

Routledge Studies in Archaeology

For a full list of titles in this series, please visit www.routledge.com

Recent and forthcoming titles:

- 16 **The Maritime Archaeology of a Modern Conflict**
Comparing the archaeology of German submarine wrecks to the historical text
Innes McCartney
- 17 **The Archaeology of Bronze Age Iberia**
Argaric societies
Edited by Gonzalo Aranda Jiménez, Sandra Montón-Subías and Margarita Sánchez Romero
- 18 **Debating Archaeological Empiricism**
The ambiguity of material evidence
Edited by Charlotta Hillerdal and Johannes Siapkis
- 19 **Archaeology's Visual Culture**
Digging and desire
Roger Balm
- 20 **Marking the Land**
Hunter-gatherer creation of meaning in their environment
Edited by William A Lovis and Robert Whallon
- 21 **The Archaeology of Human-Environment Interactions**
Strategies for investigating anthropogenic landscapes, dynamic environments, and climate change in the human past
Edited by Daniel Contreras
- 22 **The Life of Trade**
Events and Happenings in Niumi's Atlantic Center
Liza Gijanto
- 23 **Exploring the Materiality of Food 'Stuff's'**
Transformations, symbolic consumption and embodiments
Edited By Louise Steel and Katharina Zinn

**Exploring the Materiality
of Food 'Stuff's'**

Transformations, symbolic consumption
and embodiments

**Edited by Louise Steel
and Katharina Zinn**

 **Routledge**
Taylor & Francis Group
LONDON AND NEW YORK

- Woodburn, J. (1966) *The Hadza*, 16mm film, London: School of Economics,
 Wright, K. (1991) 'Origins and development of ground stone assemblages in Late
 Pleistocene Southwest Asia', *Paléorient* 17: 19–45.
 ———. (1993) 'Early Holocene ground stone assemblages in the Levant', *Levant*
 25: 93–111.
 ———. (1994) 'Ground-stone tools and hunter-gatherer subsistence in Southwest
 Asia: Implications for the transition to farming', *American Antiquity* 59: 238–63.
 ———. (2000) 'The social origins of cooking and dining in early villages of western
 Asia', *Proceedings of the Prehistoric Society* 66: 89–121.
 Wright, M. (1993) 'Simulated use of experimental maize grinding tools from South-
 western Colorado', *Kiva* 58: 345–55.

5 Bodies of water

Exploring water flows in rural Kenya

Luci Attala

Introduction

This chapter coheres the foci of the more-than-human (cf. Whatmore 2002) and New Materialities (cf. Barad 2003, 2007; Bennett 2010; Coole and Frost 2010) moves together so as to highlight the co-productive and agential role water plays in shaping the lives and bodies of a small group of Giriama subsistence farmers in rural Kenya. This community, increasingly troubled by creeping desertification and the accompanying poor harvests that it brings, has been obliged to seek water at great distances on a daily basis. This brute reality and the exclusive reliance on environmental waters¹ have altered since the successful construction of a sweet water² well financed by a group of UK-based development agencies. This chapter interrogates the problems of disregarding the profoundly entangled corporeal and ecological continuum that flows between water and bodies generally (cf. Bennett 2010) and, using this framing, considers the material abilities of water and bodies during areas and times of water scarcity to engage and demonstrate how fluidity and movement supports their mutuality. Therefore, rather than considering water simply as a resource for human use, I am choosing to establish water as a subject that, through its physical abilities and material behaviours, not only shapes cultural ontologies but also through ingestion viscerally upholds, mobilizes and sustains bodies.

A more-than-human perspective rejects the reduction and objectification of entities to resources in favour of a holistic recognition of events and being, including the influences and associations articulated through interactions. A New Materialities perspective approaches the material world similarly but also foregrounds the very physicality of material interactions so as to appreciate how relationships are enacted and predicated on the very empiricity or 'materiality' of engaging substances. By merging a more-than-human approach with a New Materialities theoretical framework, as I am here, this chapter rejects an orthodox, anthropocentric perspective that places humanity as pivotal to all engagements so as to demonstrate that it is not just the human requirement for water that shapes activities and events, but the very properties of water itself alongside that need that stimulate actions, bodies and ideas. In recognition that both bodies and water are materials, I also note that through interacting within bodies water affects

behaviour. Thus, while this chapter recognizes that water both tangibly and symbolically addresses fundamental and central existential concerns on a visceral level, it also turns to focus on how the physicality of water inspires and thus determines engagements and futures. Attention will be given to how water is seen to manifest to demonstrate that (like any material) its physical presence both constrains and permits its (and our) behaviours and, in consequence, enables people's lives and bodies *to be as they are*. As a result of this perspective, the inextricable binding of our shared materialities is brought to the fore (Barad 2007; Capra 2002), and then, contra to orthodox representations, this focus shows how actions with and around water are enacted not through human influence alone, but in accordance with how water, and people, in different settings can behave together.

Who is water?

Water's role in shaping social and cultural lives has been well documented in anthropology (for some more current examples see Aiyer 2007; Chen et al. 2013; Hastrup 2009; Helmreich 2009; Kaplan 2007; Lansing 1991, 2006; Orlove and Canton 2010; Strang 2004, 2011, 2013 2015). However, despite a diverse body of literature on how people *use* water, the place of water as material influencer is only relatively recently being approached (Carey 2010; Chen et al. 2013; Mathur and da Cunha 2014) and as a result, water's visceral potency – that is: how water prompts people to act as it circles round and through bodies remains somewhat under-explored in the social sciences. This more-than-human/New Materialities approach aims to address this with a view to recognize water's ability to affect behaviours and outcomes. This approach appreciates the material centrality of water to embodiment but does so as to highlight how the manners with which water and bodies behave are embedded within a wider co-productive ecology together (cf. Barad 2007). This focus rejects the exclusive representation of water as an inert material or resource serendipitously available for human consumption and attempts to give water a 'voice' as non-human animals have through the multi-species ethnographic move (cf. Haraway 2008; Kirksey and Helmreich 2010). Without a 'voice', what water does remains disguised, concealed – transparent, if you like, not dissimilar to the fluid itself – despite the significance of water in all of our lives.

The epistemological attitude of, or penchant towards, objectification is evident in the methods by which water is engaged with in a typical, modern town or city in the industrial North. Looking at the infrastructure that manages water and allows it only checked and constrained passage into our homes illustrates the custom by which water is conceived. Here, water is corralled and guided into the very fabric of the buildings we have designed so as to enable it unfettered passage – to flow without obstruction and unimpeded through specifically fabricated pipes, secreted under floorboards and within walls so as to capture, retain, hold and then allow it to emerge from multiple outlets in different areas of each dwelling at our behest for

safe consumption and ingestion. Consequently, people are in a perpetual state of drawing water into their lives – over and through their bodies – and, alongside a complicated web of submerged pipelines, live with it imperceptibly within and surrounding them, waiting in the pipes for its moment of engagement or flushing through our flesh on its route to corporeal release. This state of affairs allows water to be paradoxically invisibly ever-present – ready for use at the turn of a tap, plumping out our bodily cells, cleansing where it attends until it runs back down plugs and into pipes to begin the cycle again without a break in delivery. Even water outside of our buildings is channelled away similarly, into drains and under-road piping.

However, in geographical locations where there are no taps, no municipal provision and where communities rely on the environment and meteorological activity for a supply of water, experiences with water diverge dramatically from the comfort of a continual, consistently available, clean resource (Moran 2008). In areas where water is labelled a 'limiting factor' (Moran 2008, 208) relationships with water rely on direct, personal, creative engagements as water does not arrive with any regularity or certainty. Its appearance, rather than predicated on public services, occurs as a result of multiple, interacting global climatic factors that individuals have no control over – one month rampaging, the next trickling, and habitually abandoning areas for extended, life threatening, periods at a time. In these places, water not only leaves bodies rapidly but is also repeatedly sought for, carried across vast distances and is typically ingested sparingly as a result (Hastrup and Rubow 2014).

Moreover, water, in locations described as suffering from water insecurity, is not merely a sparkling life-affirming fluid but rather can periodically transform into a necessary danger – filled with potentially lethal microbes (Chouin 2008) that can inveigle our bodies via ingestion. In addition, as it disappears, water can bring (Ashton 2002; Gleick 2000, Gleick et al. 2006; Li 2013; Odgaard et al. 2007) further problems and, as a weighty subject to carry, transportation of water acts on the body as a backbreaking, energy and time intensive process. In these settings, engaging with water demands a different kind of attention to what water does and where it goes. For the Giriama farmers inhabiting a semi-arid area of rural Kenya with which this chapter is concerned, water insecurity is a regular experience and this lack of water is becoming a reliable and genuine threat to their lives.

Ethnographic context

The Giriama are a diverse and geographically scattered tribal group. Originally claiming to be from 'Shungwaya', a – to this day – undiscovered region putatively to the north, they assert that they migrated into this area of Kenya some 400 years ago as a result of purported conflicts with their Omoro neighbours (Mutoro 1987; Spear 1978; Zeleza 1995). As a people they now collect themselves together with eight other tribal groups that similarly migrated into the forested strip that previously ran uninterrupted just

west, and along the length, of the east Kenyan coastline. This combination of peoples consisting of the Giriama and the Chonyi, Digo, Duruma Jibana, Kambe, Kauma, Rabai and Ribe are known collectively as the Mijikenda (the nine Kayas) – a term which replaces the previous denigrating name Wanyika that translates as a derogatory ‘people of the bush’ (Parkin 1991, 32).

The individuals that this chapter discusses are semi-peripatetic subsistence horticultural pastoralists who – until only very recently (approximately the last two years) – depended directly and exclusively on meteorological conditions to bring water to their lives. Inhabiting a small ASAL (arid and semiarid land) region edging the last of Kenya’s tropical forest in the Eastern coastal province just inland above the Galana River to the north of Malindi and 100 km south of the Somali border, called Bore (pronounced Bor-ay), this group of Giriama must utilize traditional methodologies to negotiate, and engage, with water (Fig. 5.1). The Giriama employ mixed-economic methods for subsistence, storage and exchange. As such they prove economically adaptive and resilient. Families primarily depend on their small *shamba* gardens for staple, storable crops such as maize and cassava but also rely on diverse forest resources such as bush meat (typically small birds and monkeys) and honey, alongside shepherding small herds of drought resistant cattle and goats and holding chickens. Farm gardens are personal concerns and individual’s responsibilities but are also used to support the extended family groups that most people live within.



Figure 5.1 Giriama women and children walking home after collecting water from the community well, 2016 (Copyright, L. Attala)

Thus, despite having distinctly personal and private areas and particular tasks to tend to, the farm gardens and family houses together form what could be termed micro-communities. Family groups vary in size between 20 and 40 people, but typically average around 30 members and are comprised of a series of related households (for example brothers, their wives and children) who inhabit inward-facing dwellings all constructed out of a loose weave wattle and clay daub thatched with palm leaves around a wide open central point, often surrounding a shading tree. This small collection of four or five homes materially represents part of the family’s kinship structure with further status and wealth markers represented by house size, construction materials and amount of livestock. Farming for the Giriama is not a gendered occupation; all of the women in the area farm their own plots of land.

Bore is home to approximately 2000 people and is split into three distinct sections: Bore Gonja, Bore Singwaya and Bore Koromi. The ethnographic information in this chapter focuses on the households of Bore Koromi, an area of relative affluence that has ready access to a road and a seasonal river, and has a population of 504 people.

Representations of Giriama water

... the water supplies are few and far between, and some of them speedily dry up, and remain dry for months. Geriama is worse off than any district. In the dry season the women leave their homes at early dawn to fetch water, and do not return till night. At the same time pools of salt water, temptingly clear, are to be found everywhere in Geriama and Duruma ... Any diminution in the amount of rain is instantly felt, and a season of drought occasions a famine.

(New 1873, 81–2)

As the quote from New (1873) demonstrates, the Giriama territories are historically associated with water insecurity suggesting that ingesting small amounts of water are culturally well established. Nearly 100 years later Parkin (1991) also found the distances women and children walk for their water remarkable. In this account he illustrates just how far women from different areas travel to collect water for their families before a stand-pipe was installed in Gotani in 1984.

Before the Gotani source was installed, they had to seek water in Kalo-
leni. For Gotani women this source is twelve kilometres distant, while for those in Bamba it is much further: they would leave Bamba at 3 a.m., arriving at their destination at 8 a.m., and then return to Bamba before nightfall the same day. Even nowadays, with water available in Gotani, the journey from Bamba is twenty-seven kilometres.

(Parkin 1991, 99)

In 1994, Waaijenberg wrote of the Giriama covering comparable distances, and in 2014 the women and children of Bore still walk as far for water at certain times of year (6 hours plus for a round trip) carrying small amounts of water (20 litre cans) on their heads back to their families to drink each day (140 million hours per day are dedicated by women and children to water collection (Water Org. nd.). As a result these women's days and bodies are subjugated, and their life chances restricted, under the necessity of continuously going to where the water is available. Moreover, collected water was typically 'the full colour of the ground since animals would also step in the water' (Alex, personal communication 2013), a state that resulted in recurring digestive health concerns, including fatalities (Jeremiah, personal communication 2013).

Worldwide waters

Diarrhoea caused by inadequate drinking water, sanitation and hand hygiene kills an estimated 842,000 people every year globally, or approximately 2,300 people per day (Prüss-Ustün et al. 2014), whilst simultaneously, at least 50 billion bottles of water are sold per year at 1,000 times the price of tap water (Fishman 2011).

According to multiple agencies, water concerns will be high on the international agenda in the near future. For many, these concerns come hand in hand with the global climate changing (Hastrup and Rubow 2014); for others water consumption methods and inequities are the primary culprits (Gleick et al. 2006, Gleick 2014; Water Org. nd.). This situation in part emerges as a result of waters falling and flowing unevenly across the planet (Strang 2004), but is exacerbated by the increase in demand brought on by urbanization and agriculture (Fishman 2011; Gleick et al. 2006, Gleick 2014) and is further intensified as climatic changes alter patterns of rainfall (Blaikie 2001; Leary et al. 2007). As a result, narratives of water insecurity are broadcast with increasing frequency. Accordingly, water in all its forms and in diverse geographical settings is recurrently portrayed as either: uncertain, at risk, contaminated, vulnerable and altering, and in association with just current (and not projected) climatic fluctuations and deviations, industry, agricultural and human domestic usage, water practices are being contested and reconsidered (UN Water 2014; 2015). In short, world water systems are assuming grave significance in discussions ranging from social justice and inequalities to human survival.

Adopting a human exceptionalist perspective that primarily conceives of and then presents water quantitatively (as a resource for consumption) allows anthropologically focused inequalities to be brought into sharp socio-economic and geo-political relief. This is well illustrated by Fishman (2011) as he shows the disproportionate quantities of water that flow through contemporary, modern cities – not just for consumption/drinking ingestion, but also for washing cars, flushing toilets, industrial cooling systems, golf

courses – to support the lives of those living in the affluent global North. His picture offers a sharp counterpoint to the lives of those, such as the Giriama, who must seek for only small amounts of water every day (Parkin 1991; Sheridan and Nyamweru 2008; Zeleza 1995).

As a result, calls to manage global water are increasingly heard (UN water 2014). For example, and by way of illustration of how the concerns global agencies' perceive are shifting, water management, originally unrepresented explicitly in the Millennium Development Goals (MDGs) were later incorporated in section 7.C under Goal 7 – a goal that hopes to 'ensure environmental sustainability' (Way 2015, 7) – and now occupies an entire section (Goal 6 of 17) in the post-2015 Sustainable Development Goals (SDGs) (Osborn et al. 2015). This modified focus – from implicit to explicit – draws on the complicated concerns circulating water and places the objective of clean, accessible and affordable water for human consumption, sanitation and agriculture high on the sustainability agenda for 2030 (Osborn et al. 2015). Through paying attention to human uses and socio-cultural needs for global waters current statistics demonstrate that nations in the future are going to struggle to meet requirements (Osborn et al. 2015; Way 2015), and by contrasting water-related statistics, such as those cited earlier in this section, we are presented with a poignant illustration of how the human experience of water dramatically alters depending on geography.

However, conceiving of water as an object and as one entity brings a series of problems. As Morton (2010; 2013) demonstrates in his plea for a new ethic and a less destructive manner with which to conceptualize our world, water is too vast and multifarious to successfully comprehend. For Morton, thinking of water as one thing makes it into what he calls a hyper-object (2013) – an item so all-encompassing in its diverse manifestation that it is only poorly graspable as an awkward abstraction. Labelling water as a singular resource forces us to think about it in schematic terms (Biro 2013), perhaps because otherwise water is just too immense to even 'think with' à la Lévi-Strauss (1955).

For Strang, on the other hand, the problem of water is not its range of expression but that it easily troubles the boundary between 'nature' and 'culture' (2013). As a substance simultaneously both (as it were) wild and tamed, running free in rivers or subdued and contained in half litre plastic bottles, water effortlessly slides between these categories – seeping as if in the liminal, betwixt and between the constructs of the natural and cultural, neither one thing nor the other (Lahiri-Dutt 2014). Concerns about water insecurity also struggle to successfully hold, place, categorize or approach water for precisely the reason that water keeps moving in and out of geographies and people's lives. As Wagner notes, the global water crises of today blur the 'boundary between natural hazard and manufactured risk' (2015, 5). Consequently, he calls for new theoretical engagements that realize waters and lives in parallel – as co-producers – so as to recognize their existential inter-dependence or mutuality (Wagner 2015).

Geographical and sociological context regarding water in Kenya

Of the 41.6 million people in Kenya nearly half of the population (17 million) exist without regular access to safe drinking water (Gathigah 2013; Water Org. nd.). Eighty per cent of Kenyan land is identified as arid or semi-arid land, or ASAL, which means that these regions rely exclusively on climatic conditions for their water. Predictions claim that populations living in the Kenyan ASAL can expect their access to, and relationships with, water in the near future to alter as a result of climate changes (Funk et al. 2008). These forecasts emerge from decadal analyses of recorded temperatures that demonstrate (and further predict) alarming rises in temperature³ and, in association, envisage regular volatile, variable and destructive precipitation in the future (Funk et al. 2008). These climatic realities and projected trends make inadequate and unreliable water supplies an expected circumstance for rural populations to negotiate and endure, and thus the current conditions of prolonged drought with devastating flash floods are anticipated to continue to impact the lives of those people who live in the East Kenyan ASAL (Fitzgibbon 2012). These amalgamating circumstances condemn rural livelihoods in Kenya to amplified life stressors because of insecurities around water sources. Moreover, these climate hazards are anticipated to threaten life through a series of other knock-on complications such as reduction in agricultural yield, water shortage, disease diversification and flood destruction.

Kenya's administration is considered poorly equipped to organize and facilitate water security for its population (FiilFlynn 2010). According to the 2014 update of the WHO/UNICEF Joint Monitoring Programme (JMP) for water supply and sanitation, Kenyan progress is 'not on track' (2014, 11) to meet the MDGs created in 2005 for 2015. According to FiilFlynn (2010), it will take another 30 years to achieve something approaching equal access to water for the population, a forecast that suggests that for decades to come millions will continue to tolerate an inconsistent supply. The JMP statistical tables (2014) substantiate this by noting that in 2012 only 13 per cent of the population in rural locations had gained access to a public tap or standpipe. Any funding and good intentions are cited as having faltered in association with poor management and insufficient maintenance (anecdotal evidence). As anxiety mounts in association with unequal distribution, urbanization's requirements and water's blatant disregard for borders, one could assume that Kenya is heading for a state of increased potential for conflict and disruption (Chaturvedi 2000; Odgaard et al. 2007). However, as Witsenburg and Roba (2007) show, a persistent and fundamental lack of water, contrary to expectation, does not create conflict. Rather, it brings physiological enervation, a physically weakened population who are, through dehydration, troubled by ill health, apathy and inability, and who cannot take action or fight back (Witsenburg and Roba 2007). Serious physiological consequences of dehydration manifest when just four

per cent of body water is lost (EHI 2013), making a regular supply of clean water to pass through bodies vital for their survival. Therefore, it is not only the material lack of water that shapes corporealities, it is also the phenomenological experience of jeopardy that inhibited flows bring.

International relationships with water

The consequence of water shortage for rural subsistence horticulturalists does not need explanation and as previously explained, according to projections things are not set to improve for the farmers of Bore. As has been shown, this, alongside limited water storage facilities and the lack of piped water, means water needs to be sourced on a daily basis without which one's mortality is faced. It is hard (and perhaps not even relevant) to account definitively for the creeping desertification that is affecting their lives. Nonetheless, suggestions for these circumstances circle around three main themes: one, global climate change – brought on by the excesses of industrialized nations' consumption (Leary et al. 2007); two, deforestation (Moutinho et al. 2005; Santilli et al. 2005) – manifest in this area specifically by the locals' cumulative reliance on the income generating charcoal production; or, three, meteorological – because of a recurring weather pattern that produces 15 years of drought on a cyclic basis (Gabriel, personal communication 2013).

As an outcome of the global concerns for the altering climatic conditions, I have been working with a small group of these Giriama farmers to monitor and evaluate their situation, paying specific attention to the socio-economic alterations to conditions brought about through the connection the farmers have made with a Welsh-based reforestation initiative called The Community Carbon Link (CCL). Since 2009 I have returned every year (with the exception of 2013) to see the farmers.

The Community Carbon Link (CCL) is one of 150 different voluntary organizations in Wales that connect with communities in sub-Saharan Africa. Inspired and supported by the Wales Africa Community Links (WACL)⁴ programme and the Welsh government, the CCL has in turn supported these farmers. The lion's share of the Welsh government's international funding has for the last 15 years been ring-fenced for African projects, some of which has been dedicated to supporting the maintenance of this diverse network of development agencies in the shape of Wales/Africa Community Links (Wales/Africa Community Links nd.). At inception, the CCL's original objective focused singularly on absorbing atmospheric carbon through sponsored tree planting: the purpose of which was to work towards combatting climate change. Through tree sponsorship in Wales, participants in the community scheme could supply Giriama farmers with drought resistant, fast growing cashew nut trees; each tree, numbered and plotted, is now visible on Google Earth. Since the establishment of this partnership in 2007, the CCL has sponsored tens of thousands of cashew and moringa trees (amongst others) so as to provide not only cash crops but also

to continuously absorb carbon and potentially re-establish biodiversity and the water table. Despite the trees chosen for the project being drought resistant and extremely hardy (Moringa produces crops within months and the cashews in only a few years), all trees needed irrigation to guarantee survival at planting. It became clear almost immediately that the survival of seedlings was vulnerable if bringing water into the area was not rapidly addressed. Fortunately, the Welsh Government, keen to support projects that aspire to reach the UN MDGs, funded the CCL (under their Clean Energy Award Scheme) to facilitate the digging of a sweet water well to support the sustainable development of this group in the light of their current problems. Significantly, the grant not only funded the digging of a bore hole but also a solar-powered water pump and storage tanks to contain the water brought up for the community.

A measure of the success of the overall programme comes from the quote by Archbishop Desmond Tutu:

People in Wales have big hearts. They belong in a small country but, oh man, they have the kick of a mule!

(Tutu 2013)

Giriama authenticity and the materiality of water

Prior to this partnership the Giriama relied exclusively on relationships with the spirits and environmental conditions for their water supply. According to Giriama legend described by a local, 'the whole world was filled with water until *Mulungu* (God) separated water to one side and left open grounds'. The areas of still water left behind after this movement, however, are seen as areas of concern because, being left behind, they are said to shelter demons. Contaminated water troubles millions of people worldwide. 'Eighty per cent of all diseases and one third of the deaths in developing countries are the result of contaminated water . . . and [as] standing bodies of water can harbour the carriers of dengue fever and the larvae of mosquitoes' (Ball 2002, 315–6); it is easy to see why still water can be considered dangerous. Unsurprisingly then, there are multiple taboos associated with water that does not move (such as the water in wells and lakes), which, if transgressed, might temporarily spoil the water by 'turning it into blood'. In addition, water is said to have a tendency to hide. When this occurs (for example, during periods of drought) communication with the big trees and/or the ancestors is considered an effective method to bring water out of hiding because it is in the trees that the water is retained – a belief that is perhaps supported by the water harvesting practice as depicted by Waaijenburg (1994).

Coconut palms are also used to harvest rainwater: it is concentrated by the crown, flows downwards along the trunk and is guided into a vessel by a leaf tied to the trunk.

(Waaijenburg 1994, 278)

In association with these beliefs, engaging and communicating with the environment, particularly with, and through, the forest trees has produced a series of important communal and personal ritual practices that afford the Giriama a method by which to affect or influence the water out of the bodies of trees and into their own. Water flows into Giriama lives from a variety of sources: river, spring and well water, rains, trees and now Welsh agencies. Water is considered in multiple not singular terms, with alternative methodologies adopted for effective interactions with each kind of water.

According to Parkin (1991), the central heart of Giriama culture, their authenticity and power was materialized, perpetuated and preserved in (and as) the sacred space of the Kaya. The word Kaya simply means home (Krijtenburg 2013), but here it describes the many fortified villages the Mijikenda established deep in forested highlands that used to run along the eastern coast. Perhaps as a response to the violence that originally propelled them to migrate, the nine tribes of the Mijikenda constructed high-walled fortresses deep in the relative security of the forest for their protection (Parkin 1991). The Kaya have been equated to the first, safe home for the Mijikenda after their move into Kenya (Krijtenburg 2013; Nyamweru et al. 2008; Spear 1978) and can be seen to represent the body of the Mijikenda people boundaried but simultaneously embedded into the landscape.

A Kaya, designed to hold up to as many as 1,000 people, is constructed with only two entrances (Nyamweru et al. 2008; UNESCO 2008). Each entrance, served by a thin, guarded and triple-gated pathway, runs typically from the east to the west and was cut into the thickly overgrown and thorny bush (UNESCO 2008). This model functioned to inhibit intruders (Parkin 1991; Wanza and Mugwima 2012), thereby constraining unwanted foreign, polluting flows into the body of the Mijikenda (cf. Douglas 1966), and has been responsible for creating an air of mystery about internal tribal practices. This sense of the enigmatic is further exacerbated by the claims that buried within the walls of each Kaya is a medicinal substance of undisclosed ingredients called the *fungo* brought all the way from Shungwaya. The *fungo*, advertised as a secret potion that manipulates a frighteningly forceful protective, and deadly if disturbed, sacred magic (Parkin 1991, 37), once buried established an untouchable material 'core' of authentic Giriama-ness (Wanza and Mugwima 2012) and presumably helped to keep unwanted visitors at bay. Thus, the Kaya with limited, protected access functions as a sheltered and distilled cultural 'umbilicus' from which Giriama-ness could be produced and its health and purity maintained (Parkin 1991, 42). Today the Kayas are uninhabited but are protected heritage sites (UNESCO 2008) and are still considered important and powerful places by my informants amongst the Giriama.

It was in the Kayas that relationships with water were regularly enacted through sacrifice and other rain-making rituals (Parkin 1991; Zeleza 1995). According to my informants, communal ritual practices were surprisingly effective in 'calling' water to the people's bodies as and when necessary. These practices, embedded within an animistic ontology, organized and enacted by trained elders, guaranteed collective crops and livelihoods

through a process of symbolic sacrificial negotiation with the 'devils' that lived in and held the water hidden from human bodies in the form of the bodies of big trees of the forest. It is only through careful discussion with these devils, that, by using their innate ability to create so-called 'miracles', the devils would 'bring the water from the big trees to the nearby sources of water'. But calling water was not the exclusive domain of the trained elders. Private 'calls' for water could also be made by the use of personal sacrifices (chickens or goats, depending on quantities) in smaller forest ritual settings named Kizas (Champion 1967).

The word Kiza translates as 'house of spirits' (UNESCO 2008) and is typically placed 'under very tall trees by a river or spring' (UNESCO 2008) where the water is held. The Kaya Fungo is just one of nine Kayas acknowledged as a world heritage site (UNESCO 2008). The Kaya Fungo, principally associated with the Giriama above any other tribes of the Mijikenda (Koinante 2011), is positioned significantly south of Bore and has four key Kizas identified. This is not the case with the other primary Kayas documented by UNESCO (2008). The Kizas evident at Kaya Fungo are acknowledged as concerned specifically with water and what water can do:

- *Zia ra Ache* functioned to wash the spirits of death away;
- *Kiza cha Mvula* was used for rain prayer ceremonies in which half-buried pots filled with water brought rains;
- *Mbari Tandahu* was a women's Kiza in which they used oil to bring rains, and, finally,
- *Mtsafa wa Kaya* was a permanent water point where rain, and the peace it brings, was honoured.

(UNESCO 2008)

This abundance of water-designated Kizas found in the Giriama Kaya suggests that historically the Giriama culture afforded their relationships with water a place of strategic and spiritual significance. This is substantiated in elders' accounts that equate bringing rain with wealth (Krijtenburg 2013).

Moreover, from data collected in the field since 2010, this continues to be the case for the Giriama in Bore. Despite the virtual wholesale adoption of Baptist theology in this area, locals (particularly the younger members) still regularly used local Kizas to encourage the trees to liberate the water as rain for them. According to a local minister, it is surprising that 'they... get what they asked for'.

Watery bodies: the material realities of water

The word 'fluid' coming from the Latin *fluidus*, to flow or fluctuate, describes that which can change as a result of existing without a fixed shape. For a substance to qualify as a fluid its molecular structure must have loosely packed, even 'jiggling' (Ball 2002, 151), particles. This results from what are described as weak bonds between the elements of the molecules (Ball

2002). Water, while being classed as a fluid, unfortunately breaks a number of physical rules and does not behave like other liquids. This is because water has a far more organized molecular structure than typical fluids. This occurs because of the way hydrogen behaves. In short, hydrogen actively attracts the circulating oxygen and insists on bonding with it. According to Ball, this means water is really 'more akin to a crystal than to a gas' (2002, 158) and is altogether not 'uniform' (2002, 161). It is this lack of uniformity that allows other substances to dissolve within it and, in contradiction to all standard thermodynamic principles, means water when frozen lightens and floats despite an increase in density. For Ball, it is these (amongst other) anomalous properties of water that allow it to commonly be considered mysterious and somehow 'unworldly' (Ball 2002). One could argue, in association, that it is this other worldliness that contributes to the manner by which the substance both can be, and is culturally, engaged with (cf. Strang 2013). Certainly, in the case of Giriama culture, water and water's requirements and behaviours are inextricably entangled with apprehensions and paradoxes regarding consumption.

For example, it is the physical ability of water to move in multiple ways that is seen as both a concern and indicative of its potency. Thus, water is powerfully unpredictable – it flows away or stagnates, it disappears, rains down, causes floods, bodies constantly urge for it, insects bite you for it, it hides underground, it houses, dissolves and disguises dangers of all sizes, alters direction and quantity as it soaks or evaporates away. Thus, bodies must approach it with caution to ensure it remains benign. For the Giriama, honouring water's ability to move through bodies and landscapes is recognized as the behaviour that keeps it safe for consumption; attempts to contain, confine and dam it are contrary to how water naturally behaves. As mentioned earlier, for the Giriama still waters are considered to be the 'shelter of the devil' and, therefore, if arrested in their flow are prone to becoming inhabited by demons. Consequently, as water moves through bodies, so water must be allowed to move on where possible and as a result storing water in any quantities become fraught with concerns. This means the ability to only store small amounts of water, as is the case for most families, avoids allowing demons into one's life. Furthermore, the means to store water for any length of time is less attractive as a result.

In addition, improper bodily contact with water causes anxieties. For example, the Giriama make every effort to ensure that their hands do not come in contact with the water – moving or otherwise – during collection. Touching the water in this way can unsettle demons that would later track you and trouble your sleep. Those individuals who wake feeling tired may well have been pursued by demons during the night – a bodily reminder that upsetting water will upset your corporeality. These conceptions, enacted and played out through culturally sanctioned embodied practices, organize the methods by which water can be safely related to, and have supported the community to manage with smaller amounts of water in an area where water scarcity is a common event. Thus, the prohibitions associated with

water collection and the inability to contain and hold vast amounts of water through limited collection is supported and maintained by the cultural taboos accompanying ideas of still waters. Moreover, these ideas reinforce and validate the more-than-human agencies of the lived environmental and the ecological realities that propel the Giriama to seek water daily and in small amounts to avoid the dangers inherent in having too much water that cannot be ingested swiftly. Moreover, advocating limited storage prohibits social tensions associated with accumulation and supports group sharing. The above is also further supported by the material reality of the weight of water and the relatively small amount one can carry home for consumption/ingestion.

The socio-economic and cultural consequences of the well

Needless to say, the well has dramatically altered practice for the local population. Water, while still dependent on underground shafts filling, flows more readily into the central communal point and people's bodies thereby abating some external agencies' concerns regarding survival of the farmers and their trees. However, contrary to expectations, a brief quantitative survey of the community completed in 2014 indicates that the main benefit of having regularly available well water concerns not the quantity of water utilized but the time saving associated with its collection.

Time savings come specifically from the reduced overall daily haulage dedicated by each family to meeting what they consider to be their water needs. Haulage, according to respondents, previously occupied multiple family members (primarily, if not exclusively, women and children) up to as much as six hours each day on average. These time-consuming daily intervals, devoted exclusively to water acquisition, barely afforded haulers the occasion to obtain less than the minimum daily water requirement as defined in WHO guidelines (Howard and Bartram 2003). Thus, water haulage single-handedly generates a time and energy intensive equation that dominates lives and subjugates what bodies can achieve in a day. Alternatively put, extensive distances plus the weight of the water carried under the relentless equatorial sun (using muscle power alone) culminates in vitiation.

Today, this time has been cut dramatically – sometimes to as little as just 20 minutes, but on average approximately an hour per family group. But this has not prompted people to accumulate water for drinking or otherwise. On the other hand, this striking reduction in time has opened the door to other activities and possibilities. For example, the savings on haulage time, coupled with the water surfacing in the well cleaner than the previously relied upon river, has generated a network of corporeally significant consequences. With extra time and cleaner water ingested, a sense of security has prompted community members to think constructively about further economic ventures. However, the ambivalences associated with ingesting water prevail, and the culturally endorsed notions circulating still water remain

evident in social practice and continue to generate performances that limit the security that storage provides.

The well system, designed to store drawn water in containers at ground level demands that the water stand overnight. The Giriama caution associated with still waters means trusting water that has been retained for any length of time conflicts with traditional cultural norms. This mistrust was both vindicated and enacted when thirsty baboons and hippos, on smelling the water, made attempts to force access by battering the containers. Rather than barricade and protect the water supply, the community unanimously decided to empty the storage tanks each night into a specially built overflow trough to enable the non-human animals to drink. Thus, a cycle has been established: from sunrise the solar pump fills the tanks, at sunset the water is emptied into the trough. However, because the well, reliant on underground waters, still remains a fragile source that could dry up at any moment, this choice of action appears on first inspection to be economically regressive. For the community, on the other hand, regardless of the insecurity this brings, releasing the water was preferential, not only because it preserved the system and supported the wildlife, but because safe water moves and still water can attract demons.

More-than-human, 'wet' materiality

Engagement with . . . materiality is at the crux of the human enterprise.
(Boivin 2008, 20)

A traditional reductionist approach to water as a singular resource objectifies water and establishes it as quite other from the bodies it permeates and upholds. This perspective sees the ecology of interactions that coheres, sustains and enables lives to co-exist as secondary. Ingold (2011) and Morton (2013) independently call this field of vital connections the 'meshwork'. Furthermore, reductionism asserts borders and categories, and in consequence disregards the porosity of boundaries (both physical and conceptual), and the complicated, influencing entanglement of substances that all relationships depend on (Barad 2007; Capra 2002). As a result, a reductionist perspective sidesteps the very physicality of materials and the fundamental recognition that engagements are determined by the properties of the materials concerned. Indeed by habitually allowing the human subject, and the idealistic, hierarchical and dualistic notions of 'culture' and 'nature', a pivotal position when considering human worldly interactions, the inescapable reality that life comprises of a series of collaborations and consequences within a material sphere that are prescribed – even limited – by the pure physicality of encounters, is overlooked (cf. Boivin 2008); water's physicalities and concomitant abilities work to dissolve those boundaries (Lahiri-Dutt 2014).

Furthermore, a New Materialities' perspective attempts to remedy the epistemological rupture between representation and empirical reality through a blended approach to materials. The aptly named Wet Theory (Appadurai and Beckenridge 2009) offers a new analytic that can effectively include the material world. Wet Theory seeks to create a softer, 'wetter', science that allows numbers, measurements and rigid borders to soak, saturate and smooth the abstracted hard edges we use to craft our worlds into seemingly solid realities. It questions the valorization of sharp edges and definitions in a world that is, in fact, messy, spongy and aqueous. As Appadurai and Beckenridge say 'the flow of water . . . is not just an ecological fact . . . it is an ever shifting production' (2009, viii), where bodies and water co-productively intermingle. Thus Wet Theory offers us a way to bring flow, porosity, liquidity and contingency in material life as well as in theory (Lahiri-Dutt 2014) – and encourages us to explore the permeability of both cognitive and material boundaries (Appadurai and Beckenridge 2009). Adopting this perspective allows the boundaries between what is water and what is human to blur. Thus, what is typically represented as two quite distinct entities begin to be realised as inextricably entwined in a fluid and lively relationship enacted in accordance with the confines that their physical properties determine. This perspective not only exposes the illusion of physical separation, but also allows the subject/object, culture/nature framing of 'humanity' and 'water' to emerge as problematic. Where do the person and/or the water stop and start? Moreover, using this framing exposes both entities as pervasive and all-encompassing extensions, and co-productive generators, of each other. Consequently, water, when viewed as an object and one thing is typically presented as a resource for use, but when presented as a 'wet' material hyperobject emerges as a multiplicity of forms, a presence, a part of things, a constituent of bodies and a manner or way of being. Thus, just as humans have diverse cultures, the notion of water as a singularity disappears and many waters reappear to show us that as waters flow they vary, and are individualized not only in accordance with provenance and socio-cultural settings (cf. Bear and Eden 2011), but also with their own materiality – a state of confusing complexity which illustrates not only what water does as it flows through bodies, landscapes and ideologies, but also shows how (and that) encounters between humans and different waters are mutually constitutive, transformational and together shape cultural lives. Consequently, in association with water altering its behaviours, human performances, too, must alter in a bid to reengage with water successfully (Hastrup and Rubow 2014), thereby revealing a broader generative, cyclic dance (cf. Capra 2002) between the interacting materials that comprise fleshy bodies and watery bodies.

Conclusion

Cultural understandings do not proceed, but rather are helped into becoming, by the material world and human engagement with it.

(Boivin 2008, 47).

The global water situation is currently represented as problematic. In association with the excesses of the industrialized North and the truism that a regular supply of clean water for life is a vital and incontestable reality, calls for water awareness and equity are heard with increasing regularity. The ability of water to fall and flow with indifference for political borders further contributes to water security concerns. While water can fall anywhere as rain, bodies of water are limited to flowing in quantities through the channels carved out in the landscape over time. To leap the riverbank or burst up through the land and extend its reach further, water relies on other means, that is – its relationships with bodies – to allow it passage into alternative territories. As water is drilled for, piped, pumped, dammed, stored, carried, used, digested and excreted by multiple bodies and agencies, it manages to further mobilize through new landscapes and into new expressions of being. Embedded within the interdependent and interactive planetary system all material (including human and nonhuman animal) activities are co-productively engaged in generating ways of being. Consequently, using a more-than-human and New Materialities approach illuminates not only how human and non-human animals are responsible for spreading water's reach, but how water simultaneously shapes and supports human and nonhuman lives through the manners by which it behaves. This method includes humans into the classical hydrological system, thereby demonstrating not only that humans interfere with and organize ecological structures but that as embedded entities within the system (thought to be) being organized, the other materials (such as water) need also to be conceived of as players who similarly interfere with them (Hastrup and Rubow 2014). Water thus presents as a globally active hyperobject (Morton 2013) and a principal evolutionary driver simply 'because it [is] . . . a constant requirement' (Finlayson 2014, 49). However, approaching water as one subject fails to represent its creative complexity or do justice to the 'melting of cause and effect' (Bennett 2010, 33) that occurs through the adoption of a cohered more-than-human and New Materialities perspective. For example, it is not only that certain areas of the bush dry up, and that drought is troubling this location, but also that water is heavy and cumbersome to carry, that it evaporates and stagnates, *alongside* the regular need for the fluid that mean the Giriama must not only devote constant attention to bringing water into their lives and enact their relationships around water as they do.

Notes

- 1 'Environmental waters' describes all water types that become available in a landscape without the involvement of human action. Typically, this means rainfall, spring, riverine and lake water.
- 2 'Sweet water' describes potable water. It is distinct from salt water (saline/brine). Wells dug relatively near to the coastline run the danger of tapping into, and becoming contaminated by, underground salt water streams.
- 3 The IPCC agrees temperatures in this equatorial region of Kenya could rise by 1.1C or a staggering 6.4C by the end of the twenty-first century (Leary et al., 2007).
- 4 In 2016, WACL was subsumed, along with a few other development agencies, into Hub Cymru Africa (a subdivision of the Welsh Centre for International Affairs) (hubcymru.org 2012).

References

- Aiyer, A. (2007) 'The allure of the transnational: Notes on some aspects of the political economy of water in India', *Cultural Anthropology* 22(4): 640–58.
- Appadurai, A. & C. Beckenridge (2009) 'Introduction', in A. Mathur & D. da Cunha (eds) *SOAK Mumbai in an Estuary*. Online. Available HTTP: <https://man-nysosa66.files.wordpress.com/2011/02/soak-mumbai-in-an-estuary.pdf> (accessed October 2015).
- Ashton, P.J. (2002) 'Avoiding conflicts over Africa's water resources', *Ambio* 31(3): 236–42.
- Ball, P. (2002) *H2O: A Biography of Water*, London: Orion Books.
- Barad, K. (2003) 'Posthumanist performativity: Toward an understanding of how matter comes to matter', *Signs: Journal of Women in Culture and Society* 28(3): 801–31.
- . (2007) *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, Durham, NC: Duke University Press Books.
- Bear, C. & S. Eden (2011) 'Thinking like a fish? Engaging with nonhuman difference through recreational angling', *Environment and Planning D: Society and Space* 29(2): 336–52.
- Bennett, J. (2010) *Vibrant Matter: A Political Ecology of Things*, Durham, NC; London: Duke University Press.
- Biro, A. (2013) 'River-adaptiveness in a globalized world', in C. Chen, J. MacLeod & A. Niemanis (eds) *Thinking With Water*, 166–84. Montreal: Kingston: London: Ithaca, NY: McGill-Queens University Press.
- Blaikie, P. (2001) 'Social nature and environmental policy in the south: Views from Verandah and Veld', in N. Castree & B. Braun (eds) *Social Nature: Theory, Practice and Politics*, 133–50. Oxford: Blackwell Publishers.
- Boivin, C. (2008) *Material Cultures, Material Minds: The Impact of Things on Human Thought, Society, and Evolution*, Cambridge: Cambridge University Press.
- Capra, F. (2002) *The Hidden Connections: A Science for Sustainable Living*, London: Harper Collins.
- Carey, M. (2010) *In the Shadow of Melting Glaciers: Climate Change and Andean Society*, Oxford; New York, NY: Oxford University Press.
- Champion, A. (1967) *The Agiryama of Kenya*, London: Royal Anthropological Institute of Great Britain and Ireland.
- Chaturvedi, A.K. (2000) *Water: A Source for Future Conflicts*, New Delhi: Vajbooks India.
- Chen, C., J. Macleod & A. Neimanis (eds) (2013) *Thinking with Water*, Montreal: Kingston: London: Ithaca, NY: McGill-Queen's University Press.
- Chouin, G. (2008) 'Archaeological perspectives on sacred groves in Ghana', in M.J. Sheridan, & C. Nyamweru (eds) *African Sacred Groves: Ecological Dynamics and Social Change*, 178–94. Oxford: James Currey.
- Community Carbon Link (nd.) *Community Carbon Link*. Online. Available HTTP: <http://www.carbonlink.org/> (accessed October 2015).
- Coole, D. & C. Frost (2010) *New Materialist: Ontology, Agency and Politics*, Durham, NC; London: Duke University Press Books.
- Douglas, M. (1966) *Purity and Danger: An Analysis of Concepts of Pollution and Taboo*, London: Routledge.
- EHI (2013) 'Dehydration', *European Hydration Institute*. Online. Available at HTTP: <http://www.europeanhydrationinstitute.org/dehydration.html> (accessed Feb 2016).
- FiilFlynn, M. (2010) *Kenya – Water and Sanitation Service Improvement. GAC in Infrastructure: Emerging Good Practice in Urban Water Projects*, Washington, DC: World Bank. Online. Available HTTP: <http://documents.worldbank.org/curated/en/2010/10/16583800/kenya-water-sanitation-service-improvement> (accessed October 2015).
- Finlayson, C. (2014) *The Improbable Primate: How Water Shaped Human Evolution*, Oxford: Oxford University Press.
- Fishman, C. (2011) *The Big Thirst: The Secret Life and Turbulent Future of Water*, New York, NY: Simon and Schuster.
- Fitzgibbon, C. (2012) *Economics of resilience study; Kenya country report*. Online. Available HTTP: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228500/TEERR_Kenya_Background_Report.pdf (accessed 16 April 2014).
- Funk, C., M.D. Dettinger, J.C. Michaelsen, J.P. Verdin, M.E. Brown, M. Barlow & A. Hogg (2008) 'Warming of the Indian Ocean threatens eastern and southern African food security but could be mitigated by agricultural development', *PNAS* 105(32): 11081–6; published ahead of print August 6, 2008, doi:10.1073/pnas.0708196105
- Gathigah, M. (2013) *Massive water find in drought-stricken Kenya*. Online. Available HTTP: <http://www.aljazeera.com/indepth/features/2013/09/2013915104042357942.html> (accessed October 2015).
- Gleick, P.H. (2000) *The World's Water 2000–2001: The Biennial Report on Freshwater Resources*, Covelo, CA: Island Press.
- . (ed.) (2006) *The World's Water 2006–2007: The Biennial Report on Freshwater Resources*, Washington, DC: Island Press.
- Gleick, P.H., H. Cooley, D. Katz & E. Lee. (eds) (2006) *The World's Water 2006–2007: The Biennial Report on Freshwater Resources*, Washington, DC: Island Press.
- . (ed.) (2014) *The World's Water Volume 8: The Biennial Report on Freshwater Resources*, Washington, DC: Island Press.
- Haraway, D. (2008) *When Species Meet*, Minneapolis: University of Minnesota Press.
- Hastrup, K. (ed.) (2009) *The Question of Resilience: Social Responses to Climate Change*, (Historisk-filosofiske Meddelelser No. 106), Copenhagen: The Royal Danish Academy of Sciences and Letters.
- Hastrup, K. & C. Rubow (eds) (2014) *Living with Environmental Change: Water Worlds*, London; New York, NY: Routledge.
- Helmreich, S. (2009) *Alien Ocean: Anthropological Voyages in Microbial Seas*, Berkeley, CA; Los Angeles, CA: University of California Press.
- Howard, G. & J. Bartram (2003) *Domestic Water Quantity, Service Level and Health*, Geneva: World Health Organisation Press. Online. Available HTTP: http://www.who.int/water_sanitation_health/diseases/WSH03.02.pdf?ua=1 (accessed October 2015).
- Hubcymru.org (2012) *Hub Cymru Africa*. Online Available at HTTP: <http://www.hubcymru.org/hub/about.html> (accessed February 2016)
- Ingold, T. (2011) *Being Alive: Essays on Movement, Knowledge and Description*, London: Routledge.
- Kaplan, M. (2007) 'Fijian water in Fiji and New York: Local politics and a global commodity', *Cultural Anthropology* 22(4): 685–706.
- Kirksey, E. & Helmreich, S. (2010) 'The emergence of multi-species ethnography', *Cultural Anthropology* 25(4): 545–76.

- Koinante, J. (2011) *Mukogodo, Mau and Kaya Forests in Kenya*, International expert group meeting: Indigenous peoples and forests, Department of economic and social affairs. Online. Available HTTP: www.un.org/esa/socdev/unpfi/documents/EGM_IPF_Koinante.doc (accessed October 2015).
- Krijtenburg, F. (2013) 'Keeping this land safe: Stakeholder conceptualisation of protection in the context of a Mijikenda (Kenya) world heritage site', in S.J.T.M. Evers, C. Seagle, & F. Krijtenburg (eds) *Africa for Sale: Positioning the State, Land and Society in Foreign Large-Scale Land Acquisitions in Africa*, 275–99. Leiden; Boston, MA: Brill.
- Lahiri-Dutt, K. (2014) 'Beyond the water-land binary in geography: Water/lands of Bengal re-visioning hybridity', *ACME* 13(3): 505–29.
- Lansing, S. (1991) *Priests and Programmers*, Princeton, NJ: Princeton University Press.
- . (2006) *Perfect Order: Recognizing Complexity in Bali*, Princeton, NJ: Princeton University Press.
- Leary, N., J. Adejuwon, V. Barros, P. Batimaa, B. Biagini, I. Burton, S. Chivanno, R. Cruz, D. Dabi, A. de Comarmond, B. Dougherty, P. Dube, A. Githeko, A. Abou, A. Hadid, M. Hellmuth, R. Kangalawe, J. Kulkarni, M. Kumar, R. Lasco, M. Mataka, M. Medany, M. Mohsen, G. Nagy, M. Njie, J. Nkomo, A. Nyong, B. Osman, E. Sanjak, R. Seiler, M. Taylor, M. Travasso, G. von Maltitz, S. Wandiga & M. Wehbe (2007) A stitch in time: Lessons for climate change adaptation from the AIACC project. AIACC working papers 48. Online. Available HTTP: http://www.aiaccproject.org/working_papers/Working%20Papers/AIACC_WP48_Leary_et.al.pdf (accessed October 2015).
- Levi-Strauss, C. (1955, 1973) *Tristes Tropiques*; trans. J. & D. Weightman (1973) *Tristes Tropiques*, London: Penguin Books.
- Li, F. (2013) 'Contesting equivalences: Controversies over water and mining in Peru and Chile', in J. Wagner (ed.) *The Social Life of Water*, 18–35. New York, NY: Oxford: Berghahn.
- Mathur, A. & D. da Cunha (2014) *Design in the Terrain of Water*, San Francisco, CA: ORO Editions/Applied Research and Design.
- Moran, E. (2008) *Human Adaptability: An Introduction to Ecological Anthropology*, Boulder, CO: Westview Press.
- Morton, T. (2010) *The Ecological Thought*, Cambridge, MA; London: Harvard University Press.
- . (2013) *Hyperobjects: Philosophy and Ecology after the End of the World*, Minneapolis, MN: University of Minnesota Press.
- Moutinho, P., M. Santilli, S. Schwartzman & L. Rodrigues (2005) 'Why ignore tropical deforestation? A proposal for including forest conservation in the Kyoto protocol FAO corporate document repository', *Forestry Department*. Online. Available HTTP: <http://www.fao.org/docrep/009/a0413e/a0413e06.htm> (accessed October 2015).
- Mutoro, H.W. (1987) An archaeological study of the Mijikenda Kaya settlements on the Hinterland Kenya coast, Unpublished PhD thesis, University of California, Los Angeles.
- New, C. (1873, 1971) *Life, Wanderings and Labours in Eastern Africa*, 3rd edn, London: Frank Cass & Co.
- Nyamweru, C., S. Kibet, M. Pakia & J.A. Cooke (2008) 'The Kaya Forests of coastal Kenya: 'remnant patches' or dynamic entities?', in M.J. Sheridan & C. Nyamweru (eds) *African Sacred Groves: Ecological Dynamics and Social Change*, 62–86. Oxford: James Currey.
- Odgaard, R., E. Sjaastand & B. Derman (eds) (2007) *Conflicts Over Land and Water in Africa*, Oxford; East Lansing: James Currey; Michigan State University Press; University of KwaZulu-Natal Press.
- Orlove, B. & S.C. Canton (2010) 'Water sustainability: Anthropological approaches and prospects', *Annual Review of Anthropology*, 39: 401–15.
- Osborn, D., A. Cutter & F. Ullah (2015) Universal sustainable development goals: Understanding the transformational challenge for developed countries, stakeholder forum. Online. Available HTTP: http://docs.google.com/gview?url=http://sustainabledevelopment.un.org/content/documents/1684SF_-_SDG_Universality_Report_-_May_2015.pdf&embedded=true (accessed October 2015).
- Parkin, D. (1991) *The Sacred Void: The Sacred Void: Spatial Images of Work and Ritual Among the Giriama of Kenya*, Cambridge: Cambridge University Press.
- Prüss-Ustün, A., J. Bartram, T. Clasen, J.M. Colford Jr, O. Cumming, V. Curtis, S. Bonjour, A.D. Dangour, J. de France, L. Fewtrell, M.C. Freeman, B. Gordon, P.R. Hunter, R.B. Johnston, C. Mathers, D. Mausezahl, K. Medlicott, M. Neira, M. Stocks, J. Wolfand & S. Cairncross (2014) 'Burden of disease from inadequate water, sanitation and hygiene in low- and middle-income settings: A retrospective analysis of data from 145 countries', *Tropical Medicine and International Health* 19(8): 894–905.
- Santilli, M., P. Moutinho, S. Schwartzman, D. Nepstad, L. Curran & C. Nobre (2005) 'Tropical deforestation and Kyoto Protocol', *Climatic Change* 71(3): 267–76.
- Sheridan, M.J. & C. Nyamweru (eds) (2008) *African Sacred Groves: Ecological Dynamics and Social Change*, Oxford: James Currey.
- Spear, T. (1978) *The Kaya Complex: A History of the Mijikenda Peoples of the Kenya Coast to 1900*, Nairobi: Kenya Literature Bureau.
- Strang, V. (2004) *The Meaning of Water*, Oxford: Berg.
- . (2011) 'Fluid forms: Owning water in Australia', in V. Strang, & M. Busse (eds) *Ownership and Appropriation*, 171–95. Oxford: Berg.
- . (2013) 'Conceptual relations: Water, ideologies, and theoretical subversions', in C. Chen, J. Macleod & A. Neimanis (eds) *Thinking with Water*, 185–211. Montreal; Kingston; London; Ithaca, NY: McGill-Queen's University Press.
- . (2015) *Water: Nature and Culture*, London: Reaktion Books.
- Tutu, D. (2013) Wales for Africa. *Llywodraeth Cymru: Welsh Government*. Online. Available HTTP: <http://gov.wales/topics/international/walesforafrica/?lang=en> (accessed February 2016).
- UNESCO (2008) The world heritage convention nomination dossier for inscription on the world heritage list: The sacred Mijikenda Kaya forests (Kenya). Online. Available HTTP: <http://whc.unesco.org/uploads/nominations/1231rev.pdf> (accessed October 2015).
- UN Water (2014) *World Water Development Report 2014 – Water and Energy*, Online. Available HTTP: <http://www.unwater.org/publications/publications-detail/en/c/218614/> (accessed October 2015).
- . (2015) *World Water Development Report 2015 – Water in a Sustainable World*, Online. Available HTTP: <http://www.unwater.org/publications/publications-detail/en/c/281166/> (accessed October 2015).
- Waaijenburg, H. (1994) *Mijikenda Agriculture in Coast Province of Kenya: Peasants in Between Tradition, Ecology and Policy*, Royal Tropical Institute, The Netherlands Online. Available HTTP: <http://library.wur.nl/WebQuery/edepot/165798> (accessed October 2015).

- Wagner, J.R. (ed.) (2015) *The Social Life of Water*, New York, NY; Oxford: Berg.
- Wales/Africa Community Links (nd.) *Wales/Africa Community Links*. Now reformed as Hub Cymru Africa. Online Available at HTTP: <http://www.hubcymruafrica.cymru/hub/index.html> (accessed Feb 2016)
- Wanza, N.C. & B.N. Mugwima (2012) *Designing for Sustainability in Cultural Landscapes: The Kaya Kinondo Forest of the Mijikenda Community, Kenya Sustainable Futures: Architecture and Urbanism in the Global South*, Kampala, Uganda. Online. Available HTTP: http://www.sfc2012.org/wanza_njuguna.pdf (Accessed March 2016).
- Water Org (nd.) *Safe Water*. Online. Available HTTP: <http://water.org/> (accessed October 2015).
- Way, C. (ed.) (2015) *The Millennium Development Goals Report: United Nations*. Online. Available HTTP: [http://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20\(July%201\).pdf](http://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20(July%201).pdf) (accessed October 2015).
- Whatmore, S. (2002) *Hybrid Geographies: Natures Cultures Spaces*, London: Sage.
- WHO/UNICEF Joint Monitoring Programme (JMP) (2014) *Progress on Water and Sanitation*. Online. Available HTTP: http://www.wssinfo.org/fileadmin/user_upload/resources/JMP_report_2014_webEng.pdf (accessed October 2015).
- Witsenburg, K. & A.W. Roba (2007) 'Use and management of water resources in Kenya's drylands', in R. Odgaard, E. Sjaastad & B. Derman (eds) *Conflicts Over Land and Water in Africa*, 215–38. Oxford: James Currey; Michigan State University Press; University of Kwazulu-Natal press.
- Zelega, P.T. (1995) *Mijikenda*, New York, NY: Rosen Publishing Group.

Part two

Embodied encounters