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## Collective Climate Adaptation: Can Games Make a Difference?

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### A New Focus on Adaptation following Hurricane Sandy

There are quite a few people in New York and New Jersey who want the government to do something. They want to make sure that the horrendous effects of Hurricane Sandy are not repeated in the years ahead. In the Northeast, the unusual “superstorm” resulted in extensive property loss and more than 100 deaths. Current estimates are that the storm caused more than \$60 billion in damage in New York and New Jersey alone.<sup>1</sup>

What are the things that local, state, and federal agencies can do to reduce the risks associated with destructive storms? They can build massive seawalls, breakwaters, or other barriers to keep high tides and storm surges from plowing into unprotected areas. The Dutch and the Italians have made major investments along these lines. Or they can create new tidal wetlands and sand dunes to block water before it reaches homes and businesses along the waterfront. A third option would be to buy out landowners in areas that are likely to be hit repeatedly and to let those areas lie fallow. Additionally, they could strengthen coastal infrastructure including bridges, roads, subways, power plants, and water treatment facilities so they can withstand inundation caused by even the most ferocious hurricanes, such as Sandy. Perhaps the government can propose new building standards that require houses to be rebuilt on stilts or with breakaway panels at the ground level. They can subsidize new insurance programs so that anyone hurt by a storm is quickly and sufficiently compensated. Finally, emergency preparedness, including evacuation strategies and creation of temporary shelters, can always be improved.

Any and all of these options will cost a lot of money. And the funds involved will have to come from somewhere, or require new taxes—something that is unappealing to many given the current economic difficulties facing the nation.

Most experts think that climate change will increase the number of severe storms, the height of storm surges (as a result of sea-level rise), the number of very hot days every summer, and the risk of disease associated with standing pools of water and contamination of drinking water supplies.<sup>2</sup> One of the results of Hurricane Sandy is that the debate over what is causing climate change and what might be done to limit greenhouse gas emissions has given way to an acute focus on reducing coastal vulnerability and increasing resilience to these types of climate change impacts, what is commonly called *adaptation planning*.<sup>3</sup> It doesn't really matter what caused the most destructive hurricane in recent memory, at least not for people in the Northeast; what matters is how we can reduce the risks associated with similar—and increasingly likely—events in the future.

### Collective Choice Problems

Even in a period when there is growing opposition to expanding government's role in our lives, almost everyone who suffered at the hands of Hurricane Sandy wants help. There is no way, though, that private interests are going to foot the bill for building new storm barriers or making sure that bridges and roads are less vulnerable to major storms. Collective action at the local, state, and national level is required.

Most people make conscious decisions about how to manage risks in their personal lives. They alter their behavior to minimize their vulnerability. They buy insurance. They put aside emergency funds or spend time planning how to protect themselves and their families in case the worst occurs.

Making decisions about personal risk is pretty straightforward. However, making collective decisions about risk management is much harder. In all of the communities we are a part of—at the local, state, national, and international levels—people perceive risks differently. This makes it hard to agree on appropriate trade-offs involved

in risk management, especially in the face of uncertainty. Unless we can reach agreement on how to manage climate change and other meteorological risks, though, no one will have peace of mind. And we will be setting ourselves up to repeat the disaster of Sandy—or worse.

So how can we help communities make the tough collective risk-management decisions necessary to prepare for climate change and future severe weather events like Sandy? We have an idea: how about games.

## **Helping Coastal Communities Prepare to Manage Risks Associated with Climate Change and Storms like Hurricane Sandy**

With support from the National Oceanographic and Atmospheric Administration (NOAA) and the National Estuary Research Reserve System (NERRS), our team is working with four coastal New England communities to test a new way of building community-wide risk-management capabilities. At the heart of our strategy are games: face-to-face role-play simulations that bring mixed groups of residents together for a couple of hours to imagine what they might do to reduce climate change risks in a hypothetical community that's a lot like theirs. (Our project website is available at <http://necap.mit.edu>. This work builds on the previous use of climate change role-play games to build collective risk-management capacity in Maryland.<sup>4</sup>)

The four communities we are working with are Wells, Maine; Cranston, Rhode Island; Barnstable, Massachusetts; and Dover, New Hampshire. We have prepared climate change impact projections for each municipality. Our next step is to discuss these projections with officials, business leaders, and residents in our partner towns to identify serious vulnerabilities in each community.

Based on climate change projections and what we learn about local vulnerabilities, we will create a role-play simulation for each community. These games will require groups of six people to imagine they live in a hypothetical coastal community facing the same sort of climate change risks and barriers to adaptation as the real-world town the game was designed for. Game participants will receive a short scenario spelling out the reasons they have been asked to come together to deal with the possible risks posed by climate change. Participants will also be asked to imagine that they are playing a certain role in this hypothetical community, for example, as a planner or an environmental advocate. Each person will receive confidential instructions telling them about their role and their role's interests. We will construct the roles in each game so that, as in real life, conflicting interests make it difficult to reach agreement about how to handle climate change risks. Then, with a packet of technical information in hand, game participants will have 90 minutes to see whether they can come to agreement about what their hypothetical community should do to manage climate change risks.

Once we start playing these games with large numbers of people in each community, participants will be asked to complete a very short questionnaire before each game begins, and another once the game is over. We want to see if game playing has any impact on their views about climate change risks and whether and how these risks might be managed.

At each game workshop, anywhere between three and ten groups will play the game at the same time. When the game is over, everyone will discuss the outcomes at the different tables. Six to eight weeks later, we intend to interview about 10 percent of the participants to see what they remember about the game and what lessons it might hold for their own community.

We will also survey a randomly selected control group of people in each community who won't play the game. This will help us ensure that the attitudes of participants playing the game are generally reflective of the attitudes of other people in their community.

Following the widespread use of the games in each community, we will monitor meetings of local agencies, boards, and neighborhood groups for approximately a year to see whether community-wide game playing has had any apparent effects on climate change adaptation or related efforts in any of our partner towns.

## **What Do We Expect to Find?**

In 2011 and 2012, we played similar climate adaptation games with a few volunteer communities in Massachusetts. Before-and-after questionnaires, as well as in-depth interviews with game-players in Amesbury, Newburyport, and New Bedford, Massachusetts, provide a glimpse of some of the potential benefits of using role-play simulations to educate and engage the public. (These climate change games—the Flooding Game, the Heat Islands Game, and the Water Use Game—and directions for downloading them are available on the Harvard Program on Negotiation's Clearinghouse website.<sup>5</sup>)

These towns played a game called the Flooding Game, in which participants assumed the roles of the town mayor, a real estate developer, a town planner, and representatives from the town's residents association, affordable housing coalition, and an environmental organization, and had to reach agreement on how to deal with increased flooding risk in the hypothetical town of Evanstown. People who played the game in Amesbury and Newburyport included public officials, community leaders, and members of the general public. Some high school students also participated. Agreement was reached in many but not all groups, and participants generally reported that playing the game

convinced them that reaching agreement about how to handle increasing flooding risks was definitely possible, despite the scientific uncertainty and conflicting interests involved. Before-and-after survey results revealed that the game, although only 90 minutes long, altered many people's assumptions about what a community can do to address climate change risks.

In New Bedford, game participants included representatives from the harbor development commission, local conservation and economic development agencies, the mayor's office, and emergency management providers. In-depth interviews with participants three weeks after the game revealed that most participants found the experience to be an engaging, enjoyable, and effective way to learn about climate change risks and adaptation planning. Many participants noted that they had increased empathy for and understanding of the perspectives and interests of other parties likely to be involved in adaptation planning. Almost everyone felt that the game showed them a pathway for managing climate change risk amid scientific uncertainty and conflicting views about what should be done.

Given these preliminary results, we've structured our current study based on the following three provisional hypotheses:

1. Widespread game playing will increase public optimism about whether communities can reach agreement on how to manage climate change risks.
2. Widespread game playing will increase the public's desire to reduce risk, regardless of how confident community members are about climate change projections or whether they believe greenhouse gas emissions are already warming the planet.
3. All segments of the population want the government to take a lead role in explaining climate change risks, determining community vulnerabilities, and figuring out what can be done to address them.

### Role-Play Simulation Games and Adult Learning

The application of role-play games in adaptation planning is new. However, role-play simulations have been used in a number of other adult learning contexts for quite some time, and there is clear documentation of how games work as part of general professional training,<sup>6</sup> emergency-preparedness training,<sup>7</sup> and negotiation training.<sup>8</sup>

Role-play simulations provide what has been described as *immersive* learning, as opposed to *absorptive* learning.<sup>9</sup> These games give the sense of actually "being there" through incorporating elements of tangible problem solving, audiovisual and sensory stimulation, and imaginative immersion in a game narrative and assumed role. Accordingly, role-play simulations have considerable teaching and learning potential in situations where a sense of being there is critical for increased understanding, such as in the case of emergency response training.

Role-play games ask participants to take on assigned roles within a fabricated context. This requires a significant emotional investment, as participants must work to understand the nature, thinking, beliefs, and perspectives of their assigned characters.<sup>10,11</sup> This often results in what has been called *perspective taking*, or an ability to identify with the perspective one assumes.<sup>12</sup> Additionally, role-play simulations create a safe space in which participants can try out new ideas or unconventional courses of action, engage in creative dialogue, and free themselves from certain real-world constraints.<sup>11,13</sup> As a result, simulations provide dynamic environments that allow—and encourage—participants to examine their usual perspective with a critical eye and to envision creative solutions.<sup>11,13</sup>

In light of these educative strengths, role-play simulations are increasingly being used in the context of natural-resource management and environmental planning to promote discussion among stakeholders with conflicting viewpoints and encourage creative problem solving.<sup>14-17</sup> For all of the reasons above, we believe that role-play games will be helpful in building the adaptation capacity of our partner communities. However, whether we will find evidence to support our hypothesis remains to be seen.

### Conclusions

Can games like those we are testing help communities prepare for a storm like Hurricane Sandy? Obviously, these activities cannot stop a storm; nor can they increase our ability to predict severe weather events. However, they could help coastal communities envision what they would need to do if a severe storm actually hits their region. Game playing, when managed properly, can also help elected officials, business leaders, and community activists determine whether their existing risk-management arrangements are sufficient. Had role-play simulations taken place before Hurricane Sandy, stakeholders in the affected communities could have already thought through and discussed their reactions. Preparations could have been in place beforehand. Game playing might have helped a number of communities affected by Hurricane Sandy collectively think through risk-management strategies and make hard decisions about infrastructure improvements, investment in storm-resistant design, and changes in patterns of development, thereby potentially assisting them in reducing their local vulnerabilities. Waiting until after the storm means delayed aid, greater impact, and irreversible damage, such as loss of life.

In eighteen months, we will know more about whether widespread game playing enhances the ability and inclination of residents and officials in coastal communities to engage in collective climate change risk management. Based on our preliminary findings, we think that tailored role-play simulations designed with substantial involvement of local

scientists, officials, and leaders of grassroots groups may help stakeholders see how different attitudes and interests can be blended together into effective adaptation efforts. If games do not work in this way, we will have to find some other method for building collective risk-management capacity and engaging the public in adaptation planning. For, as Sandy has forcefully shown, the failure to collectively manage climate change and meteorological risks may come at devastating price.

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