Local Response to Global Change: Strategies for Information Transfer and Decision Making for Cross-Scale Environmental Risks

Workshop Summary

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Belfer Center for Science and International Affairs
John F. Kennedy School of Government
Harvard University
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Background of Workshop

On January 29-30, 1998 a research planning workshop entitled Local Response to Global Change: Strategies of Information Transfer and Decision Making for Cross-Scale Environmental Risks was convened at the Belfer Center for Science and International Affairs, John F. Kennedy School of Government, Harvard University. Its goal was to explore the integration of scientific information and environmental policy and management processes through a focus on linkages between information and decision systems across different scales. The workshop brought together seventeen practitioners and scholars from ecology and environmental science, political science, jurisprudence, economics, geography, agriculture, rural community development, coastal studies and management, and several national and federal research institutions concerned with global change.

The Workshop was conducted in the context of an emerging longer term research program on cross-scale environmental risks and the role of information and decision systems in their effective management. Two collaborative studies are being conducted to refine research hypotheses and protocols for that program. These studies examine strategies for integrating cross-scale information and decision making systems in response to climate change in two arenas: 1) the agricultural sector in the U.S. Great Plains with special focus on climate change and variability in water resource management - particularly of the Ogallala Aquifer; and 2) the U.S. coastal zone with special focus on vulnerabilities resulting from potential accelerated sea-level rise. Prior to the workshop, invitees had received for review a theoretical concept paper entitled Information and Decision Making Systems for the Effective Management of Cross-Scale Environmental Problems and an accompanying research protocol.

The workshop was designed as a forum to critically appraise the theoretical paper and the research protocol, and to begin the broader task of sketching a long-range, multi-institutional, interdisciplinary research program on the effective management of cross-scale environmental risks.

Procedure

The workshop started with a plenary discussion focusing on the general theoretical propositions advanced in the concept paper. Two working groups were held in parallel sessions. Discussions in one group focused on the barriers and obstacles to the cross-scale integration of information and decision making systems. The second group addressed the research protocol, focusing on research and methodological issues to be addressed in the larger research program. A plenary session addressed break-out group results, emerging questions regarding the effectiveness of cross-scale management, and the design of a long-term research program to address management of cross-scale environmental problems.

Discussion Highlights

While the discussions covered a wide range of issues, we highlight below those issues central to the investigation of information and decision systems in the context of cross-scale environmental problems.

Conceptual and theoretical issues

In addition to the focus on cross-scale issues, more attention needs to be paid to the problem of scale mismatch: i.e., the scale or geographic and temporal extent of the environmental problem versus the scale and extent or duration of the management regime(s) with its various institutions that are supposed to address it.
The structuring of the world into processes and systems that occur at different scales with occasional, if
critical, cross-scale interactions may be too simplistic, or at least not self-evident, for management regimes
or policy systems. Alternatively, one may think of a division into coalitions or policy subsystems that cut
across scale and that are unified by common action agendas or ideological belief. Communication up and
down scales within such a subsystem (similar world views, purposes, values, and interests) may be much
more frequent and easier than communication across subsystem boundaries even on the same scale. A study
of communication networks and the flows and hurdles within them may thus be more fruitfully launched
from the viewpoint of people’s interests and agendas than from a more arbitrarily defined spatial, temporal
or organizational scale. The question of under what conditions communication occurs across either scales
and/or subsystems remains an intriguing one in either case.

Several important questions were raised about the nature of information and the communication process:
• what information is and how it differs from attitudes and perceptions;
• whether information or the process of communication matters;
• what gets transferred and what is most important – information, values, or norms;
• what type of information is useful; and
• how, if at all, information affects behavior.

Information needs to be understood in a broadly defined context, including:
• the tasks that need to be accomplished and the interaction among different parties that go beyond the
management problem at hand;
• the causal models (or mental maps) different people have of the world, and its role (if any) in altering
these perceptions and causal models;
• the economic and social reality that information bears costs and has value;
• the rules and institutions that allow or facilitate information transfer;
• the importance of face to face contacts for building trust among participants in the information
exchange network; and
• the problem that supply of information is frequently greater than the demand for it.

Methodological and research design issues

The comparability of the two cases - agricultural and water resource management on the one hand and
coastal zone and coastal hazards management - needs to be more clearly specified. It may be feasible to
pursue only for narrowly defined aspects. For example a comparison of the management of weather-related
hazards (climate variability) might be more fruitful than a comparison of the entire management regime
that needs to address both long- and short-term processes. A similar distinction should be made between the
management of highly regulated and largely unregulated activities, and how information needs and flows
differ for the management in either case. This calls for greater clarification of the similarities and
differences in the agricultural and coastal cases.

There is a strong need to define a suite of dependent variables that will serve as surrogates or measures of
effectiveness. This could include a variety of end-of-the-causal-chain phenomena like changes in water
levels, or changes in coastal development, or higher-up-in-the-causal-chain stand-ins such as the degree of
concern, institutional capacity, contractual environment, permit histories, policy or program changes, or
information availability. Ideally data for these variables should be sought over a period of 20-30 years
to see a change in effectiveness over time.
The research needs to focus on the obstacles and bridges to information flows. Amongst the obstacles are:

- the lack of scientific or technical information or processing capacity;
- the understandability of the information that is available;
- the novelty of a problem;
- the lack of a sense of crisis, urgency, or relevance, or authority within existing institutions to address a problem;
- merely passive databases; and
- an exclusively top-down or bottom-up approach to designing information exchange networks.

Purposeful interaction at close range is essential. Proposed bridges to facilitating information flows include:

- dense institutional arrangements;
- trust in the messenger (people and institutions);
- similar information and messages coming from a variety of sources;
- a close linkage to locally relevant problems and intensely felt needs (motivation);
- a nested R&D capacity (i.e., creation, packaging, and communication of information) which aims at co-ownership/co-production of knowledge; and
- the use of existing social and institutional networks and capacities and filling in the missing links.

Conclusion

Convening this diverse group of scholars and practitioners proved to be an effective and helpful means of addressing the multiple dimensions that characterize cross-scale environmental problems. We received both conceptual and methodological contributions that are invaluable. We hope that this workshop has nurtured seeds of future collaboration between institutions in which interdisciplinary scholarship and cross-fertilization can help guide the building of theory and the structuring of management of cross-scale environmental problems.
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