

## Guest Editorial: Water and Disasters—Crafting Creative Solutions

An aspect of water resources management that has received relatively little attention in the discourse on water pertains to water and disasters. The destructive potential of water has been well recorded in history going as far back as biblical times. Recent years have witnessed instance after instance of the catastrophic consequences of floods and droughts throughout the world. Particularly noteworthy in this context are the great Indian Ocean tsunami of 26 December 2004, the major Mumbai floods in May 2005, and, in August 2005, the catastrophic hurricane Katrina and the resulting devastating floods in New Orleans. In terms of sheer destruction of physical infrastructure there are few natural disasters on record that match Katrina. Preliminary estimates put economic losses from the hurricane in excess of US\$200 billion (with hundreds of people reportedly dead), even surpassing the damage inflicted by the Indian Ocean tsunami. Equally destructive are major droughts that have plagued different parts of the world, especially in the African continent, throughout this century causing colossal losses and suffering. This special issue of the *International Journal of Water Resources Development* devoted to the theme of ‘Water and Disasters’ is a major effort to examine in depth and comprehensively the multiple facets of water in the context of disasters.

Several issues central to developing and implementing an effective, efficient, and viable integrated disaster management plan have been identified by expert analysts in the field. In the wake of the killer hurricane Katrina and other major natural disasters, it is important to pay special attention to these suggestions. These include: (1) the need for an effective early warning system that can rapidly disseminate to all concerned parties the details of an imminent disaster; (2) the need for a co-ordinated plan at the local, state, and national levels to implement at short notice the search, rescue, and evacuation of all affected residents; (3) the need for a clear delineation of responsibilities among many different agencies without compromising the ability for instant co-ordination at all levels; (4) the case for a state-of-the-art system for long-term forecasting of flood and drought disasters; (5) the case for effective public–private partnership in disaster management, mitigation, and relief efforts; (6) the ability for rapid economic assessment of flood and drought damage; (7) synchronization of relief efforts when floods or droughts strike two or more adjacent countries simultaneously; and (8) plans in place for the effective deployment of international aid in the wake of major disasters.

Robust institutions for integrated disaster risk management are absolutely essential to implement in a timely fashion disaster warning, evacuation, emergency relief, mitigation, and post-recovery efforts. The recent Katrina debacle reinforces the concerns that have been articulated in the discourse on integrated disaster risk management about institutional

impediments. For instance, the excruciatingly slow delivery of much-needed assistance by the Federal Emergency Management Agency (FEMA) to the residents of New Orleans and other Gulf Coast areas after the disaster struck has been singled out by many observers and analysts as the crucial contributing factor to the widespread devastation that followed. Likewise, in the case of the great Indian Ocean tsunami, the absence of a tsunami warning system was largely responsible for the extensive destruction in the Indian Ocean countries.

A survey of historical floods and droughts points to the lack of a well-conceived and coherent disaster management policy as the major cause for the exacerbation of the enormous tragic consequences that followed. Gopalakrishnan & Okada (2003, 2004) have argued the case for a thorough overhaul of the institutional component of integrated disaster risk management as currently conceived. Their review of disaster management institutions has indicated significant weaknesses in the ability of the current system globally to effectively implement integrated disaster risk management. The recent Katrina debacle reinforces the concerns articulated in these papers. Gopalakrishnan & Okada (2003) have identified eight key elements for the design of dynamic new disaster management institutions. Based on their analysis the authors have suggested six approaches for incorporation in the design and development of new institutions for the successful implementation of integrated disaster risk management in its multiple phases. These are institutional integration, public–private partnership, information sharing and technology transfer, disaster diagnosis, legislative revamping, and cultural calibration.

The eight papers included in this special issue of the *International Journal of Water Resources Development* corroborate several issues noted above and thus further strengthen the case for institutional revamping. The opening paper by Levy & Gopalakrishnan discusses and evaluates the socio-economic damage and human toll of the Sumatra–Andaman earthquake of 26 December 2004 and the resulting tsunami, the most devastating (property damage and human toll combined) in recorded history. The authors make the case for implementing a reliable tsunami warning and mitigation system for the Indian Ocean countries and the development of greater tsunami resilience in the region. Johnson *et al.* discuss four of the most critical flood disasters that have occurred in England and Wales in the past 50 years and assess their impact on flood policy formulation. Dawson *et al.* investigate and quantify the likely flood impacts of the Thames estuary under different plausible, but unlikely, sea level rise scenarios. The authors point out that future management strategies need to be adaptive and robust to effectively deal with climate change uncertainty. Levy *et al.* discuss the challenges and opportunities that face decision makers in incorporating and implementing advances in decision support systems for flood disaster management. The authors propose a flood decision support system architecture that capitalizes on the latest advances in flood risk management such as remote sensing, geographic information systems (GIS), hydrologic models, and numerical weather predictions, etc. Shi *et al.* present a comprehensive review of integrated risk management of flood disasters in the metropolitan areas of China. This paper elucidates the relationship and the interactions between urbanization in the metropolis and the process of flood disaster changes and proposes a solution to alleviate these fluctuations through the adjustment of the land use structure and pattern in metropolitan areas. Sheng *et al.* provide an analysis of rapid economic assessment of flood control failure along the Rio Grande via a comprehensive case study. The economic losses avoided by four major flood control projects on the Rio Grande are estimated using a novel approach combining satellite imagery, GIS, and economic methods. This is a particularly timely contribution in

light of the singular lack of rapid action on the part of FEMA and other responsible parties in the wake of hurricane Katrina.

The last two papers change the focus from floods to droughts, a water disaster that can be as catastrophic as flood events, as the recent drought episodes in the African continent have demonstrated. Schuck *et al.*, using survey data from the worst drought in Colorado's history, point out how drought conditions influence the choice of irrigation systems by irrigators. They demonstrate with supportive evidence how the adoption of technically efficient irrigation systems can mitigate the effects of droughts by enabling irrigators to maintain water consumption with curtailed applications. In the final paper Zeuli & Skees examine the use of a rainfall index contract as a tool to improve drought management with the aid of a probing case study of an irrigation district in New South Wales, Australia.

The guest editors hope the papers included in this volume will receive the attention of disaster management planners and practitioners globally, especially in the domain of water, and jolt them into crafting creative solutions to tackling these disasters effectively, efficiently, and rapidly.

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## References

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