The Ganges water treaty: 20 years of cooperation, on India’s terms

Kimberley Anh Thomas

The Pennsylvania State University, 302 Walker Building, University Park, PA 16802, USA
E-mail: kimthomas@psu.edu

Abstract

International cooperation has become a universal mandate for governing transboundary waterbodies. Diverse stakeholders promote cooperation as a desirable, if not indispensable, approach to achieving sustainable and equitable benefits from and for transboundary waterbodies. However, calls for international water cooperation operate from the presupposition that cooperation is an unambiguous concept. While cooperation appears self-evident and unproblematic, cases of formal cooperation reveal points of contestation about cooperation itself. For example, India and Bangladesh disagree about the extent to which cooperation is occurring over the Ganges River despite having penned a bilateral treaty that has been in force for 20 years. I analyze qualitative interviews and previously unpublished hydrological data to evaluate assertions that hydrological hazards in Southwestern Bangladesh result from India’s activities and that India is failing to uphold the 1996 agreement. The analysis indicates that these assertions are true and false: India is broadly adhering to the Ganges Treaty but unilaterally withdraws water during a critical period of the dry season when regional livelihoods are most vulnerable. The study concludes that transboundary water cooperation as an abstract ideal overlooks the fact that cooperation as a practice emerges from and operates within specific historical, political, cultural, and economic contexts.

Keywords: Conflict; Cooperation; Ganges River; International freshwater treaty; Law; Transboundary rivers

Introduction

On 22 May 2014, one hundred policy makers, government officials, and academics filed through the august halls of the United Nations (UN) office in Geneva to participate in a workshop entitled ‘Counting our gains: Identifying, assessing and communicating the benefits of transboundary water cooperation’. The UN Economic Commission for Europe (UNECE) convened the event to solicit commentary on a draft policy note for the 1992 UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes, which had opened for accession to all UN Member States in February 2013. The workshop organizers lamented that although transboundary water cooperation is increasing,
some countries fail to cooperate with each other in part because of the ‘lack of recognition of the benefits of cooperation’ (UNECE, 2014, p. 3).

Various breakout sessions were scheduled for small-group consultation and brain-storming, but while participants were invited to openly share their experiences and lessons learned, the workshop conveners were explicit about what was and what was not suitable for discussion. During the opening remarks, one of the organizers announced, ‘The point of the workshop is not to discuss what we mean by transboundary water cooperation’ (UN, 2014). Instead, those of us in attendance were instructed to refer to the definition provided in the policy note, which stated, ‘In the context of this Policy Guidance Note, transboundary water cooperation is understood as cooperation between two or more countries sharing a transboundary water basin’ (UNECE, 2014, p. 5). Circularly defining cooperation as cooperation does little to explain what countries are committing to when they engage in or seek cooperation with one another, nor does it clarify what costs or benefits might accrue to them from doing so. The question that this meeting raised for me is: ‘Just what is cooperation, anyway?’

The uncomplicated framing of cooperation at this UN workshop stands in striking contrast to shared water governance between India and Bangladesh. As Zeitoun & Mirumachi (2008, p. 305) have indicated in a telling anecdote, an Indian representative at a roundtable discussion expressed perplexity at a Bangladeshi delegate’s pleas for greater cooperation over transboundary water development and data sharing. ‘But we are cooperating,’ is the message. Zeitoun & Mirumachi’s (2008) anecdote exemplifies the marked disconnect in perceptions of cooperation that exists between riparian states. Moreover, their work contributes to the growing chorus of researchers who argue for greater consideration of the variegated nature of conflict and cooperation.

Critical scholarship on interstate conflict and cooperation offers three insights of relevance to this study. First, conflict is not necessarily bad (e.g. Mack & Snyder, 1957; Frey, 1993; Homer-Dixon, 1994; Barnett, 2000). Conflict is integral to everyday life, and as Barnett (2000, p. 286) rightly observes, ‘peaceful conflict is a necessary dialectical process that drives historical change’. Second, conflict and cooperation do not constitute end members of a spectrum whereby one indicates the opposite or absence of the other. Rather, conflict and cooperation often coexist within complex and dynamic political settings where legislators, multinational organizations, and non-governmental entities pursue diverse agendas (e.g. Mack & Snyder, 1957; Craig, 1993; Kistin, 2007). Finally, reducing interactions between state actors to a binary of conflict or cooperation risks eliding subtle forms of interaction (e.g. coercion, intimidation, stalling, withholding data) that can lead to inequitable or unfair outcomes in negotiations over water (Kistin, 2007; Zeitoun et al., 2010; Warner et al., 2013). So-called ‘soft power’ tactics in highly asymmetric political settings can produce all the trappings of cooperation (treaties, data sharing mechanisms, joint management bodies, etc.) while failing to resolve riparian conflicts (Sneddon & Fox, 2006; Zeitoun et al., 2010; Warner et al., 2013). Such findings crucially call into question the notion of cooperation as an unambiguously Good Thing (Frey, 1993; Kistin, 2007; Jägerskog & Zeitoun, 2009). Despite these robust and oft-repeated observations about conflict and cooperation, academics and policymakers continue to call for greater transboundary water cooperation as if there was no question about what it means (e.g. Global Water Partnership (GWP), 2013; Price, 2014; UNECE, 2014; Adeel et al., 2015).

Unfortunately, cooperation is an ambiguous and contested concept. This fact raises several important questions in my research on transboundary water governance in South Asia. What is Bangladesh asking for when it seeks greater cooperation from India? How do we recognize cooperation when it occurs? What conflicts does cooperation resolve? What role is India perceived to play in Bangladesh’s water crises? Is transboundary water cooperation the corrective to these problems?
Case study: the Ganges River

All of these questions reflect the hydropolitical context of South Asia. Bangladesh has 57 transboundary rivers, all of which originate outside its borders, and most of its domestic rivers are distributaries of those waterways (Chowdhury, 2010). Fifty-four of these rivers flow into Bangladesh from India alone. Thus, Bangladeshis typically direct their attention to India when channels run dry or when riverbanks are breached (e.g. Zaman, 1993; Adel, 2001; Feroze, 2014). Indeed, a sense of vulnerability and helplessness to the ‘whims’ of India pervades political and popular discourse. For instance, a former Bangladeshi member of the bilateral Joint Rivers Commission was quoted in April 2014 as saying that ‘… ups and downs of water flow has [sic] been happening as per India’s whim’ (Siddique, 2014, p. 4, emphasis added).

Compounding concerns expressed within Bangladesh, the Ganges-Brahmaputra-Meghna basin has been identified by a variety of foreign analysts as being at critical risk of widespread food insecurity, loss of livelihoods, and human displacement (e.g. Malhotra, 2010; Choudhury et al., 2012; Gosden, 2014; GWP, 2014). Rivers sit at the nexus of these threats; their myriad applications for hydropower, irrigation, commerce, industry, and ecosystems services (e.g. fisheries, conveyance of sediments and pollutants) make rivers inseparable from questions of economic development, land use, and energy and food production in South Asia. Competing uses, growing demand, and decreasing or inconsistent water supply thus become the basis for prescriptions for increased coordination and cooperation among user groups, both within and between states (e.g. Parua, 2001; Chowdhury, 2010; Uprety & Salman, 2011; UN, 2013).

Between states, broadly recognized forms of cooperation include joint river commissions, data sharing, monitoring, and high-level negotiations, but transboundary water scholars and practitioners alike tend to regard formal legal agreements (e.g. treaties and their equivalents) as the pinnacle of hydrodiplomacy (e.g. GWP, 2013). For example, researchers at Oregon State University developed the water event intensity scale to score interactions between countries over transboundary waterbodies (Wolf et al., 2003; Yoffe et al., 2003). Ranging from −7 to +7, the 15-point scale regards international water treaties so favorably that such instruments (+6) rank only second to voluntary unification into one nation over the issue of water (+7).

Based on this metric, India and Bangladesh’s track record of hydro-diplomacy has been underwhelming. The two countries have only signed a single long-term treaty despite numerous pledges by both parties to reach formal agreement on all 54 of their shared watercourses. The sole agreement was signed in 1996 and governs the distribution of the Ganges River during the dry season. Once celebrated for resolving a decades-long conflict between the two states, the treaty is often criticized in Bangladesh for not ameliorating conditions such as high salinity, loss of navigation routes, fisheries declines, and poor agricultural yields. Much of the criticism contends that the treaty is not adequately implemented, as one recent newspaper editorialized: ‘… there has hardly been any dry season ever since the treaty was signed when Bangladesh has got the fair share of the water’ (New Age, 2016). This study investigates these grievances.

The paper proceeds with a survey of the hydrological hazards faced in Bangladesh during periods of water excess (floods) and scarcity (drought). Drawing on field-based interviews, news media, and academic publications, I show how the discursive linkage of hydrological hazards to upstream practices in India form the basis for additional demands for bilateral cooperation by both Bangladeshis and foreigners, despite the landmark treaty signed in 1996 to address
Bangladesh’s complaints\(^1\). Finally, I analyze 20 years of hydrological data (12 years of which are restricted and previously unpublished) to evaluate claims that India has not been adhering to the agreement\(^2\). By synthesizing personal accounts from a range of actors with quantitative analysis of water sharing, this work responds to calls for transboundary water research to examine the impacts of interstate cooperation and conflict at multiple scales (Sneddon & Fox, 2006; Mustafa, 2007; Rieu-Clarke, 2010).

My analysis shows that India has been largely abiding by the terms of the treaty. However, this does not mean that the treaty has been an unmitigated success. While addressing some conflicts (insufficient dry season flow to Bangladesh), it has also generated new ones (due to unilateral diversions during the most critical period of the dry season). These findings reveal a danger in concluding that a dispute has been resolved because a treaty has been ratified (e.g. Uprety & Salman, 2011), or that an agreement is successful because it has operated for years without interruption (e.g. Pandey, 2014).

**Regional hydrology**

Southwestern Bangladesh, which comprises the terminal portion of the Ganges basin catchment, is an especially sensitive barometer of shifts in water supply. This dynamic deltaic landscape is seasonally flooded, arid, or tidally inundated with brackish water, with each situation posing unique challenges to residents of the area. The degree to which residents regard a given water condition as beneficial or hazardous depends on both the timing and magnitude of water availability. Rainfall is highly seasonal, with 85–87% of annual precipitation occurring during the narrow five-month period (June–October) during and after the monsoon season (Rahman et al., 2000; Chowdhury, 2010; Figure 1).

**Seasonal dynamics.** Normal flooding is a welcome and much-anticipated event during which fields are hydrated, nutrient-rich silts are deposited on land, fish ponds are replenished with water, aquifers are recharged, tidal rivers are freshened, and navigation routes that withered during the dry season are reopened (Mirza et al., 2003; Hofer & Messerli, 2006; Islam et al., 2010). Rain and river flows that occur beyond typical conditions are characterized by significant deviations in duration, magnitude, timing, areal extent, and/or degree of inundation (Hofer & Messerli, 2006). While the development of each extreme flood is unique, the catastrophic effects are generalizable: widespread crop loss, human fatalities, livestock death, and the destruction of infrastructure, including household dwellings, roads, railways, factories, and communication lines (Islam et al., 2010).

The dry season levies a different suite of adversities upon residents. Although informants recounted difficulties with limited water access and erosion, high salinity emerged as their foremost grievance about water. Salinity is a perennial issue for communities in Southern Bangladesh where tidally influenced rivers carry saltwater tens of miles inland and fingers of land extend deep into the estuary. River-ocean exchange occurs throughout the year in this region but is most pronounced during the dry season when rain and river water are insufficient to resist seawater intrusion into rivers and groundwater (Mirza, 2010).

---

\(^{1}\) I conducted 34 semi-structured interviews with water resource users in Southwestern Bangladesh in March 2014. The sample consisted of 14 farmers, 12 fishermen, and 8 boat operators, thereby capturing those occupations that are especially reliant on surface freshwater.

\(^{2}\) The 20-year time frame of the hydrological analysis (1997–2016) corresponds to the active period of the ongoing water-sharing treaty that expires in 2026.
Seawater and brackish river water destabilize livelihoods by contaminating soil and rendering groundwater unusable for human consumption or irrigation.

Fluid problems, fixed solution

As a direct and indirect determinant of people’s quality of life, water and its myriad challenges have been the subject of sustained examination in Bangladesh. The ways that these challenges are understood, in turn, shape approaches to resolving them. How have water hazards in Bangladesh been framed? What solution emerges from such framings?

Descriptions of the hydrological regime in Bangladesh invariably highlight its downstream position. Engineers, journalists, policymakers, legal scholars, ecologists, and social scientists alike note that Bangladesh is the lowest riparian in the second largest hydrologic region in the world, a corollary of which is that 90–94% of the country’s surface water flows are allochthonous (e.g. Nishat & Faisal, 2000; Islam, 2010; Krug, 2010). Given the potentially devastating impacts of floods and droughts, Bangladeshis are keenly aware of the relationship between water availability and crop yields, fisheries, groundwater supplies, forest health, and property damage. When paired with a widespread sense of vulnerability to upstream water development activities, India becomes the obvious target for blame for deficiencies and excesses in river flow: ‘Indian barrages, canals, reservoirs and national water grids are slowly strangling Bangladesh’ (Ahmed, 2014, p. 2).

Among India’s river development projects, the most contentious has been the Farakka Barrage, which lies approximately 16 km (10 mi) upstream of Bangladesh in the Indian state of West Bengal. This
2.24 km-long diversionary structure enables India to shunt indispensable dry-season water supplies away from Bangladesh toward the moribund Hooghly River, upon which the port city of Kolkata (formerly Calcutta) relies.

The commissioning of the Farakka Barrage in 1975 was met with immediate and clamorous protest in Bangladesh as India unilaterally diverted water to Kolkata (Abbas, 1982; Crow et al., 1995). Bilateral negotiations progressed in fits and starts for more than 20 years until the two countries signed the aforementioned long-term agreement in December 1996. The 30-year treaty assures Bangladesh a minimum volume of Ganges water during the dry season, but the compact has done little to stem the charges leveled against India. One writer asserted, ‘Although a 30-year water treaty has been in effect between the two countries since 1996, it has been seen that India diverted water according to its own will, depriving Bangladesh from her just share during [the] dry season’ (Islam, 2011).

**Personal accounts of hazards.** Several informants in this study identified a range of hydrological challenges that they face, including greater salinity, inundation, heightened tidal effects, and more hazardous conditions in general (Table 1). Although colloquial descriptions of hydrological dynamics differ from those provided by researchers, residents and academics are united in pointing to the release or retention of water in India as the cause of water hazards in the region.

**Expert accounts of hazards.** Personal accounts like those documented in Table 1 are corroborated by academic studies that identify saltwater intrusion, fisheries decline, groundwater depletion, erosion, floods, and impeded navigation among the pernicious outcomes of altered river flows due to Farakka Barrage (Adel, 2001; Shahid & Behrawan, 2008; Gain & Giupponi, 2014; Rabbani, 2014). For example, in a study of salinity effects in Southwestern Bangladesh, Rahman and his co-authors (Rahman et al., 2000, p. 31) found that ‘[l]arge-scale surface water withdrawal in India after commissioning the Farakka Barrage causes a drastic fall in the Ganges low-flow condition within the Bangladesh territory during every dry period’. They conclude that this reduction in river flow facilitates greater seawater intrusion from the Bay of Bengal (Rahman et al., 2000). Conversely, Zaman (1993, p. 5) notes the common attribution of flooding in Bangladesh to India: ‘It is held that the Farakka barrage on the Ganges in West Bengal, upstream from Bangladesh, is used to … increase the river flow during the rainy season, causing downstream floods.’

**Calls for cooperation.** Demands for increased international water cooperation thus become a logical response to hydrological challenges that are widely perceived to emanate from poor or insufficient transboundary river governance (e.g. Nishat & Faisal, 2000; Parua, 2001; Salman & Upreti, 2002; Chowdhury & Ward, 2007; Rahaman, 2009; Malhotra, 2010; Ahmed, 2013). Indeed, transboundary water cooperation is purported to deliver a broad suite of socio-ecological benefits that will not only resolve water disputes between India and Bangladesh but will also extend into other areas of concern, such as environmental protection (Ahmed, 2013), human security (Sadoff et al., 2013), regional stability (Rahaman, 2009), and economic well-being (Strategic Foresight Group (SFG), 2013). However, the

---

3 A five-year treaty was signed in 1977, and two Memoranda of Understanding (signed in 1982 and 1985) extended the terms of the 1977 agreement for a period of three years each.

4 Analyses of the treaty’s content and scope are provided elsewhere (see Hossain, 1998; Subedi, 1999; Tanzeema & Faisal, 2001; Salman & Upreti, 2002; Rahaman, 2009; Thomas, 2012).
Table 1. Hydrological shifts and hazards attributed to water resource practices in India, as described by informants in Bangladesh.

<table>
<thead>
<tr>
<th>Observation</th>
<th>Testimony</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased salinity</td>
<td>‘…salinity started to increase since Farakka construction began. Fresh water from upstream is not enough to make the river water fresher, seawater gives pressure northward.’ – Boatman, age 72</td>
</tr>
<tr>
<td>Greater tidal effects</td>
<td>‘The fresh water used to come from Farakka, through Ganga River. India made a barrage there … The current flow is supposed to flow from North (inland) to South (seaward) as I have seen in the past, but it is flowing from South to North now.’ – Farmer, age 55</td>
</tr>
<tr>
<td>Flooding</td>
<td>‘If India releases water, we get water. If they hold back the water, we will not get water. India doesn’t release water very easily. The excess water flows over the [Farakka] barrage and comes to our portion of the river. If they open up one sluice gate, we will sink under water.’ – Boatman, age 32</td>
</tr>
<tr>
<td>Low water levels</td>
<td>‘In past, the river was full of water … Now, we can cross some portion of river by foot … The river will return to its old condition if India stops holding the water back.’ – Farmer, age 60</td>
</tr>
<tr>
<td>Water hazards</td>
<td>‘I think the cause of this turbidity in our river is sudden release of water during monsoon from Farakka. We had an accident six months ago; my uncle died in that accident. The accident was because of turbidity current. Six people died.’ – Boatman, age 36</td>
</tr>
<tr>
<td>Reduced navigability</td>
<td>‘You can see that the river has not water full to the brim now. But in India, they have more than enough water. Big ships can navigate to their portion but we are operating small boats.’ – Boatman, age 23</td>
</tr>
</tbody>
</table>

persistence of grievances and hydrological calamities in Bangladesh in spite of a bilateral treaty with India does not necessarily mean that more cooperation will resolve the problem. What is legal is not always just, and an evaluation of the existing cooperative framework will illustrate that compliance with a treaty may still engender conflict.

Evaluating cooperation over the Ganges River

Given the highly seasonal nature of hydrological challenges and the diverse suite of complaints lodged against India (Table 1), bilateral cooperation over the Ganges River must be assessed for both the wet season and dry season. First, the Treaty only stipulates water sharing during the dry period (January 1 to May 31). The fact that the Treaty does not regulate wet season river flows has been used to argue that India releases excess water to Bangladesh during this time and increases flood risks there as a result (e.g. Khalequzzaman, 2013). However, the Ganges River shifted course from the Hooghly River as its main distributary toward the Padma River (in present-day Bangladesh) several centuries ago (Begum, 1987). Therefore, without the Farakka Barrage directing water to Kolkata, Bangladesh would otherwise receive all the monsoon-fed river flows and would be subject to even greater risk of flooding than it is with the barrage in place. Furthermore, the barrage is not a storage structure, so there is no reservoir of water that would be discharged to Bangladesh during the wet season. As a result, there has been no discernable effect of Farakka Barrage during the wet season (Hofer & Messerli, 2006).

The second basis for evaluating cooperation involves the degree to which India is complying with water sharing during the dry season. Residents and media sources quoted earlier illustrate the common belief that India withholds water from Bangladesh, but such claims are rarely substantiated. This may be attributed in part to the fact that water data in South Asia are considered a matter of national security and are
exceedingly difficult to obtain (Pandey, 2014; Price, 2014; Surie, 2014). The lack of public access to Ganges flow data has thus left policy analysts, scholars, the media, and the public to speculate about the implementation and efficacy of the treaty (Price, 2014; Surie, 2014). For instance, Subramanian and his colleagues (Subramanian et al., 2012, p. 32) provided no supporting data but stated in a World Bank report, ‘While the Ganges Water Sharing Treaty did provide a framework for future cooperation between India and Bangladesh, the agreed upon flows to Bangladesh did not fully materialize.’

Fortunately, in 2008 the Joint Rivers Commission in Bangladesh began publishing, as online press releases, the amount of water received from Farakka Barrage for each dry season (Joint Rivers Commission Bangladesh (JRCB), 2016). These data have been used to corroborate claims that India is not adhering to the agreement5. For example, Islam et al. (2013, p. 164) report, ‘The analysis of flow data revealed that during the years 2008–2011, 85% of the times [sic], the flow at Farakka Barrage were [sic] below the respective historic average-flow.’ However, here and elsewhere, the authors only examined the data as binaries in which Bangladesh did or did not receive the minimum flow based on the historic average (Khalequzzaman & Islam, 2012; Islam et al., 2013; Pandey, 2014)6. Furthermore, their analyses were limited to publicly available data.

My own approach differs in two key respects. I collated the JRCB data with restricted data that I obtained from a federal research institute in Bangladesh. This yields the full range of flow volumes for the active period of the treaty (1997–2016). Moreover, I plot these not as binaries, as previous researchers have done, but as deviations from the mandated volumes (Figure 2).

The treaty stipulates a fixed quantum of water that must be released to Bangladesh during the five-month dry season (January 1 to May 31), which is divided into fifteen periods of 10 days each (e.g. Jan 1–10). I calculated the percent difference between expected (based on historic averages from 1949–1988, as listed in the treaty) and actual flows released to Bangladesh for each of the 300 10-day periods between 1997 and 2016, and then averaged them by year. As such, this analysis provides an indication of how much water was delivered, not just whether or not Bangladesh received the minimum mandated flow. Thus, the points plotted in Figure 2 are annual averages of the percentages by which flows deviated from the expected volume based on historic dry season flows. Far from a consistent trend of deprivation, the data indicate that on average India has released more than the required volume to Bangladesh (black trend line, Figure 2).

Figure 2 compares the flows released to Bangladesh against historic flows, but Ganges River flows have fluctuated over time with changes in precipitation, snow melt, and upstream development. How, therefore, does the picture of compliance shift when the actual released flows are compared against those volumes mandated by the treaty? In other words, is Bangladesh receiving its due share even when dry season flows are exceptionally low?

Ideally, these questions would be addressed through a comparison of the flows released to Bangladesh with actual flows arriving at Farakka Barrage during each 10-day water-sharing period, but unfortunately the Farakka data prior to 2008 are not publicly available. However, using nine years of available data (2008–2016), when released volumes are compared against those mandated by the treaty based on actual river flows, we can still see that India has been satisfying its commitment to Bangladesh (Figure 3).

---

5 One notable exception is Pandey (2014) who used a subset of these data to conclude that the treaty has been a success for Bangladesh.

6 The water-sharing schedule for the 1996 Ganges Treaty was based on historic dry season flows during 1949–1988 (Article II and Annexure II in Government of Bangladesh (GoB) (1996)).
In addition to releasing specified volumes of water, India is bound by Article II of the treaty to protect water flows at Farakka (GoB, 1996). The conventional wisdom is that upstream river development has precluded India from meeting this obligation (e.g. Islam et al., 2013; Kawser & Samad, 2015). However, I obtained a restricted Bangladeshi government study that found average dry season flows at Farakka after the treaty (1997–2010) were actually 2.33% higher than those before the treaty (1948–1988). This finding is consistent with my own analysis in which I found interannual variability but no statistically significant decline in dry season flows reaching Farakka over time (1997–2016, \( p = 0.2 \); data not shown).

My findings contradict the conventional wisdom in Bangladesh that India is abrogating its legal obligations. By revealing the actual water flows released to Bangladesh as mandated by the treaty, these findings also appear to dispel widespread and long-standing speculation about India’s water sharing practices. However, these analyses still seem insufficient to the task of negating all the accounts of managers and end-users of the transboundary water system, as well as the copious academic studies and media accounts about poor water conditions in Bangladesh. Indeed, further probing of the data provides additional insight into the pervasive discontent with the treaty.

*Timing is (almost) everything.* Despite a general trend of compliance with the treaty, India did fail to release the minimum volume nearly 20% of the time (26 negative deviations out of 135 water sharing periods).
periods during 2008–2016). Is it possible that periodic over-extraction by India could account for persistent complaints of dispossession in Bangladesh even if, overall, water is fairly distributed? Why do some commentators claim that Bangladesh rarely gets her fair share of water when the data clearly indicate otherwise (Figure 3)?

Perceptions of deprivation in Bangladesh may lie in the timing of water delivery. Indeed, a striking pattern emerges from the distribution of negative deviation events that is likely more significant than the absolute number of such events. In addition to dividing the five-month dry season into 10-day periods, the 1996 treaty further accounts for seasonal water variability by bracketing the window March 11–May 10 as a ‘critical period’ (GoB, 2011; Figure 1). While the average January–May discharge (2008–2016) is 2,192 m$^3$/s, the ‘critical period’ is demarcated by the lowest dry season flows, which range from 1,727 to 2,107 m$^3$/s (GoB, 1996).

Recognizing that water flows during the period March 11–May 10 truly are vital for the ecology and economy of the region, the two governments agreed that each country would receive a guaranteed flow of 991 m$^3$/s in alternating water-sharing periods$^7$. However, when we examine India’s water sharing

---

$^7$ Bangladesh is due to receive 991 m$^3$/s during March 11–20, while India retains the remaining volume. The following period of March 21–31, India retains 991 m$^3$/s while Bangladesh receives the leftover amount, and so on until May 10.
practices more closely, it becomes clear that Bangladesh is being denied its guaranteed minimum flow during the most challenging period of the dry season (Table 2).

During the nine-year period 2008 to 2016, India failed to release the minimum volume of ‘critical period’ water to Bangladesh 55.5% of the time (15/27 events). The two years during which Bangladesh received a conspicuously high volume of water (2014 and 2015) were the two wettest years for these periods since 2000, indicating that India complied when it was easiest to do so.

The timing and spatial distribution of fresh water is crucial for the viability of many crops and fisheries, upon which tens of millions of Bangladeshis depend directly for their sustenance and livelihoods. Among the 12,000 plant varieties and 50 major crops that grow in Bangladesh, rice claims paramount importance as the country’s staple grain (Chowdhury, 2010; Rahman et al., 2011). Although thousands of rice cultivars exist, most farmers have abandoned indigenous varietals in favor of Green Revolution, high-yielding boro rice, which accounts for one-half to two-thirds of national rice production (Rahman et al., 2011). However, boro is a dry season crop that requires irrigation and few farmers in Southwestern Bangladesh can afford the cost of pumping groundwater from the greater depths where salinity and arsenic levels are sufficiently low (see also Gain & Giupponi, 2014). Therefore, agriculture during the dry season is typically limited to small-scale production of fruits and vegetables. One respondent in this study commented on the challenges residents face during this time by saying,

‘During the dry season we do not get enough water for irrigation. We use waters of small rivers and canals to water our vegetables near our house, but these waters are not enough for fields upon fields of crops. Crop conditions become bad. Farmers have to face losses. Farmers lose their smiles.’

The Treaty specifies that neither party should inflict any harm on the other party through their respective uses of the river. The preceding discussion suggests that the principle of no-harm is not sufficiently enforced. However, such enforcement is elusive and likely to remain so because the Treaty does not

---

8 Only four of the fourteen farmers I interviewed in Khulna reported that they cultivate boro rice, and three of these were wealthy landowners who could afford to bore deep tube wells.

9 Interview conducted on 27 March 2014 with a farmer in Khulna, Bangladesh.
define what constitutes harm nor how a given harm may be attributed to the other party’s actions (Rahaman, 2009). Furthermore, the agreement inadequately prescribes how disputes may be resolved (Adel, 2002; Rahaman, 2009). Such omissions are consistent with Woodhouse & Zeitoun’s (2008, p. 110) observation that ‘[a] poorly written treaty is unlikely to provide the legal basis to remedy a dispute arising from the covert use of power’.

Furthermore, Articles IV–VI guide the establishment and administration of a Joint Committee, which according to Article VII is responsible for investigating any disputes. However, should a dispute remain unresolved, the issue is passed on to the Indo-Bangladesh Joint Rivers Commission, and then on to the central governments. No clear arbitration mechanism or protocol is identified (Rahaman, 2009), which means that any dispute in which both parties are sufficiently invested could be mired indefinitely in gridlock. Such a scenario would likely have little impact on India as the upstream country, but could have grave consequences for Bangladesh.

India’s unilateral dispossession of water owed to Bangladesh during the critical dry season therefore demands redress, especially in light of evidence that diverted flows to Kolkata have done little to mitigate the sedimentation problems that motivated construction of Farakka Barrage in the first place (Sanyal, 2003; Prakash, 2007). Despite India withholding this water, such discrepancies are unlikely to account for the full gamut of grievances discussed above. For instance, there is little basis for assertions that India is responsible for Ganges floods given the lack of storage capacity at Farakka, as well as the inevitability of flooding in Bangladesh due to its position within a massive floodplain (see also Zaman, 1993). Claims of increased navigational hazards due to activities in India are equally problematic (Table 1). The tidal rivers of Bengal are capricious, unstable entities – dynamic erosion and deposition of river boundaries, tidal bores, the coupling of peak monsoon flows and high tides, and shifting sand bars have posed hazards to navigation for centuries (Begum, 1987; Jansen et al., 1989; Majumdar, 2010).

The fact that there are hydrological hazards in Bangladesh is uncontroversial. However, individual explanations for these hazards diverge and do not always sustain scrutiny. When considered in aggregate, accounts by residents, water managers, academics, and the media provided a coherent message of discontent with the implementation and outcomes of the treaty. Taking this sentiment seriously prompted me to further interrogate the data, which revealed that India unilaterally diverts water to Kolkata at a time when the viability of many crops in both countries is at its most vulnerable stage. Given this inopportune timing, significant water withdrawals by India are likely to be more keenly felt and therefore leave a disproportionate impression on Bangladeshis about overall water sharing dynamics between the two countries. Thus, it becomes clearer why Bangladesh pleads for cooperation while India maintains that it already is cooperating.

The question of cooperation. The Stockholm International Water Institute (SIWI) optimistically proclaims that ‘regional cooperation on transboundary waters is a public good that benefits all parties’ (SIWI, 2016). Certainly in the abstract, international cooperation is unambiguously positive. However, actual international cooperation is always concrete, never abstract. Idealized notions of international cooperation framed in vague, decontextualized terms make for good sound bites but are woefully insufficient for addressing the multidimensional, cross-sector challenges that characterize the vast majority of transboundary water disputes.

By analyzing field-based interviews, academic accounts, and media coverage in conjunction with fine-scale examination of a water-sharing treaty, this case has demonstrated that cooperation is a
subjective, contingent, disputed, and ambiguous concept. The absence of such nuanced detail in so much international cooperation propaganda (e.g. UN Water, 2013; International Centre for Water Cooperation (ICWC), 2016) may go some way to explaining why ‘unquestioned and loosely-defined understandings of ‘cooperation’ [have] become the norm’ (Jägerskog & Zeitoun, 2009, p. 11). If international water scholars and practitioners are committed to promoting equitable and just water resource governance, then we must better account for the complexity of cooperation in practice. As I have done above, we must investigate concrete particulars such as water flow, precipitation, and seasonal usage rather than celebrating cooperation as a vague ideal.

Conclusions

It is understandable why the 1996 Ganges treaty would be celebrated as ‘one of the world’s successful examples of a peaceful resolution to a long-drawn river water dispute’ (Hossain, 1998; see also Pandey, 2014, p. 651). Over a 25-year period (1971–1996), the governments of India and Bangladesh convened over 100 meetings during which long-term conflict resolution remained elusive. A series of short-term agreements helped alleviate tensions, but overall this period was marked by great uncertainty and distress for Bangladesh, which lacked any assurance of dry season flow and suffered from India’s periodic unilateral water withdrawals (Abbas, 1982; Crow et al., 1995). Finally, as two World Bank legal advisors observed, ‘[a]fter a number of short-term legal instruments, India and Bangladesh [were] able to resolve their long and bitter dispute over the Ganges through a 30-year Treaty’ (Uprety & Salman, 2011, p. 651).

This sanguine evaluation of the Treaty was only partially true. Treaty ratification was a major event structuring water use and access in South Asia, and it has provided critical assurance of water flow to Bangladesh during the dry season. The treaty thus solved the conflict of India unilaterally diverting water to Kolkata. At first glance, my quantitative analyses of 20 years of water-sharing data during the active period of the treaty appeared to corroborate the assessment that the treaty is working effectively. Indeed, my preliminary examinations indicated that India has been releasing more than the mandated volumes to Bangladesh during the dry season (Figures 2 and 3). This was a surprising discovery and one that seemed to discredit vociferous claims in Bangladesh that India has not been abiding by the terms of the agreement. However, understanding cooperation as ‘an iterative and non-linear process’ (Kistin, 2007, p. 4), it becomes clear that new conflicts have emerged in the midst of an active cooperative agreement.

The treaty mandates a specific quantum of water that India must release to Bangladesh during every 10-day period of the dry season. I presented hydrological data that show that India frequently deprives Bangladesh of its due share of water during the critical period (March 11–May 10) when water demand in both countries is most acute (Table 2). Moreover, by releasing more water than required during the remaining water-sharing periods, India can claim within almost any given year that it is complying with the agreement (Figures 2 and 3). These findings highlight how focusing on interstate cooperation obscures the ways that formal agreements can lead to inequitable outcomes at other scales (see also Sneddon & Fox, 2006; Mustafa, 2007).

I now return to the first question I posed: ‘Just what is cooperation, anyway?’ For India, cooperation means at least in part adhering to the rule of law. In the case of the Ganges River, this entails releasing to Bangladesh the volumes of dry season water to which it is legally entitled, and by this measure India has
been duly obliging. For Bangladesh, cooperation might take on another meaning, one where water is not only shared according to seasonal averages but to specific periods on which the success or failure of crops, fisheries, and livelihoods hang. Therefore, the problem with cooperation is not only that policymakers and academics define it in circular terms, treat it as inherently good, or view it as the linear opposite of conflict. An additional problem with cooperation is that it means different things to different people.

The workshop in Geneva that I described at the outset tasked participants with sharing their positive experiences with transboundary water cooperation in order to encourage its broader adoption. The analyses presented here, however, seriously challenge the very premise of that event. While prevailing abstract notions of cooperation treat it as unambiguously positive and worthwhile, the upshot of this study is that academics, practitioners, and policymakers must evaluate cooperation as emerging from and operating within specific historical, political, cultural, and economic contexts. Such situated analyses reveal that the practice of cooperation may lead just as directly to unjust outcomes as equitable ones.

Acknowledgements

This article is based on dissertation fieldwork that was generously funded by a Fulbright IIE Graduate Research Fellowship. The author wishes to gratefully acknowledge this support.

References


Strategic Foresight Group (SFG) (2013). Rivers of Peace: Restructuring India Bangladesh Relations. Strategic Foresight Group, Mumbai, India.


Received 21 July 2016; accepted in revised form 22 December 2016. Available online 15 March 2017.