CLIMATE-SMART CITIES™

Decision support tools for climate change planning

EXECUTIVE SUMMARY

THE TRUST FOR PUBLIC LAND

Written by Caryn Ernst And Kathy Blaha

Produced under a grant from The Macarthur Foundation

For The Trust For Public Land's Climate-Smart Cities program

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December 2015

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Printed on 100% recycled paper.

The Trust for Public Land creates parks and protects land for people, ensuring healthy, livable communities for generations to come.

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Background and overview

THE TRUST FOR PUBLIC LAND'S *Climate-Smart Cities* program is founded on the principle that to respond to climate change, cities must restore natural functions of the land by weaving green elements into the built environment. The Climate-Smart Cities program helps cities meet the climate challenge through conservation and design – from creating waterfront parks and restoring wetlands to creating green alleys and "water smart" playgrounds.

A flagship service of the Climate-Smart Cities program is the development of **spatial decision support tools** to translate goals from a city's strategic climate planning into priority sites for green infrastructure development through the use of Geographic Information Systems (GIS) technology. The Trust for Public Land believes that delivering effective spatial decision support to municipal governments and their partners will enable cities to turn Climate Action Plans and other climate strategies into action. Translating written strategies into place-based priorities will enable cities to efficiently develop needed policies and apply on-the-ground investment for mitigation, resilience, and climate justice objectives.

The purpose of this report is to research the tools and data currently available to cities for climate change decision support, and to understand the interests, needs and capacity of potential users within municipal government and among partner organizations. This inquiry is intended to help inform the development of more effective spatial decision support tools for climate change planning.

This study has highlighted a number of opportunities, as well as a few important barriers to local climate mitigation and resilience planning, particularly for green infrastructure:

1. While data availability and quality is improving rapidly, there is still a need for high resolution, locally relevant data.
2. Web-based *custom* decision support tools can support interdepartmental and inter-jurisdictional planning and can be a critical tool for comprehensive climate planning.
3. Although data and tools are important to climate planning, the process of coordinating between departments within cities and between jurisdictions, and building support for climate action, are just as important.

This study highlighted that there is a large disparity in climate planning and readiness between cities. While some cities like New York, Boston and Santa Clara are very advanced in their climate planning, others are struggling to do basic coordination between departments, and still others are not yet looking at climate change as a priority. The cities that are most advanced in their climate planning and action are most often focused on protecting communities from sea level rise and storm surges, and absorbing and managing stormwater.

The cities that are furthest along with their climate planning have a robust resilience or sustainability office within the city's leadership structure and/or the support of consulting contracts or partnerships with research institutions or national nonprofits, such as the Trust for Public Land, RAND, Climate Interactive, or Institute for Sustainable Communities. These national and regional organizations are playing an important role in the transfer and successful replication of technology and innovation between jurisdictions, and are helping to scale up local capacity to mitigate and adapt to climate change.

Academic and research institutions, federal agencies and private sector firms are playing an important role in the development of high resolution, locally relevant data, and need to continue this work, with a focus on downscaled climate models and cost benefit data. Federal agencies, research institutions and national nonprofits needs to continue creating decision-support tools with a focus on tools that can be customized locally with a wide range of vulnerability analyses, high resolution, locally relevant climate data, and that support the ability to plan across city departments and across jurisdictions.

Although, the data and tools are critical to guiding effective climate mitigation and adaptation, our interviews taught us that this work is about much more than a tool; it's a process of identifying risk then assessing solutions, assisting with implementation, and finally, measuring and monitoring. It is also about integrating green infrastructure work into broader climate change planning, and facilitating and supporting partnerships between city departments, outside agencies and jurisdictions.

Creating tools that support effective climate change planning

THE PRIMARY ADVANTAGE OF A WEB-BASED DECISION SUPPORT TOOL is its ability to promote coordination and collaboration across city departments, organizations, sectors, jurisdictions, regions and countries. More than anything, effectively mitigating and adapting to the global impacts of climate change will require sharing information and collaborating on solutions at every level. Web-based decision support tools, therefore, should be designed to:

1. Meet the needs of different types of users
2. Integrate diverse priorities
3. Visualize and compare a variety of scenarios
4. Support collaborative, as well as independent, action

Meet the needs of different types of users

As part of our research, we explored the functionality of existing tools and asked our interviewees what tool functionality would best support their work. We identified three primary types of users of web-based decision support tools – decision-makers, public and technical staff – and assessed the type of functionality that would best meet their needs.

PUBLIC (general, specific community, interested stakeholders): Spatial tools can convey risks in a way that nontechnical users can relate, and by enabling interaction with the data, can share more complex data and build a deeper understanding of potential change and threats. Tools for the public must be able to make a compelling case that will build understanding and interest in an audience that may not be otherwise be engaged.

DECISION-MAKERS (elected officials, agency leaders): Creating effective decision support tools for decision-makers is challenging, which is likely why 65% of our interviewees were not using online tools. The data and analysis must be technically and scientifically sound, but accessible to non-technical users; and the results must be accessible at a high level and support "making the case", while also allowing for detailed, site-specific comparative analysis.

TECHNICAL STAFF (scientific, academic and agency): Technical staff often have access to data and in-house analytical tools. Web-based tools can serve as a platform for sharing high resolution data with other partners and key audiences, enabling their data to be integrated into applied solutions, and as a source of related data and analyses that can enhance their own work.

Integrate Diverse Priorities

Climate change planning, mitigation and adaptation strategies are by nature comprehensive and wide-ranging. Local and departmental climate planning is critical to on-the-ground implementation; however, that work needs to be integrated and coordinated across departmental and jurisdictional boundaries in order to be effective, to identify and

take advantage of co-benefits and to magnify potential impacts.

Web-based decision support tools offer a potential platform for coordination and collaboration by enabling different types of spatial data and analyses to be uploaded and integrated into scenarios. In turn, enabling the data and analyses from a web-based tool to be downloaded to in-house GIS systems allows agencies to align their internal planning with other resilience objectives.

This type of integration can enable staff and decision-makers to see where they have multiple vulnerabilities, mitigation opportunities, and priority populations – and then to plan strategies accordingly. It also allows them to see where they have co-benefits, such as stormwater and habitat protection, enabling them to take advantage of resources available for one strategy (combined sewer overflows) to address a related but separate problem (river restoration).

Visualize and compare a variety of scenarios

Many interviewees emphasized that the politics and process of climate adaptation planning were as important, or more important, than the technical analysis. They face skepticism about climate change and about what a city can do in the face of it and have difficulty conveying a sense of urgency or immediacy. The data is speculative and includes wildly diverse scenarios, (i.e. potential 1' to 5' sea level rise), that extend into the distant future, and no one knows the cost of inaction.

Politicians and agency directors are having to make decisions with little comparative data on the costs or benefits and end up following the money, being reactive to political pressure, or taking the cheapest path with the least resistance. Low-income and vulnerable populations are often neglected in the process.

Scenario planning can help cities analyze alternative approaches and select those with the greatest combined benefits at the least cost; thus enabling thoughtful, proactive approaches to climate action. However, it is expensive and difficult for cities to do on their own in a comprehensive way. A web-based tool that enables cities to visualize and compare various scenarios and share them with constituents can help decision-makers weigh costs and benefits and justify investments. Even with limited data on costs, being able to Identify potential co-benefits through scenario planning can help guide more strategic investments and build public support.

Support collaborative, as well as independent, action

The flexibility and accessibility of a web-based decision support tool would enable individual jurisdictions to do local climate resilience planning with an eye toward regional (or ecosystem-wide) integration and coordination. A regional web-based decision support

tool would take advantage of science and data being developed at the regional level, as well as new local data. It could reinforce commonalities among jurisdictions, bring in regional agencies, like water and sewer, while supporting more informed local decision-making. The tool functionality that supports integration and collaboration among city departments – data upload and download, the ability to run different queries and overlap varied priorities to identify co-benefits – is the same functionality that would enable regional planning with local implementation.

Notes

THE TRUST FOR PUBLIC LAND

The Trust for Public Land
101 Montgomery St., Suite 900
San Francisco, CA 94104
415.495.4014

PHOTOS: FRONT TOP, DARCY KIEFEL, FRONT BOTTOM, HOLLIS BENNETT; BACK, ANDREW FEDERMAN.

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