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Water Justice: Key concepts, debates and research agendas

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1. RELATING FRESHWATER AND ENVIRONMENTAL JUSTICE

In this chapter, we focus on a wide-range of justice concerns related to freshwater. While we acknowledge social and environmental justice concerns in marine and estuarine systems—including those linked with climate change, environmental flows, contamination, or fish stock depletion—our chapter explicitly attends to injustices related to freshwater, notably for domestic consumption, but also regarding irrigation and other livelihood uses. For drinking water, close to 1.8 billion people regularly rely on contaminated and unsafe sources. As a result, water-borne and diarrheal disease remain among the leading causes of ill-health and disease globally, causing over a half million deaths per year (WHO 2015a). Women and girls often travel considerable distances to collect water—with an estimated 200 million hours spent *everyday* on this core domestic task. This situation poses a suite of physical and safety risks (UNESCO 2015) apart from time losses that take away from rest, leisure, or other productive tasks. Access to water and sanitation is also critical for education, livelihood generation, and other key facets of human development and social wellbeing (UNESCO 2015; Hall et al 2013; Crow et al 2012; Mehta 2014). There are significant challenges related to water quality and needs for livelihood uses. Among them, *de jure* transformations in water rights and *de facto* shifts in water allocations pose significant risks to food, economic, and livelihood security (Molle and Berkoff 2006). Many concerns related to domestic and irrigation water are considered to be increasingly acute given on-going hydro-climatological changes associated with shifting climatic baselines, ongoing quality challenges, and competing uses at the agriculture-energy-water nexus (cf. Chapter on *Climate Justice*).

Linked to water's importance, particularly for the world's vulnerable and impoverished, the notion of 'water justice' is one that has garnered considerable analytical and political attention over the past several decades. The concept has been used to interrogate the dispossession occurring with mining and capitalist expansion in Peru and Bolivia (Budds and Hinojosa 2012; Perreault 2013), anti-privatization movements from Argentina to Ghana that have worked to resist private sector control and profiteering from water

resources (Bennett et al 2005; Bakker 2010), neoliberal governance shifts that further marginalize Canadian First Nations (Mascarenhas 2007), and key negotiations leading up to the UN adoption of the Human Right to Water and Sanitation in 2010 (Miroso and Harris 2012).

Key environmental justice concerns relate to the fact that water access and quality are highly unequal, and vary according to a range of social and spatial gradients. Households in some areas may have to spend one quarter or more of their income to acquire water for their daily needs (e.g. work in Ghana by Amenga-Etego and Grusky 2005)—well above the international recommendations of 3-6% of household income to access basic needs (Hutton 2012; UNDP 2010). There are also core justice concerns related to absolute costs, given that on a per unit basis a person with access to high quality or subsidized water may pay 1/10th or even 1/100th the price for the same amount of water as those living in contexts that do not enjoy such access (Crow 2001). As one example, a resident in well-served parts of Metro Manila pays PHP 10 – PHP 12/m³ (US\$0.22 – US\$0.27) for consumption of 10 m³ as compared to PHP 200/m³ (US\$4.44) for those living in nearby *barangays* (village-level administrations) reliant on deliveries from water carts and tankers (Torio 2016). All told, higher income populations in many parts of the world often enjoy unimpeded access to high quality water at relatively low or negligible cost, while lower income populations often pay a greater proportion of income, as well as more in absolute terms, for water that may be less safe and/or reliable.

Globally, such differences are stark. Consider, for instance, that a resident of the U.S. consumes on average 13 times more water than an average resident of Bangladesh (216 m³/per capita/year of domestic water in the U.S., as compared to 16.3 m³/per capita/year for residents in Bangladesh, data from Hoekstra and Chapagain 2007). Considerations of this type reveal the importance of a justice lens to understand and respond to water challenges, whether unequal domestic access, affordability, or the differentiated effects of water quality, water-related hazards, and water variability for productive needs—all of which we discuss further below. As we also suggest, the flip side is also true—water impinges on a range of justice considerations, from health to economic development, thus

meriting consideration.

2. WATER ACCESS AND QUALITY IN RELATION TO SOCIAL, SPATIAL AND HYDRO- ECOLOGICAL DIFFERENCE

Tracing social and spatial differences – from the neighbourhood to the global scale, and between the global North and South – is one way to investigate water-related inequalities. Water justice considerations for drinking, sanitation, and productive uses must therefore be identified, understood, and assessed in relation to a wide range of social and political factors, including gender, income, indigeneity, and race. Recent works have also increasingly emphasized the ways that biophysical factors and material conditions, from topographic and environmental conditions, contribute to inequalities (cf. Perreault 2014; Sultana 2011). While we cannot address all of these differences, the following sections provide several illustrations of social, economic, and biophysical differences as key to characterizing and assessing water injustice.

Social, Economic and Demographic Factors

Gender

Gender is frequently highlighted as crucial for unequal water access or changing conditions. Linked to the gendered labor burden of water access for household needs (highlighted above), it has been argued that women may be particularly vulnerable to water pollution, droughts or floods. Specifically, the fact that women are commonly responsible for water fetching, as well as cooking, cleaning, or care of ill or elderly household members suggests that poor water quality, or unreliable access might affect women disproportionately, albeit in diverse ways. Sugden et al. (2015) highlight that the out-migration of males in agrarian communities of the Eastern Gangetic Plains (India) produces gendered vulnerability to drought for women belonging to marginal farms and tenant households. In this case, women are particularly vulnerable to drought due to

irregular income and lower capacities to invest in off-farm activities (*ibid*). In work on the arsenic crisis in Bangladesh, Sultana (2011) calls attention to the ways that contaminated wells result in complex social and health outcomes for women, including emotional distress linked to the inability to provide safe water for their families (thus challenging their ability to meet expectations of being a ‘good mother’), or in having to rely on tenuous social networks to maintain access to safe water (e.g. by doing favours or begging neighbours who might have access to a safe well).

Highlighting similar themes, Wutich (2009) suggests gender-water linkages are mediated through household roles and livelihoods, referencing the relative stress faced by men and women in urban Cochabamba, Bolivia. In this example, women indicated higher levels of stress on survey responses related to negotiations with vendors over water prices, among other factors. In all of these ways, gender is often considered as foundational to water related equity and justice considerations (see also Alston 2006; Sultana 2014; O’Reilly et al 2011).

Indigeneity

Indigeneity is another key axis to consider when evaluating water related justice concerns. This is largely due to the unique history of Indigenous¹ peoples vis-à-vis colonial processes and colonial state practices, which often fail to recognize Indigenous territorial and water rights. These complex histories have often led to compromised water quality and quantity as a result of prioritization of commercial, industrial, and settler uses—often disconnecting Indigenous people, governance practices, and livelihoods from water within (and without) traditional territories (Boelens et al 2006; Simms 2014). Moreover, changes to water and land access have specific implications for Indigenous peoples due to physical, cultural and spiritual connections to water (Boelens et al 2006; Wilson 2014). The examples below illustrate unique water justice challenges facing Indigenous peoples including the safety of

¹ While there is no consensus regarding the term Indigenous, capitalization is frequently used to convey respect (Kesler 2015).

and access to drinking water as well as governance and control of waters, including source water.

In Canada, drinking water on First Nation reserves (parcels of land set aside under the Indian Act and treaty agreements in Canada for the exclusive use of First Nations (Hanson 2015)) is often of considerably lower quality than for other Canadian residents resulting in what many have referred to as a ‘two tiered system’ (MacIntosh 2008; Simeone 2010). Unsafe drinking water affects both physical health (i.e., high incidence of illnesses associated with water borne disease) as well as cultural or spiritual well-being of First Nations (First Nations, Métis and Inuit peoples are terms for the Indigenous peoples of Canada) given complex socio-cultural relationships to water (Basdeo and Bharadwaj 2013; McGregor 2009). One reason for this inequality is the differential governance system – drinking water off-reserve is a provincial responsibility. while authority for on-reserve drinking water is the responsibility of the Federal government. While significant investments and legislative proposals have been made to remedy the situation, on-reserve drinking water quality remains a persistent problem across the country (Cave et al 2013). Among the reasons for this persistent problem is the lack of clarity around roles and responsibilities between multiple departments within the federal government and First Nations communities, as well as capacity challenges (Simeone 2010; Simms 2014)—issues that are compounded by the fact that many of the reserves are geographically remote and small in size (Spence and Walters 2012).

Other water justice concerns for Indigenous peoples have also been evidenced in a range of contexts across the globe, often linked to territorial rights. In the example of the Central Kalahari Game Reserve (CKGR), Botswana courts allowed Indigenous San people to return to their traditional territories after a forced and highly contested relocation (Morinville and Rodina 2013). While the court ruling enabled the San to return to the reserve, they were not permitted to access traditional water sources—meaning that communities could not *effectively* return to their traditional lands. The situation was eventually rectified through a 2011 legal judgment that upheld that territorial access necessarily also implied water

access and rights (*ibid*, see also McKenzie 2015 for similar case for the Yakye Axa people of Paraguay).

Indigenous water justice also invites attention to broader cultural considerations, governance interactions, and source water conditions (rather than sole focus on domestic drinking water), in addition to longer histories and relationships that condition present day realities. This is the case given that Indigenous livelihood practices—critical to physical and cultural health and identity—are frequently linked with ecosystem conditions (e.g. water quality, quantity and flows, as well as broader ecosystem issues, such as health of fish populations). As one example, Wilson et al. (2015) discuss ways that the Koyukon Athabascan people of Ruby, Alaska express socio-cultural connections to water and the vulnerability associated with ongoing changes. In this case, climate induced hydrologic change reduced the ability of residents of this community to predict the timing of river ice freeze-up, ice thickness, and break-up. This has direct consequences for Indigenous culture, health and livelihoods as residents are less able to access the Yukon River and its tributaries during the winter months. The community also faces diminishing seasonal access to key harvesting areas in addition to increasing hazards associated with travel on thinner river ice, as well as due to a greater number of open leads (unfrozen areas) (see Chapter X on the Arctic).

Income, Race, and other Intersectional Factors

Highlighting income, poverty, and race as several of the longstanding concerns of environmental justice, scholarship on water has also found that household income is a strong predictor of safe water access (e.g. Dapaah 2013 and Mahama et al. 2014 for case studies of Accra, Ghana, where higher income residents are better able to afford fees for vendors, or storage facilities). Of course, as with any of these categories, they cannot be neatly separated and are best understood as intersectional. Consider the recently highly publicized example of lead contamination in Flint (Michigan, USA). In this case, a budget crisis and on-going austerity measures led officials to switch the municipal water supply to the Flint River with expectations that this would save the city over \$5M. The tragic story of

the majority African American city of Flint now serves as a paradigmatic environmental injustice. In brief, this “economic” decision to change the water source to one with more corrosive properties resulted in leaching from old lead pipes—poisoning thousands of residents with lead—known to have long-term health and developmental effects especially for young children (Lin et al 2016). As Ranganathan (2016) explains, such examples should not be understood merely as outcomes of racism but as linked to broad political economic shifts and associated disinvestments, including those couched in liberalism (including the associated language of equality). Here, we also see the complex intersections of race, class and place, particularly in the context of austerity and neoliberal governance shifts (cf. Mascarenhas 2007)

Biophysical conditions: Flooding, drought, climate change and other material considerations

As several of the above examples help to illustrate, biophysical conditions are another dimension critical to assess water related environmental justice concerns, particularly as certain communities might be more vulnerable to on-going degradation or environmental changes. Many examples show that even as ecological conditions or environmental change are often cast as *apolitical*, or equity-neutral, all people and places are not affected similarly. As political ecologists, critical hazard researchers, and other scholars have shown, even when cast as ‘natural’, droughts, floods, or similar events do not have the same effect on all segments of the population—indeed, there is considerable evidence that vulnerability and exposure to risks and hazards are highly inequitable (cf. *Flood Risk* Chapter). In a key comparative study, Neumayer and Plumper (2007) demonstrated the gender-differentiated effects of floods, droughts and other ‘natural’ disasters. Statistically evaluating data from 141 countries, they show that women and girls are more likely to suffer morbidity and mortality following a disaster event. This correlation is stronger for bigger events and also in contexts that are considered to be less gender equitable (see also Ribot 2009; Nightingale 2015; Watts and Bohle 1993 for other examples of differentiated vulnerabilities to risks and hazards). Returning to the arsenic crisis in Bangladesh—while presumably the geology of arsenic potentially affects all residents equally or at least

randomly, it is clear that wealthier residents are better able to dig deeper wells to maintain access to safe water (Sultana 2011).

In the context of climate change, it is well established that many regions anticipate, and are already experiencing, more pronounced extreme events, including drought and flooding. Given that marginalized populations often are living on degraded or unsuitable lands, it is clear that low-income settlements may be particularly susceptible to flooding, wastewater pollution, or similar hazards (see *climate justice* chapter). One stark example of this is in Cape Town, South Africa, where there are estimated to be more than 220 informal settlements throughout the city (Mels et al 2009), 80% of which are located in low-lying, flood-prone areas, such as wetlands, or other marginal lands. These areas are particularly vulnerable to the impacts of annual flooding made worse by a lack of basic services, disaster relief and other key resources (Ziervogel et al 2014).

‘Drought’ and water scarcities are also often tied to a range of institutions, discourses, infrastructures, and processes that foreground justice considerations. Mehta (2001) highlights the ways that discourses of scarcity were naturalized to bring legitimacy to the construction of the Sardar Sarovar Dam in India. While presented as a solution for scarcity, powerful elites benefited from this development while the water needs of the poor went largely ignored. In another example from Israel/Palestine, Alatout (2007) documents that water in the ‘land of milk and honey’ was initially presented by hydrologists as abundant in ways that supported considerable in-migration of Jews to historic Palestine. Then, after the consolidation of the new state of Israel, the scientific discourse shifted to one of ‘scarcity’ that supported centralized water management and the formation of new centralized state institutions and infrastructures to manage the scarce and important resource. In these ways we see that hydrological concepts and debates, including notions of ‘drought’ or ‘scarcity,’ may be explicitly or implicitly linked to a range of political outcomes, goals, and justice considerations.

Water infrastructures

Much recent work on water justice and equity has also highlighted the importance of infrastructures as key to consolidating differentiated water access, or conditions. In brief, it is suggested that one way to trace networks of power, or inequity, is through mapping the physical infrastructure of water or sanitation, following the pipes, wells, dams, and taps to understand ways that these infrastructures materialize and consolidate inequities (e.g., Barnes 2012; Carse 2012; Kooy and Bakker 2008; Anand 2011; Birkenholtz 2009). For instance, water taps and metering devices have been shown to shape uneven geographies of water access and experiences of marginalization—key themes in work on impoverished and peri-urban settlements in South Africa as documented by Loftus (2006), von Schnitzler (2009) and Rodina (2016). Inequality and marginalization are also strong themes in work on sanitation infrastructure and access (e.g. Morales et al 2014), large scale damming, development and irrigation infrastructures (e.g. McCully 1996; Harris 2008) and other household infrastructures, whether access to pumps to enable groundwater withdrawals in Rajasthan (Birkenholtz 2009), or water storage in urban Accra (Dapaah 2014).

3. CONCEPTUAL TOOLS AND INTELLECTUAL TRADITIONS TO UNDERSTAND WATER JUSTICE

Given these considerations and the range of case studies and illustrative examples, it is helpful to briefly survey some of the key literatures and concepts that served to better understand, and respond to, water justice issues. Key traditions and concepts include water security (Cook and Bakker 2012), political ecologies of water (Loftus 2009), and infrapolitics (Anand 2011). In addition, we find inspiration in emergent work from feminist theory on emotions and subjectivities as well as contributions from post-humanism that highlight more-than-human injustices.

Water security has been highlighted in research and policy documents of the past several decades, drawing from interdisciplinary perspectives (Cook and Bakker 2012). Earlier research focused on the connections between secure water provision and national security, autonomy, and stability (Gleick 1993). Work of the past three decades constitutes a

paradigmatic shift—as the concept increasingly refers to governance and practice to mitigate and prevent unacceptable water-related risks for food, livelihood, health, ecological, and personal security—all aspects of “human security” (Grey and Sadoff 2007; Garrick and Hall 2014). Linked to water security, “nexus” thinking offers a basis to think through the interconnections between water and agriculture, energy, domestic use, environmental health. Bringing these themes together, a water security framework combined with ‘nexus’ approaches has the potential to i) understand how variegated water-related risks confer harm to different segments of the population; and ii) trace the variable effects when considering water-related intervention at the system-scale (e.g. “trade-offs” between water for domestic use or irrigation). Although justice concerns are not always central to water security studies, the concept can be useful to think through the complex and intersecting water requirements across many different uses, users, locales or scales, including the possibility of more adequately acknowledging complex trade-offs in decision making (Bakker 2012).

As many of examples cited throughout this chapter make clear, water justice has been a clear theme of studies in political ecology and feminist political ecology—focusing considerable attention on basic needs, livelihood concerns, as well as North-South inequities in water access or quality. While environmental justice studies often focus on ‘local’ scale concerns, political ecological research seeks to attend to multi-scalar and political economic conditions important for understanding observed environmental changes, or linked inequities—giving explicit consideration to power relationships and structural conditions that underlie those issues. Political ecological understandings have been reflected in diverse water policy circles, and even increasingly in global institutions and policy frameworks. For instance, the 2006 United Nations *Human Development Report* rejected the dominant paradigm that water stress was a function of physical scarcity. Rather, it argued, “the roots of the crisis in water can be traced to poverty, inequality and unequal power relationships, as well as flawed water management policies that exacerbate scarcity” (p. 5). This statement makes abundantly clear that water access cannot be viewed as an apolitical hydrological process, but rather, as a “hydro-social” process, where water access is reconfigured and reshaped through socio-political processes (Swyngedouw 2004;

Linton and Budds 2014). Even as the ideas of water justice appear to be gaining traction in formal debates, many institutions and practices nonetheless maintain economic, individualistic, or natural science framings of the issues in ways that make justice concerns appear to be secondary at best, or at worst, irrelevant. Indeed, there continues to be strong reliance on hegemonic water governance practices with a focus on privatization, market approaches, or technocratic solutions in ways that side-line or avoid complex justice challenges (Goldman 2007; Harris et al 2013).

Recent scholarship has also highlighted water in the context of inter-generational and inter-species justice. Among such contributions, feminist theorists have discussed the possibility of a ‘watery subjectivity,’ highlighting the porosity of bodies, human and non-human, in the ways that water moves through us—literally connecting all life. As Neimanis (2013: 28) argues, attention to water as a metaphorical, and material connector between all living beings allows us to understand ourselves, and our bodies, as connected and linked to other peoples, places, animals, and ecologies. She writes:

Perhaps by imagining ourselves as irreducibly watery, as literally part of a global hydrocommons, we might locate new creative resources for engaging in more just and thoughtful relations with the myriad bodies of water with whom we share this planet.

Contributions of this type are opening new aspects of water justice debates, particularly with recent contributions from historians, literary theorists and other humanities scholars, adding new insights to a field that has historically been dominated by natural sciences and engineering fields (e.g. Chen et al 2013)

4. SHIFTING WATER GOVERNANCE IN LIGHT OF JUSTICE CONCERNS

While environmental justice considerations related to water appear to be increasingly recognized, how to best respond to these challenges is a source of ongoing debate. Water governance broadly refers to processes and practices that shape decision making over water and its uses, including, but not limited to, actors and institutions, as well as formal and informal laws and regulations that govern how water is accessed and used. Governance

is critical because of its potential to overcome and respond to key justice considerations, or given the very real possibility that governance structures and processes can also exacerbate justice concerns (see example of First Nations in Canada as explained above). Foregrounding equity and justice, we might ask: how can we use water, or make decisions related to water, differently to respond to justice considerations, and especially to better meet the needs of those who are particularly vulnerable and underserved? Such a justice orientation is somewhat distinct from, and potentially resistant to, efficiency, cost recovery or other governance priorities that are often emphasized (Goldman 2007).

While much of the above discussion is concerned with distributional justice considerations, it is clear that procedural and compensatory justice, as well as notions of recognition, are all key considerations for water governance. These issues are perhaps addressed most readily through efforts to engender participatory water governance. The full and meaningful engagement of communities in water-related decisions that affect them is often promoted as key to addressing equity concerns, as well as broader sustainability goals linked to notions of effective governance (Goldin 2010). Even with growing agreement on the importance of participatory governance and citizen involvement, there are nonetheless considerable obstacles to meaningful participation, especially in ways that also serve equity aims. Among other considerations, to the degree that water is viewed as an engineering or technical challenge, this can reinforce barriers to broad and inclusive governance, particularly for women or other marginalized populations (Barnes 2013; Goldin 2010). Moreover, participatory governance at times treats certain groups tokenistically, looking only for the physical presence of members, or ‘representative’ participation, rather than considering if there is engaged dialogue across communities (which would be key for a meaningful understanding of procedural justice).

Given ongoing about how to better respond to these challenges, it is important to maintain a critical perspective in terms of equity claims and how they are enrolled to promote particular governance shifts. The discourse on water privatization, for instance, has been propelled over the past several decades in part based on the idea that efficiencies and cost savings will enable needed investments to be made to be able to extend infrastructure to

underserved communities (Bakker 2010). Yet, numerous case study examples have shown that the equity outcomes have frequently not been borne out—e.g., for the well-known case of privatization in Cochabamba, Bolivia, equity concerns were paramount in community protests that eventually led to cancellation of the contract (see Torio 2016, and Harris et al 2013 for other examples).

5. CONCLUDING REMARKS AND FUTURE RESEARCH NEEDS

Adequate water quantity, quality, risk considerations, and changing governance practices are all concerns that require careful consideration through an environmental justice lens. Given the manifold concerns related to changing water conditions, we have also suggested that there are ample reasons why water is meaningful for broader discussions of justice. The examples provided in this chapter demonstrate the unevenness and inequities inherent to the history, geography, and on-going challenges related to water. Given that water is simultaneously social and biophysical (Bakker 2012; Perrault 2014), understanding and responding to water justice challenges requires targeted thinking at the intersection of social, ecological, technological and political-economic *relations*. We need to continue to develop our theoretical and empirical understandings of the complex systemic and lived experiences of water injustices, including varied perceptions of water-related risks in a changing world. To be better able to respond to these concerns, research and innovation is required develop governance and policy approaches to meet sustainability and justice goals, particularly in the face of multivalent constraints that often make these goals difficult to achieve.

While not an exhaustive list, we offer several specific areas in need of future water justice research, policy, and practice. Among the governance questions that remain to be addressed are practices that will serve the effective and meaningful implementation of participatory governance, as well as the human right to water. Unfortunately, more often than not, research has served to identify what does not work, with little in the form of governance innovation and evaluation to better achieve these goals. We ask: how can governance processes be more inclusive, in ways that enable meaningful engagement, or to

better address complex trade-offs in ways that are transparent and accountable? For the human right to water, there are many outstanding questions about how governments, NGOs, and civil society can promote its realization given ongoing inequities, complex trade offs (e.g. between domestic and irrigation water, or financial and capacity obstacles facing many governments), as well as given future uncertainties and challenges (e.g. climate change).

In addition, further research remains critical to better connect questions of injustice across various scales, intersectionally (e.g., Indigeneity in relation to material conditions and income, for instance), and in relation to nexus understandings (trade-offs between water-energy-food). In short, understanding and responding to water injustice will also necessarily involve attention to key linkages related to food, energy, health and other sectors. To date, we have not yet been able to solve challenges related to narrow 'water security' definitions making integrated and complex responses in a context of ongoing uncertainties and variabilities a daunting challenge.

As with other sustainability and justice discussions, much more attention is also needed from humanities, ethics, and arts communities to avoid treatment of these issues as merely 'technical' problems to be solved. Instead, full engagement with a wide range of scholars, policy makers, artists, and community practitioners will provide a stronger foundation from which to respond to the broader 'crisis of imagination' that hinders innovative responses. It is clear to us as water justice scholars that dealing with these challenges requires careful, creative, and innovative thinking in the context of broader questions of what we face as humans, living together with other communities, species, and ecologies in a complex and ever-changing world.

BIBLIOGRAPHY

Alatout, S 2007, 'State-ing Natural Resources through Law: the codification and articulation of water scarcity and citizenship in Israel', *The Arab World Geographer*, vol. 10, no. 1, pp. 16 - 37.

Alston, M 2006, 'The gendered impact of drought', in BB Bock & S Shortall (eds), *Rural gender relations, issues and case studies*, CABI Publishing, Oxfordshire.

Amenga-Etego, R & Grusky, S 2005, 'The new face of conditionalities: the World Bank and water privatization in Ghana' in D McDonald & G Ruiters (eds), *The age of commodity: Water privatization in Southern Africa*, Earthscan, London and Sterling, VA.

Anand, N 2011, 'Pressure: the PoliTechnics of water supply in Mumbai', *Cultural Anthropology*, vol. 26, no. 4, pp. 542–564.

Bakker, K 2012, 'Water: political, biopolitical, material', *Social Studies of Science*, vol. 42, no. 4, pp. 616–623.

Bakker, K 2010, *Privatizing water: governance failure and the world's urban water crisis*, Cornell University Press, Ithaca and London.

Barnes, J 2012, 'Pumping possibility: agricultural expansion through desert reclamation in Egypt', *Social Studies of Science*, vol. 42, no. 4, pp. 517–538.

Barnes, J 2013, 'Who is a water user? The politics of gender in Egypt's water user associations', in L Harris, J Goldin, & C Sneddon (eds), *Contemporary water governance in the Global South: scarcity, marketization, and participation*, Routledge, London.

Basdeo, M & Bharadwaj L 2013, 'Beyond physical: Social dimensions of the water crisis on Canada's First Nations and considerations for governance', *Indigenous Policy Journal*, vol. 23, no. 4.

Bennett, V, Davila-Poblete, S & Nieves Rico M 2005, *Opposing currents: the politics of water and gender in Latin America*, University of Pittsburgh Press, Pittsburgh.

Boelens, R, Chiba, M & Nakashima, D 2006, *Water and indigenous peoples*, UNESCO, Paris.

Birkenholtz, T 2009, 'Irrigated landscapes, produced scarcity, and adaptive social institutions in Rajasthan, India', *Annals of the Association of American Geographers*, vol. 99, no. 1, pp. 118–137.

Budds, J & Hinojosa-Valencia, L 2012, 'Restructuring and rescaling water governance in mining contexts: the co-production of waterscapes in Peru', *Water Alternatives*, vol. 5, no. 1, pp. 119–137.

Carse, A 2012, 'Nature as infrastructure: making and managing the Panama Canal watershed', *Social Studies of Science*, vol. 42, no. 4, pp. 539–563.

Cave, K, Plummer, R & Loë, R 2013, 'Exploring water governance and management in Oneida Nation of the Thames (Ontario, Canada): an application of the institutional analysis and development framework', *Indigenous Policy Journal*, vol. 23, no. 4.

Chen, C, MacLeod, M & Neimanis, A 2013, *Thinking with water*, McGill-Queen's University Press, Montreal and Kingston.

Crow, B 2001, 'Water: gender and material inequalities in the global South', CGIRS Working Paper Series, Center for Global, International and Regional Studies and the Department of Sociology, University of California, Santa Cruz.

Crow, B, Swallow, B, & Asamba, I 2012, 'Community organized household water increases not only rural incomes, but also men's work', *World Development*, vol. 40, no. 3, pp. 528-541.

Cook, C & Bakker K 2012, 'Water security: Debating an emerging paradigm', *Global Environmental Change*, vol. 22, no. 1, pp. 94-102.

Dapaah, E 2014, *Water access and governance among indigenous and migrant low income communities in the Greater Accra Metropolitan Area (GAMA), Ghana*, MA Thesis, University of British Columbia.

Garrick, D, Hall, JW 2014, 'Water security and society: risks, metrics, and pathways', *Annual Review of Environment and Resources*, vol 39, pp. 611-639.

Gleick, P 1993, 'Water and conflict: fresh water resources and international security', *International Security*, vol. 18, no. 1, pp. 79-112.

Goldin, JA 2010, 'Water policy in South Africa: trust and knowledge as obstacles to reform', *Review of Radical Political Economics*, vol. 42, no. 2, pp. 195 – 212.

Goldman, M 2007, 'How "Water for all!" policy became hegemonic: the power of the World Bank and its transnational policy networks', *Geoforum*, vol. 38, pp. 786 - 800.

Grey, D & Sadoff, CW 2007, 'Sink or swim? Water security for growth and development', *Water Policy*, vol. 9, no. 6, pp. 545-571.

Hanson, E 2015, *Reserves*, University of British Columbia, viewed 24 February 2015
<http://indigenousfoundations.arts.ubc.ca/home/government-policy/reserves.html>

Hall, RP, van Koppen, B, & van Houweling, E 2013, 'The human right to water: the importance of domestic and productive water rights', *Science and Engineering Ethics*, vol. 20, no. 4, pp. 849-868.

Harris, L 2008, 'Water rich, resource poor: intersections of gender, poverty and vulnerability in newly irrigated areas of Southeastern Turkey', *World Development*, vol. 36, no. 12, pp. 2643-2662.

Harris, LM, Goldin JA & Sneddon C 2013, *Contemporary water governance in the Global South: scarcity, marketization, participation*, Routledge, London.

Hoekstra, AY & Chapagain, AK 2007, 'Water footprints of nations: water use by people as a function of their consumption pattern', *Water Resources Management*, vol. 21, no. 1, pp. 35–48.

Hutton, G 2012, *Monitoring "affordability" of water and sanitation services after 2015: review of global indicator options*, paper submitted to the United Nations Office of the High Commission for Human Rights, viewed 8 January 2016,
http://www.wssinfo.org/fileadmin/user_upload/resources/END-WASH-Affordability-Review.pdf

Kesler, L 2015, *Aboriginal identity & terminology*, University of British Columbia, viewed 24 February 2015, <http://indigenousfoundations.arts.ubc.ca/home/identity/aboriginal-identity-terminology.html>

Kooy, M, & Bakker, K 2008, 'Splintered networks: The colonial and contemporary waters of Jakarta', *Geoforum*, vol. 39, no. 6, pp. 1843–1858.

Lin, J, J. Rutter & H. Park, 2016, 'Events that Led to Flint's Water Crisis' The New York Times, <http://www.nytimes.com/interactive/2016/01/21/us/flint-lead-water-timeline.html? r=0> (last visited Mar 15, 2016).

Linton, J & Budds, J 2014, 'The hydrosocial cycle: defining and mobilizing a relational-dialectical approach to water', *Geoforum*, vol. 57, no. C, pp. 170–180.

Loftus, A, 2006, 'Reification of the dictatorship of the water meter', *Antipode*, vol. 38, no. 5, pp. 1023-1045.

Loftus, A 2009, 'Rethinking political ecologies of water', *Third World Quarterly*, vol. 30, no. 5, pp. 953 - 968.

Mascarenhas, M 2007, 'Where the Waters Divide: First Nations, Tainted Water and Environmental Justice in Canada', *Local Environment*, vol. 12, no. 2, pp. 565 - 577.

Mahama, AM, Anaman KA & Osei-Akoto I 2014, 'Factors influencing householders' access to improved water in low income areas in Accra, Ghana', *Water and Health*, vol. 12, no. 2, pp. 318 - 331.

McKenzie, SO 2015, 'Yakye Axa v. Paraguay: upholding and framing the human right to water', in Y Haeck, O Ruiz-Chiriboga, & CB Herrera (eds), *The Inter-American court of human rights: theory and practice, present and future*.

Mels, A, Castellano, D, Braadbaart, O, Veenstra, S, Dijkstra, I, Meulman, B, Singels, A & Wilsenach JA 2009, 'Sanitation services for the informal settlements of Cape Town, South Africa', *Desalination*, vol. 248, pp. 330-337.

McCully, P 1996, *Silenced rivers: the ecology and politics of large dams*, Zed Books, London.

McGregor, D 2009, 'Honouring our relations: an Anishnaabe perspective', in J Agyeman, P Cole, R Haluza-DeLay & P O'Riley (eds), *Speaking for ourselves: environmental justice in Canada*, University of British Columbia Press, Vancouver.

MacIntosh, C 2008, 'Testing the waters: jurisdictional and policy aspects of the continuing failure to remedy drinking water quality on First Nations reserves', *Ottawa L. Rev*, vol. 39.

Mehta, L 2001, 'The manufacture of popular perceptions of scarcity: dams and water-related narratives in Gujarat, India', *World Development*, vol. 29, no. 12, pp. 2025-2041.

Mehta, L 2014, 'Water and human development', *World Development*, vol. 59, pp. 59-69.

Miroso, O & Harris L 2012, 'The human right to water: contemporary challenges and contours of a global debate', *Antipode*, vol. 44, no. 3, pp. 932-949.

Molle, F, Berkoff, J 2006, *Cities versus agriculture: Revisiting intersectoral water transfers, potential gains and conflicts*, Colombo, Sri Lanka: Comprehensive Assessment Secretariat, pp. 1-80.

Morinville, C, & Rodina, L 2013, 'Rethinking the human right to water: water access and dispossession in Botswana's Central Kalahari Game Reserve', *Geoforum*, vol. 49, pp. 150-159.

Neimanis, A 2013, 'Feminist subjectivity, watered', *Feminist Review*, vol. 103, pp. 23-41.

Neumayer, E & Plumper T 2007, 'The gendered nature of natural disasters: the impact of catastrophic events on the gender gap in life expectancy, 1981-2002', *Annals of the Association of American Geographers*, vol. 97, no. 3, pp. 551 - 566.

Nightingale, AJ 2015, 'Adaptive scholarship and situated knowledges? Hybrid methodologies and plural epistemologies in climate change adaptation research', *Area*, pp. 1-7.

O'Reilly, K, Halvorson SJ, Sultana F & Laurie N 2011, 'Introduction: global perspectives on gender-water geographies', *Gender, Place & Culture*, pp. 381- 385.

Perreault, T 2013, 'Dispossession by accumulation? Mining, water and the nature of enclosure on the Bolivian Altiplano', *Antipode*, vol. 45, no. 5, pp.1050-1069.

Perreault, T 2014, 'What kind of governance for what kind of equity? Towards a theorization of justice in water governance', *Water International*, vol. 39, no. 2, pp. 233–245.

Ranganathan, M 2016, 'Thinking with Flint: Racial liberalism and the roots of an American water tragedy', *Capitalism Nature Socialism*, vol. 27, no. 3, pp. 17–33.

Ribot, J 2009, 'Vulnerability does not just fall from the sky: toward multi-scale pro-poor climate policy', in R Mearns & A Norton (eds), *Social dimensions of climate change: equity and vulnerability in a warming world*, The World Bank, Washington.

Rodina, L. 2016. Human right to water in Khayelitsha, South Africa – Lessons from a “lived experiences” perspective. *Geoforum*, 72, pp. 58–66.

Simeone, T 2010, *Safe drinking water in First Nations communities*, Parliamentary Information and Research Service, viewed 8 January 2016, <http://www.parl.gc.ca/content/LOP/ResearchPublications/prb0843-e.htm>

Simms, B 2014, “*All of the water that is in our reserves and that is in our territory is ours*”: colonial and Indigenous water governance in unceded Indigenous territories in British Columbia, MA Thesis, University of British Columbia.

Spence, N & Walters, D 2012, “‘Is it safe?’ Risk perception and drinking water in a vulnerable population’, *The International Indigenous Policy Journal*, vol. 3, no. 3.

Sugden F, Maskey N, Clement F, Ramesh V & Philip A 2015, 'Agrarian stress and climate change in the Eastern Gangetic Plains: gendered vulnerability in a stratified social formation', *Global Environmental Change*, vol. 29, pp. 258–269.

Sultana, F 2011, 'Suffering for water, suffering from water: emotional geographies of

resource access, control and conflict', *Geoforum*, vol. 42, no. 2, pp.163-172.

Sultana, F 2014, 'Gendering climate change: geographical insights', *The Geographical Journal*, vol. 66, no. 3, pp. 372-381.

Swyngedouw, E 2004, *'Social power and the urbanization of water: flows of power'*, Oxford, Oxford University Press.

Torio, P 2016, *Water privatization in Metro Manila: assessing the state of equitable water provision*, PhD Thesis, University of British Columbia.

United Nations Development Programme (UNDP) 2010, *The Human Right to Water. UN-Water Decade Programme on Advocacy and Communication*, 8 January 2016, http://www.un.org/waterforlifedecade/pdf/facts_and_figures_human_right_to_water_eng.pdf

United Nations Development Programme (UNDP) 2006, *Human Development Report 2006*, viewed 8 January 2016, <http://hdr.undp.org/sites/default/files/reports/267/hdr06-complete.pdf>

United Nations Educational, Scientific and Cultural Organization (UNESCO) 2015, *Water for women*, viewed 8 January 2016, http://www.unwater.org/fileadmin/user_upload/worldwaterday2015/docs/Water%20For%20Women.pdf

von Schnitzler, A 2008, 'Citizenship prepaid: water, calculability, and techno-politics in South Africa', *Journal of Southern African Studies*, vol. 34, no. 4, pp. 899-917.

Watts, MJ & Bohle, HG 1993, 'The space of vulnerability: the causal structure of hunger and famine', *Progress in Human Geography*, vol. 17, pp. 43-67.

Wilson, NJ 2014, 'Indigenous water governance: insights from the hydrosocial relations of the Koyukon Athabascan village of Ruby, Alaska', *Geoforum*, vol. 57, pp.1–11.

Wilson, NJ, Walter, MT & Waterhouse, J 2015, 'Indigenous knowledge of hydrologic change in the Yukon River Basin: a case study of Ruby, Alaska', *ARCTIC*, vol. 68, no. 1, pp. 93–106.

World Health Organization (WHO) 2015a, *Drinking-water: key facts*, World Health Organization Media Centre, viewed 8 January 2016,
<http://www.who.int/mediacentre/factsheets/fs391/en/>

Wutich, A 2009, 'Intrahousehold disparities in women and men's experiences of water insecurity and emotional distress in urban Bolivia', *Medical Anthropology Quarterly*, vol. 23, no. 4, pp. 436-454.

Ziervogel, G, Waddell, J, Smit, W, & Taylor, A 2014, 'Flooding in Cape Town's informal settlements: barriers to collaborative urban risk governance', *South African Geographical Journal*, vol. 98, no. 1, pp. 1 – 20.