

BOOK REVIEW

Designing water disaster management policies: theory and empirics, edited by Chennat Gopalakrishnan, London and New York, Routledge Books, 2016, 106 pp., US\$160.00 (hardback), ISBN 13 978-1-138-93079-7

The UN World Water Assessment Programme report (Adikari & Yoshitani 2009) identifies several types of water-related disasters, including floods, windstorms, tidal wave and tsunami, droughts, and water-borne epidemics. The report shows that water-related disasters viewed long-term are increasing in frequency and intensity every year both regionally and globally. They are causing enormous damage to life and property, much of which could be avoided through making appropriate development choices and having effective water-related disaster management policies.

A recent study by Gopalakrishnan (2013) found that water disasters accounted for 90% of all natural disasters during the period 2000–2010. The study found that droughts, floods and storms together accounted for 60% of the fatalities (estimated at 1.07 million) and 96% of the victims (estimated at 2.48 billion) in terms of human losses. Water-related disasters also accounted for 76% of economic damage from all natural disasters, estimated at over \$1 trillion. The review and critique of current water disaster management policies identified five areas to effectively meet future challenges. These were risk management, vulnerability assessment, capacity building and resilience, disaster risk reduction–development linkage, and institutional design.

Efforts to improve the current system would require a comprehensive disaster risk assessment policy, establishing an early-warning system, improving vulnerability assessment and vulnerability reduction mechanisms, engaging in capacity building, and developing resilience enhancement measures. It would also require further integration of water disaster risk reduction policies into development plans at all levels, and a complete revamping of water institutions.

That explains the reason for this timely volume. The book contains seven papers, including an introduction by the editor, previously published in the *Journal of Natural Resources Policy Research*. The discussions in the various papers highlight several research priority areas relating to the need for reliable databases, mainstreaming disaster reduction policies as well as policies grounded in new institutions, and gauging the extent of social resilience in the case of floods or droughts and how it informs social assessment for adaptive planning for climate change and issues related to vulnerability.

In the opening article, on flood disaster management policy, Sadiq and Noonan combine five data sources to find local governments' participation in the Community Rating System (CRS) nationally. The US Federal Management Association (FEMA) created the CRS in 1990 to enhance community flood resilience. Community flood management activities are promoted by the CRS through discounting flood insurance premiums proportional to the flood management measures implemented. The empirical study of local communities sheds light on motivational factors in the communities' decision to participate in the CRS as well as their intensity of participation. They use a logit model to explain why some communities participate and others do not. Their results show that local capacity factors, socio-economic characteristics, and political economy factors are significant predictors of participation. To understand the predictors of CRS score conditional on participation, the authors used both a tobit model and a craggit model. It was clear that factors predicting participation were different from those factors predicting CRS scores.

Kousky provides a historical examination (1972–1994) of the Army Corps of Engineers studies on the benefits and costs of protecting natural valley storage (NVS) areas in New England for flood mitigation and brings forth the economics and politics of 'green' flood control. Benefits exceeded

costs only along the Charles River. The studies showed that the cost of large-scale land acquisition outweighed the sole benefits of avoided flood damage. The NVS studies posed the question of whether regulating land use was a cheaper alternative to land purchase. The findings of the NVS studies did not apply to levee setbacks, green infrastructure for stormwater management, or other multi-purpose projects. These had different economic and institutional contexts.

Michaels notes how advances in probabilistic forecasting are transforming and reshaping flood risk management. She discerns four trends shaping the assimilation of probabilistic flood forecasting into flood risk management. These are: (1) longer forecasting lead times; (2) advances in decision-making aids; (3) inclusion of probabilistic forecasting in hazard mitigation; and (4) collaboration between researchers and managers. While acknowledging technical challenges that remain in designing and generating 'ensemble prediction systems for flood forecasts', she says the challenge of how to use probabilistic flood forecasts in order to make binary management decisions for reducing flood losses requires developing institutional capacity. In the evolving policy landscape, flood risk estimation is an important component of decision making under uncertainty.

Hedelin and Hjerpe examine the benefits of collaboration in flood risk management by using a 'provider-user matrix' in the case of Ljusnan River Group in Sweden. The matrix is properly illustrated through a Swedish case of polycentric decision making and governance. Their investigation shows that users have not gained from collaboration benefits, such as through a greater understanding of the flood response system or from sharing detailed hydrological data, which are relatively simple to implement. The authors are nevertheless convinced that the provider-user matrix is a holistic way to study benefits and improve the efficiency gains from collaboration. They enumerate various benefits of using the provider-user matrix and are in favour of comprehensive and context-based approaches to collaboration.

Ranjan takes a look at how farmers adapt to catastrophic water scarcity (drought and its increasing frequency) through social networking and intergenerational occupational transitioning. He notes that in both Australia and the US, groundwater levels and droughts have resulted in farmers exiting agriculture. In a developing society such as India, watershed management and employment-guarantee programmes have been used to deal with occurrences of drought. He presents a model of dynamic intergenerational preferences and occupational choices to explore possible transition paths out of agriculture. The different preferences across generations within a farm household are incorporated through a dynamically evolving utility function. These influence the time paths of investments in human, social and natural capital. Dwindling groundwater due to drought may increase reliance on urban livelihoods. Since the different weights modelled in the household utility function are due to intergenerational differences in preferences for rural versus urban lifestyles, they may determine whether this occupational transition can be attained. His key point is that policies aimed at making agriculture more sustainable, either economically or environmentally, must be sensitive to intergenerational decision making and the complex interactions and trade-offs among natural, social and human capital stocks.

In the next paper, Dale, Vella and Cottrell investigate whether social resilience informs social assessment and social impact assessment for adaptive planning for climate change in vulnerable regions. The authors detect that the social resilience concepts that are gaining momentum due to an emerging understanding of the socio-ecological nature of biophysical systems are not particularly well connected to the sociological and psychological literature related to social resilience. Through extensive literature review they show that neither school of thought is well connected to the concepts of social assessment and social impact assessment, which are the more standard tools supporting planning and decision making. The authors thus suggest that more cross-disciplinary integration is needed to increase the effectiveness of social resilience concepts, while dealing with climate change adaptations.

The UN World Conference on Disaster Risk Reduction held in Sendai, Japan, in 2015 noted in its working session that the management of water-related disasters such as floods and droughts

should not be considered in isolation but should comprise an essential part of integrated water resources management. Managing the extremes in the hydrological cycle is critical to water resources management, as these events pose severe negative social and economic externalities for development and economic growth. By focusing on system-based perspectives and a results-based approach, and by highlighting the scope for collaboration and risk reduction, this book should prove to be of great interest to national and global stakeholders and policy makers who have to reduce losses from the occurrences of floods and droughts due to climate change. People tasked with designing and implementing the complete cycle of water disaster management will find the knowledge developed through reading the book highly useful and extremely valuable. The editor has shown remarkable skill and sensitivity in selecting papers and presenting them to broaden perspectives and facilitate informed policy making.

References

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- Gopalakrishnan, C. (2013). Water and disasters: A review and analysis of policy aspects. *International Journal of Water Resources Development*, 29, 250–271.

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