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Water Conflict Pathways and Peacebuilding Strategies

By David Michel



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ABOUT THE REPORT

This report explores water-related conflict pathways and articulates potential peace-building strategies to mitigate conflict risks. The report is grounded in a survey of the academic literature on natural resources conflict, case studies of three major basins, and participant interviews and documentary analyses of water diplomacy processes.

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Cover photo: A woman walks along a dry lake bed near the Rawal Dam in Pakistan on June 22, 2018. (Photo by B. K. Bangash/AP)

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Summary



Growing populations and economies, unsustainable management practices, and mounting environmental pressures are exerting increasing strains on the world's vital freshwater resources. Resulting shortfalls between rising demands and shifting supplies could engender or exacerbate water conflicts among countries or communities attempting to ensure their share.

History furnishes little evidence of outright water wars, but violent international water-related confrontations do occur and frictions over water can contribute to fueling civil conflicts within states. A range of indirect factors including political institutions, economic conditions, and societal values and perceptions affect the relationship between water insecurity and conflict risks. Inequitable allocation of the costs and benefits of water development and inadequate access to decision-making procedures around shared waters can loom larger in generating conflict than the unequal allocation of or inadequate access to the physical resource itself.

Studies examining the actors, drivers, and contexts engaged in different types of water conflicts may help to develop early warning indicators for emerging risks and contribute to crafting tailored conflict reduction approaches and targeted peace-building strategies. Many of the world's shared waters most vulnerable to potential water conflicts are marred by a dearth of effective governance mechanisms and distrust and dissension among water users that frustrate sustainable cooperation.

Water diplomacy, formal and informal engagements undertaken by state and nonstate actors not party to the water conflict, can constructively shape the context and collective decision-making frameworks for collaborative water resources management. By working to enhance the conflict parties' water governance resources and capacities, promote cooperative decision-making processes and inclusive policy institutions, and facilitate peaceful dispute resolution, water diplomacy can contribute to building the environmental and societal resilience to sustainably manage future water resource challenges.



Modeste Traore, a 56-year old fisherman, propels his fishing boat along Lake Wegnia, in the Sahel region of Koulikoro, Mali, on November 23, 2019. (Photo by Arouna Sissoko/Reuters)

Water Insecurity and Conflict Risks

Water politics, like all politics, in the classic formulation of Harold Lasswell, is a question of who gets what, when, and how. And like all politics, conflict can arise around each and every element of the equation.

Modern society depends on adequate water supplies for agriculture and industry, to generate power, ensure public health, and maintain essential ecosystems. Yet growing populations, soaring demand, unsustainable management practices, and mounting environmental challenges are imposing increasing burdens on the world's critical freshwater resources. Global climate change threatens to intensify these strains, upsetting precipitation patterns and altering river flows in every inhabited basin on the planet. Resulting shortfalls between rising demands and shifting supplies could foster or worsen water conflicts among countries or communities attempting to secure their share.

Many regions now face unremitting water stress as rivers, lakes, and groundwater aquifers bump against the limits of their renewable capacity. In several major river systems, yearly water withdrawals nearly equal or even exceed long-term flow balances and ecosystem needs.¹ In many major aquifers, withdrawals surpass natural rates of replenishment, progressively exhausting groundwater reserves.² Considering both surface and groundwater together, one global assessment found that 2.9 billion people currently live in areas facing severe water scarcity (where total net water withdrawals outstrip renewable supplies) for at least four months of the year. For half a billion people, net demand exceeds supply all year round.³

Figure 1. Water Conflict Pathways

Environmental factors, political institutions, economic conditions, and societal values and perceptions affect water insecurity and conflict risks.

WATER SERVICE PROVISION

In 1999, Bolivia privatized the municipal water company in Cochabamba. Fearing expropriation of communal water systems, residents and farmers launched a wave of strikes and blockades that saw the government declare a “state of siege” before ultimately returning the utility to public management.

WATER AS A TOOL OR TARGET OF WAR

Government forces in Syria purposely destroyed water plants and pumping stations in the besieged city of Aleppo. In Iraq, ISIS seized control of dams in Fallujah, Haditha, and elsewhere, using them to flood or cut off water supplies to Shiite and government-held areas.

WATER DISASTERS

Calamitous flooding devastated Thailand in 2011. Led by opposing political parties, the national and Bangkok city governments operated drainage systems under their control to protect favored constituencies while inundating political rivals. Popular discontent erupted, including violent riots and illegal breaching of flood gates.

WATER AND BORDER DISPUTES

In 2010, Nicaragua landed soldiers and construction crews on the opposite banks of the San Juan River in a military incursion to dredge the channel, asserting that infrastructure works by Costa Rica had modified the watercourse and changed the border.

ENVIRONMENTAL PRESSURES ON SHARED WATER SUPPLIES

Drought and diminished rainfall have shifted the range and the growing conditions for crops and grasses across much of the Sahel, pushing semi-nomadic herders seeking pasture for livestock grazing on to the lands of farmers. Local farmer-herder confrontations periodically escalate into violent intercommunal clashes that can threaten broader instability.

GROWING/CHANGING USER DEMANDS

Petroleum exploitation in Nigeria’s coastal Niger River Delta has dramatically degraded the region’s water quality, poisoning streams and groundwater, fisheries and fields. Ethnic rebel groups regularly cite the Delta’s contamination among the grievances motivating their attacks on international oil company operations and violence against the state.

CONSTRUCTION/OPERATION OF INFRASTRUCTURE ON A SHARED WATERWAY

Since the 1970s, Turkey has developed massive infrastructure programs in the Tigris-Euphrates Basin. Blaming Turkish dams for decreasing water supplies, Syria supported the PKK insurgency against Ankara to counter Turkey’s alleged manipulations of Euphrates river flow, precipitating serial military crises over the ensuing decades.

RESOURCE EXPROPRIATION/ACCESS TO DECISION MAKING

Maoist rebels in India rally to the slogan “Water, forest, land, respect and rights” (*Jal, jungal zam- een izzat aur adhikar*) against development policies that have dispossessed and displaced indigenous and rural poor communities from communal lands and water supplies.

Humans impact freshwater systems not only by the resources they remove from them but by the pollutants they release into them. Water pollution has deteriorated in almost all the rivers of Africa, Asia, and Latin America since the 1990s.⁴ Worsening water quality in turn effectively lessens available water quantities, rendering some sources too degraded for certain uses.

Strains on world water resources are rising. In the coming decades, global population will grow from 7.7 billion people to 9.7 billion in 2050. The global economy, according to OECD projections, will more than double. World water needs will largely climb in tandem with population and economic growth. Global models calculate freshwater withdrawals will jump anywhere from 20 percent to 33 percent from 2010 levels by 2050, propelled by surging demands from manufacturing, power production, and domestic use.⁵

Climate change threatens to compound water resource challenges, affecting both demand and supply. On the demand side, global warming will increase water claims for industrial cooling and household use. All else being equal, rising temperatures would reduce potential crop yields and crop water productivity, boosting irrigation demands. Estimates of the incremental water needed to meet growing agricultural needs in a warming world vary from an additional 40 percent to 100 percent more than what would be required absent climate impacts.⁶

On the supply side, global warming will accelerate Earth's hydrologic cycle, disrupting fundamental hydro-meteorological mechanisms. Elemental patterns and processes such as the timing and amount of rain and snowfall and the onset of the monsoon may shift or falter. Long-term alterations in the volume, timing, location, and form of precipitation (whether it falls as rain or as snow) could scramble the seasonal availability or shuffle the geographic distribution of crucial water supplies for communities and ecosystems around the world. In addition to exerting chronic pressures on water resources, climate change is expected to elevate the probability of

more acute water-related disasters. Annual flood disasters around the world roughly quadrupled from 1980 to 2014. Drought episodes doubled over the same period. Climate models project extreme storms, floods, and droughts will become more frequent and severe.⁷

All told, by 2050 the combined effects of socioeconomic pressures and climate change could plunge as many as 1.3 billion more people into conditions where water needs will consistently exceed the available surface water supplies.⁸ Such figures portend potentially wrenching collisions between growing water needs and available water supplies. Some 42 percent of the global labor force work in heavily water-dependent sectors, such as agriculture, mining, and fisheries.⁹

Rising water insecurity endangers these livelihoods and the economies and communities they support. Droughts cut crop yields and curb energy production. Floods destroy capital and infrastructure. Beyond the economic losses, the human toll is harrowing: unsafe and insufficient water supplies account for 9 percent of the global disease burden and more than 6 percent of all deaths worldwide.¹⁰ Without effective policy changes to adapt to global warming, by 2050, water scarcity impacts could depress economic output by 7 to 12 percent throughout much of Africa and Asia, and by up to 14 percent across the Middle East.¹¹

Fortunately, policymakers increasingly recognize the potential threats posed by water insecurity. The World Economic Forum ranks water crises among the most likely and most impactful global risks of the coming decades. European Union policymakers, the US intelligence community, and the UN Security Council have all stated that water challenges could contribute to destabilizing key countries, aggravate social disruptions in fragile states, and endanger global peace and prosperity.¹²

No modern states have ever declared war over water. Nations dependent on shared water sources have collaborated far more frequently than they have

clashed. Some hostile neighbors have continued to cooperate over water even as their armies sparred. Nevertheless, global surveys have counted forty-four hostile, militarized international actions over water, from riots to border skirmishes to larger battles, in the sixty years from 1948 to 2008.¹³ Large-scale studies covering hundreds of transboundary basins through the nineteenth and twentieth centuries have concluded that countries sharing a river experience notably higher levels of international conflict, particularly where upstream-downstream configurations in the basin create power differentials between riparians.¹⁴

Nor is interstate warfare the only threat to security and stability posed by rising pressures on common waters. Many potentially combustible water disputes involve subnational and nonstate actors, such as insurgencies and separatist groups. Tensions surrounding water resources availability, access, and development—especially when channelled or aggravated by ethnic, religious, or other socioeconomic or cultural differences—can stir antagonisms that may animate civil strife or intercommunal rifts.¹⁵ Internal conflicts can be as destructive as international ones, and are far more common. Civil wars have killed more people than interstate conflict every year since the 1970s.¹⁶ Further, internal conflicts often provoke humanitarian crises, destabilizing communities, displacing refugees, embroiling neighboring countries, and drawing in outside interventions.

Recent research seeking to discern relationships between water stress and violent conflict has delivered mixed results. Some statistical studies conclude that water scarcity can increase the likelihood of international hostilities between riparian states without reaching the level of outright warfare. Other studies indicate that water scarcity and extreme variations in rainfall raise the risk of civil conflict within states. Still other evaluations report weak or no correlation between shifting water availability and collective violence. Even the most exacting

of these quantitative analyses, however, confront data challenges and methodological questions that make it difficult to draw more general conclusions.¹⁷

Few analysts argue that water stress or environmental change directly cause conflict in a deterministic stimulus-response relationship—that is, in which resource scarcity inevitably leads to violence. Rather, a range of indirect factors, such as when and where water stresses occur relative to demand, the importance of water-dependent sectors in the economy, and the existence and efficacy of coping capacities—including technical infrastructure, management mechanisms, and financial and material resources—influence the nature and extent of impacts on societies.¹⁸ Water stress impacts in turn interact with contextual elements such as power asymmetries between actors, ineffective governance, and economic inequalities to create contingent combinations of circumstances that may contribute to catalyzing conflict.¹⁹

Political institutions, economic conditions, and societal values and perceptions shape how communities apprehend and address water resource challenges, mediating between water insecurity and conflict risks.²⁰ Importantly, water conflict dynamics frequently revolve not around environmental changes and resource pressures but around governance policies and practices. Inequitable allocation of the costs and benefits of water management and inadequate access to decision-making procedures around shared waters can loom larger in generating conflict than unequal allocation of or inadequate access to the physical resource itself. Inequality, exclusion, and the sense of shared injustice at such marginalization may galvanize collective grievances that can mobilize violent actions.²¹ Water politics, like all politics, in the classic formulation of Harold Lasswell, is a question of who gets what, when, and how.²² And like all politics, conflict can arise around each and every element of the equation.



People visit the confluence of the Mali and N'mai tributaries of the Irrawaddy River, near the site of Myanmar's controversial Myitsone Dam project, on March 22, 2017. (Photo by Minzayar Oo/New York Times)

Water Conflict Pathways

Analysts have begun to sketch out potential pathways linking water resource pressures to conflict risks. In 2014, the US Agency for International Development published its toolkit for water and conflict programming, identifying a number of socioeconomic, environmental, and political factors that can contribute to tensions around shared waters, including infrastructure development, weak governance institutions, and climate change impacts.²³ Beatriz Rodríguez-Labajos and Joan Martínez-Alier adopted a political ecology approach, defining conflict types according to the uses of water in different commodity chains.²⁴ Peter Gleick and Charles Iceland classified three conflict triggers—diminished water supplies, increased water demand, and extreme flooding events—and also explore water as a possible weapon or casualty of war.²⁵ A team at the Netherlands Environmental Assessment Agency catalogued several

disparate conflict drivers, including strained and erratic water supplies, the use of water as a military tool or target, and the effects of water stress on such issues as arable land, food prices, and migration.²⁶

This report builds on these studies, characterizing conflict pathways by situating the relationships between the conflict actors themselves, and between the conflict actors and the water resource. Specifying the actors, mechanisms, and contexts engaged in different kinds of water conflicts can enhance our understanding of water security threats. A growing current of research suggests that, in certain circumstances, cooperation to manage shared water resources can help avoid violent conflicts and promote more peaceful relations between riparian states, and foster peacebuilding, reconciliation, and recovery in conflict-affected societies.²⁷ Analyses

Given water risks can evolve dynamically over time, oscillating between peaceful coordination and contention, conflict resolution, and recurrence. In fact, conflict and cooperation frequently coexist, with water users collaborating in some areas even as they quarrel in others.

identifying the catalysts to different conflict pathways may help to develop “early warning” indicators for emerging conflict risks and contribute to formulating appropriate conflict reduction approaches. Similarly, elucidating how distinct conflict pathways may unfold can help illuminate vulnerabilities and pinpoint opportunities and entryways for strengthening water governance processes and institutions to bolster broader systemic resilience to water security risks. Finally, in conflict-affected countries, clarifying different conflict types can help craft targeted peacebuilding strategies and prevent conflict recurrence in postconflict environments.

The United Nations defines water security as “the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.”²⁸ Water conflicts may take forms and follow pathways implicating any of the constituent components of water security—water access, available water quantity or quality, livelihoods and development, water-related disasters, and political processes. (Figure 1 on page 4 lists several examples.) Sources of water conflict, then, include at least the following:

- **Environmental pressures on shared water supplies.** Variations in precipitation patterns, changes in snow and ice melt, and saline intrusion into rivers and groundwater aquifers may alter or disrupt the quantity, quality, or timing of available water resources, potentially engendering or exacerbating competition between contending water users.
- **Water-related natural disasters.** Floods, droughts, and water-related catastrophes can cause significant loss of life and livelihoods, economic damage,

population displacement, and social disruption.

Where government disaster responses are inadequate or inequitable, the state’s failure to ensure the public welfare may spark popular contestation. Large multi-country studies suggest that natural calamities may play such a role in fueling conflict in communities divided along ethnic or political lines. Marginalized populations may then blame the government for worsening the disaster’s impacts or slowing recovery, rendering them more likely to support political violence.²⁹

- **Changing user demands.** Growing user demands, claims from new users, or significant changes in the location, timing, or nature of water uses can strain available renewable resources, creating tensions between consumers.³⁰
- **Construction/operation of infrastructure on a shared waterway.** Constructing and operating infrastructure on shared waterways in the absence of a collective agreement can raise conflicts among different stakeholders. Water infrastructure such as dams, irrigation schemes, and inter-basin transfers can alter water flows and affect ecosystems, fisheries, navigation, and disaster risks. Infrastructure’s economic, environmental, and social impacts may be uncertain or contested, and prospective costs and benefits unevenly distributed, generating frictions between affected parties.³¹
- **Resource expropriation/access to decision making.** Water rights and governance procedures are often poorly defined or subject to arbitrary control by the government or economic elites. State authorities may undertake infrastructure projects, implement management policies, or expropriate water resources without the effective participation of or consultation with relevant stakeholders. Governments or other actors may in this way engage in “water grabbing,” utilizing their power to appropriate land,

water, and associated resources to control their use, spawning potential conflicts over resource exclusion and access to decision making.³²

- **Water service provision.** Access to adequate safe water is a fundamental human need. The abilities of civil authorities to ensure water and sanitation services stand as highly visible measures of state “performance legitimacy.” Government incapacity to provide these public goods (on acceptable terms) can erode the social compact, stirring popular discontent.³³
- **Water and border disputes.** Rivers form over a third of the total length of international land boundaries. Natural processes such as erosion, however, can alter river courses and lakeshores, affecting the boundaries they define. Some border delineations do provide for periodic adjustments. Some water body shifts, though, have engendered violent confrontations.³⁴ With climate pressures and societal demands growing, human management will increasingly impact the world’s shared waterways, raising the possibility of increased conflict over water-related boundary modifications.
- **Water as a tool or target of war.** Water sources and infrastructure may be seized or targeted in violent conflicts to leverage control of a territory or population.

Multiple water conflict pathways may interweave. For example, water infrastructure development may enable resource expropriation, exclusionary decision making may amplify disaster vulnerabilities, or water disputes may ramify into confrontations over arable land, fisheries, forests, or other goods that water sustains. Such conflict risks multiply when shared water resources spread across jurisdictional borders, where they are managed by different institutions under different administrative, legal, and political systems.

Given water risks can evolve dynamically over time, oscillating between peaceful coordination and contention, conflict resolution, and recurrence. In fact, conflict and cooperation frequently coexist, with water users collaborating in some areas even as they quarrel in others. By

the same token, water stresses and conflict dynamics can also interact. Water insecurity may constitute a threat multiplier, helping spark violent conflict; violent conflict, in turn, can degrade societal and state capacity, weakening the ability to address water challenges and driving a vicious cycle of fragility and insecurity.³⁵

Crucially, management choices around shared resources may engender water “security dilemmas.”³⁶ Measures taken by one community to uphold its own water security, such as constructing a dam to increase water storage or provide flood protection, may undermine the water security of other communities by altering the availability and control of water resources and shifting each community’s exposure to water risks.³⁷ The US intelligence community judges that as water resource challenges worsen in the coming decades, some states in shared basins might purposely exploit control of water supplies through dams and other infrastructure as a means of putting pressure on other riparians.³⁸ Such veiled coercion of downstream countries by upstream powers could prove as destabilizing as overt violence.

A detailed examination of different case studies can elucidate the particular dynamics at work in distinct conflict types, illuminating the positions and perspectives of the actors engaged while highlighting the importance of specific water security contexts and identifying intersections between different conflict pathways. The case studies in the following sections—on the Indus River Basin, Mali, and Myanmar—illustrate three types of water conflict: construction/operation of infrastructure in the case of the Indus River Basin; resource expropriation/access to decision making in the case of Myanmar; and a combination of environmental pressures on shared water supplies, resource expropriation, and water-related disasters in the case of Mali—as well as different scales of conflict (interstate, intrastate, and intercommunal) and different institutional settings and governance structures for peacebuilding and water conflict management.

Case Study: The Indus River Basin

The Indus River Basin is one of the most important water systems in Asia. Some 276 million people in Pakistan, India, China, and Afghanistan reside within the basin's boundaries, generating an economy of \$380 billion.³⁹

Crucially, the Indus nourishes the agricultural breadbaskets of the subcontinent. Its basin is one of the most intensively cropped and heavily irrigated areas on Earth. Agriculture absorbs 93 percent of all water withdrawn from the Indus River and the basin's underground aquifers.⁴⁰ In Pakistan, where the agricultural sector employs 38.5 percent of the labor force and produces 18.5 percent of gross domestic product (GDP), the Indus Basin waters more than 90 percent of the nation's crops.⁴¹ In India, where undernourishment remains a major public health problem, the basin produces around a third of the rice stocks and more than half of the wheat crop disseminated through the government-run Public Distribution System, helping to promote national food security.⁴² The Indus also holds considerable hydropower potential in a region where hundreds of millions of people lack electricity. Yet growing populations and expanding economies are driving rising water demand throughout the Indus Basin even as environmental pressures and unsustainable consumption practices stretch supplies.

WORSENING WATER STRESS

Yearly water withdrawals in Pakistan have risen by 20 percent since the mid-1970s, while total annual withdrawals in India doubled over the same period. As water requirements have ballooned, many users have turned to wells to supplement or supplant surface water sources. Groundwater now supplies half of all withdrawals in the basin.⁴³ However, unsustainable groundwater abstractions are outpacing natural rates of replenishment. Taken together, net surface and groundwater withdrawals

exceed available resources during half the year or more over much of the basin.⁴⁴ Future population and economic growth will further strain resources. By 2050, according to different demographic and development scenarios, the basin will be home to 346–469 million inhabitants and will host a regional GDP four to eight times larger than today.⁴⁵

Rising water demands risk colliding with a warming climate. Extreme weather events may grow more frequent and intense, presaging greater flooding and drought.⁴⁶ Significantly, the Indus depends on snow and ice melt, particularly during the dry months that bracket the summer monsoon rains. Glaciers in the upper basin function as massive freshwater repositories, seasonally accumulating ice and snow at high altitudes, then releasing meltwaters that contribute 80 percent of the river's yearly flow. Global warming is gradually shrinking the Himalayan glaciers. Greater glacier melt could initially boost river runoff. But as deglaciation continues, meltwaters will subsequently dwindle, diminishing downstream water supplies.⁴⁷ India and Pakistan possess meager capacity to buffer prolonged fluctuations in river levels. Pakistan's reservoirs furnish the water storage equivalent of only thirty-four days of Indus inflows.⁴⁸

Consequently, many analysts foresee worsening water stress in the Indus Basin.⁴⁹ Yet substantial uncertainty clouds regional climate projections and their ramifications for water resources.⁵⁰ Climate impacts will differ between the upper and lower basin and between the eastern and western watersheds. Different models calculate water availability in the Upper Indus Basin could be anywhere from 60 percent higher to 15 percent lower by 2100, even as water demands across the basin will then be considerably greater.⁵¹ In Pakistan, crop production could fall by up to 13 percent, while hydropower

production estimates vary from 22 percent more to 34 percent less, depending on the climate and water risk scenario.⁵² Such uncertainties confound decision makers' ability to weigh the implications of alternative policy choices across diverse objectives and navigate competing claims among different water users.

THE INDUS WATERS TREATY

In the face of growing challenges, hydro-relations between the Indus's main riparians, India and Pakistan, are fraught. The frontier that partitioned British India in 1947, setting India and Pakistan apart at independence, also set them at odds over water. The six main branches of the Indus system run westward through India before crossing into Pakistan. (A seventh major branch, the Kabul River, originates in Afghanistan, entering Pakistan from the east.) The new international boundary bisected these six primary tributaries, as well as the canal networks irrigating the region's agriculture. Upstream India affirmed its sovereign right to develop rivers running on its own territory as it saw fit. Downstream Pakistan, suddenly severed from vital river sources rising beyond its borders, feared that Indian water demands could deprive it of its historical rights to Indus flows, jeopardizing its economy and food security. Persistent tensions between the two states drew the World Bank to mediate their dispute, culminating in the 1960 Indus Waters Treaty (IWT).⁵³

International water treaties typically allocate shared rivers quantitatively, apportioning water to the parties either by volume or as percentages of the flow. The IWT instead divides the Indus physically, splitting the fan of six major tributaries. To Pakistan it allots full use of the three western rivers, the Chenab, Jhelum, and Indus main stem (amounting to about 80 percent of the six rivers' average annual flow). India must allow these rivers to run freely through its territory except for restricted uses related to domestic and agricultural needs and specifically defined purposes of hydropower generation. India in turn receives full rights to the three eastern rivers, the Beas, Ravi, and Sutlej. When these eastern branches exit India, they become available to Pakistan. Critically, the



Adapted from artwork by Peter Hermes Furian/Shutterstock. The names, designations, and boundaries on this map do not imply official endorsement or acceptance by the United States Institute of Peace.

INDUS BASIN

CONFLICT TYPE

Construction or operation of infrastructure on a shared waterway

CONFLICT SCALE

Interstate, primarily between India and Pakistan, but also implicating Afghanistan and China

CONFLICT GOVERNANCE STRUCTURE

Indus Waters Treaty (ratified in 1960)

treaty also structured a massive program of infrastructure financing (partially funded by India) to assist Pakistan in developing canals, storage, and “replacement works” to offset the loss of supply from the eastern tributaries.

Though deemed a diplomatic success, the IWT is often characterized as a “divorce settlement” and a “riparian iron curtain” rather than a cooperative accord.⁵⁴ Its provisions for information sharing are inadequate and their implementation is impaired by pervasive cultures of data secrecy.⁵⁵ Its provisions for cooperative infrastructure works have never been used. Rancor and mistrust permeate perceptions of the treaty in both countries. Pakistani critics assert that Indian infrastructure on the western rivers detrimentally affects flows to Pakistan, leading Islamabad to formally challenge several Indian developments under the treaty’s dispute mechanisms. Yet the IWT requires no systematic aggregate impact assessments, so though individual Indian projects may obey the treaty’s strictures, many analysts maintain that stringing multiple dams on the western tributaries will entrain damaging cumulative repercussions downstream. Moreover, many in Pakistan worry that each additional installation incrementally increases India’s capacity to regulate flows downriver, augmenting Delhi’s potential ability to strangle Pakistan’s economy. India counters that its works on the western rivers consist of “run-of-the-river” structures, meaning they do not have the capacity to impound significant volumes of water, and that Pakistan’s water woes stem from Pakistani mismanagement. Substantial Indian opinion thus condemns recurring Pakistani objections to planned Indian projects as cynically obstructing India’s legitimate development aims.⁵⁶

TRANSBOUNDARY WATER CONFLICT AND INTERNATIONAL SECURITY

Born in the bitter legacy of Partition, Indus water governance intertwines with the politics of national security and territorial sovereignty. The basin’s three western rivers flow through contested Jammu and Kashmir. Pakistan and India each administer a portion of this majority-Muslim former princely state, which is claimed by both. Certain

Pakistani policymakers and press outlets accuse India of using dams in Jammu and Kashmir to manipulate river flows destined for Pakistan, either withholding water to foster famine, or suddenly releasing it to provoke flooding. Militant groups such as Lashkar-e-Taiba, responsible for the 2008 Mumbai attack, have also threatened to bomb India’s dams and menace war to recapture Pakistan’s rightful water.⁵⁷ Indeed, former Pakistani president Asif Ali Zardari warned in 2009 that failure to resolve the Indus issue “could fuel the fires of discontent that lead to extremism and terrorism.”⁵⁸ According to a former chief of staff of the army, Pakistan’s military posture will remain “India-centric” until the Kashmir and water disputes are settled.⁵⁹

Indian policymakers and pundits take the opposite view. Many advocate conditioning India’s continued compliance with the IWT—and leveraging the latent ability to regulate the Indus’s flow conferred by its upstream position—to compel Islamabad to rein in domestic extremists.⁶⁰ In retaliation for Pakistani militant attacks, many call for maximizing India’s exploitation of the western rivers under the IWT and curtailing all remaining flows to Pakistan from the eastern rivers.⁶¹ Chairing a review of the treaty in 2016, Indian Prime Minister Narendra Modi averred that “blood and water can’t flow together.”⁶² In the longer term, a number of analysts consider that water insecurity in Pakistan could pose grave strategic dangers to India. Some conjecture a water-deficient Pakistan might deploy militant proxies to sabotage Indian water infrastructure. Others envisage that climate impacts and water shortages, coupled with institutional incapacity to meet these trials, could enflame civil strife, destabilizing or even debilitating the Pakistani state.⁶³ Without naming specific opponents, the new Joint Doctrine of the Indian Armed Forces identifies climate change, environmental disasters, and rising competition for natural resources as real conflict risks and potential geopolitical threats shaping India’s security environment.⁶⁴

The wrangling over control of the Indus reverberates within India and Pakistan and ramifies beyond their borders. In Indian-administered Jammu and Kashmir, many Kashmiris consider that by attributing the western

Water policy in both [India and Pakistan] remains highly “securitized,” framing water governance as a zero-sum conflict of existential threats and national survival. To many analysts, such predominating logics of “water nationalism” undermine the prospects for productive cooperation.

rivers solely to Pakistan, the IWT expropriates water and hydropower resources from local control, throttling their economic development and thwarting their political autonomy, thereby stoking separatist aspirations for Kashmiri independence. In 2002, the state legislature passed a nearly unanimous resolution appealing to annul the treaty. Similar recriminations roil Pakistan. Downstream Sindh Province charges upstream Punjab with withdrawing more than its share of the Indus to offset waters conceded to India under the IWT.⁶⁵

At the regional level, political turmoil in Afghanistan and forbiddingly remote geography in China have so far largely prevented those nations from developing their Indus resources. But water demands in both countries are climbing. Afghanistan, struggling through decades of war, holds increasing hydropower and irrigation to be strategic objectives of national reconstruction. Islamabad frets that prospective Afghan works could divert flows from the Kabul River, which provides 16 percent of Pakistan’s water supplies. Media reports that New Delhi is helping Afghanistan erect several dams on the Kabul rouse Pakistani apprehensions of encirclement by its Indian adversary.⁶⁶ Afghan and Pakistani analysts alike have identified common benefits and mechanisms for cooperation on the Kabul; officials have also periodically proffered support. But reciprocal recriminations and mutual apprehensions regarding lack of knowledge resources, negotiating capacity, and preparation have so far foiled progress toward agreement.⁶⁷ By the same token, some three-quarters of the Indus’s annual flow enters India from China, raising concerns in India about the impacts of Chinese designs upstream. Chinese investments in Pakistani hydropower projects under the Belt and Road Initiative—with a number of construction sites situated in contested Kashmir and guarded by Chinese security personnel—similarly discomfit New Delhi.⁶⁸

EMERGING WATER CHALLENGES AND ENDURING WATER NATIONALISM

At the time of its signing in 1960, then World Bank President Eugene Black believed the IWT had managed to resolve opposing interests that otherwise could have pushed India and Pakistan into war over water.⁶⁹ Some observers argue that the accord plays a larger confidence-building role reducing regional tensions between nuclear-armed rivals.⁷⁰ But the IWT offers little response to many emerging challenges. The agreement contains no provisions concerning the basin’s shared groundwater aquifers, nor does it address environmental protections or water quality beyond hortatory pledges to prevent undue pollution as far as practicable. Negotiated when global warming was unsuspected outside a tiny scientific circle, the treaty includes no mechanism to manage shifts in water availability due to climate change. Beyond neglecting particular issues, the IWT also omits the river’s other riparians; neither Afghanistan nor China are party to the accord.⁷¹

Indian and Pakistani policymakers recognize the perils of mounting water stress on the Indus. Their declared national water policies emphasize the need for more effective and integrated water resources management and call for cooperation on transboundary waters.⁷² Yet water policy in both countries remains highly “securitized,” framing water governance as a zero-sum conflict of existential threats and national survival.⁷³ To many analysts, such predominating logics of “water nationalism” undermine the prospects for productive cooperation.⁷⁴ Multiple studies examining environmental, socioeconomic, and political criteria have found that governance factors—institutional capacity, effective management, and hydropolitical tensions—are key determinants of vulnerability to disruptive water and climate pressures in transboundary basins. These studies judge the Indus Basin countries wanting.⁷⁵

Case Study: Mali

A land-locked state in West Africa, Mali straddles the Sahel, a semiarid ecoclimatic transition zone between the Sahara to the north and savanna to the south. The northern half of the nation receives less than 200 mm (7.8 inches) of precipitation a year, offering sparse vegetation a growing season of less than fifteen days. Rainfall increases progressively to the south, supporting agricultural belts in the country's center and southwest. The Niger River, Africa's third-longest waterway, arcs through southern Mali, creating a unique interior delta that sustains flood recession agriculture and important areas of irrigated cultivation and pastoralism. Nine identified groundwater aquifers constitute the principal source of drinking water.⁷⁶

Climate change and postcolonial government measures, both of which have altered traditional access to water and land for the pastoralist Tuareg in the north, have contributed to decades of clashes between nomadic herders and sedentarist farmers, sparking repeated insurgencies and drawing in regional involvement.

ECONOMIC DEVELOPMENT AND WATER INSECURITY

Mali is one of the world's poorest countries. Predominantly rural, 58 percent of Mali's 18.5 million people live in the countryside. Half of the population subsists below the poverty line. The World Bank has estimated that nine in ten urban dwellers nationwide have access to basic drinking water services, but only two-thirds of rural residents do. Less than half the urban population and only one-fifth of rural inhabitants use at least basic sanitation services. Water insecurity imposes a heavy burden on Mali. Insufficient and irregular rainfall can crimp crop yields, thin livestock herds, and sap agricultural livelihoods. The United Nations

has estimated that annual losses from water scarcity, water-related illnesses, water pollution, and waste approach 5 percent of Mali's GDP.⁷⁷

Mali's economy depends preponderantly on agriculture. The agricultural sector accounts for almost 40 percent of GDP and provides 65 percent of employment, according to World Bank estimates. Crop irrigation and livestock claim 98 percent of water withdrawn from the country's rivers, lakes, and aquifers. Even so, nearly all of Mali's farmland is watered not by irrigation but by rainfall. Dutch experts calculate that rainwater, sometimes called "green water," constitutes 94 percent of Mali's overall "water footprint," a measure that tallies the total water consumed in the country, while surface and groundwater, termed "blue water," account for just 6 percent.⁷⁸

Mali's agricultural livelihoods and welfare depend on water availability. Precipitation is highly seasonal, with almost all annual rains falling during the June–September rainy season. Rainfall also fluctuates significantly from year to year, leaving farmers and herders reliant on the vagaries of weather to water their fields and pasturage. River levels likewise vary correspondingly with precipitation. For example, a 10 percent dip in rainfall typically entails a 20 percent drop in river discharge; a 30 percent drop in rainfall produces a ruinous 60 percent plunge in river flow.⁷⁹ Consequently, nearly all irrigation water withdrawals occur during the rainy season, when river levels are high. Mali has moderate reservoir storage in five dams that can be used during the dry season, but more than 80 percent of this capacity lies behind the Manantali Dam on the Senegal River in Mali's far southwest, whereas almost all of Mali's irrigated agriculture takes place on the Niger River.

Mali (and much of the Sahel region) entered a rapid and pronounced drying shift in 1968–69. Average annual rainfall tumbled by 16–24 percent in the years after 1969, and annual precipitation in the first decade of the twenty-first century remained 12 percent below the 1920–1969 average. Similarly, the Niger River’s average annual flows have slumped by some 24–33 percent in Mali over the years since the 1960s.⁸⁰ Climate change projections disagree whether rainfall trends will increase or decrease over the coming decades but concur in expecting appreciable regional warming, suggesting higher crop water demands. Several recent analyses anticipate that annual average river runoff and water availability in Mali’s Niger River Basin could decline by as little as 5 percent or as much as 15 percent by the middle of the century, while drought episodes are projected to become more frequent and intense.⁸¹

TUAREG SEPARATISM: DROUGHT, EXPROPRIATION, AND EXCLUSION

The protracted rainfall deficits that began in 1969 particularly affected Mali’s Tuareg communities. Nomadic or seminomadic pastoralists, the Tuareg make up about 10 percent of Mali’s population but predominate across much of the sparsely populated north. Severe droughts in the early 1970s, which returned and deepened in the mid-1980s, decimated Tuareg livestock. Rainfall patterns both weakened and shifted hundreds of kilometers to the south, forcing many Tuareg to drive their herds farther south in search of pasture, into agricultural lands cultivated by sedentary farmers.⁸² Countless others left the rangelands and migrated to cities or across the border into Algeria and Libya, where there are also large Tuareg populations.

The deteriorating environmental conditions significantly disrupted the Tuaregs’ livelihoods and lifeways, and, compounded by governance structures that favored sedentary agriculture, pushed them away from nomadic pastoralism and toward farming and urban wage labor. The generation of Tuareg who went abroad looking for work became known as *ishumar* (from



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MALI

CONFLICT TYPE

Environmental pressures on shared water supplies, resource expropriation/access to decision making, water-related disasters

CONFLICT SCALE

Intrastate, between Mali government and Tuareg separatists; and regional, engaging neighboring states and the international community

CONFLICT GOVERNANCE STRUCTURE

National peace accords (incompletely implemented)

the French *chômeur*, “unemployed”).⁸³ Across Mali’s Sahelian north, recurring droughts from the 1970s into the mid-2000s resulted in declining food security and a lasting erosion of wealth and welfare.⁸⁴

The droughts also fueled long-standing Tuareg grievances against the Malian state. Culturally and linguistically distinct from the rest of Mali’s population, the Tuareg chafed under exclusionary rule by the distant central government in Bamako. French colonial administration had accorded the Tuareg a modicum of relative autonomy (perceived as “colonial privilege” by other colonized peoples). After independence in 1960, however, political power in Mali resided with the more southern ethnic groups. From 1960 through 1990, there were only two Tuareg ministers appointed in all the intervening government cabinets, two Tuareg officers in the Malian military, and no Tuareg heads of national administrative departments. Civil servants and technicians assigned to the remote region often simply never took up their posts. When catastrophic droughts crippled the north, government officials embezzled much of the international aid effort, diverting humanitarian assistance funds to build private villas, known as “drought castles,” in the capital.⁸⁵

Bamako’s postcolonial policies of agricultural modernization and sedentarization, intended to turn “worthless” rangeland in the north into productive farmland, further marginalized the Tuareg.⁸⁶ Between 1967 and 1997, Mali nearly tripled its cultivated area, mostly by converting grazing lands to farm fields.⁸⁷ Mali also ramped up rice cultivation along the floodplains of the Niger, progressively squeezing out the native plants herders relied on for fodder during the dry season.⁸⁸ As decreasing rainfall and diminishing river flows shrank the growing zones around the Niger, Tuareg herders increasingly clashed with sedentary Songhay rice growers over rights to the river’s resources. Finally, a series of land tenure reforms that imposed formal title on lands previously held collectively and allowed the state to take over fallow and unregistered land, privileging

fixed properties and sedentary communities, checked herders’ customary access to grazing corridors and seasonal pasturelands.⁸⁹

RECURRENT CYCLES OF REBELLION

The droughts and dislocations of the 1970s and 1980s cemented the Tuareg’s sense of alienation and neglect at the hands of an indifferent or inimical state, helping forge a national movement and support for political independence. Ishumar Tuareg who had fled Mali during the droughts started planning an uprising, receiving military training and support from the regime of Muammar Gadhafi in Libya. Scattered attacks occurred in 1982 and 1985. Full armed insurgency began in June 1990.⁹⁰

The Tuareg rebels achieved several quick victories over the Malian army, and a preliminary cease-fire, mediated by Algeria, was reached in January 1991. The ensuing Tamanrasset Accords provided significant autonomy to the north and promised to devote almost half of Mali’s fourth national investment program to developing the region. A National Pact concluded in 1992 codified the main elements of the accord.⁹¹ But the development funding never materialized. The rebel movement fractured into discordant factions. Sedentary communities, unrepresented at the peace negotiations, deemed their interests disregarded. Fighting resumed, soon breaking down along intercommunal lines. The army rounded up and executed Tuareg village leaders. Tuareg forces attacked farming settlements along the Niger River. Songhay farmers, merchants, and military formed a civil militia, the Ganda Koy (Masters of the Land), and retaliated against the Tuareg. Finally, weary of the spiraling civil war, traditional leaders of the Songhay communities joined with Tuareg tribal and religious leaders to initiate reconciliatory meetings among all ethnic groups, ultimately brokering a fragile peace in 1996.⁹²

The peace did not last. Renewed rebellion erupted in 2006–09. This revolt largely arose from Tuareg internal rivalries, but it also reflected enduring grievances fired in the droughts of the previous generation. Like the earlier

rebellion, the government and the insurgents quickly reached a peace settlement under Algerian auspices, pledging to revive the terms of the 1992 National Pact. Again, implementation stalled. The rebel movement splintered, the violence escalated, and fighting sputtered on for another three years. Repeated government failures to follow through on promised development programs, official corruption, and mutable clan politics all helped perpetuate a cycle of insecurity and rebellion.⁹³

That cycle still continues. Crisis again gripped Mali from 2012 as radical Islamist groups took over two-thirds of the country and declared the “Republic of Azawad.” The rekindled conflict’s complex dynamics meshed Tuareg separatism and intra-communal politics with the geopolitics of the Arab Spring, the Libyan Revolution, the spread of al-Qaeda in the Islamic Maghreb, and the post-9/11 war on terror. Jihadi factions seized on the beginnings of yet another Tuareg uprising, first absorbing, then turning on and displacing the Tuareg insurgents. After the Malian army unraveled, the government appealed for French military assistance. The French Opération Serval reconquered the north’s major cities within weeks, and was succeeded in 2013 by a UN peacekeeping mission. Under the auspices of the international community, the Malian government concluded a peace agreement with the various Tuareg separatist groups in May 2015.⁹⁴

Even so, strife in Mali goes on. Islamist attacks and intercommunal violence persist. Disaffected herder populations often sympathize with an Islamist presence that frames pastoralist grievances and anti-government resistance in religious discourse. Farmer-herder unrest over resource access, never confined only to the Tuareg, afflicts swaths of the country, straining traditional management and justice mechanisms.⁹⁵ The ongoing conflict itself, which has destroyed assets and infrastructure, reduced access to basic water services, and hampered humanitarian aid provision, grinds down societal resilience and capacity to cope with subsequent shocks.⁹⁶

NATIONAL PEACE AGREEMENTS AND PARTICIPATORY RESOURCE MANAGEMENT

The long conflicts in Mali have economic and political roots. These roots tap water. Key elements of the politics and economics underlying the conflicts revolve around the contested management of, access to, and uses of water and related resources. Each of the negotiated agreements that closed the successive Tuareg rebellions affirmed the need to tackle these issues to build the peace.

Thus, the 1992 National Pact established a special status for northern Mali based on the election of democratic regional assemblies, explicitly empowering each assembly to define and promote policy for water management, rural development, land tenure, livestock, and ecosystem preservation. Likewise, the 2015 peace agreement declared the signatories “determined to deal definitively with the basic causes of the [conflict],” acknowledging the droughts of the 1970s and 1980s among these causes and “recognising the need for governance which recognises the geo-historical and socio-cultural specificities of the North, whose history has been marked by challenges which have deeply affected the living conditions of its populations.” The 2015 accord then renewed the commitment to creating an elected regional assembly habilitated to determine policy for economic development, territorial management, water and sanitation, environment, agriculture, and livestock.⁹⁷

Surveyed about their expectations for the 2015 agreement, northern communities placed the highest priorities on job creation, the development of access to basic services (water and sanitation, health), and support for rural development, food security, and the environment, naming these objectives over and above establishing local elected governance, strengthening the rule of law, or increased road and power infrastructure.⁹⁸ They are still waiting. The 2015 agreement has yet to be substantially implemented.⁹⁹

Case Study: Myanmar

Myanmar possesses abundant fresh water. According to UN Food and Agriculture Organization data, all the nation's agricultural, industrial, and domestic water use combined requires less than 3 percent of its 1,168 km³ annually available renewable supplies. Myanmar's hydrological riches also carry substantial development potential, especially for hydroelectricity. Experts estimate the country's rivers command 100 gigawatts of unexploited hydropower.¹⁰⁰

After decades of isolation under military rule, Myanmar since 2011 has embarked on an ongoing political transition and undertaken significant reforms encouraging foreign investment and private sector development to capitalize on the country's ample natural resources and spur economic growth.¹⁰¹ But the contested exploitation of water resources in territories claimed by multiple ethnic groups threatens the country's sustainable development and political stability.

WATER RESOURCES AND ECONOMIC GROWTH

Myanmar has devoted great efforts to developing its water resources in recent years. Today, twenty-nine hydro stations furnish 58 percent of the nation's total power generation.¹⁰² Yet the country's per capita electricity consumption remains among the world's lowest. Only two-thirds of Myanmar's inhabitants have access to electricity at all, according to World Bank estimates; 7 percent of the urban population and 40 percent of rural residents do not. The government recognizes that inadequate and unreliable power supplies could scuttle development prospects. Though electricity production doubled and installed generating capacity quadrupled from 2000 to 2014, by 2009 peak load demands were also rising by 15 percent per year on average.¹⁰³

Importantly, effective hydropower generation capability waxes and wanes throughout the year. Because Myanmar's rivers are monsoon fed, water levels mirror seasonal rainfall patterns. Eighty percent of annual flows occur during the rainy season, May to October, and 20 percent during the dry season, November to April.¹⁰⁴ Most of the country's hydropower dams afford limited water storage to compensate for fluctuating flows, so during the dry season actual power generation falls to a third of the installed capacity. Tellingly, economic surveys regularly label lack of dependable electricity a substantial constraint on business.¹⁰⁵

With national electricity needs projected to triple over the next decade, the government aims to quintuple installed hydroelectric capacity and extend grid access to 100 percent of the population by 2030.¹⁰⁶ Hydropower expansion also seeks to attract foreign investment and generate revenue by exporting electricity to neighboring markets. Even as Myanmar began its democratic opening, energy demand was booming in surrounding countries, offering rich opportunities to tap the regional power trade.¹⁰⁷ Since 2011, national development plans and reforms to investment laws have facilitated foreign participation in finance and construction. As of early 2019, the Ministry of Electricity and Energy had reportedly inked forty-nine hydropower contracts, memoranda of understanding, or joint venture agreements with foreign companies.¹⁰⁸

RESOURCE EXPROPRIATION AND ETHNIC INSURGENCIES

Clouding Myanmar's hydropower aspirations, a long history of conflict over natural resources has pitted the central government against restive regions and ethnic insurgencies.¹⁰⁹ Violent internal struggles have riven Myanmar since the 1948 independence of the Union of

Burma, when the political exclusion of certain groups begat multiple ethno-nationalist movements. The ensuing failures of inclusive state formation engendered decades of civil war. Dozens of ethnic armed organizations (EAOs) established enclaves and local administrative systems of varying autonomy. Unable to defeat the separatist groups, the state came to tolerate and even accommodate some of these areas.¹¹⁰ Within their respective regions, the national government and military (Tatmadaw), state-backed militias, and the EAOs alike turned to the unregulated production, taxation, and sale of natural resources—timber, gems, jade, illicit drugs—to fund their activities.

When the military regime concluded bilateral cease-fires with several EAOs during the period 1989–95, the door was opened to a “cease-fire capitalism” of rampant resource exploitation. By dampening hostilities, delineating areas of control, and legitimizing the ethnic forces, the agreements facilitated a new wave of resource extraction. But the cease-fires never led to substantive political dialogue or mutual arrangements for resource management or benefit sharing. Numerous EAOs never participated in the accords. Resource capture remained a conflict tactic, since resources controlled by one side represented revenues unavailable to its adversaries. Fighting ultimately returned to many regions, escalating over time and spiking in the post-transition period, after 2011.¹¹¹

Hydropower development in Myanmar lies firmly embedded in this history. By geographic circumstance, nature endowed Myanmar’s mountainous ethnic borderlands with the lion’s share of the country’s hydroelectric potential. Kachin, Karen, and Shan States alone hold over two-thirds of the nation’s technically viable hydropower.¹¹² When the government, dominated by the Bamar majority, moved to expand hydropower, it looked to these regions. Myanmar’s national policies and institutional structures for natural resource and hydropower development, though, confer little role to the country’s fourteen state and regional governments. The 2008 constitution accords to states the rights to regulate only small projects of under 30 megawatts.¹¹³ Without consulting or engaging the local



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MYANMAR

CONFLICT TYPE

Resource expropriation/access to decision making

CONFLICT SCALE

Intrastate, between government and multiple armed ethnic groups

CONFLICT GOVERNANCE STRUCTURE

Ongoing national peace process

populations, the military regime signed concessions with (predominantly Chinese) companies to develop plants in territories often held by EAOs, whether under a cease-fire agreement or not. The concession contracts dedicated 90 percent of the power that the projects would generate for export, allotting only 10 percent to Myanmar, a grossly lopsided division compared to development agreements common elsewhere in Asia.¹¹⁴

Largely denied the projects' possible benefits, local populations also feared they would bear the prospective costs. Hydropower dams would likely alter river flows and sediment loads, negatively impacting biodiversity, fisheries, and alluvial farming in the floodplains. Since much of the country is prone to earthquakes, potential dam failures could wreak catastrophic damages.¹¹⁵ Yet the thirty-five hydropower ventures already existing or underway prepared only rudimentary environmental impact assessments falling short of international standards. No national policies guide sustainable hydropower planning, and no cumulative or basin-wide analyses of any projects have been performed.¹¹⁶ Only in August 2018 did the government introduce the new Myanmar Sustainable Development Plan requiring effective and accountable evaluations of development projects' social and environmental impacts. Even so, this nominal framework to decentralize, demilitarize, and rationalize comprehensive national development planning remains largely aspirational.¹¹⁷

Hydropower soon became a flashpoint in the ongoing tensions between the central government and ethnic areas. Developing hydropower concessions demands considerable tracts of land for dam construction, road access and equipment, and for the reservoirs that provide water storage to offset seasonally varying river flows. To secure the needed land in territories claimed by ethnic forces, the government often resorted to land seizures, forced population displacements, arbitrary arrests, and militarization of large areas, effectively enacting a dual strategy of "water grabbing/land grabbing" for hydropower development.¹¹⁸ Protests have erupted around a dozen different dam projects, including calls

for a moratorium on all hydropower development until a comprehensive peace agreement can be reached. Armed violence also flared close to many project sites.

MYITSONE DAM

The Myitsone Dam exemplifies hydropower conflicts in Myanmar. In 2009, the military regime concluded three years of negotiations with China to erect the Myitsone Dam in Kachin State on the Irrawaddy River just below the confluence of the Mali and N'Mai rivers. China's single-largest hydropower development abroad, the Myitsone project would double Myanmar's hydroelectric generating capacity. As the keystone of a seven-dam cascade, the reservoir created by Myitsone would submerge forty-seven villages and displace up to eighteen thousand people. Though Kachin activists staunchly opposed the dam from the outset, the military authorities proceeded to bulldoze homes and orchards, resettling thousands of residents in "model villages."¹¹⁹ In March 2011, the Kachin Independence Organization (KIO)—the EAO whose armed forces had fought the Tatmadaw for more than three decades until agreeing to a cease-fire in 1994—issued an open letter to the Chinese government warning that the project could ignite civil war if the Tatmadaw invaded KIO territory to guard construction sites. Soon after, in June 2011, the Tatmadaw clashed with the Kachin Independence Army at the recently completed Dapein Dam, a smaller installation situated on an Irrawaddy tributary downstream from the Myitsone site. State-run media depicted the military offensive as needed to protect hydropower resources from the KIO. The combat killed dozens, ending a seventeen-year cease-fire and plunging the region back into war.¹²⁰

Against this backdrop, elections in November 2010 set the stage for a quasi-civilian government to take office in April 2011. At the same time, broader opposition to Myitsone had been spreading to the country as a whole. Many now viewed the dam's impacts on the Irrawaddy as imperiling Myanmar's cultural heritage and the concession's unequal terms as compromising Burmese sovereignty. In September 2011, new president Thein Sein suspended the



A protester holds a flyer voicing opposition Myitsone hydropower dam during the last day of Chinese President Xi Jinping's visit to Yangon, Myanmar, on January 18, 2020. (Photo by Ann Wang/Reuters)

Myitsone project.¹²¹ A government commission formed in 2016 to review the dam delivered its report in November 2018, but the results have not been made public. Despite Chinese lobbying, construction has not resumed.¹²²

WATER POLICY AND THE PUBLIC SPACE

Myitsone represents only the most prominent of Myanmar's hydropower conflicts. Similar dynamics of armed violence, territorial militarization, and human rights abuses surround numerous other projects, including the Kunlong and Shweli Dams in Shan State and the planned Hatgyi Dam on the Salween River in Karen State.¹²³

Water conflict in Myanmar revolves around the intersections between hydropower and political power. Who has the legitimate authority to manage water resources, in what spaces, for what purposes, to whose cost and benefit? Myanmar has struggled to develop

inclusive, accepted national governance institutions. For the inhabitants of the country's many ethnic areas, state mega-dam projects dispossess local populations of their customary water resource rights and uses and expropriate the benefits in the form of hydropower.

Since the democratic transition started in 2011, the government has resumed a number of bilateral cease-fires and initiated the multilateral 2015 Nationwide Ceasefire Agreement. Myriad civil society organizations have urged participants in the peace talks to agree to new, participatory, transparent, and accountable approaches for sustainable resource management and benefit sharing.¹²⁴ Even so, the peace process has yet to directly address, much less effectively reform, natural resource use and governance in Myanmar. This overarching failure continues to fuel local grievances, undermining inclusive state building and sustainable peace.¹²⁵

Water Governance and Water Diplomacy



As illustrated in the preceding case studies, water governance is inherently conflictual. By its nature, water cannot be managed only for a single purpose in isolation. All water management must assimilate the contending demands and competing interests of multiple sectors and stakeholders across different geographic scales, time frames, and levels of government.

Major water uses are themselves bound up with the management of other vital resources. Water managers characterize these interdependencies as composing the water-food-energy nexus.¹²⁶ Water represents an essential input for agriculture, fisheries, and food supply chains. It is used extensively in energy generation, for hydroelectricity, and cooling thermal power plants. Likewise, growing, preparing, preserving, and distributing food requires energy. So does treating and transporting water. Agricultural practices—what crops to grow, how, and where—substantially affect local water cycles. And many common crops can be turned into energy as biofuels. Relationships among the water, food, and energy systems are complex, and policy aims and choices at different points in the water-food-energy nexus may compliment or conflict with objectives and impacts at other points.

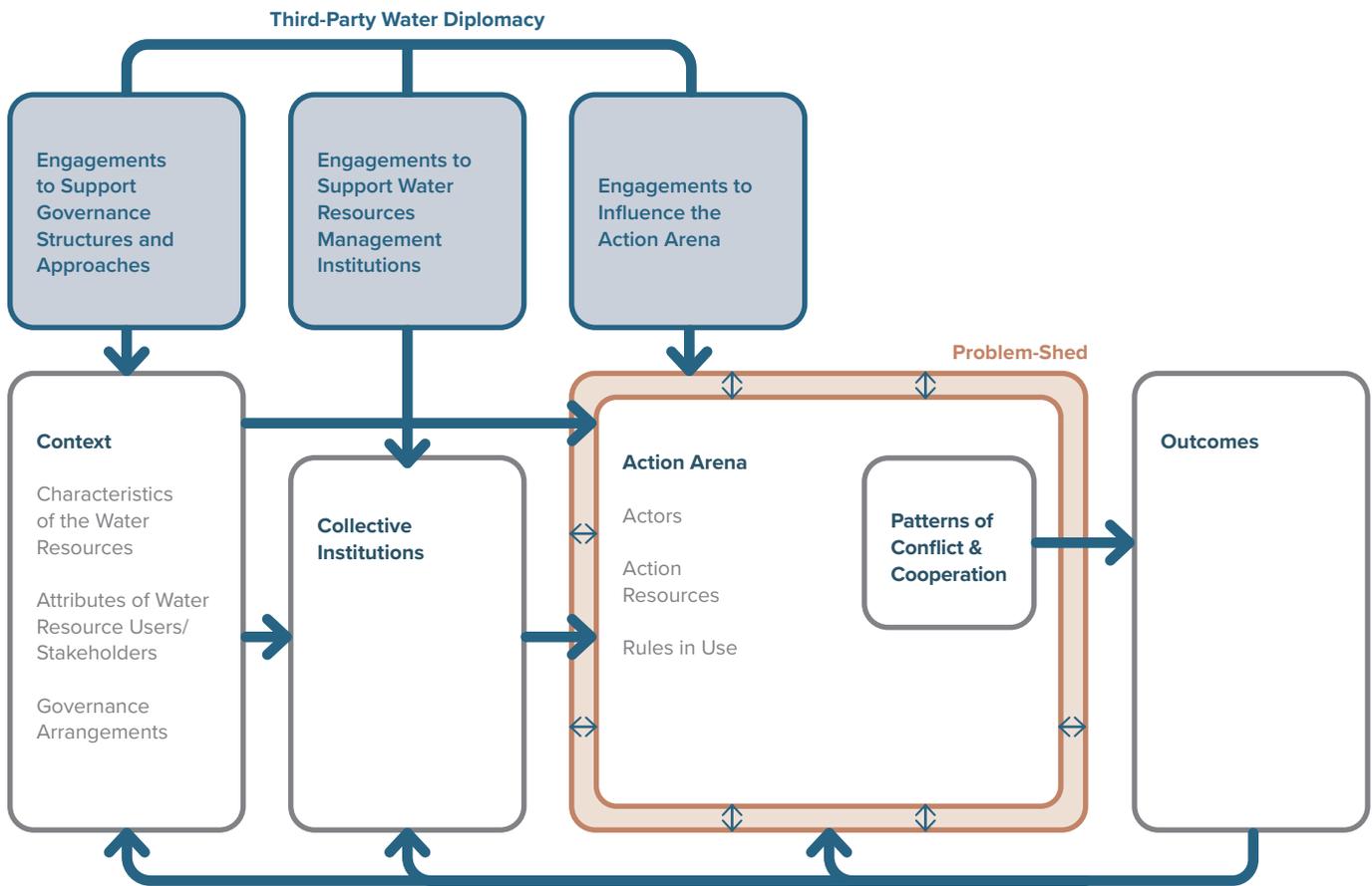
Recognizing the interdependent and multidimensional character of water governance, policymakers have striven to forge the tools to realize more coordinated management of water and related resources. These policies take various names—integrated water resources management (IWRM), adaptive water management, nexus approaches, ecosystem-based strategies—and differ in their particulars, but all espouse the common

objectives of more holistic and sustainable water governance.¹²⁷ Though individual solutions must be tailored to specific places, polities, and policy contexts, certain central tenets emerge from these integrated paradigms.

First, policymaking should be participatory and transparent to ensure public legitimacy. To secure the commitment and contribution of relevant actors and navigate trade-offs among competing users and demands, authorities should promote stakeholder dialogue and input to policy design and implementation. Second, policy must be scientifically informed and evidence based to be effective. Authorities should produce, share, and use timely, consistent, and comparable water data and information to guide, evaluate, and improve resource management. Third, policy must be adaptable and adjustable to meet the complexities of the water-food-energy nexus and manage risks such as climate change that will evolve in uncertain ways over varying time frames. Fourth, authorities should embrace policy learning, iteratively assessing policy impacts, incorporating new information and experience, and revising implementation accordingly. Most important, policymaking should recognize the basin as a hydrological unit and manage the ensemble of water uses at functionally appropriate scales within integrated basin governance systems. Where political or sectoral boundaries nest within or intersect at various scales across the basin, management practices should foster cooperation and cross-sectoral coordination among users and levels of government.¹²⁸

Enhancing effective collaboration will be essential to achieving global water security. Indeed, goal six of

Figure 2. Third-Party Water Diplomacy and Collective Water Governance



Adapted from Elinor Ostrom, *Understanding Institutional Diversity* (Princeton: Princeton University Press, 2005) and Blake D. Ratner et al., “Addressing Conflict through Collective Action in Natural Resource Management,” *International Journal of the Commons* 11 (2017): 884.

the United Nations’ Sustainable Development Goals—“ensure availability and sustainable management of water and sanitation for all”—expressly commits the international community to increase water cooperation, expand collaborative institutional arrangements, and implement IWRM at all levels.¹²⁹ To that end, a growing number of analysts point to strengthening water diplomacy.

THIRD-PARTY WATER DIPLOMACY

Water diplomacy can be broadly defined as the processes and activities undertaken by state and nonstate actors to promote cooperation and to prevent, reduce, or peacefully resolve conflicts within or between states related to the availability, access to, or management of shared water resources.¹³⁰ Enacting integrated governance approaches raises intrinsically *political* and often

contentious questions.¹³¹ Rarely will the hydrological boundaries of a basin or watershed correspond to the practical parameters of what Allen Kneese called the “problem-shed” of a given policy challenge.¹³² Exactly how are the policy issues defined? What sectors should then be integrated at what scales, which stakeholders involved by what processes, what institutions engaged and empowered at what levels of government? What costs and benefits (for whom) should decision makers weigh? When must adaptable policies be revised, what risks and uncertainties need to be assessed and which accepted? Water diplomacy consists in the dynamic strategies and interactions that parties employ to navigate these questions across stakeholders, scales, and governance levels.¹³³ Cooperative water diplomacy enables the realization of integrated water governance.

Many of the world's shared waters most vulnerable to rising water stress are marred by a dearth of collaborative mechanisms, deficits of institutional capacity, and distrust and dissension among users that frustrate sustainable cooperation.

Even so, many shared waters lack effective cooperation. Half of the global population lives within the world's 310 transboundary river basins, which are shared by 150 countries.¹³⁴ Most of these basins are not covered by collaborative accords. Where international agreements are in place, few fully embody integrated management principles. Many don't include all the basin countries. Many want for dispute resolution procedures, mechanisms for data exchange, or provisions to address varying river flows.¹³⁵ In other cases, riparians may regard existing treaties not only as inadequate but as unfair, enshrining historical inequities or uneven power relations between participants.¹³⁶ Global surveys of national water governance systems report that, though many countries have drawn up integrated policy frameworks, actual implementation lags, especially in developing states.¹³⁷

Many of the world's shared waters most vulnerable to rising water stress are marred by a dearth of collaborative mechanisms, deficits of institutional capacity, and distrust and dissension among users that frustrate sustainable cooperation.¹³⁸ In such cases, third-party actors can play important roles promoting water diplomacy to mitigate existing or emerging water conflicts. Third-party involvement may come from neighboring governments or other nonriparian states, intergovernmental organizations, development agencies, NGOs, or other actors who are neither direct stakeholders in the shared water resource nor participants in a given water conflict. Third-party engagement may entail fostering official diplomacy between state actors, or it may take the shape of facilitating different forms of unofficial or "multitrack" dialogue or interactions between state or nonstate parties.¹³⁹

Third-party water diplomacy, conflict management, and peacebuilding can be described as shaping the context and decision framework for the collective

governance of shared water resources. Water policymaking, whether in a transboundary basin or local irrigation association, takes place within a surrounding context defined by several exogenous factors. These factors include the characteristics of the water resource (scarcity, spatial and temporal distribution, rates of renewal); attributes of the resource users or stakeholders (socioeconomic characteristics, access to and dependence on the resource); and existing governance arrangements (societal systems of legal and political structures, as well as the particular formal and informal institutions, laws, and customary rules governing resource access and use).

This overarching context in turn informs the specific decision-making forum or "action arena" for bargaining and policymaking around a given issue, and may be defined at many levels and scales, from the local to international.¹⁴⁰ An action arena consists of actors, resources, and rules. Actors may be individuals or collective entities such as government ministries or civil society organizations. Resources represent the tangible and intangible assets and capabilities that allow actors to exercise agency, engage in decision-making processes, and influence other actors. These encompass financial and material capacities, political and legal authorities, and factors such as legitimacy, allies and constituencies, and information and cognitive schemata (for example, nexus governance paradigms), enabling actors to mobilize knowledge and resources. Rules concern the particular procedures and "rules-in-use" in a given action arena. These include the formal and informal rules, norms, and customs that determine what actors and roles have standing to participate, how resources may be used, and how decisions are reached. In an action arena defined by an international treaty, for example, statutory rules-in-use might confer actor standing only to states, and stipulate decision making by consensus.

Action arenas are dynamic stages. For many water conflicts, an established institution or procedure—a government agency, court, village council—will constitute the recognized action arena, with attendant actor roles and rules-in-use. For many issues, however, no clear forum or process for decision making and conflict resolution may be readily apparent or agreed upon, requiring actors to adapt existing arrangements or articulate new ones, collectively negotiating the participants and parameters creating the action arena.

Typically, multiple different potentially applicable rule sets coexist (international laws, national regulations, customary routines, cultural norms) and multiple different actors and institutions could claim a role. Different actors will appeal to the authority of different rules-in-use, depending on their interests, and argue for the inclusion or exclusion of other actors and roles according to their advantage. In practice, the action arena and the problem-shed will often prove mutually constitutive. How parties define the problem-shed will shape which participants and what rules they prefer to form the action arena, while which actors and what rules-in-use form the action arena will shape how the problem-shed will be collectively defined. Problem-sheds are not fixed but fluid. Most action arenas are not found but forged.

The outcomes produced in action arenas, cooperative or conflictual, in turn feed back into the context

and action arenas for water governance. For example, should riparian countries sharing a transboundary waterway agree to create a joint river basin organization, the mandate, membership, management mechanisms, and decision procedures established by the accord will shape the context, actors, resources, and rules for subsequent policymaking.¹⁴¹

Water diplomacy can act at multiple points to promote cooperative collective action. (See figure 2 on page 23.) Third-party engagements, such as to strengthen national resource management structures, support regional organizations, and advance the implementation of international conventions and objectives, can help institutionalize collaborative governance approaches and shape the surrounding contexts in which contending groups enact water conflict and cooperation.¹⁴²

Third-party diplomacy can also address specific action arenas. Through means such as mediating formal negotiations and facilitating informal stakeholder dialogues, problem-solving workshops, and capacity-building trainings, external third parties can encourage conflict reduction, enhance actor capabilities, augment resources, promote cooperative and inclusive rules-in-use, and help conflicting parties to structure the collective problem-shed so as to create and realize opportunities for mutual benefits.



A man waters beet plants in a garden in Gao, Mali, on March 7, 2013. Gao is located along the Niger River, whose water is vital for the success of local agriculture. (Photo by Joe Penney /Reuters)

Peacebuilding Strategies for Water Resources Conflicts

Water diplomacy can play important roles in advancing integrated resource governance, collaborative decision making, and peaceful dispute resolution.¹⁴³ In vulnerable and conflict-affected environments, third-party engagement can help foster favorable conditions for cooperation, facilitate effective processes, and furnish resources for collective action. Where water conflicts are particularly intractable and interactions between contending parties intransigent, unofficial multitrack dialogues can provide alternative avenues for communication, confidence building, and policy exploration when formal negotiations are ineffectual or impossible.

Third-party water diplomacy can fulfill a number of conflict prevention, conflict reduction, and conflict resolution functions:

- **Communication/convening:** Interventions can provide opportunities and channels for opening, maintaining, or restoring communication between conflicting actors when other routes are blocked or refused.
- **Agenda setting:** Interventions can provide a common mechanism enabling participants to identify key issues and frame problem-sheds, clarify areas of agreement and disagreement, and define deliberation procedures and rules-in-use.

- **Policy exploration and development:** Interventions can allow parties jointly to assess policy issues and options, evaluate experiences from other regions, develop shared models and scenarios, and collectively elaborate new policy strategies.
- **Policy integration and participation:** Interventions can offer mechanisms for overcoming policy silos, bringing together actors, institutions, and interests ordinarily separated by their institutional identities and missions. Similarly, interventions can offer avenues for identifying excluded actors and incorporating marginalized stakeholders into policy processes.
- **Policy recommendation:** Interventions can provide external actors a vehicle for communicating policy ideas, best practices, norms, and external knowledge resources to disputant parties.
- **Public awareness:** Interventions can furnish platforms for improving public awareness and understanding regarding the issues, policies, and actors.
- **Knowledge building:** Interventions can supply a forum for information sharing and data exchange between actors, and support the generation of new research, joint fact-finding, analysis, and policy learning to increase the knowledge resources for evidence-based decision making.
- **Capacity building:** Interventions can bolster international, national, and local capacities by strengthening the resources, expertise, and networks available among actors and institutions to understand issues, advance their interests, forge coalitions, and enact solutions.
- **Constituency building:** Interventions can help build political will and constituencies for cooperation by facilitating and legitimizing contacts and linkages between actors, institutions, and stakeholders both within conflicting parties and between them.
- **Relationship building:** Interventions can help conflicting actors to build trust and mutual understanding of each other's aims, interests, values, intentions, and concerns.¹⁴⁴

In practice, these multiple peacebuilding objectives interconnect. Knowledge and relationship building can facilitate joint policy exploration and development, while the experience of collaborative policy development cements relationships and contributes collective knowledge resources. Enhanced policy integration and participation strengthens capacity and constituency building, while capacity and constituency building further enable and legitimize policy integration, participation, and collaborative decision making.

Water diplomacy is not a panacea. Different third-party actors, such as governments and NGOs, will bring different resources, capabilities, and relationships to bear in engaging the specific parties to any given water conflict. Such potential diversity of support can prove an asset. But a multiplicity of uncoordinated external actors can result in inconsistent and fragmented interventions. So too, disputant parties may perceive external initiatives as infringing their sovereignty or as partisan interference in their affairs. Third-party water diplomacy must focus on improving outcomes for the conflict parties, facilitating peaceful interactions, and building actor capacities to resolve their own disputes.¹⁴⁵

WATER DIPLOMACY, CONFLICT PHASES, AND CONFLICT PATHWAYS

Water diplomacy can address all phases of the conflict cycle, before, during, and after the outbreak of violent confrontation. Third-party initiatives can serve preventive diplomacy, conflict resolution, and postconflict recovery. Nevertheless, certain types of third-party engagement may prove more practicable and productive in certain phases.¹⁴⁶ In high intensity stages, violent conflict has emerged, relations are most rancorous, and actors' perceptions of the issues and of each other especially diverge. These phases may be more amenable to third-party initiatives supporting communication, relationship building, and providing external policy counsel and knowledge, as ongoing violence may frustrate more directly collaborative interactions among the conflicting parties.

QUESTIONS TO GUIDE THE ASSESSMENT AND FORMULATION OF THIRD-PARTY WATER DIPLOMACY ENGAGEMENTS

- What are the natural attributes and usage patterns (bearing in mind the water-food-energy nexus) of the shared water resource?
- What are the projected trajectories for future water supplies and demands? What uncertainties characterize these projections?
- In what ways and on what time frames might different socio-economic and climate change scenarios impact future water resources' availability, access, uses, and risks?
- What sources of data and information do the conflict parties utilize? To what degree are these sources shared or mutually compatible and scientifically sound?
- What are the management mechanisms, customary practices, decision-making processes, legal regimes, and institutional structures governing the shared water resources?
- Who are the actors and stakeholders in the water conflict? Are any relevant actors or stakeholders marginalized or excluded from the collective negotiating or policymaking process?
- What are the relationships among the different actors and between the actors and the water resource? Is the water conflict embedded in larger historical or ongoing political conflicts?
- What conflict pathways characterize the water conflict?
- How do the different actors define the problem-shed framing the water conflict?
- What cultural norms and societal values shape the actors' perspectives, priorities, and policy positions? To what extent do actors share norms and values?
- What resources, capabilities, and relationships can potential third-party actors apply to water diplomacy in the conflict?
- How might third-party actors coordinate and sustain their water diplomacy engagements?

Lower intensity phases of latent conflict, or pre- or postconflict phases, may be more suited to practical third-party interventions promoting joint agenda setting, capacity building, knowledge development, improving public awareness, and fostering collaborative policy development and participatory decision making that parties might reject under circumstances of greater conflict. The conflict cycle phases constitute a continuum, and third-party engagements anywhere along the spectrum can help reduce conflict intensity and move the parties from higher to lower stages.

By the same token, third-party water diplomacy can help address the array of potential water conflict pathways. Even so, certain strategies may be more apt to help mitigate particular water security risks. Strategies to encourage inclusive governance institutions and participatory policy processes can alleviate the dangers arising from state resource expropriation and exclusionary decision making. Similar strategies can help better position parties to manage growing or changing water user demands. Strategies advancing multi-stakeholder dialogue, collective knowledge building and information exchange, via measures such as joint environmental and social impact assessments for example, can help parties to foresee and evaluate the differential water insecurity ramifications of infrastructure development projects on shared waters. Likewise, strategies working

to augment knowledge resources, bolster actor capacities to collect and share water data, and to integrate scientific information into policymaking can help actors apprehend and prepare for water-related disasters and evolving environmental pressures on water resources. Public awareness initiatives may be particularly valuable to help blunt the growth of “cultures of conflict,” fed by entrenched grievance narratives and the formation of polarized in-group/out-group social identifications that can fuel conflict persistence and recurrence.¹⁴⁷

Beyond particular conflict phases and potential conflict pathways, third-party water diplomacy can contribute to broader peacebuilding efforts to reduce or remove core tensions driving conflict and assist parties to establish positive structures, practices, and institutions for durable peace. Collaborative water governance, embodied in collective agreements, cooperative institutions, participatory policy approaches, and shared standards of practice, helps promote sustainable water management and reduce vulnerability to environmental pressures and hydro-political tensions around shared water resources.¹⁴⁸ By supporting countries and communities to practice integrated water governance approaches through cooperative processes and inclusive institutions, third-party water diplomacy can contribute to ensure the environmental and societal resilience to peacefully manage future water resource challenges.

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