International Center for Enterprise Preparedness (INTERCEP)

Climate Change Adaptation Lessons Learned from Hurricane Sandy

Web Forum

On January 18, 2018, Jessica Grannis, Adaptation Program Manager for the Georgetown Climate Center and staff attorney and adjunct professor at the Harrison Institute for Public Law at the Georgetown University Law Center presented on Climate Change Adaptation Lessons Learned from Hurricane Sandy, and provided insights to climate change adaptation in the Northeast and across the United States. Below is a summary of the web forum.

Introduction

The Georgetown Climate Center is a resource on climate policy. It convenes experts on topics such as reducing emissions and how best to prepare and adapt to climate change. The Center provides policy support to states and municipalities, and creates tools and other resources on these issues. For example, a recent project focused on legal and policy challenges to rebuild with resilience after Superstorm Sandy in New York and New Jersey.

During Sandy, many areas that were not anticipated to flood did end up flooding. Other areas are also experiencing more intense flooding than expected. This trend is being observed across the world. The number of climate related disasters is increasing over time.

Sea level rise is part of the challenge and can exacerbate storm surge and other problems. Some communities have seen a foot of sea level rise over the past century. Estimates go up to over 6 feet by the end of the century. If there is dramatic melting of ice sheets this figure could be even higher.

In New York City (NYC), the Federal Emergency Management Agency (FEMA) flood zones suggest that the flood plain will expand with an additional 11 and 30 inches of sea level rise. Similar vulnerabilities to flood risk are also expected in Miami, New Orleans, and other coastal cities.

How do we prepare for this future?

Our typical organizing principle is that there is no single bullet. Cities should adopt a multi-layered approach. This includes zoning and building codes to ensure that private development is more resilient to future climate risks. It also highlights the need for insurance in order to provide financial security when these events happen. Green and ecosystem services should be strengthened to improve resilience. In addition, sea walls and other flood risk reduction projects can be part of climate adaptation strategies to reduce climate risks.
It is important to understand the Federal context in which communities are operating. This includes the National Flood Insurance Program. FEMA develops the flood maps, including the 100-year flood map that portrays the 1/100 chance of flooding in any given year. These flood maps determine when a property owner is required to carry flood insurance. It is used by states and communities to determine longer-term decisions about where to build and where to drive greater density, etc. That is part of the challenge communities are facing, how to use these maps for long-term planning.

How do we rebuild with resilience? Disaster recovery programs were designed to get communities to where they were before a disaster rather than allow them to rebuild with more resilience. For example, transportation impacts in Vermont after Hurricane Irene included culverts that became clogged with debris and blew out damaging roads and bridges topping those culverts. The state wanted to build larger, bottomless, culverts that would allow for greater stream flow to avoid potential clogging. But FEMA denied the additional costs of making these changes to improve resilience, and had to appeal to get reimbursed for the costs to rebuild these culvert.

In the aftermath of Superstorm Sandy, it was important to find ways to encourage affected communities to rebuild in new, more resilient ways. They did this with Rebuild By Design. There were six winning projects. States and local projects were provided with funding to implement programs that turned conceptual ideas into actionable projects.

Examples of these projects include:

- **East Side Coastal Resilience Project**: In LES Manhattan, this is a piece of the Big U project. It takes an existing park and integrates a levee system and nature-based features, while also enhancing waterfront access for communities living in that area, including public housing.

- **Living Breakwaters - Staten Island**: Considers a layered approach that includes changing land use patterns in communities adjacent to coastlines, wetland restoration, and recreation oyster reefs to dampen surge energy. Also contemplated are resilience hubs, which are designed to provide educational and recreational services, as well as emergency response services in a flood event.

- **Living With The Bay - Nassau County**: Mill river system. This project will take a watershed approach to reducing flood risks. In the upper part of the watershed a series of lakes that have become clogged with sediment and trash and aims will be restored to better retain storm-water. Green infrastructure will be installed in neighborhoods adjacent to the river to reduce stormwater discharges. In Hewlett Bay, living shorelines will be used to dampen storm surges.

- **Hudson River project - Hoboken, NJ**: Includes storm surge protection, enhancing access to the waterfront in a very densely built area. The project integrates these features along the waterfront and in public right of ways within city streets.

There are important challenges to climate change adaptation and resilience from a legal and policy perspective in this region. Some projects had funding gaps, some had very large budgets and the funding that was ultimately allocated for their implementation was sometimes a fraction of what was expected. In Hoboken, for example, Rebuild By Design worked with the community to evaluate options and think about what they could build given budget constraints. They had many community events and presented
options for flood protection while also providing other “sunny day” benefits like increased access to the waterfront. They learned communities can be a huge ally in thinking about how to design projects to deliver multiple different resilience benefits.

Another challenge is developing projects at an adequate scale since that may require multiple municipalities and other jurisdictions. To do this, states may set up a steering committee to pull together local decision-makers at a regional scale. Projects and funding can be used as a carrot to get municipalities to improve their practices, and to manage and maintain infrastructure projects after work is complete.

Because Sandy was a storm surge driven event most projects in the area focused on this impact. A key to successful implementation of these projects is integrating natural systems and incorporating amenities so that the result is rainy day flood protections while also providing sunny day benefits.

Another issue that all of the grantees are grappling with is that you can put in structures to protect an area in the event of a storm surge, but all these areas are also facing internal flooding from higher precipitation. This requires broad deployment of green infrastructure solutions in order to address needed interior drainage behind flood protection structure. To address this problem cities need to look at the full suite of options, which include creating design standards to integrate green infrastructure in anything that is under public control, and to encourage or require green infrastructure through zoning regulations.

New York City looked at legal barriers because of zoning and other rules and made changes to waive height restrictions and other barriers to allow for buildings to be rebuilt with resilience. They also developed guidance on how to retrofit common building types to help building owners identify solutions for incorporating flood mitigation measures while rebuilding. Across the board, the City looked at how to institutionalize these changes.

Other parts of the country are grappling with similar challenges in the area of climate change adaptation. In Louisiana there was a very significant masterplan process to address flood risk after Hurricane Katrina and to assess how to spend resources from the Deepwater Horizon disaster. In Virginia the state is looking at planning to 2100 and where they will encourage retreat from the most at-risk areas of the city. In Boston, they have requirements that large-scale new development projects consider future flood risks and mitigate those risks. And in San Francisco there is a tax measure to support nature-based projects to enhance ecosystems and reduce flood risk.

Q&A

*Will we retreat from the coastline?* Yes, many areas are thinking about this. One of the winners of the National Disaster Resilience Competition was the state of Louisiana, and their project was to work with communities to look at viable retreat options for coastal communities. This includes relocating populations, accommodating future development, making structures more resilient, protecting and
investing in high and dry portions of the state. People are talking about migrating from the coast, but these are difficult conversations since people have been living there for generations.

How do we translate the need to take action now with the challenge of these problems taking place many decades into the future? Will funding gaps be met by the public or private sectors when we are saddled by a near-term perspective? That’s the beauty of these resilience projects where it’s not just for storm protection but also combining everyday sunny day benefits as well. If it’s just a sea wall it’s more difficult to get support and funding. But if a project also considers social, economic, and environmental benefits it is easier to find other sources of support.

Are there communications challenges? How do we communicate that these projects will have benefits? It is important to highlight examples and rate them and to communicate the benefits. People need to know that these can be done and that they can be replicated, but sometimes they need to be tailored and adapted to a unique legal and regulatory framework. Another critical factor is to get buy-in from elected leaders and this is also a communications challenge.

Additional Resources:

- Georgetown Climate Center: http://www.georgetownclimate.org/
- Adaptation Clearinghouse: http://www.adaptationclearinghouse.org/
- FEMA Flood Map Service Center: https://msc.fema.gov/portal
- Rebuild By Design: http://www.rebuildbydesign.org/