

Public Risks and the Challenges to Climate-Change Adaptation: A Proposed Framework for Planning in the Age of Uncertainty

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Human and natural systems will likely have to adapt to hazard impacts (flood events, hurricanes, droughts and sea level rise) that will be intensified by climate change. The traditional “predict and plan” approach of current physical urban and regional planning is not effective in dealing with climate change due to increased uncertainty about the future climate, how effectively CO2 emissions will be reduced, and planning horizons of more than 50 years (Quay 2010). “Predict and plan” places emphasis on forecasts of future trends or a future desired state and then identifies the land use requirements and infrastructure needed to serve or create this future.

We present a new model emerging from research and practice that is better suited for planning for hazards linked to the uncertainties of climate change adaptation. The model draws on theories of collaborative planning and anticipatory governance. It offers a flexible decision framework that uses a wide range of possible futures, flexible land use and infrastructure policies that can be readily adapted, and monitoring of actions and the resiliency of outcomes of such actions. We provide case studies to demonstrate application of the model to climate change planning.

Challenges to Climate-Change Adaptation

Research initiated in the 1970s on local natural hazard mitigation efforts has accumulated a well-developed knowledge base. The knowledge is instructive here given the similarities between hazard mitigation and climate-change adaptation. Both deal with weather-related events, are future-oriented, address potentially widespread risks, and both focus on anticipating uncertainties. The core challenges identified in the hazard mitigation literature include:

- (1) *Weak Public Constituency* – A lack of awareness of historic hazard risks and emerging climate change risks cannot explain deficiency in action. The risk-perception literature based on surveys of the public and local decision makers consistently indicates a high level of awareness accompanied by a low level of priority for action.
- (2) *Local Government Paradox* – Weak public support creates a local government paradox (Burby 2006). Most disaster losses are borne at the community level and not covered by federal disaster relief and insurance, but local governments fail to anticipate the risks by enacting strong hazard mitigation plans and effective practices due to weak public support. In the case of climate change, local action is further constrained because of heightened scientific uncertainty about how natural climate systems will respond over time and how successfully social systems can reduce greenhouse gas emissions.

Case Studies: Coupling Collaborative Planning and Anticipatory Governance

Collaborative planning calls for authentic dialogue, wherein stakeholders and experts fashion plans and policies together, whereas anticipatory governance offers guidance for planning practice amid conditions of accelerating change and great uncertainty. Case studies of three municipalities reveal that climate change adaptation planning entails integrating the collaborative and anticipatory governance approaches into a three-stage model:

Develop a Knowledge Base That Anticipates Multiple Futures – Amid great uncertainty, the knowledge base for local plan-making and implementation should consider a range of possible future scenarios rather than a forecast premised on a single future scenario based on previous experience and the historic range of previous variability. Denver and London cases exemplify weaving expertise into multi-stakeholder collaboration and fostering the expansion of a network of collaborators in order to generate scenarios.

Formulate Flexible Adaptation Policies – Analysis of the risk-reduction effects of potential policies across a range of scenarios can be used to develop integrated adaptation plan policies. London and Punta Gorda (FL) cases show how collaborative planning processes supported development of flexible policies that require joint actions by participants.

Create a Program for Implementation Action and Monitoring – By contrast to a fixed predict-and-plan approach, an adaptive approach is premised on the idea that communities are dynamic and changing, and plans must be revised in a continuing process. Of the few adaptation planning efforts, all are in the early stages of developing structured monitoring programs. But, London and Punta Gorda (FL) cases indicate intentions of engaging broad networks of stakeholders in implementation and monitoring.

Additional Information

The full version of this summary was published in *Cityscape: Journal of Policy Development and Research* (v. 15, no. 1, 2013). The full version of this publication and research summaries for other publications are available at: <http://hazardscenter.unc.edu/mitigation-planning/> and at <http://www.ie.unc.edu/cscd/projects/dma.cfm>.

More about the Coastal Hazards Center and its work can be found at <http://hazardscenter.unc.edu>. More about the Institute for the Environment and its work can be found at www.ie.unc.edu.

The three innovative municipalities are dissimilar in terms of population (small to large city), location (coastal to high plains), and national context (United Kingdom and United States), and key climatic changes of concern (coastal flooding and sea-level rise and water supply). These differences suggest that the approach we are describing can be applied across multiple contexts.

Implications for Policy and Practice

The complexity, uncertainty, and distant planning horizon associated with vulnerability to climate change cannot be effectively managed based on the traditional predict-and-plan approach. To guide the significant social and capital investments likely to be required for adaptation, social institutions must embrace new methods that explore uncertainty and provide strategic guidance for current and future decisions.

Several core implications are offered:

- Scenario development should engage multiple stakeholders and not just experts.
- The scenario formulations process should enable critical thinking required to derive plausible future impacts and policies that are grounded to place.
- Policy solutions should be designed to be flexible and incrementally implemented to allow adaptations, and based on results from monitoring of actions and outcomes from actions.
- Policies should be robust meaning that they are adaptable across scenarios.
- Develop in-house capability within government agencies and supportive non-governmental organizations with the ultimate goal of imparting capability across regions.

Quay, Ray. 2010. "Anticipatory Governance: A Tool for Climate Change Adaptation," *Journal of the American Planning Association* 76(4): 496-511.

Burby, Raymond. 2006. "Hurricane Katrina and the Paradoxes of Government Disaster Policy: Bringing About Wise Governmental Decisions for Hazardous Areas," *The Annals of the American Academy of Political and Social Science* 604 (March): 171-91.

Acknowledgements

This material is based upon work supported by the U.S. Department of Homeland Security Coastal Hazards Center under Award No. 00313690. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, express or implied, of the U.S. Department of Homeland Security.