



## Water

VERONICA STRANG, *Durham University*

*Because water permeates every aspect of human existence, ethnographic accounts describe many forms of engagement with it: for example, its centrality to modes of production; its influence on how societies organise themselves socially and spatially; its role in leisure activities and the enjoyment of its aesthetic qualities. Human relationships with water, though culturally and historically specific, share common themes of meaning, recognising water's essentiality to life, health and well-being at every scale. This often translates into the use of 'living water' in religious rituals, such as baptism or mortuary ceremonies, in which water expresses important ideas about social identity and spiritual movement between material and non-material domains.*

*The material control of water has long been recognised as vital to gaining and maintaining political power. In recent decades anthropology has focused increasingly on debates about water ownership and rights of access to water, and considered how the control of water reflects social, economic and political relations. There is growing interest in water infrastructures, and how they have often enabled unsustainable practices in water use and management. Today, as the world faces an anthropogenically-created ecological crisis, water issues are central to concerns about climate change, global warming, and increasing volatility and uncertainty in water flows. This has encouraged a new area of anthropological focus on non-human as well as human rights in relation to water. Thus the anthropology of water extends from its multiple uses in everyday life to the major issues that all societies urgently need to address.*

### **Introduction**

As the element essential to life and to all processes of production and reproduction, water permeates every domain of human existence. It has always had a background presence in anthropology's ethnographic literature, where it appears in religious rituals; shapes human spatial organization around water sources; and structures people's lifeways and modes of production, as well as their ecological knowledge and environmental engagement. However, water itself has not been the focus of anthropological studies until relatively recently. It came to the fore with growing interest in the relationship between the control of water and political power and, more strongly, when environmental anthropology emerged as a lively subfield in response to increasing concerns about sustainability. As societies have begun to realise that the world is facing a human-made ecological crisis, water has become the focus of intense research in multiple disciplinary areas. Anthropology brings to this a vitally important capacity to illuminate its diverse social and cultural dimensions (Hastrup 2011, Hastrup & Hastrup 2015, de Wolff *et al.* 2019, Wagner 2013).

Human engagements with water take place on every scale, beginning with the most basic physical needs for clean water to maintain health and to ensure bodily and domestic hygiene. Recognition that water is literally essential to all biological organisms means that it has cross-cultural meaning as the 'substance of

life'. This understanding supports important concepts of water as a common good, to which everyone must have rights of access and use, and this fundamental principle permeates many discussions about water ownership and governance. Yet many people lack access to clean water and sanitation for a variety of reasons, including the overuse of limited local resources; disruption of rural lifeways; economic imperatives to migrate to marginal and poorly served urban areas; and insufficient fiscal or technical capacities to create infrastructures for water supply. Such a lack of access to clean water is a key indicator of governmental capacities to provide for people's most basic needs, and of the deep inequalities existing both within and between societies.

### **Religion, health and wealth**

Anxieties about meeting basic human rights of access to sufficient clean water tend to obscure other aspects of people's immediate engagement with it, but these are also powerful influences on how people respond to a range of water issues. Water's essentiality to life means that it has a central place in multiple religious belief systems. In many place-based societies, where what are often described as 'nature religions' pertain, its elemental powers are frequently manifested in deities responsible for rain, fertility, and the creation of life. For example, in Africa, Mami Wata, a water goddess valorised in many parts of the continent's west coast, provides all of these things (Drewal 2008). In Aboriginal Australia, water is the source of cosmogenesis in the creative era known as Dreamtime, in which the world was formed, while the Rainbow Serpent, which is a manifestation of the powers of water, continues to generate life from within the land (Merlan 1998, Strang 2009). In the monotheisms of larger societies, water features as a vital manifestation of a humanised deity's divine beneficence or, in the form of floods or drought, as an expression of god's wrath. Thus for many people, access to sufficient and timely water carries an important moral and religious dimension.

Whatever the form of the providing deities, many religious schema also conflate ideas about water and the human spirit, generating visions of 'living water', vital to physical and spiritual well-being (Krause & Strang 2013). Such beliefs are central to a host of rituals in which water cleanses, heals, and blesses, and metaphorically carries the spirit between material and non-material domains. The notion of living water is also a response to people's phenomenological engagement with it as an animated and animating element that is always in motion: shimmering, flowing, appearing, and disappearing. Physical and immediate interactions with water - bathing, drinking, swimming, and observing - provide a range of compelling sensory experiences, which lend emotive weight to people's thinking about water and what it means (Krause 2016, Strang 2005). Thus, an understanding that water flows through, enlivens, and connects people and places supports important ideas about common substance and identity. These are neatly expressed, for example, in the use of water for rituals of baptism that welcome individuals into particular groups or congregations, or which conjoin them in marriage (Mallery 2011). The inevitable dark side of this

understanding is that a vision of identity as literally 'substantial' also allows for many anxieties about social and/or physical pollution, and invasions of 'otherness' that might compromise individual or collective health and well-being (Strang 2004).

Concepts of holiness, health, and wealth are both etymologically and conceptually related. They express capacities for maintaining (spiritual, bodily, or fiscal) wholeness and flourishing. As well as being seen as fundamental to physical health, the relationship between health and water has seen a transition from assumptions about water's intrinsic healing qualities (as assumed, for example, in the thousands of holy and healing wells in many parts of the world) to more material notions about the healing properties of water's mineral content, which led to a major fashion in Europe for spas and baths (Anderson & Tabb 2002). Water's centrality to processes of production leads to cross-cultural acknowledgement of its essential role in enabling human agency and generating wealth. What constitutes wealth is culturally diverse, but in many societies the relationship between water and wealth is often demonstrated in the ways that the ownership of water, displayed in landscaped gardens, fountains, and pools, provides a key signifier of wealth and social status.

### **Power and control**

As the above implies, the control of water is intrinsically related to economic and political power, and historical and ethnographic research has demonstrated that how water is controlled and distributed provides a precise mirror of social, political, and environmental relations. A classic study of Balinese water temples, for instance, describes the carefully balanced social and hydrological relations mediated by local priests acting as both religious leaders and water managers (Lansing 1991). On a larger scale, it has famously been argued that major infrastructures such as irrigation schemes, requiring the centralisation and coordination of labour, were foundational to the creation of nation states (Hocart 1970). The importance of water in political organization is particularly clear in the historical emergence of 'hydraulic societies' dependent upon major irrigation schemes, such as those in Mesopotamia, and in the Indus Valley (Butzer 1976, Giosan *et al.* 2012, Tvedt & Jakobsson 2006). Karl Wittfogel's historical analysis of water in China suggested that state capacities to control a vast network of canals was vital for the establishment of powerful imperial dynasties (1957). However, subsequent writers have rejected the argument that the control of water necessarily leads to 'despotic regimes', observing that relationships between water and power can take many different forms (Krause & Ley forthcoming).

However, Wittfogel's more fundamental point, that power and the control of water are inextricably related, remains influential, and contemporary ethnographers have continued to explore how the control of water mediates relations between states and citizens, with access to water often demonstrating persistent social inequalities. For example, the manipulation of weirs, sluices, and water flows in a South Indian irrigation scheme has been shown to reinforce the advantages of village elites (Mosse 2003). In multiple development

contexts, gender inequality influences women's access to and control over water (Coles & Wallace 2005, see also Lahiri-Dutt 2006). The provision of water in Mumbai turns out to be linked to social identity and recognition of 'hydraulic citizenship', and leads to the exclusion of marginal groups lacking such recognition (Anand 2017). Shifts in ideology are similarly reflected in water. A strong focus on instrumentalism - a determination to act directly on the material environment - in industrialised societies has been exported, via literal and economic colonialism, to many parts of the world under the guise of development (Lewis & Mosse 2006).

Focusing on the history of the American West, the commodification of water into an asset may mean that 'capitalism has created over the last 100 years a new distinctive type of hydraulic society, one that demonstrates once more how the domination of nature can lead to the domination of some people over others' (Worster 2006: 50, see also Escobar 2005, Josephson 2002, Reisner 2001).

Water has its own material powers, of course, in the force provided by water flows. Many societies have harnessed these powers, via channels, water wheels, and mills, to do 'work' to support their processes of production, and to direct irrigation to their crops. But water is not always amenable: it also has its own agentive effects in making and unmaking environments and impacting upon human lives. In a world dominated by dualistic ideas of nature as the 'other' to culture, water is commonly seen to represent the capacities of the non-human world to reject the authority of human instrumentality. Water's material forces highlight that such efforts often involve an intrinsic tension - a wrestling for control (Edgeworth 2011). This brings to the fore the reality that every cultural landscape is also a cultural waterscape. Control over water flows is achieved via the imposition of dams, canals, drainage, reservoirs, pipes, and other directive infrastructure that materialises societal ideas, values, and practices in relation to water. As with other forms of infrastructure, such concretization inscribes long-term patterns of human-environmental engagement upon the land and waterscape (Bichsel 2016, Harvey & Knox 2012, Larkin 2013).

Over time, human communities have engaged with water with varying degrees of determination to control its movements and direct its flows into serving their interests. Early societies, and those that have retained pre-industrial economic modes of hunting and gathering, horticulture, and small-scale agriculture, have tended to be conservative in their practices, working with the inherent processes of local ecosystems, and imposing relatively low-key forms of manipulation of the landscape for their purposes. In many larger societies, however, trajectories of human-environmental engagement have been very different, as population growth and technological developments have encouraged more assertive efforts to control water flows. Social and religious changes, in particular movements from nature religions to monotheistic beliefs, have led to notions of 'dominion' and the desire to impose patriarchal authority on 'nature', often feminised as alternate to male 'culture' (Plumwood 1993, 2002). The objectification of nature has also been encouraged by a more scientific lens upon the world, through which ideas about what water is have

become 'disenchanted', leading to its reconceptualization as H<sub>2</sub>O (Illich 1996, Linton 2010).

Greater dominion over water has been realised through new forms of science and technology enabling extensive engineering of the landscape and increasing capacities to direct water flows into supporting the needs and desires of rapidly enlarging human populations. Water usage has risen, in part because of more profligate domestic habits, but also in its use to support societies' growing dependence on irrigated agriculture, as well as industry itself, which - due to the embodied water in goods and production processes - often results in the movement of water globally from arid environments to densely populated and wealthier temperate regions (Hoekstra & Chapagain 2007, Meissner 2012).

The commoditization of water, and its reductive reframing as a resource or economic asset, has further encouraged utilitarian ideas about the material world as the basis for the provision of 'environmental services' or 'ecosystem services' to humankind. Patterns of water use in many societies have reflected the dominance of these ideas. In the last century there has been a race to build large dams, canals, and other infrastructures designed to direct water into enlarging urban areas; into hydro-electric generation; and into irrigated agriculture (Khagram 2004). Today over 70% of the Earth's freshwater is directed into irrigation, and the World Bank has stated that a further 15% will be needed in the next decade to provide sufficient food and energy for the expanding human population.<sup>iii</sup> They are predicting major shortfalls, which raises the prospect of a range of problems, including rising numbers of environmental refugees.

### **Infrastructure and conflict**

Shortfalls in water supply also exacerbate the issues surrounding the management of transboundary water flows which provide opportunities for both collaboration and conflict. The United Nations reports that 145 states share transboundary lakes or rivers (2019). In the last fifty years, 295 international water agreements have been signed, but there have also been thirty-seven 'acute transboundary water disputes' and two-thirds of the 263 transboundary river basins lack any framework for cooperative management. With rising demand, and with water flows becoming less reliable (in particular where global warming has diminished the water storage provided by glaciers), there is obvious potential for greater conflict.

Such tensions are readily evident in the controversies relating to the construction of big and 'mega' dams, such as the Hoover Dam on the Colorado River (built in 1936); the Kariba Dam on the Zambezi River (funded by the World Bank in the 1950s); and, more recently, the Sardar Sarovar Dam on the Narmada River, and the Three Gorges Dams on the Yangtze River. 57,000 large dams have been constructed over the last century: these generate nearly 20% of the world's energy, and assist much of its irrigation. They have supported worldwide population movement into urban areas, and the development of industries. Thus - like the earlier hydraulic infrastructures noted by Arthur Hocart - they have often been seen as integral to the building and flourishing of the nation state (Biggs 2012, Mohamud & Verhoeven 2016, Verhoeven

2015).

However, the human and environmental costs of such large-scale directive engagements with water have also been massive (Rodgers & O'Neill 2012). As well as increasing the potential for transboundary conflicts, their focus on water storage for resource extraction, urban supply, and cheap hydro-electricity has resulted in many human rights violations and, with concomitant social impacts, the displacement of thousands of people living in riparian rural communities (Hwang *et al.* 2007, Mathur 2006, McDonald-Wilmsen & Webber 2010, Oliver-Smith 2009). Such projects have also resulted in extreme violence at times – such as the massacre of 400 indigenous people to make way for the Chixoy Dam in Guatemala in 1982. Thousands more have been killed by dam failures; for example the collapse of China's Banqiao Dam in 1975 killed an estimated 171,000 people.<sup>61</sup> Huge dams, because of the enormous weight of water that they contain, have also been implicated in causing earthquakes: thus the Zipingpu Dam in Sichuan is thought to have triggered a major earthquake in 2008.

Many of the costs of dams and related water infrastructures are less dramatic but no less damaging. Financially, large dams tend to be uneconomic: they typically overrun predicted levels of investment by up to 96% (Ansar *et al.* 2014). They also incur major social, economic, and environmental costs. In disrupting hydrological flows, dams are hugely destructive to aquatic ecosystems, and there are human costs as well in the loss of access to water for downstream farmers, fisheries, and tourism. More broadly, irrigated agriculture in many regions has led not only to diminishing harvests, but also to widespread land salination, rendering vast areas infertile even for native vegetation. This is particularly the case in ecologically vulnerable areas such as Australia, the Middle East, Central Asia, and the southern United States, where irrigation has been aimed at producing profitable – but for arid regions, unsuitable – crops, such as cotton, rice, and wheat.

But, as Peter Bosshard, the policy director for International Rivers (an international NGO seeking to protect rivers) notes, '[m]any actors have vested interests in building dams' (2014). It is an area rife with corruption, in which major engineering contractors, irrigation consortia, and others stand to gain considerably, either through huge profits on construction, or through the gaining of water allocations for massive irrigation or hydroelectric schemes.

A notorious example is provided by Cubbie Station: an irrigation venture in south Queensland, so large as to be visible from space (Strang 2013). Cubbie Station's directors persuaded the Queensland Government to allow it to buy up over 50 water licences, and to build a series of dams along twenty-eight kilometres of the Culgoa River. The station is situated just above the New South Wales border, and diverts about a quarter of the water that would otherwise flow into the Darling River, and thus into the Murray Darling Basin, one of the most intensively farmed and ecologically compromised river basins the world. Unsurprisingly, this upstream abstraction has fuelled considerable inter-state conflict. As well as depriving

downstream farmers and other local communities of water, irrigation has destroyed over 90% of the wetlands in the Basin, which formed critical breeding areas for migrating birds. The major beneficiaries are the station's owners (an international consortia) its directors, and shareholders, and to a lesser extent the rural community for which it provides some employment and other local economic benefits.

### **Owning water**

Major irrigation schemes such as Cubbie Station, and the thousands of other companies and consortia around the world taking control of water through dam building and the acquisition of water allocations, bring to the fore key questions about the ownership of water. For much of human history, water's status as a common good remained the norm, albeit with some managerial control exercised by powerful groups: for example, the dynastic rulers of hydraulic societies or, in the medieval period, the Church, whose monasteries often provided communities with hydrological expertise and management (Tvedt & Oestigaard 2010). Although many of the traditional common property regimes described by Elinor Ostrom (1990) have undergone major alterations, water continued to be seen, until recently, as a common good.

Patterns of water ownership changed, however, as societies began to build major urban areas which demanded greater investment in technologies for water supply and waste removal. The Industrial Revolution introduced a new level of complexity, both in enlarging conurbations, and generating increasing levels of domestic and industrial pollution. The impacts of these developments were so challenging as to require major reform. In early twentieth century Britain, for example, water supply and waste removal services were initially provided by a mix of municipal authorities and Victorian philanthropists. The results were patchy, leading to considerable inequality within cities, in terms of access to piped supplies, and between cities and rural areas, the latter often remaining reliant upon local wells and pumps well into the twentieth century. Following the Second World War, democratic ideals demanded comprehensive provision of piped supplies and the public ownership of water. A national network of local water authorities was established, with water users paying for services via property rates. This worked well until the costs of maintaining aging water infrastructures became more pressing, and politicians were faced with the vote-losing prospect of raising charges for water. The Thatcher government, in accord with its conservative ideologies, decided (despite angry public protests) to privatise water, leading to a situation in which British water companies today are largely owned by international corporations (Bakker 2003). This proved profitable for water company directors and shareholders, but as water charges jumped by 60% in the following five years, rather less so for domestic water users (Strang 2004). The UK-based water companies made further profits by exporting to many parts of the world their expertise on how to privatise water.

This process proved even more controversial in countries where increases in water charges have more extreme impacts. In 2000, when the government of Bolivia responded to pressure from the World Bank to pay off its international debts through water privatization, and invited an American company, Bechtel, to

enact this, citizens revolted and a violent water war erupted that succeeded in retaining public ownership (Albro 2005). However, although governments internationally have subsequently become wary of such wholesale national water privatizations, the process has continued in various forms: for example, through types of public-private partnership, and through mechanisms such as Government Owned Corporations which, as the name suggests, reform local or regional water authorities along the lines of privatised companies, sometimes separating the profitable operational (supply) side from the more costly infrastructural maintenance, with only the latter remaining a wholly public responsibility.

There have also been more covert forms of enclosure, as illustrated by the example of Cubbie Station in Queensland, Australia. Following the colonial appropriation of land and water from indigenous groups, European settlers' rights to water generally came with riparian land ownership. As pressure on limited resources increased, farmers were given volumetric water allocations. In the 2000s, these were effectively privatised and transformed into tradeable commodities, which could be bought up *en masse* (as with Cubbie Station) or, in other cases, traded away from the related land, leaving 'dry blocks'. The conversion of allocations into profitable assets meant that those using water for the most profitable purposes (mining, cotton, rice, and wheat production) could readily outbid small farmers, or conservation organisations hoping to preserve wetland areas. This has resulted in higher levels of water use and environmental degradation.

In Australia and elsewhere, the creation of virtual water markets, whether in the form of allocation trading or as shareholding in water companies, has effectively detached water from the landscape. This process of 'disembedding' material things from their local environments and creating virtual global markets (Polanyi 1957) raises some key questions about social and environmental accountability. There is an important recent trend towards more ownership and trading of water (and other resources) by transnational corporations who are not physically present in the social communities or in the material environments where the water is located. Cubbie Station, for example, was bought up by a Chinese consortium; most large oil and mining companies are owned transnationally, as are other extractive industries. Regulating water users, even when these are locally based, is complex and challenging, and becomes more so when regulators have to deal with major transnational corporations. There are more fundamental questions, too: if a government hands control of the country's most essential resources to external agencies, how does this affect its decision-making capacities about these resources? And does it uphold democratic processes? (Strang 2016).

Similar patterns can be seen in the use of marine resources, where overfishing has led to a process of formalising quotas and creating virtual trading schemes (Minnegal & Dwyer 2010). Competitive economies have done little to address the inequalities that pertain in both areas: customary rights to fishing have often been overridden by commercial interests, just as local rights to freshwater have been overtaken by the commodification of the water industry.

The loss of customary rights of access and the devastation of local waterways by extractive industries have been particularly distressing for place-based indigenous communities, who retain close and affective attachment to their homelands, and for whom local land and waterscapes are often both sentient and sacred. As their land and other material resources have been appropriated, enclosed, and privatised, many groups have protested, and continue to do so (Berriane 2017, Strang & Busse 2010). Given the meanings of water within their cultural landscapes, the misuse and despoilation of waterways has evoked particularly anguished protests; exemplified, for example, in response to the downstream pollution caused by mining on the Ok Tedi, in Papua New Guinea (Kirsch 2003), or in relation to rivers in northern Australia (Rumsey & Weiner 2004).

Over the last several decades, indigenous communities have created international networks, working with each other, and with conservation organisations, to tackle these issues. In 2016, for example, the Dakota Sioux brought together a range of like-minded groups to stage a major protest at Standing Rock about the impacts of an oil pipeline on their land and water. Indigenous communities are challenging not only the appropriation of their traditional ownership of water (Morphy & Morphy 2009), but also the imposition of ideologies that in their view fail to value it properly. In New Zealand, in the 2000s, the Māori Council, on behalf of all *iwi* [tribes], fought a legal battle to try to reclaim indigenous people's ownership of freshwater, taking a case through the Waitangi Tribunal, the High Court, and the Supreme Court (Strang 2014). Although the claim did not succeed, the debates resulted in a robust co-management agreement, ensuring that Māori *iwi* would have a substantial voice in decisions about their related waterways (Muru-Lanning 2016, Ruru 2013).

### **Water in the Anthropocene**

There is a readily discernible link between the enclosure and privatization of water and constant growth and intensification in the use of freshwater and other resources. Such intensification, and humankind's impacts upon the planet, have become so extreme that we have now entered an age described as the Anthropocene (see Chua & Fair 2019, Crutzen & Stoermer 2000, Stensrud & Hylland-Eriksen forthcoming). It is equally plain that water is a central factor - and a key area of vulnerability - in climate change. As well as melting the ice caps and raising sea levels, higher planetary temperatures are melting the glaciers that store freshwater for many of the world's major rivers, and destabilising global weather patterns. Meanwhile, the clearance of forests and wetlands for further agricultural expansion continues. The result is much greater volatility in water flows, and higher risks of unmanageable floods and droughts.

The impacts on ecosystems are not only felt by human communities, but also by their non-human inhabitants. The Anthropocene marks the first human-caused mass extinction event on par with earlier planetary devastations. In the last century, species extinctions have spiked dramatically: a report by the World Wildlife Fund (Grooten & Almond 2018) documents the loss of 60% of species since the 1970s, and

rates of extinction are continuing to rise.<sup>14</sup> As Donald Worster observed, this pattern of environmental destruction goes hand in hand with an extremely exploitative mode of environmental engagement, and the widespread control of resources by commercial corporations, rather than by local communities with long-term attachments to places:

Whatever they [major corporations] may accomplish in the manufacture of wealth, they are innately anti-ecological. Immense, centralised institutions, with complicated hierarchies, they tend to impose their outlook and their demands on nature, as they do on the individual and the small human community, and they do so with great destructiveness. They are too insulated from the results of their actions to learn, to adjust, to harmonize. That is another way of saying that a social condition of diffused power is more likely to be ecologically sensitive and preserving (2006: 332).

It is not a given that relocating environmental control locally will necessarily produce less exploitative kinds of engagements with land and water. However, it is useful to consider the alternative values promoted by place-based communities in relation to non-human interests. Many retain traditionally egalitarian and reciprocal positionality towards non-human beings, locating humankind within living systems, rather than as rulers over them. This way of thinking has been inspirational for environmentalists, and interactions between indigenous peoples, conservation groups, and scholars has produced a serious critique of notions of human dominion, and of the anthropocentricity and the entitlement implicit in exploitative practices (Brightman & Lewis 2016, Kirksey & Helmreich 2010, Orlove & Caton 2010). This critique argues that there is an urgent need for a repositioning that – for both ethical and pragmatic reasons – gives greater parity to non-human interests, with a view to halting (and hopefully reversing) the wholesale destruction of ecosystems and their dependent species, including, of course, human communities (Kopnina & Shoreman-Ouimet 2015, Kopnina & Washington 2019). The proponents of this critique recognise the centrality of water in this regard, and thus protecting waterways has become a key part of their endeavours.

Indigenous communities have approached this challenge in various ways. Some, such as the Kogi in Columbia, have spoken up to warn about the consequences of rampant exploitation of the environment (Ereira 2009, see also de la Cadena 2010, Fienup-Riordan 2005: 233). There have been protests (as in the case of Standing Rock), and some have pushed their governments to make constitutional changes. Thus, in 2008 Ecuador passed legislation affirming the rights of nature, and a few years later Bolivia established the Rights of Mother Earth (*Pachamama*). Some groups have campaigned for rivers (such as the Atrato River in Colombia, and the Ganges in India) to be acknowledged as living persons with concomitant legal rights. In New Zealand, Māori *iwi* succeeded in gaining legal rights for the Whanganui River. In 2017, the New Zealand government announced that the river had been granted the status of a living entity, ‘comprising the River from the mountains to the sea, its tributaries, and all its physical and metaphysical elements, as

an indivisible and living whole' (Finlayson 2017: 129(1); see also Strang 2019).

At an international level, there is growing pressure from environmental activists to persuade the UN to make a formal declaration about the rights of nature (Cullinan 2003, Gray & Curry 2016).<sup>14</sup> Some are trying to establish 'ecocide' as an international crime.<sup>15</sup> There is a widening conversation about ecological justice (Baxter 2005, Schläppy & Gray 2017) and the ethics of human-environmental relations, and for some groups this is connected with ideas about spiritual engagement with the world and, most particularly, with water (Sponsel 2012, Taylor 2010). There has thus been a refocusing on the spiritual meanings of water, which as well as permeating traditional religions, has an important role in New Age movements long aligned to environmental activism. New rituals are appearing to celebrate the spiritual or social meanings of water: in the UK, this has taken the form of well dressing, a revival of an ancient Roman ritual, *fontanalia*; in Australia, there are events such as the *Splash!* Festival in Queensland, in which people bring containers of water from their home places, and pour them into a central vessel to celebrate the social and spiritual connections between communities (Strang & Toussaint 2008).

The input from indigenous, environmental, and related groups into global debates, along with widespread concern about societies' unsustainable direction of travel, has led international NGOs, state governments, religious leaders, and the United Nations to focus on the issue of values. In 2016, the UN established a High Level Panel on Water to focus on water and values, which, in their terms, meant 'economic', 'environmental' and 'cultural and spiritual' values. Their aim was to produce a set of principles for water to underpin the Sustainable Development Goals declared in 2015, with the aim of encouraging heads of state to rethink their policies and practices in relation to water (UN 2018a). This was followed by a wider World Water Development Report, which advocated an infrastructural turn towards 'nature-based solutions' (UN 2018b). These aim to work with the processes inherent in ecosystems and to therefore move towards more sustainable practices (Thomé *et al.* 2016). There are thus concerted efforts to address the urgent issues that societies face in relation to water. Whether these endeavours will change human engagements with water ecosystems sufficiently, and quickly enough, to avert social and ecological collapse, remains to be seen. It is therefore vital that the anthropological study of water continues to elucidate the relationships between human societies, non-human beings, and the material world, and assists efforts to reform these relationships to ensure that the rights, needs, and interests of all are sustained.

## References

- Albro, R. 2005. 'The water is ours, carajo!': deep citizenship in Bolivia's water war. In *Social movements: an anthropological reader* (ed.) J. Nash, 249-68. London: Blackwell.
- Anand, N. 2017. *Hydraulic city: water and the infrastructures of citizenship in Mumbai*. Durham, N.C.:

Duke University Press.

Anderson, S. & B. Tabb (eds) 2002. *Water, leisure and culture: European historical perspectives*. Oxford: Berg.

Ansar, A., B. Flyvbjerg, A. Budzier, & D. Lunn 2014. Should we build more large dams? The actual costs of hydropower megaproject development. *Energy Policy* **69**, 43-56.

Bakker, K. 2003. *An uncooperative commodity: privatising water in England and Wales*. Oxford: University Press.

Baxter, B. 2005. *A theory of ecological justice*. London: Routledge.

Berriane, Y. 2017. Development and countermovements: reflections on the conflicts arising from the commodification of collective land in Morocco. In *Development as a battlefield: International Development Policy volume 8* (eds) I. Bono & B. Hibou, 247-67. Leiden: Brill Nijhoff.

Bichsel, C. 2016. Water and the (infra-)structure of political rule: a synthesis. *Water Alternatives* **9**(2), 356-72.

Biggs, D. 2012. *Quagmire: nation-building and nature in the Mekong Delta*. Seattle: University of Washington Press.

Bosshard, P. 2014. Large dams are uneconomic, scientific study finds (5 March 2014). *International Rivers* (available on-line: <https://www.internationalrivers.org/blogs/227/large-dams-are-uneconomic-scientific-study-finds>).

Brightman, M. & J. Lewis (eds) 2017. *Anthropological visions of sustainable futures*. London: Palgrave.

Butzer, K. 1976. *Early hydraulic civilisation in Egypt: a study in cultural ecology*. Chicago: University Press.

Chua, L. & H. Fair 2019. Anthropocene. *Cambridge Encyclopedia of Anthropology* (available on-line: <http://doi.org/10.29164/19anthro>).

Coles, A. & T. Wallace (eds) 2005. *Water, gender and development*. Oxford: Berg.

Crutzen, P. & E. Stoermer 2000. The 'anthropocene'. *Global Change Newsletter* **41**,17-18 (available on-line: <http://www.igbp.net/download/18.316f18321323470177580001401/NL41.pdf>).

Cullinan, C. 2003. *Wild law: a manifesto for Earth justice*. Totnes: Green.

De Wolff, K. R. Faletti & I. López-Calvo (eds) 2019. *Water and the humanities: transforming currents for uncertain futures*. Oakland: University of California Press.

- de la Cadena, M. 2010. Indigenous cosmopolitics in the Andes: conceptual reflections beyond 'politics'. *Cultural Anthropology* **25**(2), 334-70.
- Drewal, H. (ed.) 2008. *Sacred waters: arts for Mami Wata and other water divinities in Africa and the diaspora*. Bloomington: Indiana University Press.
- Edgeworth, M. 2011. *Fluid pasts: archaeology of flow*. London: Bloomsbury Academic Press.
- Ereira, A. 2009 [1990]. *From the heart of the world: the elder brothers' warning*. UK: Tairona Heritage Trust.
- Escobar, A. 2005. *Encountering development: the making and unmaking of the third world*. Princeton: University Press.
- Fienup-Riordan, A. 2005. *Wise words of the Yup'ik people: we talk to you because we love you*. Lincoln: University of Nebraska Press.
- Finlayson, C. 2017. *Te Awa Tupua (Whanganui River) Claims Settlement Bill*. Government bill. Parliamentary Counsel Office, *Te Tari Tohutohu Pāremata*, 129(1). New Zealand government, Te Kāwanatanga o Aotearoa (available online: <http://www.legislation.govt.nz/bill/government/2016/0129/latest/DLM6830851.html?src=qs>).
- Giosan, L., P. Clift, M. Macklin, D. Fuller, S. Constantinescu, J. Durcan, T. Stevens, G. Duller, A. Tabrez, K. Gangal, R. Adhikari, A. Alizai, F. Filip, S. VanLaningham & J. Syvitski 2012. Fluvial landscapes of the Harappan civilization. *Proceedings of the National Academy of Sciences of the United States of America* **109**(26), E1688-E1694.
- Gray, J. & P. Curry 2016. Ecodemocracy: helping wildlife's right to survive. *ECOS* **37**(1), 18-27.
- Grooten, M. & R. Almond (eds) 2018. *Living planet report - 2018: aiming higher*. Gland, Switzerland: World Wildlife Fund.
- Harvey, P. & H. Knox 2012. The enchantments of infrastructure. *Mobilities* **7**(4), 521-36.
- Hastrup, K. 2011. *Waterworlds: natural environmental disasters and social resilience in anthropological perspective*. Copenhagen: European Research Council.
- & F. Hastrup (eds) 2015. *Waterworlds: anthropology in fluid environments*. Oxford: Berghahn.
- Hocart, A. 1970 [1936]. *Kings and councillors: an essay in the comparative anatomy of human society*. Chicago: University Press.
- Hoekstra, A. & A. Chapagain 2007. Water footprints of nations: water use by people as a function of their

- consumption pattern. *Water Resources Management* **21**(1), 35-48.
- Hwang, S.-S., J. Xia, Y. Cao, X. Feng & X. Qiao 2007. Anticipation of migration and psychological stress and the Three Gorges dam project, China. *Social Science and Medicine* **65**(5), 1012-24.
- Illich, I. 1986. *H2O and the waters of forgetfulness*. London: Marion Boyars.
- Josephson, P. 2002. *Industrialized nature: brute force technology and the transformation of the natural world*. Washington, D.C.: Island Press.
- Khagram, S. 2004. *Dams and development: transnational struggles for water and power*. Ithaca: Cornell University Press.
- Kirksey, S. & S. Helmreich 2010. The emergence of multispecies ethnography. *Cultural Anthropology* **25**(4), 545-76.
- Kirsch, S. 2003. Mining and environmental human rights in Papua New Guinea. In *Transnational corporations and human rights* (eds) F. Jedrzej & S. Pegg, 115-36. New York: Palgrave Macmillan.
- Kopnina, H. & E. Shoreman-Ouimet 2015. *Culture and conservation: beyond anthropocentrism*. London: Routledge.
- & H. Washington (eds) 2019. *Conservation: integrating social and ecological justice*. New York: Springer.
- Krause, F. 2016. Making space along the Kemi River: a fluvial geography in Finnish Lapland. *Cultural Geographies* **24**(2): 279-294.
- & L. Ley (eds) forthcoming. Water, power, infrastructure: ethnographic conversations with Karl Wittfogel. *Environment and Planning C*. Special Issue: Politics and space.
- & V. Strang (eds) 2013. Living water: the powers and politics of a vital substance. *Worldviews* **17**(2), 95-185. Special Issue.
- Lahiri-Dutt, K. (ed.) 2006. *Fluid bonds: views on gender and water*. Kolkata, Stree Press.
- Lansing, S. 1991. *Priests and programmers: technologies of power in the engineered landscape of Bali*. Princeton: University Press.
- Larkin, B. 2013. The politics and poetics of infrastructure. *Annual Review of Anthropology* **42**(1), 327-43.
- Lewis, D. & D. Mosse 2006. *Development brokers and translators: the ethnography of aid and agencies*. Bloomfield, C.T.: Kumarian Press.

- Linton, J. 2010. *What is water? The history of a modern abstraction*. Vancouver: University of British Columbia Press.
- Mallery, S. 2011. The Marriage Well at Teltown: holy well ritual at royal cult sites and the rite of temporary marriage. *European Review of History* **18**(2), 175-97.
- Mathur, H. 2006. *Managing resettlement in India: approach, issues and experiences*. New York: Oxford University Press.
- McDonald-Wilmsen, B. & M. Webber 2010. Dams and displacement: raising the standards and broadening the research agenda. *Water Alternatives* **3**(2), 142-61.
- Meissner, S. 2012. Virtual water and water footprints: global supply and production chains and their impacts on freshwater resources. In *People at the well: kinds, usages and meanings of water in a global perspective* (eds) P. Hahn, K. Cless & J. Soentgen, 44-64. Frankfurt: Campus Verlag.
- Merlan, F. 1998. *Caging the rainbow: places, politics and aborigines in a North Australian Town*. Honolulu: University of Hawai'i Press.
- Minnegal, M. & P. Dwyer 2010. Appropriating fish, appropriating fishermen: tradeable permits, natural resources and uncertainty. In *Ownership and appropriation* (eds) V. Strang & M. Busse, 197-216. Oxford: Berg.
- Mohamud, M. & H. Verhoeven 2016. Re-engineering the state, awakening the nation: dams, Islamist modernity and nationalist politics in Sudan. *Water Alternatives* **9**(2), 182-202.
- Morphy, F. & H. Morphy 2009. The Blue Mud Bay case: refractions through saltwater country. *Dialogue* **28**(1), 15-25.
- Mosse, D. 2003. *The rule of water: statecraft, ecology, and collective action in South India*. Oxford: University Press.
- Muru-Lanning, M. 2016. *Tupuna Awa: people and politics of the Waikato River*. Auckland: University Press.
- Oliver-Smith, A. (ed.) 2009. *Development and dispossession: the anthropology of displacement and resettlement*. Santa Fe, N.M.: School for Advanced Research Press.
- Orlove, B. & S. Caton 2010. Water sustainability: anthropological approaches and prospects. *Annual Review of Anthropology* **39**, 401-15.
- Ostrom, E. 1990. *Governing the commons*. Cambridge: University Press.
- Plumwood, V. 1993. *Feminism and the mastery of nature*. London: Routledge.

- 2002. *Environmental culture: the ecological crisis of reason*. London: Routledge.
- Polanyi, K. 1957. *The great transformation*. Boston: Beacon Press.
- Reisner, M. 2001 [1986] *Cadillac desert: the American West and its disappearing water*. London: Pimlico.
- Rodgers, D. & B. O'Neill 2012. Infrastructural violence: introduction to the special issue. *Ethnography* **13**(4), 401-12.
- Rumsey A. & J. Weiner (eds) 2004. *Mining and Indigenous lifeworlds in Australia and Papua New Guinea*. Wantage: Sean Kingston Publishing.
- Ruru, J. 2013. Indigenous restitution in settling water claims: the developing cultural and commercial redress opportunities in Aotearoa, New Zealand. *Pacific Rim Law and Policy Journal* **22**(2), 311-28 (available on-line: <http://digital.law.washington.edu/dspace-law/bitstream/handle/1773.1/1234/22PRLPJ311.pdf>.)
- Schläppy, M-L. & J. Gray 2017. Rights of nature: a report on a conference in Switzerland. *The Ecological Citizen* **1**(1), 95-6.
- Sponsel, L. 2012. *Spiritual ecology: a quiet revolution*. Santa Barbara: Praeger.
- Stensrud, A. & T. Hylland Eriksen forthcoming. *Climate, capitalism and communities: an anthropology of environmental overheating*, London: Pluto Press.
- Strang, V. 2004. *The Meaning of water*. Oxford: Berg.
- 2005. Common senses: water, sensory experience and the generation of meaning. *Journal of Material Culture* **10**(1), 92-120.
- 2009. Water and indigenous religion: Aboriginal Australia. In *The idea of water* (eds) T. Tvedt & T. Oestigaard, 343-77. London: I.B Tauris.
- 2013. Dam nation: Cubbie Station and the waters of the Darling. In *The social life of water in a time of crisis* (ed.) J. Wagner, 36-60. Oxford: Berghahn.
- 2014. The Taniwha and the crown: defending water rights in Aotearoa/New Zealand. *WIREs Water* **1**, 121-31 (available on-line: <https://doi.org/10.1002/wat2.1002>).
- 2016. Infrastructural relations: water, political power and the rise of a new 'despotic regime'. Special Issue: Water, Infrastructure and Political Rule. *Water Alternatives* **9**(2), 292-318.
- 2019. The rights of the river: water, culture and ecological justice. In *Conservation: integrating social*

and ecological justice (eds) H. Kopnina & H. Washington, 105-19. New York: Springer.

——— & S. Toussaint (eds) 2008. Special Issue: Water ways: competition and communality in the use and management of water. Special Issue, *Oceania* **78**(1).

——— & M. Busse (eds) 2011. *Ownership and appropriation: ASA monographs*. Oxford: Berg.

Taylor, B. 2010. *Dark green religion: nature, spirituality and the planetary future*. Berkeley: University of California Press.

Thomé, A., P. Ceryno, A. Scavarda & A. Remmen 2016. Sustainable infrastructure: a review and a research agenda. *Journal of Environmental Management* **184**(2), 143-56.

Tvedt, T. & E. Jakobsson (eds) 2006. *A history of water, series 1 volume 1: water control and river biographies*. London: I.B. Tauris.

——— & T. Oestigaard (eds) 2010. *A history of water, series 2 volume 1: the ideas of water from antiquity to modern times*. London. I.B. Tauris.

United Nations High Level Panel on Water 2018a. *Making every drop count: an agenda for water action*. High Level Panel on Water outcome document (available on-line: [https://sustainabledevelopment.un.org/content/documents/17825HLPW\\_Outcome.pdf](https://sustainabledevelopment.un.org/content/documents/17825HLPW_Outcome.pdf)).

United Nations 2018b. *The United Nations World Water Development Report: nature-based solutions for water* (available on-line: <http://www.unesco.org/new/en/natural-sciences/environment/water/wwap/wwdr/2018-nature-based-solutions/>).

United Nations 2019. *Transboundary waters*. UN Water (available on-line: <https://www.unwater.org/water-facts/transboundary-waters/>).

Verhoeven, H. 2015. *Water, civilisation and power in Sudan: the political economy of military-Islamist state building*. Cambridge: University Press.

Wagner, J. (ed.) 2013. *The social life of water in a time of crisis*. Oxford: Berghahn.

Wittfogel, K. 1957. *Oriental despotism*. New Haven: Yale University Press.

Worster, D. 2006. Water in the age of imperialism and beyond. In *A history of water, series 2 volume 1: the ideas of water from antiquity to modern times* (eds) T. Tvedt & T. Oestigaard, 5-17. London: I.B. Tauris.

---

[11] Water (1 Jul 2019). Topics: understanding poverty. *World Bank Group Water Global Practice* (available on-line: <https://www.worldbank.org/en/topic/water/overview>).

[2] Fish, E. The forgotten legacy of the Banqiao Dam collapse (8 Feb 2013). *The Economic Observer* (available on-line: <http://www.eeo.com.cn/ens/2013/0208/240078.shtml>).

[3] Summary statistics. The IUCN red list of threatened species. Version 2019-2. *International Union for the Conservation of Nature* (available on-line: <http://www.iucnredlist.org/about/summary-statistics>).

[4] See also Universal declaration of river rights (17 Sept 2017). *Global Alliance for the Rights of Nature* (available on-line: <https://therightsofnature.org/rights-of-nature-laws/universal-declaration-of-river-rights/>).

[5] See, for example, the work of lawyer Polly Higgins (available on-line: [ecocidelaw.com](http://ecocidelaw.com)).

### **Note on contributor**

Veronica Strang is the Executive Director of Durham University's Institute of Advanced Study, and a Professor of Anthropology. She is the author of *The Meaning of Water* (Berg, 2004), *Gardening the World: agency, identity, and the ownership of water* (Berghahn 2009), and *Water, Nature and Culture* (Reaktion 2015). She is currently working on a major volume about long-term trajectories in human engagements with water. See <https://www.dur.ac.uk/ias/staff/?id=10491>.

*Professor Veronica Strang, Institute of Advanced Study, Durham University, Cosin's Hall, Palace Green, Durham DH1 3RL, UK. [veronica.strang@durham.ac.uk](mailto:veronica.strang@durham.ac.uk)*