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**Water First**

**Issues and Challenges for Nations and  
Communities in South Asia**

Edited by  
**Kuntala Lahiri-Dutt and  
Robert J. Wasson**

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## Introduction: Placing Water First<sup>1</sup>

Kuntala Lahiri-Dutt

### CONTROL OVER WATER

Water is a unique resource, appearing in different forms and shaping all physical and biological processes. Known for its fluidity and celebrated for changing its shape and taking new forms, water also plays a special role in social and cultural representations, and these values and norms are reflected in the ways water is perceived, used, governed and treated. Water is commonly seen only as a part of the physical environment and of biology, and is studied by tracking the pathways of the hydrological cycle and its role in biology. However, much of what we make of water belongs to the domain of human culture (as asserted by de Villiers 1999; Strang 1997). The symbolism of water lies in peace, life and regeneration, its significance expressed in spiritual, religious or social rituals, imbuing it and its users with meaning and value: 'water is always a metaphor of social, economic and political relationships—a barometer of the extent to which identity, power and resources are shared' (Strang 2004, p. 21).

Well into the 21st century, we have seen a growing concern over water in recent years. Internationally, the environmental agenda, including the questions associated with climate change, are related to finding strategies for the sustainable management of water (Alam and Murray 2005; Gleick 2005; Hunt 2004). In South Asia, water is at the heart of politics between the nations as they increasingly face the challenge of meeting the growing needs of their populations. Within nations, the disputes and conflicts over the control of flowing waters are evidence of the growing need for water. Locally, the interconnections and interdependence of hydrology

are often interwoven with caste–class identities and micro-politics. More often than not, these geographical scales of political units are intricately connected and water flows through them. The large number of books recently published on this subject reflects the amount of research currently underway by social scientists on water. This book aims to enrich the growing field of water–society relationships in South Asia by focusing on the issues and challenges of, and responses from, the nations and communities in South Asia.<sup>2</sup>

The foremost driving force behind putting this book together is the perceived reluctance of water experts to engage with social concerns and the nuanced cultural interpretations of water that can help to form a holistic understanding of this vital natural element. Other, but no less compelling, factors are the escalating conflicts between community-based practices and modernist and centralized modes of governance; an increasing need for water; and the complications arising out of the demands and treatments of water resources. This book outlines the contemporary challenges that nations and communities in South Asia are facing, with a particular emphasis on India, from the current management practices and policies. In doing so, the book asserts that as part of the social and cultural landscape, its uses and practices of management being rooted in history, water is both the producer and product of the material culture through which human agency is enacted. This recognition is crucial in building a conceptual base of understanding water resources in South Asia. Agarwal and Narain (1997) had asserted some years ago and Pangare et al. (2006) has recently emphasized that rethinking provides access to the, 'vast resource of experience in dealing with issues related to water' in this part of the world.

The relationship between water and society is a complex historical, sociological and regional problem, providing the centerpiece for social theories of civilization and state, community and collective action, and culture and common property. In describing these landscapes of water in an irrigation system in South India, Mosse (2003) noted, 'The hydrology has been manipulated politically for centuries, for example, through the layout of drainage networks, the damming and diversion of rivers, the inter-linking of tanks, or the repositioning of channels' (p. 3). Control over water has been a symbol of social and political power everywhere in contemporary South Asia; locally, village elites have controlled and changed the physical flows of water through diversion structures or the positioning of sluices and heights of weirs. Nationally, states assert their

ownership of water resources and build 'empires of water' that are inextricably linked with national identities and pride. Mosse (2003) argues:

Water flows have not only shaped social and political institutions, they have also legitimized them. Medieval kings and chiefs controlled and gifted water flows, creating landscapes which inscribed their rule into the hydrology and thus naturalized it. When a Maravar king dropped flowers into the flowing water of the channel that he had excavated, and their passage resolved an inter-village dispute over water rights by revealing the water's natural flow, political rule was naturalized into the drainage. (p. 4)

Water in South Asia is, above all, a text that has written the histories of countries, regions and nations, representing a conquest or control of nature. According to Tvedt and Jakobsson (2006):

Control of water is, and always has been, based on cultural constructions of water, whilst at the same time it carries in itself values or ideologies. Dams, the classical symbols of water control, and as such also the symbols for different types of political capital and moral authority, have ideological connotations and signify particular development policies. However, large-scale water projects have also ended up as symbols of failure, in ancient times as well as in ours. It is important to study both the unnatural and natural history of water disasters, since ... not only will floods vary and have different meanings and connotations in different physical settings. The Chinese have an age-old saying that nicely sums up the long but unending story of (hu)man-water relations: 'Man always aspires higher but water flows to the lowest point.' (p. xx)

This domination of waters and rivers has been represented as 'one of the clearest illustrations of the link between the control of nature and the control of people' (McCully 1998), and has characterized water resource development planning in India (D'Souza 2003; Singh 1997). The recent river-linking project, heavily dependent on reductionist engineering magic-making, is just one example. It is a project to rationalize water distribution to transfer into deficit river basins the waters from the surplus basins, water that is seen as being 'lost to the sea'.<sup>3</sup> Gyawali and Dixit (2001) have extensively critiqued the poor foundation of this so-called scientific knowledge of the waters of South Asia, particularly in view of the fact that water is too complex a resource to be understood through any

one disciplinary methodology. D'Souza (2002) has critiqued the ideology behind water control that is often rooted in a politics of development; this ideology begins with the concepts of 'Converting Water into Wealth' (Verghese et al. 1999) and of hoping to turn the South Asian waters into 'Waters of Hope' (Verghese 1990). For example, official documents such as the National Water Policy of India (2002), approved by the National Water Council, states: 'Water is a scarce national resource to be planned, developed, conserved and managed as such, and on an integrated and environmentally sound basis, keeping in view the socio-economic aspects and needs of the states.' This proclamation clearly supports the perspective that water is not a 'common property' or a tradable good, but a national 'asset'—meant for the greater good—to be controlled and managed by central bodies. At the same time, more and more rivers have been turned into carriers of waste, their flows drastically reduced destroying riverine ecologies and the livelihoods of communities dependent on the flows of water. This deterioration in river ecologies and morphologies has created yet another 'tragedy of commons', examples of which abound in South Asia (see Ravi et al. 2004, for the Kerala experience in river-linking).

### FROM A SYMBOLIC TEXT TO AN OBJECT IN SOUTH ASIA

South Asia is amongst the naturally 'water-rich' regions of the world, where water is the most important natural resource for the nations—not only because the region contains only about 3 per cent of the world's land and 21 per cent of its population—but because of the extremely fraught nature of the use, control and the management of water. As the 21st century unfolds, water in South Asia comprises a highly contested terrain on which important global questions and questions related to the attitudes towards our environment are posed daily: regarding the ownership and control over water, access to good quality and safe water in adequate quantities, community rights and participation in its management, the commodification of this vital fluid, and the possible consequences of its privatization. For millennia, civilizations were defined and nourished by the mighty rivers, in the deltas and the plains they created, in South Asia (Nair 2004). Water in South Asian societies,

however, has traditionally been a spiritual purifier, a cleanser, the flowing waters of rivers best expressing this absorption and removal of filth.<sup>4</sup> The water in rivers is also imagined as a powerful and independent agent, with an inherent fierceness and brutality, and destructive power, but can also be benevolent, forgiving and giving. The symbolic sacredness of water is transferred to the places onto which it flows or rests as in a water-hole (*kunda*), creating holy places (*tirthas*) (Kumar 1983, p. 14).

Human societies had found ways to adapt to the hydrological regimes and processes in South Asia—the variabilities, scarcities and excesses that occur over space and between seasons.<sup>5</sup> Societies also created complex institutional systems of water management responsible for looking after the common property resource regimes, some of which are still in operation (Singh 2006). In Bengal, an independent department with separate budget, the *pulbandi daftar* (public works department also known as *pushtabandi*), was set up by the Mughal provincial government to supervise embankments, roads, bridges and river dredging (Kamal 2006, p. 197). In Nepal, many irrigation systems are locally managed by farmers in terms of water acquisition, allocation, distribution, maintenance and operation, decision-making, resource mobilization and even conflict resolution (Pradhan 2002). As against these wet parts of the region, in the desert or semi-desert areas of Pakistan where the groundwater is saline, soils sandy, temperatures high and humidity minimal, traditional adaptive processes such as rainwater harvesting and storing, and saline farming techniques allowed people to meet domestic needs and rear livestock. In dry Balochistan, for example, people made the best use of available water for irrigation through the *khushkaba* (dry farming with direct use of rainwater) and *sailaba* (flood irrigation from run-off) systems of water management. In the high mountainous areas in the north and north-west, where the natural streams flow rapidly downhill as flash floods, and people have to travel long distances to fetch water for their daily household needs, irrigation systems such as those through *kuhls*—small, often lengthy, leaky channels are usually constructed and maintained by the farmers collectively under a cooperative system. The tank system in south India and Sri Lanka served for hundreds of years as effective insurance against droughts, providing irrigation water and flood protection. Some of these structures of water management and the institutions that developed



around the structures, after surviving for thousands of years, are now at threat from ill-defined ownership and user rights with ever-increasing demands. Rapid increases in water use have occurred in the last four decades in agriculture, industry and the domestic sector, especially in the ever-growing urban centres (Biswas 2005). Often, traditional water-use systems have been disrupted by the introduction of modern techniques. The example of *karez* irrigation systems in Pakistan is a case in hand; *karez*s involved the age-old practice of meeting crop water requirements by tapping into the groundwater and conveying the water under gravity but which have now caused heavy withdrawals since the introduction of electrically pumped tubewells (Majeed and Qureshi 2000). A regular, reliable supply of safe water remains crucial for securing the livelihoods and for ensuring the food security of a large number of people, amongst whom women are the majority, providing primary subsistence needs for families (Phansalkar and Verma 2004). Yet, at times of scarcity, such as droughts, or excesses, such as inundations, victims are invariably chosen by class and gender, the poor being affected first and most, turning them into 'environmental refugees'<sup>6</sup> (Khan and Seeley 2005). For example, in Bangladesh, where poor water quality affects entire communities, women from poorer communities suffer more than men, reflecting an unequal power balance (Sultana 2006).

From a sacred resource to an object of control has been a long and complex journey for the waters in South Asia. This desire for control also turned waters into objects of disputes between the nation-states.<sup>7</sup> In the article 'Sacred Rivers, Sacred Dams', it is noted that:

In the intersections among religion, ecology, and politics, politics usually prevails ... through the cryptic use of symbols and simplified dichotomies, developmental, environmental, and moral concerns become politicized and fundamental differences obscured. The concern ... is with where, how, and why key symbols of cultural and religious values enter into development discourse and what happens when they do. (Fisher 2000, p. 401)

This has been a hallmark of water resource development in India; for example, contrasted with traditional approaches to water in the Indian subcontinent, the 'current approach of water resource development', summed up by Sengupta (2000, p. 74), is to develop irrigation potential primarily on canals and tubewells, only large

units for hydel power and multipurpose river valley projects, a strategy that has contributed to about 10 per cent increase in production since mid-1900s: 'This is substantial (only) if one does not have an exaggerated notion about their roles in development.'<sup>8</sup> Yet, large-scale hydraulic infrastructures have come to be synonymous with development in South Asia; for flood control, they have been used sparingly; for hydropower generation, their contribution has not been the major source of the total electricity supply. These infrastructural developments represent a certain degree of state legitimacy for water bargains, often contained within a set of broader 'resource development' and modernization goals that the states support by providing financial and political investments through concrete policy programmes. This supply-side hydrology has been a result of little attention to 'a whole range of surface water appropriation technologies, which were serving irrigation and drinking water needs of extensive areas' (Sengupta 2000, p. 74). Rainwater harvesting, watershed development, traditional irrigation systems, small hydel, or low and temporary embankments for dealing with floods are principles and techniques of water resource management. These are known popularly as options and if this repository of techniques could be added to the existing knowledge base and integrated in the existing decision-making processes, 'water resource planning can only improve after such integration because old designs are not excluded from amongst the possible applications' (Sengupta 2000, p. 76). Moench et al. (2003) disagree: 'the "need" for integration may be clear—but how it can be achieved is far less' (p. 5); so according to them, major questions exist over who does the integrating, whose interests are reflected in the integration process and how this process is governed to ensure the interests of all stakeholders are reflected equitably, how disputes should be resolved and, above all, what issues need to be addressed through integrated approaches. The indication is, therefore, towards enormous intellectual and practical challenges—challenges that involve a shift from 'development' to the 'management' of water resources. Moench et al. note (2003, p. 4):

With the exception of groundwater, which by nature is a dispersed resource, water development is generally a large-scale construction activity requiring major resources and organization—both of which are the prerogatives of the state. These characteristics have contributed to

the development of many large centralized irrigation and water supply organizations that dominate the water sector in ... South Asia.

As we see it, many of the 'water problems' of South Asia have been created by the neglect of the alternative options and by focusing on increasing the additional supply of water as against exploring solutions that have the potential of increasing the efficiency, equity and sustainability of water use. This approach has led to tensions between nations and communities, as emotions are ingrained in the idea of water, turning it into a symbol of power such as the hydraulic societies described by Marx and Wittfogel where the harnessing of rivers implied and involved the social and political domination of some people over others (Wittfogel 1957).

South Asian societies are confronted with a significant challenge: in economies where large portions of the population are directly dependent on agriculture for their livelihood, access to reliable sources of water is a fundamental factor influencing the level of poverty. Households depending on intensive agriculture as the single most important income source are extremely vulnerable when water quantities fall or available water supplies become unusable. Whereas groundwater access for irrigation can play a critical role in stabilizing water access for farmers (see Dayton-Johnson's 2003 review essay on the economics of such irrigation), the evidence has also pointed to its depletion resulting in 'many losing access to groundwater while a few, better situated to retain access, dominate the water economy' (Moench et al. 2003, p. 8). In parts of South Asia, the intensive and wealthy groundwater-based agricultural communities are now vanishing as farmers drill deep, unprofitable wells into bedrock underlying depleted shallow aquifers. Often commercial interests enter the scene to capture and exhaust available waters, and aggravate the scarcity situation. Given the crucial role played by groundwater use by farmers in South Asia, this raises a serious challenge of overdraft from aquifers affecting those without the ability to access this resource. Moench et al. (2003, p. 3) thus describe governance as the 'core water challenge' of South Asia:

The challenge South Asia faces is not primarily about the ability of governments, non-governmental organizations (NGOs) or communities to 'choose' one or another uniform set of technically viable solutions to water problems. It is also not really about integration or planning

mechanisms for resolving multiple demands on and disputes over a limited water resource base. Both technical solutions and the degree of integration required depend heavily on context and the specific nature of the water resource constraint being addressed.

This statement is extremely important as it touches upon the simple yet crucial issue of voice: not only who makes the decisions related to water but also what they are and how.<sup>9</sup> Instead of proposing integration or technical considerations, both of which are important, the authors advise examining the deeper 'constitutional' foundations on which day-to-day decisions and courses of action rest.

The core issue of water management in South Asia is the question of water ownership. This question is posed at different scales: between the state and communities in general, between the central government and respective states, and between local and state governments. In India, for example, water is technically a state subject, but the states and the central government continue to assert their rights over water resources. Whilst the central government continually tries to expand its roles, the states and local governments try to carve these efforts down, giving rise to confusion. Even though decentralization was constitutionally mandated in the form of the 73rd and 74th amendments, the *panchayats* and municipalities as yet do not have practical control over local water resources. This is not what the populist statements deal with. For example, the revised National Water Policy of India was launched in 2002. At the launch, the then Prime Minister Atal Bihari Vajpayee is said to have commented: 'The Policy should recognize that the community is the rightful custodian of water. Exclusive control by the government machinery ... cannot help us to make the paradigm shift to participation, essentially local water management of water resources.' (quoted in Das 2005, pp. 5-6). Prime Minister Vajpayee also noted that harnessing every drop of rainwater was a national priority and that emphasis must be placed on localized and decentralized water management. However, the National Water Policy itself does not reflect these sentiments. Over the years, water resource development in India has come to be characterized by a multiplicity of bodies. This multiplicity of administrative bodies creates obstacles in sustainable management of water and has also resulted in contradictory and conflicting claims on water. The effects of governmentality and the multiplicity of regulatory bodies are best reflected in the neglect of the environmental concerns such

as pollution load that industrial water use poses. Although India has a long history of river clean-up programmes, its rivers are used as sewage and effluent disposal drains. The country launched the Ganga Action Plan (GAP) in 1985 with the objective of improving the river's water quality to acceptable standards (defined as bathing water quality standards) by preventing pollution from reaching it, intercepting the sewage and treating it before it was discharged into the river. By the time the second phase started in 1993, the Central Pollution Control Board had identified 71 polluted stretches in the 14 major river basins in the country. A National River Conservation Plan (NRCP) was undertaken in 1995 to clean these stretches, and a separate Directorate for the programme was created under the Union Ministry of Environment and Forests (MoEF), which by 2006 had funded 20 states to clean up 42 polluted stretches of 34 rivers passing through 160 towns (CSE 2007, p. 2). An enormous amount of money has been spent on river cleaning programmes—GAP 1 and 2, the NRCP, and the Yamuna Action Plan (YAP) taken up in Delhi for building sewage treatment plants in the city—but experts point out that not much improvement has taken place because the sewage treatment facility is inadequate (less than 20 per cent of the total amount of sewage generated (around 33,000 mld), that the sewage treatment plants (STPs) cannot recover their costs, that treated effluent must be recycled and reused instead of discharging it into the river directly, and that the polluter should be made to pay (Subramanian 2004).

## APPROACHES TO WATER

If water resources are perceived as an object, a physical thing that can be measured accurately and quantified, then they can also be valued in fiscal terms. In South Asia, yet another shift that we have seen in recent years has involved treating water resources as a commodity rather than a natural endowment. There is no doubt that water must be valued and indeed it is valued, appraised and assessed continuously.<sup>10</sup> Not all of these valuations, however, are or can be done strictly in economic terms and differences might arise in terms of who is the judge (Hanemann 2006). Hence, Bakker (2004) described water as an 'uncooperative commodity' that tends to defy economic valuations. Yet another genre of valuation has

been proposed by Chapagain and Hoekstra (2004); this valuation involves measuring the 'water footprint' as an indicator of water use in relation to the consumptions by people. This is closely related to the concept of virtual water, defined as the volume of water required to produce a commodity or service. Virtual water thus is an alternative external source, in addition to the internal water sources (Haddadin 2003). Water footprints of a nation can be assessed by taking the use of domestic water resources, subtracting the virtual water flow that leaves the country, and by adding the virtual water flow that enters the country (most of the international trade in virtual water consists of foodstuffs). From this perspective, India is a net exporter of water whilst Bangladesh is a small importer and Sri Lanka is a very large importer (Hoekstra and Hung 2002). On a per capita basis, total annual (including virtual) water consumptions (m<sup>3</sup>) in this region are: Bangladesh 896, India 980, Nepal 849, Pakistan 1,218 and Sri Lanka 1,292, which can be compared to values of over 2,000 for North America and some European countries (whilst for China it is about 700). However, one needs to remember that these are macro-analyses with significant uncertainties, which may not provide an accurate picture of the hydro-ecology or be applicable for smaller units of spatial scale. For countries like those in South Asia, with large informal sectors of the economies and informal water use practices characterized by poor data availability, it might well be impossible to paint a trustworthy picture of water trade and calculate the water footprint.

An evolving framework is that of eco-hydrology, a concept that is primarily attributed to Falkenmark and Rockstrom, who in 2004 published their concept of 'blue water' and 'green water' flows. According to them, the visible blue water is only about one-third of the total precipitation on a given landmass, the rest being a part of the eco-hydrological green water that is cycling through soils, vegetation and atmosphere. They argued that there is little surplus blue water left to further increase irrigation potential, and that the only alternative is to increase the productivity of rainfed farming. The concept is crucial for operationalizing local initiatives in managing water in South Asia. Rainwater harvesting is one example—trapping and storing water behind small or micro dams that are locally managed to provide supplemental irrigation in dry phases (Agarwal and Narain 1997). Another useful framework for South Asian countries is Gleick's (2000) 'human right to water',<sup>11</sup> which

has emphasized that water is amongst the basic human needs and must be provided by welfare states at an affordable cost. This approach grounds the priority on the bedrock of social and economic rights, asserts the obligation of states to ensure access to a basic amount of drinking water and ensures that specific priorities are put in place by water policy—that meeting this basic need takes precedence over other water allocations and investment decisions.

The perspective on the value of water proposed by political ecologists has been most crucial in observing the social variables accounting for environmental change. This view is an extension of the earlier genre of concepts related to social ecology—an environmentally-oriented sociology—that examined the interdependence of the biophysical, and social and cultural domains.<sup>12</sup> The popular term 'hydropolitics', adapted from the concept of geopolitics, arises from this view and refers to the role that natural resources play as objects of military action because they constitute defining factors of a nation's power. However, according to Avila (2006), the politics can also be explained as a set of critical situations that emerge due to the absence of water policies—or changes in existing ones—of use, control and distribution. The political economy approach conceptualizes water as a resource of intense political contestation between the powerful states and communities, and amongst the states themselves. As against this approach, more recent political ecological research has documented how the depletion and degradation of water resources are embedded in exploitative power relations between different regions and nations. Agrawal and Sivaramakrishnan (2001, p. 7) observe:

The specific form of this shift toward the political has been a greater emphasis on the group identities and interests operating in formal and informal institutions that regulate the use of renewable resources.... Nation-states today can be seen neither as constituting the sites of a monolithic rationality nor as unproblematically representing the interests of heterogeneous communities within their borders.

Political ecology draws attention to the regional or the local character of water issues, and recognizes that communities can be efficient resource managers and form viable alternatives to the hierarchical institutional arrangements that the markets or states can offer in understanding water.

The work of political ecologists (for example, see Peluso and Watts 2001) brings us to the question of 'water security' that is a much-used term in global policy circles. In water resource development and planning discussions in South Asia, a picture of increasing scarcity and a bleak future are drawn to convey the sense of urgency to deal with the 'problem'.<sup>13</sup> The concept of water security conceives of simplistic linkages between increasing populations, increased environmental scarcity, decreased economic activity/migration and weakening of states resulting in conflicts and violence.<sup>14</sup> This conceptual position of water scarcity has been intensely critiqued by Jairath (2003), as a discourse of drought that contains hidden discourses of water resource development through large projects. Yet another interpretation of conflicts over resources originates from structuralist explanations—that the conflicts are always between the centre and the periphery, between the majority population and the minorities, between the authorities in need of revenues and local communities fighting for their physical as well as cultural survival. This structuralism of centre-periphery views the conflicts over resources as 'conflict between people who look upon the environment as a resource to be exploited for profit and those who define themselves as being part of nature' (Kalland and Persoon 1998, p. 10). Turbulent images of water scarcity involve dreary scenarios of crumbling water infrastructures, depleting groundwater, climate change worsening the shortages—all eventually leading to growing conflicts between individuals, groups, states and nations.<sup>15</sup> This dark image of water scarcity lends itself to the management of that scarcity by outside experts—reducing risks from floods, droughts, pollution and other 'water-related hazards', or protecting the integrity of ecosystems then becomes 'challenges'. As against this presumed viewpoint of scarcity, or looking at water as an 'environmental trigger' of conflicts, the political ecology approach sees water resources as site-specific phenomena 'rooted in local histories and social relations', and holds that conflicts are not inevitable and are often connected to large processes of material transformation and power relations. In this perspective, scarcities are constituted by, and in part constitute, the political economy of access to and control over resources (p. 5). Consequently, some international analysis of the connections between population growth and water scarcity are now increasingly examining development strategies; the recent UNFPA

document (2003, p. 1) puts greater emphasis on the question of access to water and the connections with health, and recognizes that the need is to look at achieving 'appropriate priorities, equity and economy':

Generalizations about the negative effects of global population growth on the natural environment and specifically water can be misleading and the benefits of new technologies need to be factored. Even so, in many regions water scarcity and declining quality affect the poor the most.

Wealth accumulation from water infrastructural works has usually been class/caste/gender selective in South Asia, an issue that has been raised by a number of authors in this volume, the economic and psychological hardships being reserved for those evicted to make way for such constructions. All the easy and cheap options for mobilizing water resources for human needs have not yet been explored (McCully 2002). In a recent report for International Rivers Network, McCully (2006) points out:

Want of clean water, decent sanitation, and adequate food and energy strips people of their dignity and their most basic rights. Inequitable access to water, especially growing crops, is a major factor in global poverty, and a death sentence for millions each year. Ending this unacceptable situation will require a radically new approach to investing in water. (p. 2)

Towards this goal, various efforts have been underway, rethinking the mosaic of water management (Moench et al. 1999). It is now widely recognized that 'meeting the basic water, food and energy needs of the world's poorest people, and generating the economic growth needed to lift them out of poverty, can only happen if investments are redirected to affordable, decentralized and environmentally sustainable technologies' (McCully 2006, p. 2).

Discussions regarding the water resources of South Asia conventionally begin with one of the three approaches: a description of the size of the population compared with the amount of land and water available, a description of population distribution and rainfall/water availability figures, or an inventory of available water resources of any one country.<sup>16</sup> For example, in 1999 an International Hydrological Programme of UNESCO documents titled

'Will Water Be Enough, Will Food Be Enough?' elaborates, in its South Asia section, similar points (Vakkilainen and Varis 1999). This approach resonates in a range of literature, dotted with statements such as: 'massive population growth since independence has put tremendous pressure on the finite natural renewable resource water' or 'the country also suffers from the uneven distribution of water resource among its various regions' (see Swain 1998 a & b; Agarwal 2003; Goswami 2003; Rath 2005). Ahmed (2001) has shown that the response from the states in face of this growing scarcity has most often been to turn towards technology that may provide clues to designing means to ameliorate this scarcity, or to equitably distribute the surplus of one region into another deficit region. Such apprehensions found eloquent expression in the proceedings of the World Water Conferences held periodically, and it was prophesized that the water availability in South Asia is likely to worsen significantly in the future as the rapidly growing demand for water seems likely to outstrip the potential supplies. Indeed, we have been threatened far too often with gloomy pictures of looming 'water wars' and 'water famines'. This sense of a looming crisis of water in the region brings forth an urgency of dealing with it head on. We are told repeatedly that the combined population of the countries in the region is large, that these countries are poor and agricultural, that irrigation efficiency is poor, that water distribution in these countries is unequal, that the quality of water resources is poor, and that the countries are in conflict with each other on the question of water sharing. Thus, a 'problem' is envisioned—the problem of scarcity, interpreted as being not enough in aggregate terms or in per capita terms.<sup>17</sup> As noted by Mehta (2003), the access to and control over water is usually linked to prevailing social and power relations, and thus scarcity can be constructed differently by different political and social actors. Her 2005 work analyzes this 'naturalization' of scarcity in the context of western India. It is indeed true that the scarcity can be 'real'—falling groundwater table or increased salinity indeed serves as evidence of the physical lowering in water availability. Urban residents throughout the region can vouch for this absolute scarcity. However, the scarcity can also be 'constructed', especially by statist discourses which portray the lack of water as natural rather than human-induced, and chronic rather than cyclical.<sup>18</sup>

Clearly, if the densely-populated South Asian region as a whole is now facing the threat of growing water scarcity, it is due to increasing complications over its ownership, poor management and depleting quality (Mehta 2005). Many of these doomsday water predictions have been questioned by mainstream water experts themselves (see Rogers et al. 2006). In writing about India's water resources, Vaidyanathan (2001, p. 1), for example, notes:

The scarcity of water is a fuzzy concept; that its nature and extent differ greatly between countries and regions; that there is considerable, though variable, scope for augmentation, conservation and better management; and that we need to focus on policies, including especially institutional changes, needed to exploit these potentials.

Serious efforts have yet to be made in changing the patterns of demand—primarily of water-intensive farming practices and concentrated water markets in urban centres of various sizes—in this crisis scenario. The water that is required for the well-being of the populations of South Asian nations is only a minute fraction of the total water demand. This demand of course is not only dependent on numbers, but is a function of standards of living of the populations. It is also a function of social inequity in the sharing of benefits from natural resources. Often the international agencies tend to interpret the lack of access to good quality water (and sanitation) as symptomatic of poverty, that the poor often pay more for water, and that economic development will solve the problem of scarcity. The lack of access is also seen as a distributional failure, linked to poor governance by states. This approach, that the supply of water has become a limiting factor in economic growth, is exemplified in the recent World Bank publication (Briscoe 2006).

We must remind ourselves here that it is indeed true that in absolute terms, both the population of the region and food production have increased, and so have the pressures on water supply. On this point, Mehta (2003) notes that:

It would be an ontological fallacy to deny that there is no such thing as water scarcity or water shortage. The ever-increasing length of time spent by women on water collection and the visible decline of groundwater reserves in aquifers are clear indications of one aspect of the problem of water scarcity.

However, the point she makes is that there are many other intangible and ambiguous aspects of the water problem that lead to different types of scarcities felt by a wide range of actors. Consequently, the responses to water scarcity vary, raising the need to understand their relational aspects. However, one response is already evident: agriculture, which has been the single largest user of water, will gradually lose its share to industry and municipal uses. Increasing urbanization, particularly the growth of metropolitan or mega-cities such as New Delhi, Mumbai, Kolkata, Chennai, Dhaka and Karachi, where the rich and powerful elites with higher purchasing powers live, has necessitated a steady supply and good management of water to the regions (see Biswas 2006).

One source of water that has been the greatest cause for concern is groundwater, the exploitation of which the states in South Asia had actively promoted since the mid-1960s. Although the use of groundwater has contributed significantly towards wealth creation in the rural sector and is essential for drinking water supplies, the entire economy has remained spontaneous, private and informal in nature (Deb Roy and Shah 2002). There is abundant evidence from all over the region that water tables are falling, tubewells are becoming deeper and well yields are decreasing. The Central Ground Water Board in India estimated that nearly one-fifth of the 5,700 blocks/*mandals* and *taluks* in the country have reached critical levels of over-exploitation, and their numbers are growing (Vaidyanathan 2006). In Bangladesh too, the strategy of extensive minor irrigation in winter using low-lift pumps and tubewells continues to be the main thrust of water management as seen from the Land and Water Sector Study undertaken by the International Bank for Reconstruction and Development in 1972 to the National Water Management Plan of 2004 (Faisal et al. 2005). The overexploitation of groundwater throughout South Asia has caused unforeseen social and environmental consequences and has thrown up important questions of governance and allocation (Mukherji and Shah 2003). Arsenitization of the drinking water is the greatest of such an example. Excessive groundwater exploitation has caused a progressive decline in the water tables of major cities and the decay of traditional water supply systems in rural areas. The 'colossal anarchy' over groundwater and the continued search of water policy experts for new institutions do not always bring into picture the inequities inherent in the environmental and social

consequences of groundwater exploitation: the poor, and the small and marginal farmers, losing access to their existing supplies for drinking and for ensuring food security, or the creation of informal water economies and markets for water vendors.

The response from the states in face of this growing scarcity has most often been to turn towards technology that may provide clues to designing means to ameliorate this scarcity, or to equitably distribute the surplus of one region into another deficit region. Instead of devising means to reduce consumption, the construction of civil engineering structures has been paramount in the measures that states in South Asia have so far dealt with the perceived 'vagaries' of water. The responses have also been ad hoc such as the drilling of an increasing number of wells to extract the fossil water from hard-rock aquifers in Balochistan in Pakistan (Faruqui 2004, p. 181). In all the countries, the state agencies have proliferated; each use of water is now under a different department, the multiplicity of administrative bodies often resulting in contradictory and conflicting claims on water. In doing so, the finiteness of available water resources within fixed political boundaries determined historically has incited many disputes and hydro-squabbles. The technological fixes should have made the South Asian economies less dependent on water, but that has not happened. It is not that the governments are not aware of this fact. Raju et al. (2004, p. 284) noted that the stress has been greater on the 'hardware' rather than the 'software'—the rules and procedures that govern the operation of water systems. There have also been paradigm and institutional changes, from controlling to enabling and from water resource development to management (Narain 1998).

Through this book, we have proposed and attempted to retain a holistic approach in dealing with the water resources of South Asia. We point out that the knowledge of how ordinary people, throughout history and to date conceive that water helps scientists, policy makers and politicians to comprehend both the impacts of human activity on water and how water has influenced human life and activities. As water is both a natural and social reality, it has diverse manifestations and meanings. This book acknowledges the physical reality of water, but in doing so makes the social representations of water apparent to the reader. Deliberately avoiding the recounting of 'input-output tables for water', 'water budgets' and 'water projections', or giving magic bullet prescriptions for cure, the book attempts to present the complex

picture of water resources—their histories, politics, cultures and ecologies—in one of the most densely populated regions in the world. It has become increasingly clear that water in South Asia, although politically divided amongst sovereign states, is a resource that the nations will need to share. Is water the last frontier of conflict and separation, the greatest 'commons' of South Asia, or is it an open access resource for the more powerful to draw upon ceaselessly to meet their own interests? Is it a resource for 'nation-building' in which central bodies own and take the responsibility of procuring and supplying water, often at a price, or is it a resource that can empower communities and around which ordinary citizens can strengthen their bonds with nature and enhance their commitments to others?

The time has come for us to look closely at some widely circulated myths, or at least misconceptions, about water resource in South Asia. These myths are often centred upon the view of the absolute and physical amount of water that is available for the growing populations, and based on economic premises heralded by international funding agencies. They fail to illuminate important aspects of water such as the history of water management and planning in the region that over the years has tightened the ownership and control over waters by the states in a top-down manner. There is no denying the fact that access to water is uneven among the countries and regions of South Asia, where the control over water, based on colonial legal principles, has provided the foundation for managing water. Water management in South Asia poses the question of knowledge: incomplete knowledge, poor understanding of the local ecological context and incorporation of universalistic models from the West that see the rivers as carriers of only water, making invisible the enormous quantities of sediments that are brought down by them every monsoon. Managing these waters also involves the complex question of regional water sharing; while the water resources of the Indian subcontinent are interconnected as complex systems, political boundaries cut across them raising the question of sharing trans-boundary river waters. The sharing of these waters has thrown up political challenges and disputes—situations that the nations seem to have, at times, negotiated efficiently. The South Asian region offers serious challenges to water and ecology, health and sanitation, and many of these challenges are related to the contemporary developmental

philosophies and/or originate from the onslaught of globalization. These challenges include the consequences of increasing and conflicting demands for freshwater in both rural and urban sectors, increasing competition among different uses, yet to be decided ownership and rights questions that have given rise to resistance to current systems, wastewater, impacts on poor people of commodifying and privatizing water, and a complex regional politics amongst neighbours inextricably linked with sharing of the waters of rivers flowing past political boundaries. In most parts of South Asia, the use of groundwater over the past five decades has played a central role in stabilizing agricultural production and reducing poverty, but has brought to light environmental issues such as arsenic poisoning. The foundation of economic prosperity and agricultural growth, however, is threatened by increasing competition over limited water supplies and the depletion and pollution of the existing sources. Again, water management comprises that critical area where gross inequalities in power between women and men of South Asian societies are reflected; while women are the primary resource managers in homes and on farms, and also the bearers of water chores and the negative impacts of the excesses and scarcities, men tend to dominate the decision-making processes in water management. An important challenge for South Asian water futures is to create more gender-sensitive water management policies and practices.

In most parts of South Asia, access to and control over water is the crucial foundation of the livelihoods of local communities. Schemes such as Integrated Water Resource Management can potentially play a significant role in improving local communities' access to water resources. Similarly, watershed development planning—taking the river basin as a spatial unit of planning—has the ability to include the participation of local communities. As the states have taken over the control of water management, local communities have responded spontaneously against such control imposed from above. The gigantic technological project of river-linking is juxtaposed with community resistance over the damming of the Narmada or the Damodar rivers, or the community innovations in water resource management at the village level such as that by the Tarun Bharat Sangh. Water resources in rivers comprise the battleground of conflicting ideologies; on the one hand, they are perceived as objects that can be accurately measured,

on the other they are seen as sacred and essential to the lives and well-being of local communities. The Ganga, again is not just a symbolic icon; it is the foundation of the lore that forms the core of the meanings that water holds for communities in India. These contradicting and contrasting ways of 'seeing' the waters are immensely important in determining the philosophies of future water management and control in India.

## CONTRIBUTIONS TO THE BOOK

The book is divided into three, sometimes overlapping, sections: the first deals with the regional politics and histories of water; the second addresses pressing regional issues, challenges and approaches adopted by the state; and the last presents the diverse interpretations of community responses and challenges. The first chapter in the first section is by Ramaswamy R. Iyer, who presents a synoptic overview of national water concerns in the region, focusing on the convergences as well as the divergences in views as well as inter-country relations. It highlights the co-operation between the governments on water sharing, but at the same time emphasizes that this collaboration has centred mainly upon large projects. The second chapter is by Avijit Gupta who offers his geomorphological knowledge of monsoon rivers and highlights that their management must also take into view their special characteristics. He notes that many of the rivers in this region are in fact not 'natural' anymore; they are highly controlled and regulated, revealing new channel characteristics that are yet to be fully understood, and that their management occurs in an environment of imperfect knowledge, need for more data and more case studies. In the third chapter, David Hardiman analyzes the politics of water from a historical perspective, exploring the interrelations between ideology, water use and power of local farming communities, and marking out the transition from rain-fed to irrigated farming. Douglas Hill's analysis of regional water politics shows how domestic concerns have influenced the attitudes to neighbours, for example, the crucial timing of regional agreements. In Chapter 5, Binayak Ray discusses the global conventions and regulations affecting water sharing in South Asia, and points out that China could be a major, albeit a 'shadow' player in this political game-plan. The last chapter in the section is by



Rohan D'Souza, interpreting the river-linking project from a historical perspective, and roots of the ideology behind this grand scheme, namely, the control over nature. D'Souza raises a crucial question regarding the legitimacy of 'scientific data' that is collected and presented by various government officials.

The second section deals with the general issues and challenges related to water management in the region, and offers a more diverse perspective of the pressing issues. Chapter 7 in this section is by Robert J. Wasson, showing how economic growth in India has been responsible for serious pollution and that current management regimes have little hope of ameliorating low water quality. Bruce Caldwell discusses the arsenitization of the drinking water in Bangladesh. This 'public health story' best exemplifies how state determination of 'what is good for people' can go sour, and can cause serious harm to many ordinary citizens. Tubewells, once seen as the 'key' to 'safe' water, have now been poisoning people, but the irony is that simple prescriptions of behaviour change are inadequate as they have also given local communities control over local water resources. Finally, Caldwell raises the question of an inadequate knowledge-base within which modern management practices are adopted, often leading to disastrous results such as arsenitization. Chapter 9 is by Atanu Sarkar, looking at the social determinants of arsenic-related public health issues. He identifies the equity issues that political ecologists have raised, and proves, using data from his case study in West Bengal, how this severe public health issue has affected primarily the poorer populations in rural areas. Sara Ahmed in the 10th chapter, looks at South Asian water management through a gendered lens. Ahmed makes some important points: that looking at both women and men as participants in water management will be helpful in improving the efficiency of irrigation, and improve the livelihoods in agriculture, and that a gendered lens is extremely necessary in dealing with the domestic water use sector and the sanitation sector. The main theme is that women need not be seen as victims of poor water management, but as collaborators and partners in the process of efficient water management. Chapter 11 is by Vishal Narain and Saurabh Chugh, dealing with the institutions of Integrated Water Resource Management in four states of India, and points out that piecemeal reforms, multiplicity of organizations

and authority are responsible for the poor functioning of some of these institutions. Chapter 13 is by Sucharita Sen, who has outlined the links between watershed development and rural development in India, and gives an overview of the policies. She has shown that in the process, there has been a greater understanding of issues such as the connections between sustaining the local natural resources and sustainability of livelihoods of poor communities. Questions such as equity and community participation have also been dealt with. Saravanan's contribution explains how many local level initiatives in water management are actually guided by global imperatives, enabling the top-down approach to disguise itself as bottom-up.

The last section of this book is about interpreting community roles and initiatives in and against water management practices. It begins with Chapter 14, by Saurabh Gupta and Subir Sinha, looking at Tarun Bharat Sangh (TBS) as the activist NGO operating as a development agent in rural Rajasthan. They examine how TBS maintains autonomy (through its charismatic leader) and succeeds in changing the development agenda, but at the same time how the dominant developmental ideas and institutions are used by the civil society as terrains for the disciplinary deployment of power. Chapter 15 is by Judy Whitehead, who examines the Narmada Bachao Andolan's 'transnational' alliances with environmental groups. As the transnational environmental alliance covers a wide spectrum from local to national to international spaces, it imposes limits on itself with regard to the resistance that an NGO can provide to a powerful global architecture of 'good governance'. However, in the end she suggests possible alternatives to this 'double-edged sword' that can effectively deal with these resistances. I have Chapter 16 narrated the Public Hearing of the Damodar Valley Corporation organized by small and local NGOs against the centralized water control and failures of the scheme. In Chapter 17, Jennifer Dwyne Barenstein analyzes the participation of local communities in water management in the *haor* basins in Sylhet in Bangladesh and demonstrates how these communities appear to be better organized and more effective than the responsible government agency. Chapter 18 is by Stephen Lemcke, looking at waterscapes in Varanasi. This chapter focuses on how public water locales are used by different castes or religions and can act as places that divide communities

or bring them together, as constitutive parts of their identity. The concluding chapter, Chapter 19, is by Annie Bolitho, exploring the conflicting and different interpretations of the Ganga, and the book ends with a personal account of Sankat Mochan Foundation's work on water quality in Varanasi, where the two banks of the river Ganga represent the traditional and the modern. In Varanasi, along the Ganga, water turns into a place embodying the relationship of people with the river, and revealing an ordinary yet exceptional tradition that is so uniquely South Asian.

The book shows that the issues thrown up by current water resource management policies and practices in South Asia have offered serious challenges to nations as well to the communities, although the two are entangled in complicated ways. The chapters in the book indicate that, for the nations, it is important to listen to the multiple voices that are emerging in understanding water. Many of these voices are so-called 'non-expert' views that arise from using waters for productive or non-productive needs on a daily basis and may not follow mainstream policy wisdom. The chapters in this book bring together these views. Listening to them is imperative for water policy makers, engineers and planners. Such patient hearing requires the adoption of a lot more flexible mindset than they have been known for so far. First of all, accepting the challenge would involve a recognition of the multifaceted nature of water as a resource, understanding that it is a product of history and enmeshed with local cultures and ecologies, accepting that local communities have the rights over its use and control, and that water cannot be reduced, categorized and classified, and manipulated and treated like any other object. For the communities, who have dealt with their water resources in diverse ways, it is now a challenge to evolve their strategies towards an equitable and sustainable water future. It is also important to understand that water that flows into the natural ecosystems and channels to run into the sea is not entirely wasted. This very mode of thinking led to the large dam projects, and to the extensive groundwater mining that has created a range of issues. So far, it has been the rural and urban poor who have paid a much higher cost. The positions between the civil society and the state agencies have now become polarized around water resources, and it is necessary to create a space for a dialogue. Hopefully, this book will be able to contribute towards creating that platform.

## NOTES

1. The name of the book derives from a Vietnamese proverb: 'water first, fertilizer second, labour third, and fourth is the seed', representing the rhythm of life in the deltaic floodplains of the country. I thank Dr S.A.E. Smith for bringing this proverb to my attention. Water is also a first priority for South Asia, and hence the use of the term here.
2. In doing so, we do not intend to perpetuate the imagined polarity between the State and community.
3. Bandyopadhyay and Parveen's (2004) critique of the project sees it as a simplistic supply-side solution put forward from the existing paradigm of water management. They note (p. 5310): 'The reductionist engineering concept of water has seen it mainly in the form of visible flowing water. The totality of the ecosystem services provided by water, from the time of a drop falling on the surface of a river basin to the moment of its flowing to the sea have remained marginal and neglected for a long time.... As a result, it is not possible for the existing paradigm to recognize and record these various ecological processes and their values, for instance in the conservation of biodiversity, its role as a mobile solvent, the pushing of the sediment load out to the sea, and many others. It is this conceptual limitation of the present paradigm that makes it possible for it to describe the outflow of a river to the sea as a 'waste', or finds little difficulty in locating 'surplus' river basins in a limited arithmetic assessment.'
4. Eck (1987, p. 110) noted: 'The running water of rivers is often used ritually for purification ... Bathing in the Ganges is said to purify not only the sins of this birth but also those of many previous births'. Feldhaus (1995, p. 5) showed that this purifying power of the rivers emanates from the fertilizing properties of water that is more important than the cleansing properties. The agricultural communities dependent on rivers attributed feminine qualities to them in rural areas of South Asia. The worship of waters as feminine is a South Asian tradition (Tambis-Lyche 1999); the goddess of nature is represented as the womb that is revealed in rivers. In western cultures, lands and not water bodies 'appear as the womb of life, fertile, productive' (Giblett 1996, p. 85), but against this notion, Baartmaans notes (2000, p. 4), 'Waters envelop both creation (*srishiti*), maintenance and support (*sthiti*) as well as decay and destruction (*pralaya*), only to give rise to new creation.'
5. They continue doing so, as Ahmed (1999) has shown us with many examples.
6. Myers (2005) notes that there were 27 million environmental refugees in the world in 1995, and with global warming displacing many more, the number of such people today will increase proportionately.

7. Correll and Swain (1996, p. 126) have even made a threefold typology of conflicts: state versus state, state versus group and group versus group.
8. This is known as 'developmentalism' which asserts that the state has a legitimate if not a necessary role in integrating the activities of various sectors of the national economy within the larger context of the state's developmental vision. The essence of this definition of the developmental state is that state authority is legitimate and that the state defines for itself and society a 'developmental' ideology that sets our concrete goals. This interest in development professed by the state may actually take place regardless of whether it has achieved positive economic results or not (Evans 1992, p. 147).
9. See World Resources 2002–2004, *Environmental Governance*.
10. The 1992 Dublin Principles note that freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment; water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels; women play a central part in the provision, management and safeguarding of water; and, above all, water has an economic value in all its competing uses, and should be recognized as an economic good.
11. Gleick proposes that water is different from other 'commodities', and with growing global scarcity there needs to be a right to water to protect the poor, weak and vulnerable from having an essential ingredient of life priced beyond their ability to pay.
12. Social ecologists explore social elements such as class and the use and abuse of natural resources, or social structures and cultures and the environment (see Guha's 1994 work).
13. Regarding these projections, Gleick (2000) notes: 'But what will future water demands be? How can they be predicted, given all the uncertainties involved in looking into the future? At the global level, various projections and estimates of future freshwater demands have been made over the past half century, some extending out as much as 60 or 70 years. These projections have invariably turned out to be wrong' (p. 39).
14. For example, see UN World Water Development Report, *Water for People, Water for Life* published in 2003, on the eve of the Third World Water Forum in Kyoto in Japan.
15. Gujja et al. (2006, p. 572) note that 'water conflicts are symptoms of larger issues in water resources management. ... implicit in these "million revolts" is a demand for change; first in the ways we think about water and second in the ways we manage it.'
16. Rao's early authoritative book, *India's Water Wealth* (1979) exemplifies this approach. Numerous contemporary examples of this genre of work include Saqib (2005).

17. For example, according to the UNDP report published in 2001, 12 per cent of the population in Pakistan does not have access to improved water sources and 39 per cent are without access to adequate sanitation facilities. As the population surpasses the 204 million mark in 2015, almost half of it will be in urban areas of various sizes.
18. The 'manufacture' of scarcity at the discursive level obscures several important aspects of 'real' scarcity. One, inequalities often shape access to and control over water. Two, water scarcity is not natural, but instead largely due to anthropogenic interventions, resulting from bad water management and land use practices. The naturalization of scarcity at the discursive level does not help mitigate the symptoms and causes of 'real' scarcity. In some cases, 'real' scarcity might be exacerbated due to the popular narratives (for example, water tables might continue to decline if the decrease in groundwater resources is attributed to climate change rather than to uncontrolled extraction). Furthermore, the 'manufacture' of scarcity might not result in the creation of solutions appropriate to local needs and conditions.

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## Section I

### The Regional Politics of Water in South Asia

## About the Editors and Contributors

### THE EDITORS

**Kuntala Lahiri-Dutt** has been closely associated with local level movements working on water and related environmental issues in West Bengal, India. Trained as a human geographer from Calcutta University, Kuntala has researched water and society in Lower Damodar Valley region. She has been a member of SAARC Track III water initiatives and been a resource person for Panos Institute's flood enquiry. Kuntala has set up a Gender Water Network (see <http://www.rspas.anu.edu.au/gwn>), and is a member of the Steering Committee of Gender Water Alliance. She has written widely about water resources, and has guest edited 'Water for People' special issue (51.1) of the journal *Development*. Kuntala teaches and conducts research also on community development in mining areas and has authored several papers and books. Her recent publications include the edited volume *Fluid Bonds: Views on Gender and Water*, Stree, Kolkata, 2006. Kuntala is currently a Fellow at the Resource Management in Asia Pacific Program at The Australian National University.

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for decision-makers. When coupled with environmental history, natural resource managers can better understand how landscapes have reached their current state(s). After a career in CSIRO (Australia), he was till recently Director of the Centre for Resource and Environmental Studies at The Australian National University, and is now Deputy Vice-Chancellor (Research) at Charles Darwin University in the Australian tropics.

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