
Ecologies of Risk Information: A Comparative Approach

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Abstract

Information about disaster risk is created, accessed, and used within situated webs of knowledge, technology, and values that connect scientists, policy-makers, and the public and influence important planning and regulatory decisions. The details of these relationships are important determinants of what is considered "at risk" but are often difficult to trace. This is due in part to the complexity of disaster risk science. However the fashion by which risk information is communicated, through risk maps and similar products, can also play a part in obscuring the contingencies of its production. Through comparative research in two very different settings, Boulder, Colorado and Kathmandu, Nepal, this research uses the metaphor of information ecology to render some of these assumptions visible, providing insight into the social life of risk information and creating opportunity for public engagement in decision-making processes related to disaster risk management.

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Author Keywords

Crisis Informatics, Information Systems, Disaster Risk

My research seeks to understand the implications of different patterns of information creation, flow, and access on public planning related to mitigating and preparing for natural disasters. Information produced by disaster risk models is playing an increasingly important role in public

policy decisions. These models are the result of a number of techniques and technologies developed since the 1950's to calculate and quantify risk, defined broadly as the product of potential hazards and their likely impacts [2]. Advances in scientific risk assessment over this period have facilitated the perceived rationalization of uncertainty and come in conjunction with similar technocratic approaches to policy-development across a range of areas [3]. The conduct of risk assessment depends on assemblages of expertise across numerous disciplines, technologies for the measurement of natural and man-made phenomena and infrastructures, spatial data usually collected and maintained by disparate entities, and analysis tools for using such data to produce maps and other information products that communicate the probabilistic impact of various natural hazards.

In support of such efforts, governments, researchers, and the private sector participate in complex information ecologies, defined as systems of "people, practices, values, and technologies in a particular local environment [5]. Flood mapping, as practiced by the county government in Boulder, Colorado for example, has been conducted for nearly 70 years. During this time, the technical practice has evolved as the needs of policymakers and the public for this analysis has shifted. These maps rely on disparate datasets including topographic maps, rainfall estimates, and property boundaries that are collected by different actors for their own purposes unrelated to flood mapping. Once brought together, the resulting calculus of flood risk is made available across a number of media not just as maps but also in the form of zoning and land-use regulations, property insurance premiums, and the actions of Boulder's citizens who may make real estate and other decisions based on their own mental maps of risk. In the wake of serious flooding during September 2013, the City of Boulder has launched an effort to reassess the regions' vulnerability to natural hazards, including flooding, and build resilience to future disasters [7]. A key part of the City government's strategy is community engagement and over 40 public meetings have already been convened to this end. Through such dialogue, this initiative is restructuring the local ecology of risk information and will therefore provide a rich site of study.

In contrast, Kathmandu, Nepal, one of the at-risk cities in the world in terms of potential human life lost due to earthquakes, currently lacks comprehensive risk information. Some estimates suggest that during a major earthquake, 60% of the building stock would be affected, at least 40,000 fatalities could occur, and almost a million people could be displaced [4]. Disaster risk reduction is an important element of Nepal's national development strategy. Efforts to mitigate the impacts of the next major earthquake are part of a constellation of international aid projects, post civil-war consolidation of power in the national government, and expert discourses of development, engineering, and democracy. Within this context, citizens of Kathmandu are mobilizing around ideals of open data, open source software, and volunteerism as a means of contributing to Nepali society. With the support of international development organizations like the World Bank and the United States State Department, a Nepali civil society organization called Kathmandu Living Labs has been working with university students and community groups for the past 2 years to incorporate [6] community mapping, civic hackathons, and other forms of technology-based participation mechanisms into the risk assessment process in order to improve available risk information and increase public engagement with and understanding of issues relevant to seismic risk in Kathmandu. These efforts challenge traditional, expert-led,

approaches to understanding risk through the inclusion of a broader section of the public in the creation and use of risk information.

Risk information is created to inform critical disaster preparedness and mitigation activities that impact human life and property. These activities require difficult trade-offs and sometimes painful decisions. Resources steered towards flood protection or earthquake retrofitting are resources that are unavailable to fund health or education needs. Building codes meant to protect citizens from disaster affect the character of the cities and neighborhoods where they live. These processes are inherently political; disaster risk and the impacts of efforts to address it are not distributed evenly [1]. Too often, the scientific apparatus surrounding disaster risk assessment has proved opaque to the public, hampering informed debate and participation in risk management processes. The ecology metaphor, because of its broad formulation of the actors, norms, and context surrounding information has the potential to unpack this apparatus and create opportunities for richer public engagement. My research will demonstrate this through comparative study of Boulder, Colorado and Kathmandu, Nepal, two different settings that are each undergoing changes, one government-led and the other civil society-led, to their local ecologies of risk information designed to increase public input.

Acknowledgements

This research is funded by US National Science Foundation grants 0910586, 1331490, and 1441263. I thank Project EPIC and RIPS colleagues at the University of Colorado Boulder for support and critique. I also thank project partners in Boulder and Kathmandu without whom this research would not be possible.

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