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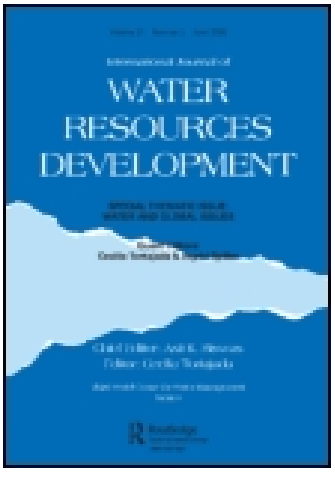

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Towards disaster risk reduction: a policy-focused approach to natural hazards and disasters

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BOOK REVIEW

Towards disaster risk reduction: a policy-focused approach to natural hazards and disasters, edited by Jason K. Levy and Chennat Gopalakrishnan, Abingdon, UK, and New York, NY: Routledge, 2013, 95 pp.

This book was originally published as a special issue of the *Journal of Natural Resources Policy Research* in 2010. It was jointly edited by Jason K. Levy, an associate professor in the Department of Homeland Security and Emergency Preparedness at Virginia Commonwealth University, and Chennat Gopalakrisnan, a professor in the Department of Natural Resources and Environmental Management at the University of Hawai'i at Mānoa. The editors have put together five chapters (besides their own introductory overview chapter) which deal with the mitigation, preparedness, response and recovery phases of disaster management. These chapters include case histories, empirical studies, conceptual-theoretical investigations, policy perspectives and institutional and risk analysis. Taken together, they shed light on some original strategies for disaster risk reduction in a variety of cultural, climatic and institutional settings around the globe. As various local, national and global responses to disasters are dissected and carefully analyzed in different chapters, the deficiencies, inequalities and complexities of the approaches come to the fore. Thus, the book raises the prospect for a major change in direction for global policy on disaster risk reduction.

In the first chapter, the editors, drawing from the special-issue papers, point to 12 emerging and holistic concepts that result in the evolution of the 'disaster risk reduction and disaster resilience' paradigm and how it differs from traditional approaches using the 'crisis and emergency management' paradigm. The differences between the two paradigms relate broadly to changes in emphasis, operations, time horizons and information use and management. The editors hope that the book will help reinforce or support the concept of disaster risk reduction as a key principle of disaster prevention. Because disasters not only devastate ecosystems and economies but also destroy human lives and cultural heritage, they identify three overarching principles that could lower disaster risk and increase community resilience. The first principle is the need for increased use of scientific knowledge and technology. The second is the need to build a culture of resilience, starting at the grass-roots level. The third and final principle is the need for emboldened action by public officials who muster political courage to implement disaster risk reduction strategies.

Chapter 2, written by D.E. Alexander, describes the impact of the L'Aquila Earthquake in Italy, which occurred on 6 April 2009. The earthquake resulted in 308 casualties and left over 67,500 people homeless. The effectiveness of government disaster management policies is evaluated in terms of the pre-impact, emergency and early recovery phases of the disaster. Disaster risk reduction is evaluated against the backdrop of the existing civil protection structure and changes to it shaped by the disaster and by a scandal associated with the misappropriation of funds. Six important policy lessons are culled from the L'Aquila disaster. Skilfully written and well referenced, the chapter calls for the precautionary principle to be employed in responding to predictions of earthquakes

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whether official or amateur, reasonable or far-fetched. Local response mechanisms to support monitoring and evaluation systems are seen to be necessary, as is the need to have an integrated response system which is able to better utilize external assistance. Other requirements include safeguards against corruption and abuse, and understanding of tensions between centrism and devolution between disaster response and emergency management systems. Finally, the need for eternal vigilance is highlighted lest gains in disaster risk reduction made in one year be reversed in the next by budget cuts or programme changes.

In Chapter 3, C. Kousky examines the intricacies of policy processes regarding the use of natural capital to reduce disaster risks to a community. "Natural capital" refers to a stock of natural resources that provide services to people which constitute "ecosystem services". Examples of work on such services include: wetland protection to mitigate flooding in the middle and upper portions of the Charles River in Massachusetts; replanting of mangrove forests in Vietnam to protect the local population from storm surges; revegetation work undertaken on slopes in China to prevent landslides; and land conservation practices in New York to prevent environmental damage to watershed regions. The motivation for using natural capital in risk reduction strategies is its cost-effectiveness vis-à-vis other measures. However, political processes could introduce barriers to adopting a natural capital approach by imposing high transaction costs. Another difficulty to using natural capital could be opportunity costs. This is when the short-term gain from destroying the natural capital may outweigh the long-term risk reduction benefit of preserving it. Natural capital for risk reduction can also be based on a consideration of other co-benefits provided by the approach, which may include such things as enhanced recreation opportunities, aesthetic improvements, habitat protection and spurred economic growth. Natural capital could also yield other co-benefits, such as reduction in human or technological errors associated with structural works. When these benefits are considered, a natural capital approach may make the risk reduction project economically feasible.

Although some leading communities are benefiting from the natural capital approach to reduce risks, the author highlights four political and institutional challenges impeding its utilization, which include lack of information, the role of uninterested decision makers, political opposition and biases, and inertia. Communities have got around some of these problems by taking advantage of triggering events, working with public entrepreneurs and engaging in multi-stakeholder negotiations. This chapter provides useful information for government policy makers in both developed and developing countries regarding the use of natural capital for risk reduction. The three main policy approaches discussed involve the roles of the government in: purchase and management of the land critical to provide the service of risk reduction; regulating land use; and provision of incentives to landowners through pricing policies, taxes, subsidies or other payment schemes. The discussion of these policy approaches adds great value to the book.

The dynamics of informal responses to covariate shocks is the focus of Chapter 4, authored by R.A. Balgah and G. Buchenrieder. In the context of traditional forms of social security, covariate shocks are those that have very heavy impacts and can trigger other related shocks. The key point considered by the authors is whether to accept the conventional wisdom whereby micro-economic theory predicts differential resilience of existing formal and informal instruments to natural and other shocks. Informal risk instruments are seen as more effective in managing idiosyncratic shock risks (at the individual or micro level), which, however, tend to collapse in the wake of covariate risks (at the macro level). Because covariate shocks are more virulent and more aggressive, formal (market or state) instruments (seen as more resilient) are needed to manage them.

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Shock responses in the chapter relate to three main considerations: response mechanisms; compensatory response; and anticipatory response. These responses are discussed within the context of the World Bank's Shock Risk Management framework. Response mechanisms are seen as formal or informal arrangements to deal with anticipated and unanticipated risks. Compensatory responses are those that relate to coping strategies, while anticipatory responses relate to preventive, reductive and mitigating strategies.

The authors use a variety of case studies from different continents to demonstrate the robustness and the resilience of informal instruments in dealing with aggregate or covariate shocks. As an example the authors cite the resilience of the Lampoon community in Northern Thailand in the aftermath of the tsunami in 2004, where community mobilization and collective action helped with the needed relief, reconstruction and recovery. Another is the use of informal institutions like the parent-teacher associations for capital accumulation in Armenia that helped children receive educational and medical services when the country was reeling under financial shocks in the 1990s. Other examples noted include: a) the role of informal networks among farmers that helped with alleviation of drought-related water problems and with water distribution in Khorezm Province in Uzbekistan over two unsteady decades since independence; b) children- and youth-led disaster risk communication networks in El Salvador which resulted in better regulations against quarrying in vulnerable stretches to prevent flooding after experiences with Hurricane Mitch in 1995 and Hurricane Sam in 2001 in El Salvador; and c) the exceptional resilience generated within the Vietnamese community after Hurricane Katrina devastated the city of New Orleans in 2005. Many adolescents and children assisted in the evacuation, relief and recovery, their resilience attributed to the unique history and experience of the Vietnam War. This chapter leads to new thinking about the resilience of informal responses to covariate shocks. They can be robust. Also, other dynamic, adaptive, or systemic processes can operate within the informal response mechanism when exposed to shocks. The robustness of the informal response is greatly enhanced by previous exposure to shocks, capacity-building measures undertaken, proper recognition of such informal response groups, and the exercise of lobbying force.

In Chapter 5, J.K. Levy puts forward Drama Theory II (DT II) as a formal group decision and negotiation framework with which to model environmental disaster management efforts. Some key differences from game theory, also used in disaster management, are discussed. For instance, drama theorists use a wider definition of rationality, compared to the deeply embedded instrumental rationality assumptions of game theory, which include static beliefs and preferences. DT II allows players to rethink their positions and change the game by engaging in a rational-emotional process till a satisfactory resolution is reached that every player can agree to. DT II thus takes explicit note of emotional appeals, apparent irrationalities and argumentation between players.

DT II differs from game theory in three different ways. DT II does not require cardinal (von Neumann–Morgenstern) payoffs and probabilistic strategies, relying instead on ordinal preferences and pure strategies. DT II allows for any number of players, each of whom has numerous options to choose from, unlike game theory, which works towards identifying equilibria within a fixed model by imposing artificial constraints on preferences and options. Through communication between players managing the disaster, the players are allowed to design the game they will ultimately play. In the scene-setting stage, decision makers gather data on the disaster, which allows for informational build-up. In subsequent communication, interacting decision makers communicate their positions, their intentions and their doubts regarding each other's intentions. The author uses the Gulf of Mexico oil spill of 2010 to demonstrate, with the aid of schematics, that

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DT II is an adaptive and powerful tool for modelling environmental disaster management. It is clear that DT II is versatile in handling the messy, complex and challenging problems associated with the disaster and in resolving dilemmas faced by the decision makers.

In Chapter 6, authors G. Strickert, S. Smarasinghe, C. Doscher and T. Davies present a conceptual framework and methodology for policy development research in complex, uncertain and data-poor environments to bring about sustainable hazard mitigation – a process that requires that public participation be integrated into disaster management planning. Since their goal is to develop policies aimed at increasing resilience to earthquakes or other low-probability, high-consequence events for mountain communities in New Zealand, they review several theoretical approaches that would optimize stakeholder involvement in order to improve policy development: the risk management approach; the empowerment approach; and the resilience approach. Their chosen methodology integrates geomorphic assessments, qualitative interviews and fuzzy cognitive maps (FCM) with three stakeholder groups consisting of managers, ski-industry workers and Alpine snow riders in six ski areas in New Zealand. From the interviews, over 300 identified variables were condensed into 10 categories for key consideration. These were then used in simulating policy scenarios. The individual's FCM can be aggregated into Social Group Fuzzy Cognitive Maps (SGFCM) of stakeholder or participant groups. Realistic policy options can emerge from the simulation where the SGFCM provides the structure for recurrent evaluation. The result showed that gap hazard analysis embedded within a policy framework to improve resilience to earthquakes performed well to identify gaps in stakeholders' hazard perceptions and awareness. The method used in the case study could advance sustainable hazard mitigation and help participatory approaches in developing policies to improve resilience to natural calamities.

This book provides very rich insights into the many complex and interrelated factors that must be taken note of in developing policies towards disaster risk reduction. It is a must-read for all professionals who are involved with disaster and emergency management: academics, bureaucrats, policy makers and even politicians who wish to reduce and better manage the risk associated with natural hazards and disasters.

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