Statistics about water resources abound. Some, like the combined length of rivers in the United States (3.5 million miles), make for interesting but forgettable trivia. Others, like the number of people who experience severe water scarcity each year (four billion), declare an issue of urgent and global concern. The staggering magnitude and profound implications of this water crisis alone are difficult to comprehend, and yet the calamity is even further compounded by climate change and international politics.

Climate change is augmenting the variability of a resource that is already unevenly distributed seasonally and geographically. Some arid regions like Mongolia are becoming drier, and humid areas such as Myanmar are receiving more rainfall. Glaciers have been described as reservoirs of fossil water because they are not replaced once melted, and although glacier response to climate warming is not uniform, thousands of Himalayan glaciers are on track for dramatic retreat or disappearance (Figure 1). This is particularly a concern for the more than one billion people in Asia who rely on glacially-fed rivers. Meanwhile, floods and storms are battering landscapes with increasing frequency and intensity, and droughts have helped fuel record-breaking conflagrations in Russia and Indonesia in recent years.

Water is also a mobile resource, compelled by gravity to flow from higher elevations to lower ones. This mobility serves valuable ecosystem (sediment transport) and economic (hydropower) functions, among many others, but it also adds important political dimensions to the issue of water governance. Thousands of rivers carry precious water resources across national boundaries, thereby complicating relations between states, some of which, like China and Vietnam, face preexisting and ongoing tensions. Consequently, water management and distribution that would otherwise be domestic matters for national and subnational governments to address become thorny international issues in the case of transboundary rivers, lakes, and groundwater.

Against the sobering backdrop of widespread water scarcity, climate change, and international politics, headlines and reports proclaiming impending wars over water seem reasonable. To be sure, various actors from academic, policy, and news arenas have been dispensing dire warnings of armed conflict for decades, portraying it as a logical consequence of growing human demand for a finite and essential resource. However, a reflection on key insights from the field of international hydropolitics reveals why water wars have failed to materialize and are unlikely to do so in the future. This essay then considers two cases in South and Southeast Asia to illustrate how international water conflicts are more likely to engender everyday forms of violence rather than the spectacular violence envisioned in the notion of water wars.

This article thus highlights two problems with the way we typically think about international water conflicts. First, war over water is extremely improbable but continues to claim an undue amount of our attention. Second, focusing on the perceived threat of water wars at some unspecified point in the future interferes with our ability to recognize and address the ordinary violence involving water that already exists. I describe everyday violence as "mundane" not to suggest that it is normal and therefore is not a problem, but to argue that it is a problem precisely because it has become normalized.

Water Scarcity

In technical terms, "severe water scarcity" means that the net surface water and groundwater withdrawal in a defined area exceeds the available water by a factor of two or more, after accounting for environmental and upstream water demands. In some cases, water scarcity is a result of climatic factors, and there is simply insufficient water delivered to an area to satisfy demand. Other cases, understood as economic water scarcity, can be attributed to inefficient water use or poor management of otherwise-sufficient volumes of water. Whether water scarcity is physical or economic, the outcome is the same—demand for a resource necessary for life outstrips its supply and
environmental flow requirements are not met (think, for instance, of the water needed to sustain wetlands or inland fisheries).

Water scarcity is especially acute in Asia, where nearly half of all people facing severe water scarcity for at least one month per year (1.9 billion) live in India and China. Meanwhile, those who suffer such shortages throughout the year number 500 million globally, with 180 million residing in India and another seventy-three million in Pakistan. The effects of such deprivation are enormous, extending beyond immediate household needs for cooking, bathing, and personal consumption. Among the far-reaching impacts of water scarcity are food insecurity due to crop failure, the decline of fisheries, loss of income, diminished industrial output, loss of navigable routes, and salinization of soil and groundwater. Global agricultural losses from salt-induced land degradation have been estimated at US $27.3 billion per year, and in Bangladesh, which already contends with significant crop losses due to cyclones and extreme flood events, 12.6 percent of all arable land is affected by salt damage.3

It is a painful irony for those living with such profound water insecurity that there is, in fact, enough water on Earth to satisfy our global annual demand. However, like many challenges, the remedy to the problem of uneven water distribution is notoriously more elusive than its diagnosis. Supplying water where and when it is needed is complicated by the issue of weight, and, as a heavy substance, water is energetically and economically expensive to transport. Some analysts point to virtual water as a possible solution, referring to the water embedded in grain and other commodities that can be transported at a fraction of the cost of bulk water distribution.4 Egypt, for example, is the largest importer of wheat in the world and has been importing food to compensate for its water deficits since the mid-twentieth century. However, Egypt’s reliance on virtual water serves more as a cautionary tale than an exemplar. About half of Egypt’s wheat is grown in Russia, one of the world’s largest wheat exporters. In 2010, Russia banned grain exports in response to severe drought and wildfires that claimed 20 percent of its crop, leading to a 50 percent spike in wheat prices internationally (Figure 2). Thus, while food imports may alleviate the immediate threats of water scarcity, it can expose populations to sudden and dangerous fluctuations in international markets, thereby shifting insecurity from water to food, energy, or other key sectors of society. Given the magnitude and consequences of regional water deficits, water occupies ever greater attention in politics. But will competition over water foment full-scale warfare?

**Water Wars**

National governments exercise exclusive control over the legitimate use of violence. Therefore, the principal concern about armed conflict over water is not about that occurring within states but between them, and there would be little talk of wars over water were it not for transboundary river basins. These are hydrologically connected water bodies, including rivers, lakes, and aquifers, that are shared by two or more countries. There are 286 transboundary river basins across the world, and almost every non-island nation lies partially or wholly within one (Figure 3).

While the exact number of transboundary water bodies has fluctuated with changes in hydrology and the configuration of political territories (more states mean more international rivers), unequal distribution and access to water have underpinned international resource disputes for centuries. However, in the 1980s, enduring and intensifying conflicts between states on the Nile, Jordan, and Indus Rivers catalyzed a new way of framing international water problems, namely that tensions over shared water resources would lead to war.5 This so-called water wars thesis predicts an escalating response to water scarcity in which anxiety over diminishing transboundary resources leads to conflict and ultimately culminates in violence.
This argument has intuitive appeal; the presence of antagonistic nations encompassing arid landscapes, shared rivers, and rapidly expanding populations lend themselves to such analysis. Armed conflict has long been occurring between India and Pakistan, who mutually depend on the highly developed Indus River system, and former Egyptian President Anwar Sadat famously stated in 1979, "The only matter that could take Egypt to war again is water."6

Some cases of armed skirmishes over international water bodies have indeed been documented. Over the past 400 years, there have been two cases in which gunfire was exchanged between states due to water conflict.7

In the mid-1960s, Israel and Syria volleyed shots over Syria’s construction of a Jordan River diversion project, which was halted in 1966.8 In the other case, localized violence flared in 1992 between Uzbekistan and Turkmenistan over the diversion of drainage water in the lower Amu Darya region.9 However, neither case constituted a war. Rather, sustained examination of the relationships between water, climate change, and security caution against facile theories that link resource scarcity and war in any predetermined way. Political scientist Idean Salehyan warns, "The overly structural logic linking climate change to armed conflict ignores human agency, ingenuity, the potential for technological innovation, and the vital role of political institutions in managing conflict."10 Straightforward predictions of increased conflict with greater water scarcity have similarly been refuted; extensive longitudinal analysis reveals that no war has been waged over water in 4,500 years.11

Two perspectives drawn from the literature on international hydro-politics illuminate why prognostications about water wars have failed to bear out. Hydro-diplomacy and hydro-hegemony both build on empirical evidence that states sharing a water body are more likely to settle their disputes through peaceful rather than violent means. However, each framework offers a different explanation of why that is so.

**Hydro-Diplomacy**

As commentators from diverse fields and corners of the world were sounding the alarms over the specter of water wars, one enterprising geographer by the name of Aaron Wolf decided to test the water wars thesis by interrogating the historical record. He and his colleagues at Oregon State University amassed a wealth of data regarding interstate interactions over transboundary water resources over a fifty-two-year period (1948–1999).12 They scored each interaction according to a fifteen-point scale that encompassed strategic alliances, official articulation of mutual goals, economic hostile actions, and war acts, among several others. The results of the analysis were striking: the researchers discovered that events were overwhelmingly cooperative or neutral (72 percent), while only 28 percent were conflictive. Even among conflictive interactions, the vast majority (82 percent) were mild (verbal hostility), and none involved war.13

The Indus Waters Treaty is a noteworthy example that, once signed, many treaties are remarkably durable instruments. The 1947 Partition of British India that established India and Pakistan as independent states had myriad impacts. One of these was that the new borders endowed India with all the headwaters of the Indus River System, upon which West Pakistan was wholly dependent for irrigation and hydropower. Suddenly,
West Pakistan was forced to pay for water over which it previously held rights, and vociferous disputes between the two countries ensued. However, after twelve years of stymied negotiations, the two countries agreed in 1960 to divide the Indus Rivers equally, signing a treaty that has been upheld despite wars between India and Pakistan in 1965 and 1971 (Figure 4).

Advocates of hydro-diplomacy note that even countries with long-standing rivalries will work to find common interests and develop creative approaches to alleviate water conflicts. Hydro-diplomacy comprises a range of cooperative mechanisms to resolve water disputes, including joint river management, monitoring systems, data sharing, and treaties. Such approaches are argued to not only circumvent the evident drawbacks of armed violence, but they can also lead to shared benefits, such as improved water resources management, trust-building, hydropower production and power trading, ecosystem sustainability, and so on.13

Attention-grabbing headlines continue to foretell of unprecedented violence over water, but many experts now dismiss the notion of want of compelling evidence. Others argue that diplomacy only partially explains the absence of water wars and focus instead on power relations between states.

**Hydro-Hegemony**

In international water law, a presumed parity exists between states and their respective claims to water resources. By emphasizing the importance of treaties and the legal principles upon which they are based, hydro-diplomacy too assumes a general equality among states. However, as Wolf’s work was gaining traction in the mid-2000s, a research team in Europe was approaching the water wars thesis from a rather different perspective.

Mark Zeitoun, Jeroen Warner, and other members of the London Water Research Group (LWRG) observed that rather than operating from positions of equal footing, states engaged in competition over water typically possess different strengths and weaknesses. Within a region, some states may wield more power through military and/or economic dominance, which they can use to influence the terms of agreement to their advantage, even to the detriment of other parties. Legal instruments can therefore be used by powerful states (hegemons) to exploit existing power asymmetries and secure for themselves the benefits of transboundary water resources. Weaker states may have little recourse to resist or alter unfair conditions given their inferior position relative to the stronger state. India, for instance, negotiated an agreement in 1954 with Nepal regarding the Kosi River that provided India with a disproportionate share of benefits in terms of hydropower, irrigation, and flood control. By paying attention to differences in relative power between states, Zeitoun and Warner therefore regard many water treaties and other cooperative arrangements as the codification of asymmetrical power dynamics rather than triumphs of diplomacy. The ability of powerful states to dictate the terms of an international water governance regime through persuasion, incentives, coercion, pressure, or other means is known as hydro-hegemony.14

The framework of hydro-hegemony advances its own explanation for the absence of water wars. In contrast to hydro-diplomacy and its privileging of the importance of interstate cooperation, hydro-hegemony recognizes how unequal power relations may function to suppress armed violence between countries competing for water. In other words, “A significant factor preventing war over water is that the actions of nonhegemonic states usually comply with the order preferred by the hegemon, whose superior power position effectively discourages any violent resistance against the order.”15

Regardless of whether the analysis is conducted through the lens of hydro-diplomacy or hydro-hegemony, the conclusion remains: future war over water is exceedingly improbable. As we will discover, however, this truth is little cause for celebration. There has been no evidence of a water war for millennia, but subtler, unspectacular forms of violence involving water occur every day. We now turn our attention to this type of violence.

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**Mundane Violence**

The Ganges River basin is the most densely populated in the world, and India claims the longest stretch of the 2,525-kilometer-long (approximately 1,568 miles) river. Although Bangladesh occupies a mere 5 percent of the basin catchment, a third of Bangladesh’s land area relies on the Ganges River and its distributaries for surface water and sediment flows that sustain the country’s robust agricultural systems, productive inland fisheries, and complex network of navigational routes. However, upstream water development in India has been redirecting the river’s dry season flows away from Bangladesh since the mid-1970s. India’s unilateral commissioning of the Farakka Barrage, a diversionary structure sixteen kilometers (approximately ten miles) upstream of Bangladesh (Figure 5), brought the two states into sharp conflict, and they eventually signed a thirty-year treaty in 1996 after decades of dispute.

The Ganges treaty stipulated water allocations to each country during the dry season and was hailed as a landmark achievement of international diplomacy. It continues to be regarded as exceptional because it is the only water treaty between the two countries, despite repeated promises to conclude agreements over their fifty-three other shared rivers. However, complaints about water deprivation in Bangladesh have persisted, while India has maintained that it is complying with the treaty. A recent analysis of river flow data (1997–2016) revealed that, in accordance with the agreement, India indeed typically releases the mandated volumes of water over the dry season as a whole, but India also regularly withholds vital water resources from Bangladesh during the driest period of the dry season, when water scarcity is most acute.16 The result is that residents in southwestern Bangladesh report tremendous suffering from saline intrusion that renders drinking water nonpotable and irrigation water destructive to crops. The diminished river flows have also been implicated in reduced fish catches and obstructed navigational routes upon which Bangladeshis rely for 60 to 80 percent of their dietary protein and for the bulk of regional transportation and commerce, respectively. However, the fact that India generally complies with the water sharing agreement affords Bangladesh little opportunity for recourse, especially since the treaty does not specify a clear arbitration mechanism or protocol for concluding unresolved disputes. Therefore, the likely outcome of this situation is that Bangladesh will continue to pay for India’s intermittent but deleterious deviations from the treaty.

As we have already learned, rivers are valued as channels for transport, habitats for wildlife, and conveyers of nutrient-rich sediments. Therefore, conflicts over international rivers are not only confined to issues of water withdrawal and diversion. When construction was completed in 2010, the Nam Theun 2 Power Project (NT2) became the largest, most sophisticated hydropower dam in Laos. The dam has the capacity to generate 1,070 megawatts of energy and is billed by the World Bank, a key supporter of the project, as an opportunity for Laos to “generate revenues through an environmentally and socially sustainable development of NT2’s...
International water conflicts are more likely to engender mundane rather than spectacular forms of violence.

Unfortunately, the project has fallen woefully short of its social and environmental goals. By late 2013, two geographers observed striking changes in the water level and ecology of the river about thirty kilometers (approximately nineteen miles) downstream of the dam. Their observations were corroborated by a villager who witnessed a peculiar pattern of lower water levels on the weekends and greater flows during the week. Further investigation revealed that river flows downstream of the dam correspond with electricity demand in Thailand, whose government wields considerable influence over the generation of hydropower in Laos. The ownership structure of the project facilitates such an arrangement; during the first twenty-five years of operation, the Electricity Generating Authority of Thailand owns even more of the NT2 (35 percent) than does the government of Laos (25 percent).

Despite the stated intentions of the NT2 to yield development benefits for Laos, 93 percent of the energy generated is directed to Thailand, where there is substantial urban energy demand for cooling large buildings. Winter weather translates to less need for power in Thailand and therefore less water being released through the dam to generate electricity. Conversely, peak energy consumption and concurrent increases in river flows occur on hot, sunny days during the dry season, when air conditioners are most in use. One of the most egregious applications of the NT2's output is the electrification of the enormous Siam Paragon mall, which in 2011 consumed 123 gigawatt hours (GWh) of electricity—nearly twice as much as the northern Thai province of Mae Hong Son with a population of more than 250,000 (65 GWh).

River flows dictated by human consumption patterns have tragic but predictable consequences. People in Laos living along the river downstream of the dam have registered complaints ranging from reduced water quality to vegetation loss to riverbank erosion. Once-productive fisheries have experienced significant declines, with associated impacts on human nutrition and livelihoods. Although the infrastructure in question is domestic rather than international, residents’ options to pursue meaningful reforms are as circumscribed as those in Bangladesh. The more than 150,000 Laotian people who depend on this reach for their livelihoods are unlikely to take any comfort from the knowledge that the dam’s reservoir has an expected life span of 500 years.

Conclusion

The existence of a vast and growing human population experiencing water scarcity has for decades underpinned expectations of water conflicts leading to war between states. Indeed, nearly half of the four billion people in the world suffering from extreme water shortages reside in Asia. Such concerns have only escalated as climate change induces significant shifts in regional water availability. Accordingly, water in Asia has recently been described as a “battleground” and as leading to “a fight like no other.” Despite the rhetoric of water wars, repeated analyses by scholars in the field of international hydropolitics indicate that these fears are largely misplaced. Proponents of hydro-diplomacy point to the historical record to argue that while water can certainly be a source of conflict, it has also served as a catalyst for peace, as evidenced by the fact that over 3,600 water-related treaties were signed between the years 805 and 1984. A less sanguine perspective of international water cooperation is assumed in the framework of hydro-hegemony, which recognizes that military and economic differences between states place weaker countries in no position to wage war against more powerful neighbors.

The essay proceeded from the consensus that war over water is exceptionally unlikely. A brief reflection on infrastructural developments on international rivers in South and Southeast Asia shifted our attention away from armed conflict to everyday forms of violence. The case of the Farakka Barrage and India’s dry season use of the Ganges reveal that Bangladeshis living downstream of the diversion periodically experience acute water stress despite India’s broad adherence to a key water-sharing treaty. In Laos, the Nam Theun 2 hydropower dam was ushered into existence in 2010 with promises of greater development for Laos, but villagers downstream of the dam complain of wide-ranging water problems that result from dam operations that privilege energy needs in Thailand over the ecology of the river. Millions of people quietly suffer from the consequences of these practices with little alternative, thereby demonstrating that international water conflicts, while a persistent reality, are more likely to engender mundane, quotidian forms of violence rather than the spectacular violence envisioned in the idea of water wars.
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