

COMMONS FORUM *RESPONSE*

Response to: Exploring New Approaches to Community Governance, by David Brunckhorst

Governance and Adaptation in Watershed Management

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In the lead essay, Dr. Brunckhorst comments on the importance of implementing new community governance approaches for resource management to deal with environmental degradation. I want to discuss two salient points in his essay, first the importance of a multi-scale approach in environmental governance; and second, the importance of understanding how to build knowledge to increase the adaptive capacity for environmental resources management. I'll use a case study of managing flood risk in a Mexico watershed to deal with these topics.

Societies and ecosystems interact over many temporal and spatial scales. Frequently, the scale of the ecological system and the scale of the social organization responsible for resource management are not aligned. Social organizations trying to manage environmental resources at inappropriate scales, might not receive the appropriate feedbacks signals from trial and error management processes. So, these scale-mismatches affect the ability to accumulate knowledge, learn and adapt to manage environmental resources.

Research led by Dr. Hallie Eakin is an excellent example of how scale-mismatches can impact adaptive capacity for flood risk management. Since 2004, Dr. Eakin and colleagues have been conducting research in the Upper Lerma Watershed, a highly populated and important economic region in Central Mexico. Two predominant scale-mismatches have been found in Lerma Watershed: spatial mismatches and temporal mismatches.

Spatial scale-mismatches occur in the region due to differences in the biophysical scope of flood dynamics and the organizational scope of the managing agencies. Flooding biophysical dynamics occur at the watershed scale, however, in Upper Lerma, some management actions and decisions are taken by agencies whose jurisdiction is lesser (municipal level) or greater (federal level) than the watershed level. These decisions that include dam operation, river maintenance and most important meteorological, river and dam monitoring are often poorly coordinated between the responsible agencies. Eakin and colleagues have found two decision making deficiencies that are in part due to a mismatch between the spatial scale of the biophysical properties and the organizational structure created to manage flooding. First, decision-makers are often unable to make decisions when they are required. For example, due to the importance of dam operation in Lerma, decisions are centralized by the federal water agency in Mexico City. Sometimes, when dam water levels are too high, local officials complain that central orders to release water arrives too late, increasing flood risk. Second, many of the decisions that are made are simply local

band-aids that do not provide long-term resolution to the causes of the flooding problem. For example, some municipalities in Lerma are cleaning and dredging sections of rivers to reduce risk of flooding. Nevertheless, municipal officials recognize that these isolated efforts are not sufficient and a coordinated effort for the whole watershed is needed.

In Lerma, temporal scale-mismatches take place because public officials often have never experienced a flood due to the terms of the public officials and the frequency of floods in the region. In Lerma, there were two major flooding events in 1998 and 2003, and several minor events in different municipalities of the watershed each year. Likewise, most public officials at state and municipal level responsible of flood management and disaster relief change their jobs every three years. When public officials get their jobs many do not have previous experience in managing flood risk, and when they finally get the training and gain experience, they leave their positions with the arrival of new public officials.

These spatial and temporal scale-mismatches in the Lerma Watershed have serious consequences on the adaptive capacity to manage flood risk. This becomes apparent in terms of lack of human, social, political and financial capital, but most important, in a lack of capacity to accumulate knowledge and manage the information to learn from previous experiences to effectively manage flood risk. These translate in a flooding chronic problem in Lerma despite the efforts of governmental organizations at different jurisdictional levels. The cumulative impact of chronic and repeated low-grade flooding can be large, particularly in terms of public and private resources spent on recuperating damages.

Building knowledge to increase adaptive capacity for environmental resources management is important when social-ecological systems are rapidly changing and these changes threaten the livelihoods of human populations. Investigating prior processes of relatively successful governance and adaptation, and comparing them to relatively not successful cases like the Lerma Watershed, will increase our understanding of how to manage social-ecological systems. Understanding how and why certain successful governing systems emerge and adapt to demographic, economic, and ecological conditions, will let us design policies to build adaptive capacity to deal with environmental degradation. As Dr. Brunckhorst states, we have to address community governance issues in operational and practical ways, to do this, we have to learn from our own successes and failures.

Further Readings:

Cumming, G. S., D. H. M. Cumming, and C. L. Redman. 2006. Scale mismatches in social-ecological systems: Causes, consequences, and solutions. *Ecology and Society* 11(1).

Eakin, Hallie. 2007. Disaster Preparedness and Response in Central Mexico: Towards and Adaptation Baseline. Flooding in the Upper Lerma Watershed. Technical Report. Department of Geography, University of California, Santa Barbara. (Available from the author: eakin@geog.ucsb.edu)

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