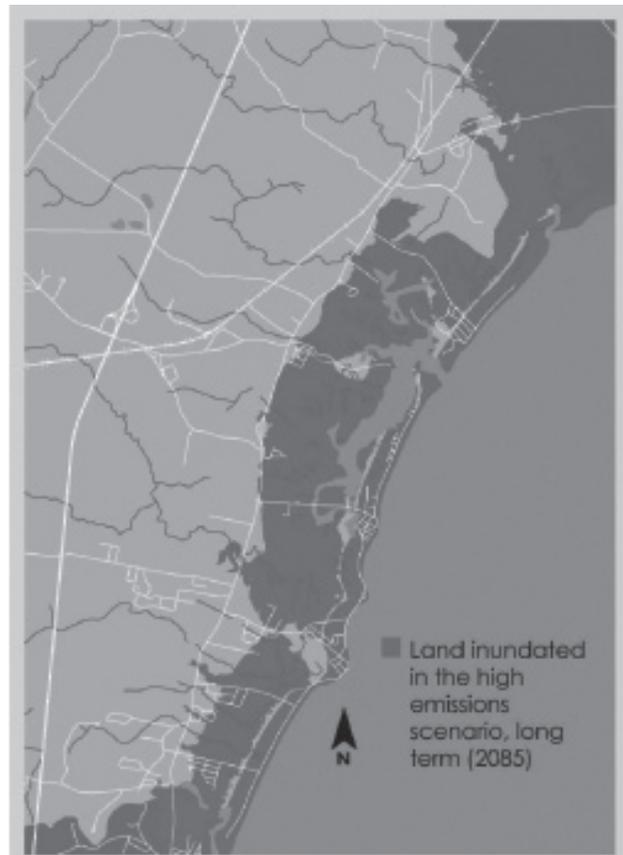
The project started officially in August 2012 and will end in August 2014. During the first year of the project,

our technical climate change experts at the University of New Hampshire produced downscaled climate change projections for each of our four partner sites. Based on the best available scientific techniques, these projections provide a sense of what the future climate will be like in each of our towns, including projections for temperature, precipitation, sea level rise, and key climate indicators such as extreme precipitation and extreme temperature events. MIT Master in City Planning students worked with experts and municipal partners to translate these climate projections into a Summary Risk Assessment for each site. Each Summary Risk Assessment explains how projected climate changes could affect the municipality, providing a broad-brush evaluation of key local risks and potential adaptation options. These documents are publicly available on our project website and will be distributed at the end of the project,² potentially through assessment-related workshops for key stakeholders.

During the first year of the project, our Master in City Planning students conducted stakeholder assessments for their partner communities.³ This involved interviewing 18 to 20 key stakeholders in each site—including local and regional public officials, planners, emergency management personnel, business owners, and environmental group representatives, among others—to gather information on stakeholders' awareness of and concern about climate change risks, and their thoughts about adaptation options. During the interview process, stakeholders were shown the climate change projections for their city or town and were asked to react to these forecasts. For each municipality, the findings of the stakeholder interviews were made anonymous and used to write a Stakeholder Assessment document, which all interviewees reviewed for accuracy and completeness. The Stakeholder Assessments were then shared with project partners and other officials in each town to inform their planning and public engagement strategies going forward.

The primary intent of producing the Summary Risk Assessment and Stakeholder Assessment for each municipality was to inform the design of a science-based, tailored role-play simulation for each site. A role-play simulation is an experiential learning exercise in which participants assume roles and participate in a mock decision-making process (Schenk and Susskind, 2014). Our NECAP role-play simulations are face-to-face exercises that put participants in the roles of local decision-makers and community members to experience what it might be like to manage climate change risks in a hypothetical but realistic community (Susskind and Rumore, 2013).

Each simulation was designed to address the primary climate change risks for that site, to convey real-world climate change projections for that location, and to reflect local political dynamics. For example, the simulation for the Town of Wells, Maine, takes participants to the hypothetical Town of Launton. Like Wells, Launton



Map of projected sea level rise in Wells, Maine by 2085 under a high emissions climate change scenario. *From the Summary Risk Assessment for the Town of Wells.*



Vulnerable coastal property near Wells, Maine. *Image courtesy of the NECAP team.*

is a small, beachfront town that is largely reliant on summer tourism for its economy and faces increasing risk from coastal storms and sea level rise. Participants assume one of six stakeholder roles—the town councilor, the local planner, the emergency management director, a regional land trust representative, a local chamber of



Hyannis Docks in Barnstable, Massachusetts, one of the NECAP partner communities. *Image courtesy of Waquoit Bay Reserve.*

commerce representative, or a coastal neighborhood association representative.⁴ Taking on an assigned role and related interests, participants have an hour to figure out how to take scientific climate projections and different stakeholder perspectives into account to decide what the town of Launton should do to prepare for increasing risk of coastal storms and flooding. The goal in creating these hypothetical settings was to create a scenario and set of roles that are relevant, realistic, and representative for each site, while allowing participants to engage in a “safe space,” take on roles other than their real life roles, and to leave behind their real world constraints for the duration of the simulation (Rumore and Susskind, 2013; Schenk and Susskind, 2014). Our MIT staff members, who are experienced in role-play simulation design, spearheaded the creation of the exercises. Our local partners actively participated in the design of the simulations, as well as in testing and refining the exercises.

Once our role-play simulations were finalized, the research-intensive part of the project began. Between the months of June and December 2013, our project team successfully ran eight to nine role-play simulation workshops in each city or town. During each workshop, participants—who ranged from local and state public officials to members of the general public—engaged in the role-play simulation and a follow-up conversation about local climate change risks and potential adaptation strategies. Through our workshops, we engaged between 110-170 participants in each site, for a project total of over 500 workshop participants. We collected data through before-and-after surveys completed by each workshop

participant. About five weeks after each workshop, MIT staff conducted follow-up interviews with 130 people, approximately 30 percent of workshop participants. Additionally, we conducted a randomized public opinion poll before we ran our simulations in each town and a second public opinion poll a couple months after the completion of our workshops. These public opinion polls allowed us to gauge public concern about climate change risks and adaptation prior to our intervention, and will help us assess whether public attitudes about climate change risks and adaptation have changed as a result of our intervention.

The intent of this data collection, in many ways the heart of the research aspect of NECAP, is to help us evaluate the effectiveness of our role-play simulation workshops as an approach for raising public and stakeholder awareness and concern about risks and support for adaptation action. We have found that participation in our role-play simulations increased participant concern about local climate change risks, heightened sense of local responsibility for preparing for climate change impacts, and increased participant awareness of other stakeholder perspectives and concerns and how they related to local decision-making. Our data analysis is ongoing and our findings are only preliminary. However, based upon our provisional analysis, it appears that, in all partner towns, our NECAP intervention increased public awareness and concern about climate change risks and built public support for local collective risk management efforts. Based on our provisional analysis, we are optimistic that role-play simulations offer an effective public education

and engagement strategy for complex decision-making concerns, such as climate change adaptation. We will be further exploring our data and expounding upon our findings in future publications.

The data from our surveys, interviews, and public polls is not only an important part of our research; it also provides valuable information for our municipal partners and other decision-makers in our partner towns and cities. For example, a striking finding from the first public poll conducted in all towns is that there was a considerable gap between the number of polled citizens who think preparing for climate change risks in their town “should” be significant or very significant (ranging from 46 percent in Cranston to 73 percent in Barnstable) and those who say they think “it actually will be” significant or very significant (13 percent in Cranston and 16 percent in Barnstable). This suggests an important “optimism gap” that might limit local efforts and a related need to increase public belief in the ability or willingness of their town to take meaningful action. Based on our provisional analysis, it appears our workshops significantly increased participant optimism about local action. Our MIT and CBI staff members are working with our municipal partners to make sense of what such findings from our different data sources mean for local adaptation efforts.

While our research-related reason for producing the Summary Risk Assessment and Stakeholder Assessment for each site was to inform the design of our simulations, we intentionally produced these documents to help our partner towns and cities initiate and support adaptation efforts by helping stakeholders understand the predominant risks facing their communities and to stimulate further technical evaluation and vulnerability analysis. Our municipal partners are already using the climate projections and Summary Risk Assessment to inform their next steps in terms of technical analysis and data gathering. The Stakeholder Assessments, public poll information and survey data provide decision-makers and other stakeholders with a valuable sense of the different perspectives about climate change risks and adaptation at play in their communities. In addition to showing that public and stakeholder concern about climate change risks is much higher than originally anticipated, these data suggest that, in some towns, stakeholders and the public tend to think of climate change adaptation as requiring major municipal investments, such as in sea walls and big infrastructure. In other towns, the data reveal a more nuanced understanding of adaptation as requiring changes in how everyday planning is done. We are working with municipal partners to translate this information into their adaptation planning and engagement strategies. Additionally, our partner municipalities are using our assessment findings in grant applications to fund additional climate change adaptation work.

In addition to the ability of PAR to achieve the dual goals of rigorous research and local capacity building, many commentators, such as Susskind (2010) and Innes

and Booher (2010), have argued that more collaborative, adaptive decision-making will likely be necessary for effective planning amid uncertainty and complexity, as in the case of adaptation. Thus, our role-play simulation exercises were designed to introduce the consensus building approach to decision-making (see Susskind and Cruikshank, 1987, 2006), with the hope of familiarizing participants with a stakeholder engagement-driven model for planning. We also intentionally designed our project to allow our MIT and CBI staff to work with our NERRS and municipal partners to organize, host, and run workshops, with the goal of enhancing their ability to engage stakeholders and to facilitate challenging planning conversations. CBI and MIT staff ran the first couple workshops in each site to provide an opportunity for our NERRS and municipal partners to observe and learn from our professionally facilitation-trained staff. We then transitioned facilitation of workshops to our local partners. Our CBI and MIT staff also produced facilitation guidance documents and provided informal facilitation training for interested partners. All of these ancillary outcomes both contributed to the quality of our research and also provided important capacity-building benefits for the communities we are working with.

Our goal in undertaking NECAP was to concurrently produce rigorous scientific knowledge that is informed by stakeholders as well as professional researchers; to generate research that is tied to the on the ground realities communities face and thus can better inform local-level policy and planning decisions; and to actively support positive change in our partner towns throughout the process. Through this effort, we have learned many lessons that can help inform and guide others in undertaking participatory action research and research as capacity building. Below, I explain some of our lessons learned about the challenges of doing PAR as capacity building, and provide recommendations for academics and stakeholders interested in undertaking this type of collaborative action research.

The Challenges of Doing PAR as Capacity Building

As the case of NECAP demonstrates, PAR can produce rigorous research while concurrently building the capacity of coastal communities to address climate change risks. However, PAR is not without its challenges, and those wanting to engage in this type of work must be aware of and prepared for the various tensions and hurdles that will inevitably present themselves.

Doing PAR requires continually working with partners to clarify objectives and goals, ensuring that the work being done meets everyone’s needs, and translating research findings and implications into relevant terms for stakeholders (Greenwood and Levin, 2007; Reason and Bradbury, 2008). This kind of research is ongoing, requiring significant foundation building and continued involvement and interaction among knowledge producers and knowledge users (Greenwood and Levin, 2007). In

the case of NECAP, we spent a year before the official beginning of the project working with NERRS partners to refine our research questions and approach and to identify and engage partner municipalities. Fortunately for NECAP, our NERRS partners already had strong pre-existing relationships with communities in their region, which allowed our MIT and CBI staff to align with our partner municipalities before the project officially began. This foundation laying, done before project funding had been secured, allowed us to build strong relationships with our NERRS and municipal partners and to tailor our research strategy to local needs. Our MIT and CBI staff members intend to continue the engagement with our NERRS and municipal partners beyond the completion of our research grant.

Given the ongoing and iterative nature of PAR, relationships are key: trust, buy-in, and willingness to learn together are necessary for PAR and research as capacity building efforts (Greenwood and Levin, 2007). Working with the NERRS Coastal Training Program helped our professional research staff quickly develop trust and buy-in from our municipal partners. That said, our academic staff have had to focus on being continuously mindful of our NERRS and municipal partners' needs and concerns. For example, while designing the simulation for one of our municipalities, our MIT staff suggested that exercise should focus on climate change risks to wastewater, since that is a critical concern in the area. Our local partners strongly disagreed with this, expressing their concern that wastewater is already such a contentious issue in the area that making it the center of the game would take away from the focus on climate change adaptation, as well as perhaps dissuade some people from participating who otherwise would. After discussion, our MIT staff agreed with our municipal partners' concerns and we changed the focus of the game. Such experiences have repeatedly demonstrated the importance of relationships



Role-play simulation workshop at the Great Bay National Estuarine Research Reserve, near Dover, New Hampshire. *Image courtesy of Great Bay Reserve.*

and willingness to work and learn together in facilitating productive research as capacity building.

Since institutional knowledge and relationships are key to doing this kind of research, it is very important to ensure continuity within the project. Our project staff and partners have been largely stable throughout the duration of the project, allowing for relationship building and the development of place-specific knowledge. However, due to students graduating, we did have a major transition in our MIT graduate student liaisons for each town halfway through the project, which proved very difficult and created significant setbacks for the project. In light of the importance of place-specific knowledge and relationships, it is best to avoid staff transitions as much as possible and to be prepared to reestablish relationships if transitions do occur. Similarly, it is important to build in ways of ensuring continuity, such as including professional staff on the project team, and establishing systems for recording and transferring institutional knowledge.

Doing PAR and research as capacity building presents a number of logistical challenges. While many commentators have called for moving research funding priorities beyond the “pure science” model (Pielke, 2007) and for funding action-oriented research (Matso, 2012), it is difficult to secure research funding in general, not to mention securing sufficient funding for the extra staff and resources needed to effectively conduct collaborative, interdisciplinary, and action-oriented research. Keeping partners updated and on the same page despite busy schedules and other projects is in itself an ongoing challenge. Developing an organization structure and systems for inter-team communication early on is critical. Clarifying expectations about project outcomes and the expected contributions and commitments of each party at the beginning of the partnership is also important.

These tasks can be particularly challenging given the different needs and work environments of involved parties. For example, graduate student schedules and timelines do not always fit well with municipal partners needs, and project partners can feel disconnected from the project if a system for keeping them updated on project progress is not put in place. Having professional staff at CBI on board to maintain continuity and consistency has been enormously valuable for NECAP. While the partnership between MIT and CBI has been key to the project's success, arranging this was difficult do potential “conflict of interest” concerns, which had to be attended to. Addressing these logistical challenges is ongoing, taking time and resources, but it is necessary for effective participatory action research.

Some Guidance for Undertaking This Kind of Research

In light of our experience with NECAP and the above-described challenges associated with this kind of work, I have identified some broad recommendations that will assist those seeking to effectively engage in

participatory action research.

Work with boundary organizations: One of the greatest strengths of NECAP is our partnership with the NERRS Coastal Training Program, an organization that is accustomed to working at the interface of research and practice and had strong pre-existing relationships with our partner communities. Aligning with such “boundary organizations”—i.e., organizations that are skilled at working between knowledge production and knowledge use and have ties to stakeholders (Clark et al., 2010, 2011)—can help expedite the process of trust and relationship building with local communities and groups.

Invest in a “Collaboration Lead”: The NERRS Science Collaborative, which is funding NECAP, requires that all research teams include a Collaboration Lead (see Matso, 2012). This person, who is separate from the Principal Investigators on the project, is tasked with ensuring all project partners—including the researchers from different disciplines and the involved stakeholders—work together and that their needs are met. Such a role is vital for facilitating research work across academic and community needs, across disciplines, and among competing interests. Having a team member dedicated to ensuring that people are working together, that all project partners know what is what is going on and are communicating with each other, and that research needs are being balanced with stakeholder needs is highly important for effectively conducting collaborative action research. I highly recommend this person have formal facilitation training and experience, regardless of their academic and professional background.

Invest in relationships: Investing in relationship and trust building early on and throughout the project is critical. I recommend gathering the entire project team—in person if possible, virtually if not—within the first month of the project to allow all partners to get to know each other, clarify expectations and timelines, and to talk about how to best communicate within the team. This can be challenging logistically, but is well worth the investment. Creating opportunities for all project partners to get together or to interact virtually at least once a year if not more frequently is also advisable, as well as finding other ways to support ongoing relationship building.

Pick your team carefully: In light of the challenges of doing this type of research, as well as the ongoing commitment and relationships that are necessary, it is important to pick your team carefully. Project staff and partners must be willing and able to commit the time and energy this type of work requires. They also need to buy into and embrace this untraditional research approach. All project partners need to work well with others and be willing to learn together and from each other. No matter how strong and committed a team, tensions will still arise. Having a process for addressing these concerns when they arise will facilitate more effective research and on-the-ground capacity building and ensure relationships do not get compromised as the result of different perspectives or

interests of involved parties.

Conclusions

Climate change presents a highly difficult planning challenge for coastal communities throughout the world. To assist coastal cities and towns in effectively managing and preparing for climate change risks, we need to find ways to enhance local capacity, resources, and ability to plan amid complexity and uncertainty. Participatory action research offers one valuable route through which academics and professional researchers can work with stakeholders to build local capacity to adapt. As the case study of the New England Climate Adaptation Project shows, this type of research demands that researchers diverge from traditional modes of research, effectively and fundamentally integrating stakeholders into the research process while still producing rigorous, credible scientific information. It also necessitates high levels of involvement from local decision-makers, planners, and other stakeholders in joint inquiry. Further, scaling up this type of work will depend upon the availability of funding to support more participatory and action-oriented research. As such, and for the many reasons discussed in this article, doing PAR and research as capacity building is not without its challenges. However, through overcoming these challenges and effectively engaging in PAR, scholars and academics can help at-risk communities effectively adapt to climate change.

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Endnotes

¹ The NERRS Science Collaborative is an organization that seeks to put National Estuarine Research Reserve-based science to work for coastal communities and is supported by the U.S. National Oceanic and Atmospheric Administration.

² The NECAP website is available at: necap.mit.edu.

³ A Stakeholder Assessment is similar to a Conflict Assessment, as described by Susskind et al. (1999). We use the name Stakeholder Assessment, rather than Conflict Assessment, in situations where there is not a pre-existing conflict.

⁴ There is also a facilitator role in each of our simulations. Since our simulations model a facilitated decision-making process, we typically assign this role to a project partner or someone we know has facilitation experience, although the role is designed to be played by any simulation participant.