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Water Resource Management in a Vulnerable World. The Hydro-hazardscapes of climate change

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Until the last three decades, the study of water resources has suffered from its treatment as a technical subject led by engineers and physical scientists. The enormity of humanity's ambition and power to exploit our freshwater environment for irrigation, hydropower and domestic and industrial supplies, while increasing shortages by spreading pollution, has attracted social scientists to analyse the economics of scarcity and the politics of water resource development. Mustafa has brought to bear a synthesis of modern insights from social sciences for which he proposes a neologism 'hydro-hazardscapes', a term which dramatizes the challenges faced by humanity in a future of changing climate. The concept of hazardscape is defined as 'simultaneously, an analytical way of seeing, which asserts power, and a social space where the gaze of power is contested and struggled against to produce the lived reality of hazardous places' (p.22). Study of the responses to extremes of droughts and floods today provides grounding for increasing resilience in the future.

The hydro-hazardscape concept is introduced in Chapter 1 and the claim is made that this approach increases understanding of a variety of contests over water resources. As illustration, Chapter 2 looks afresh at the Indus Waters Treaty which the author suggests should be reformed 'to bring it in line with contemporary international water course law, Helsinki Rules and emerging concerns with water quality and principles of equitable sharing' (p. 45). Co-operative sharing of the Indus waters has been stunted by lack of trust and technical objections fuelled by security concerns. Tensions between India and Pakistan and discords between provinces within Pakistan are exacerbated by major droughts and floods. Conflict resolution over inequitable distribution of the benefits of the water engineering and inefficiencies of usage of irrigation water demands analysis of more social institutions than in a conventional, modernist discourse.

The next chapter considers critical legal geographies, illustrated by the Canal and Drainage Act 1873 governing water resource management in Pakistan. This Act is shown to have geographical influences and impacts which make power relations concrete in space. The Act perpetuates colonial relations with a hierarchical bureaucracy more dedicated to policing than to encouraging equity in access.

Chapter 4 explores the role of social power in differential vulnerability to flood hazard and in inequity of access to water in the canal colonies of central Pakistan. A field study of 38 in-depth interviews and 154 household questionnaires revealed the social reality on the ground so often absent from technical discussions of irrigation planning. A lack of participatory water management and contemptuous distance between the governing bureaucracy and those governed makes the bureaucracy itself vulnerable to meddling by powerful political interests and its consequent failure to protect the weak.

Chapter 5 is based on another major social survey in Pakistan; this time in an urban area subject to periodic flooding. The twin cities of Islamabad Capital Territory and Rawalpindi experience flooding from the Lai. In 2001, a major flood caused 74 deaths and damage officially estimated at US \$250m. Technocratic top-down planners are trying to evict flood plain residents and to create a hydrologically-controlled stream but are frustrated by

resistance, poor understanding of the need for management of the watershed as a whole and by a lack of institutions to foster co-operation.

Groundwater development in Balochistan and Azerbaijan is the focus of the next chapter 6, which debates the relative merits of modern tube wells 'with enormous environmental costs and serious implications for social equity' (p 162) and ancient *karez (qanat)* irrigation systems which have been used for two millennia. The author's enthusiasm for the *karez* system leads him to recommend 'restoration and preservation of this wonderful system' (p. 164).

In Chapter 7, the narrative of the book then jumps, with little overt justification, from Pakistan and its neighbours to an investigation of 'Globalisation and water privatisation in Belize'. However, this evidence-based analysis is a useful addition to the many accounts of the problems besetting privatisation of water utilities in many parts of the world. A social survey revealed how popular narratives in Belize about this failed attempt at privatisation involved their sense of nationalism, identity, good governance and interlinkages between national and global power structures.

Chapter 8 adds to another popular debate in the growing literature on water governance 'Thou shalt not optimize or share: a critical view of the prior appropriation doctrine in the American West!' A restricted legal definition of beneficial use (solely agricultural, mining and municipal use) does not protect environmental flows for instream uses such as fishing, particularly important for native American tribes. Here, the themes of equity versus efficiency, private property versus collective goods and definitions of the benefits gained from rivers are clearly exposed.

The brief concluding chapter 'Mapping the contours of hydro-hazardscapes in a climate change future' reaffirms the importance of recognising water's value for community, spirituality, aesthetics, identity and culture in addition to its value for livelihoods and economic gain.

Mustafa's book is a masterly and original contribution to understanding of water governance. The book is well-referenced and draws on literature, mostly from academic journals, which may be relatively inaccessible to a wider readership in policy circles. The analyses are grounded in thorough case studies, which bring out the attitudes of both the powerful and the powerless. The central argument is convincing: water governance would be improved by seeking, and responding to, multidisciplinary information from a wider range of people. Narrow viewpoints lead to imposition of authoritarian regimes which lack the necessary flexibility to circumvent the challenges of climate change and its increased hydro-hazards.

Introduction of the neologism 'hydro-hazardscapes' is a risky business: I fear linkage of three concepts in one cumbersome word may not catch on! Most of the arguments are soundly based in evidence but occasional arguments, such as the desirability of restoration of *karez*, appear somewhat romantic, neglecting counterarguments concerning the high cost of maintenance of this system in human and financial terms.

Numerous illustrations are useful although colour would have been helpful. Figure 9 shows a greater percentage of women than men thought levees would be a solution to flooding yet the text states 'Although many of the men wanted levees for flood protection...' (p.112). Differentiation of shading has been lost in Figures 6, 26 and 27. Kalabagh Dam mentioned in the text does not appear on the map. There are also some typos which have escaped editorial gaze. A glossary might have helped non-social scientists.



These niggles aside, this well-written book is a stimulating read and it deserves to reach a wide public both inside and beyond academia.

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