Water Resource Competition in the Brahmaputra River Basin:

China, India, and Bangladesh

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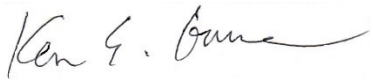

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Abstract

The Brahmaputra River originates in China and runs through India and Bangladesh. China and India have fought a war over contested territory through which the river flows, and Bangladesh faces human security pressures in this basin that will be magnified by upstream river practices. Controversial dam-building activities and water diversion plans could threaten regional stability; yet, no bilateral or multilateral water management accord exists in the Brahmaputra basin.

This project, sponsored by the MacArthur Foundation, provides greater understanding of the equities and drivers fueling water insecurity in the Brahmaputra River basin. After conducting research in Dhaka, New Delhi, and Beijing, CNA offers recommendations for key stakeholders to consider at the subnational, bilateral, and multilateral levels to increase cooperation in the basin. These findings lay the foundation for policymakers in China, India, and Bangladesh to discuss steps that help manage and resolve Brahmaputra resource competition, thereby strengthening regional security.

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Executive Summary

The Brahmaputra River, which originates in China and runs through India and Bangladesh, raises serious concerns for regional stability. China and India have fought a war over contested territory through which the Brahmaputra flows, while Bangladesh faces human security pressures in this basin that will be magnified by upstream river practices. Despite potential threats to regional stability from dam-building activities and water diversion plans on shared resources, no bilateral or multilateral water management accord exists in the Brahmaputra River basin. Moreover, this basin has received little scholarly attention compared with other river basins such as the Ganges and Indus. As a result, CNA undertook a study to gain an understanding of the equities and challenges over Brahmaputra resources at the bilateral and domestic levels in order to consider the possibilities for greater cooperation across the basin.

We find that upper riparians China and India are more concerned about the basin in political terms, whereas lowest riparian Bangladesh is primarily concerned about the basin in physical terms. While current water cooperation in this basin is limited and each riparian has its own domestic considerations, there are ways to pursue positive interactions in the Brahmaputra basin at the bilateral and even multilateral levels. In fact, because there are no interstate or water-related crises at present, the moment is opportune for China, India, and Bangladesh to work cooperatively to prevent future problems. Appealing to the shared interests of the three countries—such as economic integration and development of the basin—will be more effective for multilateral cooperation than focusing on the narrow lens of water-sharing.

Bilateral relations

China and India are engaged in a border dispute over Indian-administered Arunachal Pradesh, which Beijing regards as "southern Tibet." The Brahmaputra River runs through this disputed territory. While India's concerns are evident as a lower riparian with a border dispute, China surprisingly also has concerns despite being upriver of India. Bangladesh does not have territorial disputes with India but still fears the ramifications of poor water management by its upstream neighbors, especially India.

- China has concerns that India's dam-building activities downstream could further strengthen New Delhi's "actual control" over Arunachal Pradesh. This

issue could complicate border negotiations and further reduce Beijing's hopes of recovering this territory.

- As the middle riparian in the basin, India faces threats from upper riparian China and poses challenges to lower riparian Bangladesh. India perceives political threats from China because of Beijing's claim to part of the territory where the Brahmaputra River runs and therefore seeks to establish user rights to the river waters. India also faces physical challenges from China's upstream activities such as its robust dam-building program and possible implementation of a water diversion project.

- Bangladesh has the most to lose from water diversion activities and poor river management by upper riparian states. Bangladesh's relations with neighboring India are the more complicated of its two bilateral relationships on the Brahmaputra.

Domestic considerations

Each riparian has national priorities with regard to the Brahmaputra. Whereas China finds value in it for hydropower generation, Bangladesh's main domestic challenges encompass managing the physical impacts of the river. India's considerations reflect a combination of these interests as well as a desire to promote domestic integration.

- Upper riparian China prioritizes harnessing the Brahmaputra's economic and energy opportunities, such as the generation of hydropower to develop its western regions and to invest in clean energy resources. China has built one hydropower dam on the river and has plans for several more. In the near to medium term, China is unlikely to pursue plans to divert the Brahmaputra to relieve domestic water shortages—which is a concern for Indian observers—given cost and logistical concerns.

- India's main domestic considerations are the management of and access to Brahmaputra waters for hydroelectricity, flood control, local development, and integration of isolated northeast India into the rest of the country. India's northeast states, primarily concerned about physical impacts of the river, differ among themselves and with the central government—further exacerbating India's threat perceptions and policy quandaries.

- While Bangladesh's greatest potential threat from the Brahmaputra comes from the outside, the country's most immediate challenges on this river exist within its borders. These challenges are primarily riverbank erosion, floods, and diminished water flow and groundwater availability in the dry season. The

country's capacity constraints, dense population, and dependence on external water sources exacerbate Bangladesh's Brahmaputra-specific challenges.

Prospects for multilateral cooperation

The three riparians have taken modest steps at the bilateral level to cooperate in the Brahmaputra basin, such as limited water data-sharing and government dialogues between technical experts. Multiple options exist to expand cooperation across the basin. Bangladesh is most favorably disposed to multilateral cooperation, while China and India are cautious and selective.

- Bangladesh is the strongest advocate for basin-wide management of the Brahmaputra, given the cumulative impacts of activities by its upper riparian neighbors and Dhaka's limited capacity to address internal challenges.

- China and India have shown marginal interest thus far in addressing water resource management at a multilateral level given both countries' preferences for bilateralism. Yet neither is opposed. There are precedents and space for New Delhi and Beijing to experiment with pursuing innovative approaches to the Brahmaputra with its neighbors.

- Opportunities to expand cooperation at the multilateral level include 1) technical exchanges on the development of hydrological tools, disaster management, and pollution control and 2) confidence-building activities through official and unofficial dialogues, especially by international organizations and extraregional governments.

The only regional, multilateral framework where the three Brahmaputra riparians are members of equal status is the Bangladesh-China-India-Myanmar (BCIM) initiative. BCIM seeks to expand regional connectivity, such as through investments in infrastructure and resources. This established framework provides a built-in opportunity to cooperate on Brahmaputra issues.

- The BCIM Economic Corridor is the most promising existing framework for multilateral cooperation on the Brahmaputra. All three basin countries studied in this report are equal members of BCIM and are formally committed to pursuing greater regional integration through the BCIM Economic Corridor.

- Beginning cooperative efforts on water resources (e.g., through bilateral accords, trilateral consultations, and even a multilateral memorandum of understanding) could pave the way for a new entity—possibly a Brahmaputra Basin Commission—through which a water management and development accord could be designed and implemented.

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Glossary

ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
ASEAN	Association of Southeast Asian Nations
BBIN	Bangladesh-Bhutan-India-Nepal
BCIM	Bangladesh–China–India–Myanmar
BEI	Bangladesh Enterprise Institute
BJP	Bharatiya Janata Party
CICIR	China Institutes of Contemporary International Relations
CPR	Center for Policy Research (India)
cusec	cubic feet per second
FAO	Food and Agriculture Organization (UN)
GBM	Ganges-Brahmaputra-Meghna
GDP	gross domestic product
GMS	Greater Mekong Subregion
IFI	international financial institutions
IPCC	Intergovernmental Panel on Climate Change
IRBM	integrated river basin management
JRC	Joint Rivers Commission
JSG	Joint Study Group of the BCIM Economic Corridor
MEA	Ministry of External Affairs (India)
MOU	memorandum of understanding
MRC	Mekong River Commission
NIC	National Intelligence Council (U.S.)
NGO	non-governmental organization
NTRO	National Technical Research Organization (India)
PLA	People's Liberation Army
PRC	People's Republic of China
RLP	river-linking project
SAARC	South Asian Association for Regional Cooperation
SAWI	South Asia Water Initiative
SCO	Shanghai Cooperation Organization
UN	United Nations

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Introduction

In 2015, CNA began a project to study the competition for water resources between India, China, and Bangladesh in the Brahmaputra River basin. The Brahmaputra, which originates in China and flows through India and Bangladesh, is a coveted source of water. It is necessary for a variety of purposes, such as agriculture, fisheries, and navigation, and is a potential source of much-needed hydroelectric power to fuel growing economies in the region.

For the past decade, voices from both China and India have increasingly stirred discussion about the potential for conflict and the threats to human security as a result of water resource competition in the Brahmaputra basin. Most prominent has been Indian author Brahma Chellaney, whose 2011 book *Water: Asia's New Battleground*, raised alarm about China's dam-building efforts on the Brahmaputra.[1] Chellaney's analysis was, in part, inspired by the controversy over a People's Liberation Army (PLA) officer's 2005 book *Tibet's Waters Will Save China.*[2] Li Ling argues that upper riparian China should divert the Brahmaputra for internal use, despite the consequences for lower riparian states India and Bangladesh. Meanwhile, Bangladesh, as the lowest riparian, has long been concerned about activities by its northern neighbors that negatively affect its citizens and resources. Interestingly, India is both a lower riparian in this basin with accompanying threat perceptions—similar to Bangladesh—and an upper riparian—similar to China.

This project contributes to the burgeoning field of Asian water security analysis with a study of a river basin that has received little scholarly attention. Its particular contribution is integrating water issues with the difficult international and subnational relations of the Brahmaputra basin. After presenting an integrated examination of the challenges faced by Bangladesh, India, and China in terms of water cooperation along the Brahmaputra against the backdrop of their bilateral relations, we propose policy options for promoting water security and stability in the Brahmaputra region.

[1] The Brahmaputra is known as the Yarlung Tsangpo in Tibet, the Jamuna in Bangladesh, and the Siang in parts of India. For consistency, this report uses the term "Brahmaputra" to identify the river throughout the basin.

[2] Book title in Chinese: *Xizang zhi shui jiu Zhongguo.*

Why the Brahmaputra?

In South Asia, the Indus and Ganges basins have dominated the study of river systems. With regard to the Indus, the India-Pakistan conflict has elevated the importance of understanding the full spectrum of threats in the region, including water insecurity. The Ganges basin has also been a critical area of importance, given the hundreds of millions of people who depend on that river. See Figure 1 for a map of the river basins in the region.

Figure 1. Map of the Indus, Ganges, Brahmaputra, and Meghna basins

Source: Map drawn by Mike Markowitz, CNA, 2016. Composite relying on d-maps, http://www.d-maps.com; United Nations Food and Agriculture Organization (FAO), "SECTION III Transboundary River Basins: Ganges-Brahmaputra-Meghna River Basin," in *Irrigation in Southern and Eastern Asia in Figures, AQUASTAT Survey – 2011*, Karen Frenken, ed., Rome: FAO Land and Water Division 2012, 111, http://www.fao.org/docrep/016/i2809e/i2809e.pdf.

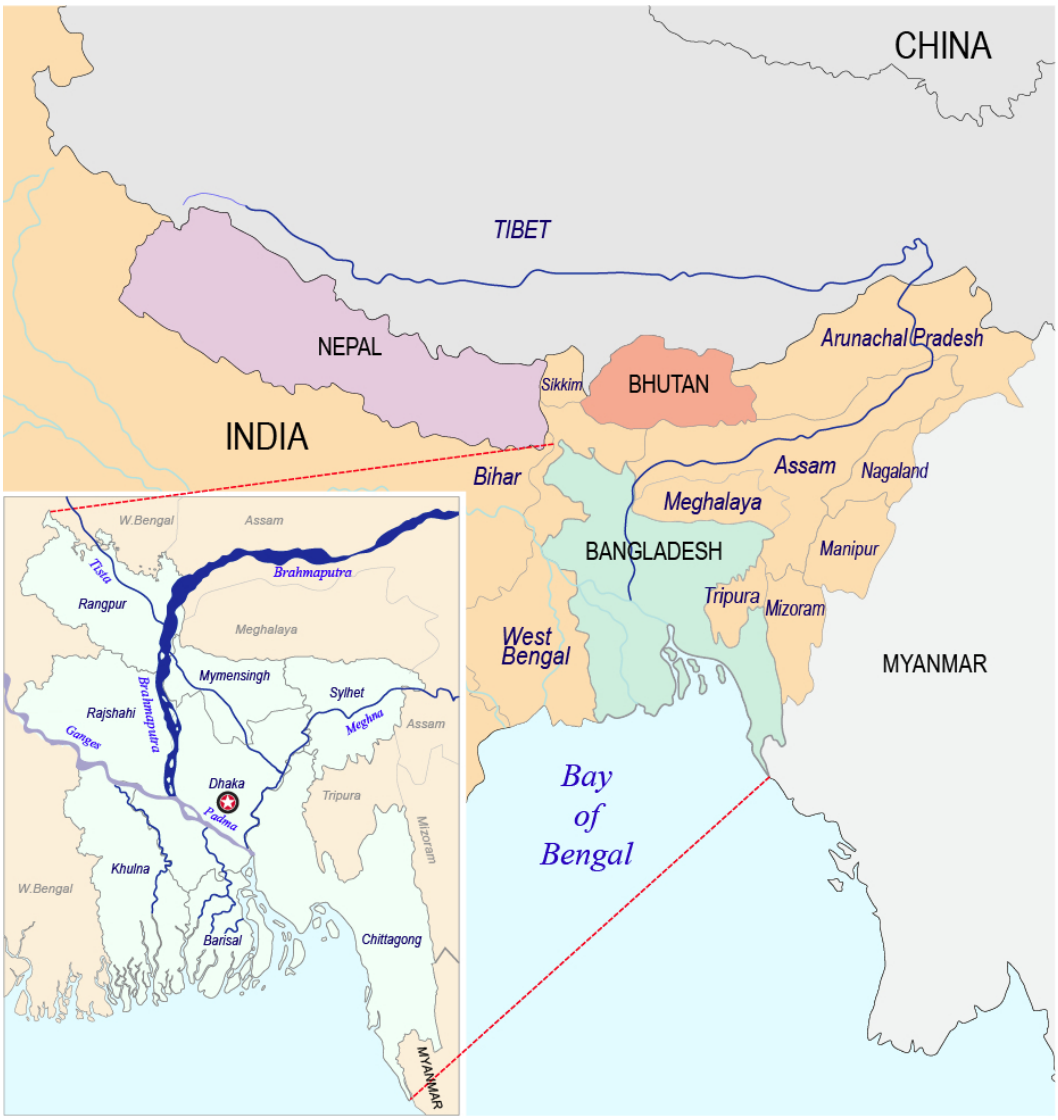
The Brahmaputra basin has been comparatively under-examined, especially considering the complex geopolitics involved and potential threats to regional stability. Covering an expanse of 580,000 square kilometers across four countries, the Brahmaputra basin comprises China, India, Bangladesh, and Bhutan, which, according to the World Bank, occupy 50 percent, 34 percent, 8 percent, and 8 percent of the basin, respectively.[3] Despite being the fifth largest river in the world by flow,[4] there is no water agreement in the Brahmaputra basin. In contrast, basin agreements have been achieved on other important transboundary rivers, such as the Nile Basin Initiative, the Amazon Cooperation Treaty Organization, and the International Commission for the Protection of the Danube River.[5] See Figure 2 for a map of the Brahmaputra, including subnational divisions for Bangladesh, India, and China.

[3] South Asia Water Initiative, "Brahmaputra Focus Area Strategy: 2013-2017," 2015, https://www.southasiawaterinitiative.org/brahmaputra. For a similar estimate, see United Nations Food and Agriculture Organization (FAO), "SECTION III Transboundary River Basins: Ganges-Brahmaputra-Meghna River Basin," in *Irrigation in Southern and Eastern Asia in Figures, AQUASTAT Survey – 2011*, Karen Frenken, ed., Rome: FAO Land and Water Division 2012, 111, http://www.fao.org/docrep/016/i2809e/i2809e.pdf.

[4] Patrick A. Ray et al., "Room for Improvement: Hydroclimatic Challenges to Poverty-reducing Development of the Brahmaputra River Basin," *Environmental Science & Policy* 54, Dec. 2015: 64.

[5] Strategic Foresight Group, *Himalayan Solutions: Co-operation and Security in River Basins*, Mumbai: Lifon Industries, 2011, 28-29.

Figure 2. Brahmaputra River



Source: Map drawn by Mike Markowitz, CNA, 2016. Composite relying on d-maps.com, http://www.d-maps.com; "Map of the Yarlung Tsangpo River," https://en.wikipedia.org/wiki/Yarlung_Tsangpo_River#/media/File:Yarlungtsangpomap.png.

Previous analysis of the Brahmaputra riparian countries has identified clear causes for concern if threats to this region are ignored. A pioneering 2012 Intelligence Community Assessment by the U.S. Office of the Director of National Intelligence entitled *Global Water Security* identified the Brahmaputra basin as having "inadequate" river basin management capacity. Of the seven river basins studied, the

Brahmaputra ranked lowest in river basin management capacity, because of "uncoordinated land use and development plans, insufficient water agreements, reduced water flows, and saltwater intrusion into the delta."[6] The report forecasts that the Brahmaputra will see ongoing discord among riparians over river development projects through 2040, as well as reduced food security and hydropower potential.

In their analysis of indicators for potential conflict in river basins around the world, Aaron Wolf et al. identify the Ganges-Brahmaputra as one basin that may see tensions in the coming years.[7] Based on water modeling data from five Asian river basins, Walter W. Immerzeel et al., writing in *Science*, conclude that the effects of climate change will be greatest in the Indus and Brahmaputra basins "owing to the large population and the high dependence on irrigated agriculture and melt-water."[8] They estimate that the food security of 60 million people may be threatened.[9] The *Global Trends 2025* report by the National Intelligence Council (NIC) examines the roles of climate change and water scarcity in complicating water cooperation and straining overall relations between countries, particularly in "the Himalayan region, which feeds the major rivers of China, Pakistan, India, and Bangladesh."[10] As an adaptation measure in response to climate change, the 2014 Intergovernmental Panel on Climate Change (IPCC) report suggests that coordination between these countries would help improve water management, including in the wider Ganges-Brahmaputra-Meghna river basin.[11]

In other South Asian river basins, steps have been taken to mitigate some of these threats. For example, India and Pakistan signed the Indus Waters Treaty in 1961, largely at the urging of the World Bank, and India and Bangladesh agreed to a 30-year water treaty for the Ganges River in 1996. Yet, there is no bilateral or multilateral accord for water management in the Brahmaputra River basin. Current cooperation in this basin only entails some dialogue and the limited sharing of hydrological data

[6] Office of the Director of National Intelligence, *Global Water Security,* Intelligence Community Assessment (ICA 2012-08), Feb. 2, 2012, v.

[7] Aaron T. Wolf et al., "International Waters: Identifying Basins at Risk," *Water Policy* 5 (2003): 29, 52.

[8] Walter W. Immerzeel et al., "Climate Change Will Affect the Asian Water Towers," *Science* 328, Jun. 11, 2010, 1385.

[9] "The Brahmaputra and Indus basins are most susceptible to reductions of flow, threatening the food security of an estimated 60 million people." Ibid., 1382.

[10] National Intelligence Council (NIC), *Global Trends 2025: A Transformed World*, Nov. 2008, 66.

[11] Y. Hijioka et al., "Asia," in *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects*, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, V.R. Barros et al., eds., Cambridge, United Kingdom, and New York, NY: Cambridge University Press, 2014, 1338.

for the purpose of flood forecasting. Moreover, these are three of the most populous nations in the world—two of which are involved in a heated dispute over the territory through which the Brahmaputra flows. In 2014, CNA's initial investigation into water security in South Asia used a gaming methodology and found a continued lack of trust between Brahmaputra stakeholder nations regarding regional security dynamics—particularly, the management of river resources. Overall, these games illustrated the need to better understand the conditions that have impeded cooperation in the Brahmaputra and that could create adverse outcomes in interstate and domestic politics. Scenarios of diminishing water resources and of heightened military hostilities are two vivid examples.[12]

Research questions

Several prior studies have examined either the water policies of each of the three Brahmaputra basin countries, with the *country* as the unit of analysis, or the implications for these countries of water management in *other basins* (namely the Ganges and Indus). Although these important foundational studies[13] cover components of the Brahmaputra River basin, significant gaps remain. Our study considers the following research questions:

[12] At the request of the Skoll Global Threats Fund, CNA designed two seminar-style, role-playing games: the initial, exploratory one in the United States, and the primary game in Asia. In each instance, we devised scenarios involving drought, flooding, upstream containment, and diversion of water that required participants to play the roles of national diplomatic and military leaders and water experts in Bangladesh, India, Pakistan, and China. For the U.S. game, held in the Washington, D.C., area, we invited subject matter experts on each country who are based in the United States. For the regional game, we invited retired ambassadors, military generals, and water experts from the South Asian countries of interest. A key finding from this game series was how insecurity over water fueled instability and tensions in other aspects of bilateral relations between the players. See Catherine Trentacoste et al., *Bone Dry and Flooding Soon: A Regional Water Management Game*, CNA, Oct. 2014, https://www.cna.org/CNA_files/PDF/IRM-2014-U-008457-Final.pdf.

[13] Important foundational research, conducted in South Asian countries as well as in Europe, covers aspects of the wider Brahmaputra River basin. Products include a study of perceptions about water security in South Asia by Chatham House, in partnership with Bangladesh Enterprise Institute (BEI), Observer Research Foundation (ORF) in India, and other regional institutions. See Gareth Price et al., *Attitudes to Water in South Asia*, Chatham House, Jun. 2014, https://www.chathamhouse.org/publication/attitudes-water-south-asia. Also, with support from the MacArthur Foundation, the Strategic Foresight Group (SFG) in India conducted a comprehensive study about potential outcomes for Himalayan water security, such as desertification, food insecurity, pollution, and dam diversions. See Strategic Foresight Group, *The Himalayan Challenge: Water Security in Emerging Asia*, 2010. A study by Norway's Peace Research Institute Oslo (PRIO) analyzed water scarcity in Bangladesh and considered the potential for multilateral cooperation mechanisms. See Åshild Kolås et al., *Water Scarcity in Bangladesh: Transboundary Rivers, Conflict and Cooperation*, Oslo: Peace Research Institute Oslo (PRIO), 2013.

1. What are the security implications of water resource competition in the Brahmaputra River basin:

- At the subnational level (i.e., domestic)?
- At the bilateral level (India-Bangladesh, India-China, Bangladesh-China)?
- At the basin-wide level (i.e., multilateral)?

2. What policies and foundational work could be pursued to mitigate water insecurity and advance stakeholder cooperation in the Brahmaputra River basin?

Given the rising demand for water and concerns about the impacts of climate change in the region, the failure of India, China, and Bangladesh to pursue a sustainable water management relationship in the Brahmaputra region raises the prospect of intensified tensions and possibly even conflict between China and India, which possess nuclear weapons. While Bangladesh does not raise the specter of nuclear conflict with its neighbors, a human security crisis there would present another threat to regional stability: Bangladesh is highly vulnerable to natural disasters, and it has insufficient capacity to address water shortages and agricultural disruption caused in part by the river practices of the two upper riparian states. In short, the lack of basin-wide management in the Brahmaputra should begin to be addressed now, in order to avoid future political-military and human security crises.[14]

Analytical approach

This project examines the Brahmaputra River basin and its major country stakeholders as a core unit of analysis. Essentially, we are connecting the dots of previous analyses that have studied segments of Brahmaputra basin security. Interest in Brahmaputra security largely emerged due to a focus on the bilateral or national implications of problems in the basin. Important foundational research regarding this basin has studied various sub-components of Brahmaputra security, including:

[14] Jessica Troell and Erika Weinthal examine the confidence-building and conflict-resolving benefits of basin-wide treaties and institutions. See Jessica Troell and Erika Weinthal, "Harnessing Water Management for More Effective Peacebuilding: Lessons Learned," in *Water and Post-Conflict Peacebuilding*, E. Weinthal, J. Troell, and M. Nakayama, eds., London: Earthscan, 2014, 436. The U.S. Water Partnership, launched by Secretary of State Hillary Clinton in 2012, defines *integrated river basin management* (IRBM) on its H2infO web portal: http://www.h2info.us/explore/river?resource_keyword=&page=2.

India-China security dynamics regarding their dam-building activities;[15] India-Bangladesh discord over water-sharing of the Teesta River,[16] a tributary of the Brahmaputra; and water security within Bangladesh.[17] At the other end of the spectrum, there have been several studies of water security in Asia broadly, but based on the reality that many of Asia's major rivers systems originate in China.

Building on these efforts, this project seeks to examine the universe of Brahmaputra stakeholders and study them cohesively in one project. Specifically, the project examines:

- The national stakeholders in each capital who interact *bilaterally* with their counterparts in New Delhi, Dhaka, and Beijing.
- The various *subnational* stakeholders (living in Arunachal Pradesh, Assam, Meghalaya, West Bengal, Nagaland, and Sikkim in India; Tibet in China; and Rangpur, Mymensingh, Rajshahi, and Dhaka in Bangladesh) who range from farmers to local officials and are often at odds with their national capitals.
- The possibility for *multilateral* activities and agreements that would serve the various stakeholders across the Brahmaputra basin.

By adopting this approach, our research effort will help fill a gap in water security literature by transcending the analytical limits of state-centric or multi-basin paradigms through attention to the Brahmaputra *at the basin-wide level* (i.e., beyond solely bilateral relations) and *at the subnational* (i.e., domestic) *level*, in addition to the bilateral level, in one assessment.

Methods

We executed our analytical approach along the following lines. First, we examined a range of primary sources and secondary literature to extract findings related to the

[15] Zhang Hongzhou, "China-India: Revisiting the 'Water Wars' Narrative," *The Diplomat*, Jun. 30, 2015; Li Zhifei, "Water Security Issues in Sino-Indian Territorial Disputes" (*ZhongYin lingtu zhengduan zhong de shui ziyuan anquan wenti*), *South Asian Studies Quarterly* [Nanya Yanjiu Jikan] 4, 2013, 29-34; IDSA Task Force Report, *Water Security for India: The External Dynamics*, New Delhi: Institute for Defence Studies and Analyses (IDSA), 2010.

[16] Sagar Prasai and Mandakini D. Surie, *Political Economy Analysis of the Teesta River Basin*, New Delhi: The Asia Foundation, Mar. 2013; Strategic Foresight Group, *Rivers of Peace: Restructuring India Bangladesh Relations*, 2013.

[17] Ayreen Khan, *Water Security: The Threat Facing Bangladesh*, Issue Brief, Bangladesh Institute of Peace and Security Studies (BIPSS), Feb. 2007.

Brahmaputra River basin only. We also considered political-military relations in the region, as well as water-related issues and drivers. Internal factors such as domestic debates were studied for their effects on foreign policy decisions. For example, control of water resources is a state prerogative in India, where elected state officials have the power to block bilateral treaties on water-sharing, with impacts on India's relations with its neighbors. The findings from CNA's 2014 series of games[18] on water security in South Asia directly informed this phase of our process by providing initial observations on how uncertainty over access to the Brahmaputra River water can motivate discord between Indian, Chinese, and Bangladeshi policymakers.

Second, we considered long-term environmental trends in the region and potential threats due to upstream water impoundment or diversion. Moreover, we searched for the extent to which they could exacerbate political-military rivalry and social instability in the region. We examined national and subnational water management approaches in India, Bangladesh, and China. For the China component of this project, we consulted Chinese-language sources—including Chinese government documents and policies, speeches by People's Republic of China (PRC) officials, state media reports, and scholarly writings—in order to better understand the range of official and non-official thinking on these issues *within* China rather than relying solely on English-language sources *about* China. To round out our analysis, we drew on analyses from U.S. and other non-Chinese specialists and foreign media reporting. These insights on water data and policies, combined with our literature review and analysis of decision-making from our game series, gave us a solid understanding of the issues as we began the next step of in-country field research.

Third, we conducted semi-structured interviews of experts and influentials in Dhaka, New Delhi, and Beijing. We investigated the political and military dimensions of water insecurity, as well as the human security consequences of current and potential water management practices across the Brahmaputra basin. In our interviews, we sought to understand the obstacles to achieving improved water cooperation subnationally, bilaterally, and multilaterally in the basin. After considering these obstacles, we developed a set of hypotheses about possible ways that the three stakeholder nations could address the challenges that impede water cooperation in the Brahmaputra.

Fourth, after processing our research and interview data, we sought to test our analytical assumptions and initial conclusions by conducting expert roundtables in each of the major stakeholder countries. We held facilitated roundtables with experts on the political-military affairs in the region and water security issues. Using a set of predetermined questions as well as dynamic follow-up questions, we structured the

[18] See Trentacoste et al., *Bone Dry and Flooding Soon,* 2014.

discussions to draw out participants on their responses and reasoning, thereby using facilitated roundtables as a filtering vehicle so we could examine our hypotheses, especially regarding possible solutions to the problem of poor cooperation on water resources in the region.

Another benefit of these three in-country roundtables is that we were able to complement our approach from CNA's previous gaming project on South Asian water security. Whereas in the 2014 game we assembled respected stakeholders from all of the study countries in one room to discuss water disputes and react to each other in different scenarios, in this study we chose to hold separate, facilitated roundtables with nationals of a single country. Due to this approach, we were able to conduct an extensive analysis of the particular interests and outlook of each country. Moreover, respondents could be especially candid in their comments without fear of upsetting nationals from the neighboring country.

We are grateful to the think tanks in the region that hosted the roundtables: the China Institutes of Contemporary International Relations (CICIR) in Beijing, the Center for Policy Research (CPR) in New Delhi, and the Bangladesh Enterprise Institute (BEI) in Dhaka.

Scope

Given our study objectives and resources, we bounded our research plan according to a few criteria:

- *First, we limited our analysis to the Brahmaputra River basin, rather than addressing the wider Ganges-Brahmaputra-Meghna (GBM) basin.* The question of how to define the "basin" inevitably emerged during the course of this project and was echoed by many interview respondents who conceived of the Brahmaputra as part of the wider GBM basin definition. Several studies over the years have examined only the Ganges and fewer have focused on the Brahmaputra, despite the arguably greater political-military and human security threats of the latter. We think there is legitimacy in keeping our focus on the Brahmaputra for that reason. Also, given the greater number of potential stakeholders that could be involved if we used a GBM definition, it would be very difficult to bring them together to find solutions. For example, the United Nations Food and Agriculture Organization (FAO) writes: "In planning and management terms, it is simply impossible to consider the GBM river system as one system because of its sheer size, complexities and

multinational character."[19] Furthermore, the World Bank's South Asia Water Initiative (SAWI) subdivides its South Asia project work, and one of its components is a separate Brahmaputra initiative.[20] Therefore, we feel that it is analytically more manageable to examine the subject at this level and that it is consistent with the view of expert institutions.

- *This study does not seek to be a scientific study of water availability or climate change impacts in the Brahmaputra basin.* Hydrological studies have been conducted on the Brahmaputra, although they are arguably too few.[21] CNA sought to undertake a wider examination of the region regarding political-military and human security in the Brahmaputra basin. The analysts on the CNA study team are not hydrological scientists; rather, we study political-military security issues. This study therefore does not seek to validate the technical water assessments made by hydrological experts. Still, to ensure credence among hydrological experts reading this report, we asked a technical expert to review our findings.

  Instead, this project seeks to (1) study views of experts in Brahmaputra riparian countries and in relevant literature; (2) understand perceptions of challenges and threats; and (3) investigate opportunities for cooperation. We discovered in our research that there is a range of competing views and narratives on this subject, in addition to discord among experts about scientific study findings. We found varying perceptions of the intent of each Brahmaputra riparian country, polarized discussion and media reporting, and insufficient confidence-building mechanisms. We felt secure in our decision to perform a wider study of the security implications of this issue rather than isolating it to purely a hydrological analysis, because data that countries are willing to make available are already viewed with suspicion by neighbors.[22] Technical water analysis would have been a welcome addition to our effort, but it would not have addressed the larger policy, psychosocial, and political-military dynamics that are at the heart of the insecurity over the Brahmaputra.[23] By situating the

[19] United Nations FAO, "SECTION III Transboundary River Basins," 2012, 123.

[20] South Asia Water Initiative, "Brahmaputra Focus Area Strategy: 2013-2017," 2015.

[21] For the most recent hydrological analysis that is specific to the Brahmaputra, see Ray et al., "Room for Improvement," 2015, 64-80.

[22] M. Surie and S. Prasai, *Strengthening Transparency and Access to Information on Transboundary Rivers in South Asia,* New Delhi: The Asia Foundation, Mar. 2015, 1-2.

[23] Water expert Nimmi Kurian of the Center for Policy Research (CPR) in India observes: "While technical issues of measurements, flow patterns and runoffs have their importance, it is just as often the more intangible, perceptual aspects that create and entrench positions and produce

water security issue within the larger context of regional security dynamics, we can focus on finding workable solutions to address water insecurity in the Brahmaputra basin over the coming years.

- *This project does not study Bhutan.* The region known as the "Third Pole"[24] divides its water resources between several countries. The Brahmaputra basin encompasses not only China, India, and Bangladesh but also Bhutan. Bhutan certainly has interests in the welfare of the Brahmaputra basin. However, we assigned equal analytical weight and devoted project resources to field research in China, India, and Bangladesh, and determined that Bhutan did not warrant the same level of attention for the following reasons:
  - Geography: The Brahmaputra does not directly traverse territory in Bhutan.
  - Comparatively less threat potential: Bhutan does not face the threat factors that we assess from China, India, and Bangladesh—three of the 10 most populous nations in the world. Their current and potential threats affect millions of citizens and have broader security implications. Bhutan has a population of about 750,000, compared with roughly 170 million in Bangladesh, 1.2 billion in India, and 1.3 billion in China.[25]
  - Political-military independence and standing: Bhutan is not the geopolitical player that the other three basin countries are. Though Bhutan is a sovereign country, Thimphu has largely been under India's sphere of influence[26] and heavily reliant on New Delhi for military protection.

Assumptions

Based on our research, we make the following assumptions in this study:

or retard cooperation at the transboundary level." See Nimmi Kurian, "Downstream Concerns on the Brahmaputra," *Hindu*, Nov. 3, 2015.

[24] See The Third Pole, "About: What Is The Third Pole?" http://www.thethirdpole.net/about. It explains, "The region that encompasses the Himalaya-Hindu Kush mountain range and the Tibetan Plateau is widely known as the Third Pole because its ice fields contain the largest reserve of fresh water outside the polar regions."

[25] CIA, "Country Comparison: Population," *The World Factbook*, July 2015.

[26] Teresita C. Schaffer, "India Next Door, China Over the Horizon: The View from South Asia," in *Strategic Asia 2011-12: Asia Responds to Its Rising Powers – China and India*, Ashley Tellis et al., eds., Seattle: The National Bureau of Asian Research (NBR), 2011, 307.

- Populations and demand for electricity will rise in India, Bangladesh, and China over the next decade.[27]
- We will see increases in glacial melt, followed by a downward trend in availability of reliable water resources in the Brahmaputra River, although the timing of these developments is uncertain. Related, we acknowledge that Brahmaputra stakeholder nations generally consider climate change a force that heightens concerns over maintaining sufficient access to water resources.
- Without significant policy changes, India, Bangladesh, and China will not sign a water management accord on the Brahmaputra within the next decade.

Goal of this research and analysis

Ultimately, this research lays a foundation for policymakers in all three countries to discuss steps toward a regional solution to long-term water needs in the Brahmaputra basin. Such an understanding will help strengthen overall security and the relationships between the riparian neighbors. Specifically, this work could support several developments for the Brahmaputra: the emergence of bilateral water dialogues between India and China that are held on a regular basis or even trilateral dialogues that include Bangladesh; the integration of water security considerations into national security and economic policy as well as infrastructure planning; the consideration of water security impacts in the development and funding decisions of international financial institutions and extraregional countries; and, eventually, the signing of a multilateral accord on cooperation in the Brahmaputra.

At a minimum, this study seeks to inform policy communities in China, India, and Bangladesh—as well as water resource specialists and academics internationally—about the interconnected aspects of the political-military situation in the Brahmaputra River basin, and the potential for national water, energy, or infrastructure policies to exacerbate interstate tensions and subnational human security conditions in the region. Across the basin (but not unique to this basin), there are stove-piped communities that do not talk to each other enough. For example, some policymakers may understand diplomatic and center-state relations but have an insufficient grasp of the science behind their decisions. Similarly, there

[27] United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2015 Revision–Key Findings and Advance Tables*, Working Paper 241, New York: United Nations, 2015, 4; The World Bank Group, "Population Estimates and Projections," 2015, http://datatopics.worldbank.org/hnp/popestimates#; The World Bank Group, "Electric Power Consumption (kWh per capita)," 2015, http://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC.

are scientists in each country who do not appreciate the political-military or social dimensions of water security.

Due to its timing, our study has the potential to inform the nascent progress between China and India that began in the early 2000s and has more recently been expanded with new dialogues and hydrological information sharing. This study could also help contribute to how the Narendra Modi government in India chooses to revisit and implement the Teesta River water-sharing accord with Bangladesh.

This project's findings aim to expand dialogue that leads to greater coordination and future institution-building—ideally, the development of water-sharing treaties for the Brahmaputra River. Given the potential threats to stability in the region if the situation continues to be ignored, our objective assessment from outside the region highlights the importance of beginning this dialogue now and the long-term benefits of basin-wide management.

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We are grateful to the John D. and Catherine T. MacArthur Foundation, which sponsored this project; to our think-tank partners in the region—the Bangladesh Enterprise Institute (BEI) in Dhaka, the Center for Policy Research (CPR) in New Delhi, and the China Institutes of Contemporary International Relations (CICIR) in Beijing—for their willingness to help us during our field research and hosting roundtable discussions; and to the experts we consulted who kindly took the time to answer our many questions.

Organization of the report

The report contains chapters on the three countries being analyzed in the Brahmaputra River basin: China, India, and Bangladesh. Each chapter analyzes the issues facing the country at the domestic, bilateral, and basin-wide levels. The report concludes with recommendations for how the countries can work together as well as improve their national policies to foster greater water security in the basin. Recommendations are also included for how the international community (i.e., international financial institutions and extraregional countries such as the United Kingdom, United States, etc.) can lend assistance in helping to advance Brahmaputra security.

Water Power, Water Worries: China's Goals and Challenges as the Brahmaputra's Uppermost Riparian

Joel Wuthnow

Chapter summary

- Known locally as the Yarlung Tsangpo, the Brahmaputra River is significant to China mainly for its hydropower potential.[28] Harnessing this potential is an integral part of China's plans to develop its western regions and to invest in clean energy resources. China has built one hydropower dam on the river and has plans for several more.
- Due to political controls in Tibet and the small affected population, domestic opposition is not likely to be a factor in limiting the speed or extent of Chinese hydropower development on the Brahmaputra.
- Possible Chinese plans to divert the Brahmaputra in order to relieve domestic water shortages have been a source of worry for some Indian observers. However, China is unlikely to pursue such plans in the near to medium term, due to cost and feasibility concerns.
- China's key concern regarding Indian activities on the Brahmaputra lies in New Delhi's prospective efforts to build hydroelectric dams in Arunachal Pradesh. Beijing worries that these facilities could further strengthen India's "actual control" over the disputed region and complicate border negotiations.

[28] The name of the river is also sometimes rendered as "Yarlung Zangbo" in Chinese media.

- Sino-Indian cooperation related to the Brahmaputra is likely to be limited by the border dispute and mutual distrust between the two states. These factors greatly reduce the likelihood of a major agreement, such as a water-sharing treaty.
- However, cooperation between Beijing and New Delhi on narrow, technical issues such as hydrological information sharing has commenced and further steps could be taken on disaster management, and pollution control.
- China has been reluctant to engage in basin-wide cooperation with India and Bangladesh. However, Beijing may be willing to explore multilateral avenues of cooperation if this can be done in a way that de-emphasizes political disputes and is focused on shared, practical and technical challenges.

Introduction

Like many of Asia's major rivers, the Brahmaputra rises in Tibet. Known locally as the Yarlung Tsangpo, the river curves its way through 700 miles of rugged and remote terrain before flowing into the northeast Indian state of Arunachal Pradesh. [29] For China, the river offers potential hydropower resources that can provide electricity for Tibet and its neighboring provinces, and play a role in Beijing's broader efforts to develop clean energy resources. China has already built one hydroelectric dam on the Brahmaputra and plans to construct several more.

While the Brahmaputra offers economic and energy opportunities for China, it also poses two key international challenges. First, Beijing has had to reassure New Delhi that its dam-building activities are non-threatening, responding to concerns by some in India that China could use these facilities to disrupt the flow of water in a future Sino-Indian conflict.[30] Second, China is concerned that Indian dam-building activities downstream could firm up New Delhi's "actual control" over Arunachal Pradesh, or what China regards as "southern Tibet." This could complicate border negotiations and further reduce Beijing's hopes of recovering this territory.

China has focused its diplomatic efforts related to the Brahmaputra at a bilateral level, including signing agreements to provide India with river flow data during the

[29] For consistency, this chapter uses the term "Brahmaputra" for the river both inside and outside Chinese-controlled territory.

[30] See, for example: Brahma Chellaney, "China's Hydro-Hegemony," *The New York Times,* Feb. 7, 2013; and Brahma Chellaney, *Water: Asia's New Battleground*, Washington, D.C.: Georgetown University Press, 2011.

flood season. Yet due to the border dispute, compounded by mutual distrust in Sino-Indian relations, cooperation between the two sides has been limited. Meanwhile, China has shown little willingness to address Brahmaputra issues at a multilateral level, involving both India and Bangladesh. Nevertheless, there may be opportunities for China to modestly expand cooperation at both a bilateral and multilateral level.

This chapter explores Chinese views and policies on the Brahmaputra. It draws on a range of Chinese-language and secondary sources, as well as interviews with Chinese experts conducted in 2015. It is divided into three main sections. The first section discusses China's domestic development activities along the river and their drivers. The second focuses on the bilateral dimension, assessing China's efforts to reassure India as well as the PRC's own concerns about Indian downstream activities. The third covers Chinese approaches to the river at a basin-wide level and the prospects for enhanced multilateral engagement.

China's domestic uses of the Brahmaputra: Activities and drivers

As of 2016, China's development activities on the Brahmaputra are limited to a series of planned hydroelectric dams. These are being built primarily to raise the standard of living in Tibet, and will also support the Chinese government's broader emphasis on clean energy. By contrast, China has announced no plans to attempt to divert the course of the river to satisfy domestic demands. While diversion plans have been discussed intermittently in China for decades, there are serious cost and feasibility issues that make their implementation unlikely.

Electricity generation

China has announced plans to construct four dams along the Brahmaputra in Tibet. Only one of these facilities is currently operational. Namely, the Zangmu Dam, which is situated in Gyaca County roughly 100 miles southeast of Lhasa, opened in November 2014, and became fully operational in October 2015.[31] The dam has a total installed capacity of 510,000 kilowatt hours, raising Tibet's overall power generation capacity by roughly 25 percent.[32] According to China's state energy plan for 2011–2015, there are also plans to construct hydroelectric dams along the river at the

[31] "China Focus: Major Hydroplant Begins Operations In Power Thirsty Tibet," Xinhua, Nov. 23, 2014.

[32] From roughly 1.5 million to 2 million kilowatt hours. Ibid.

nearby towns of Jiacha, Jiexu, and Dagu.[33] Figure 3 depicts the locations of these dams.

Figure 3. China's current and planned dams on the Yarlung/Brahmaputra

Source: Map drawn by Mark Markowitz, CNA, 2016. Sources consulted include Ananth Krishnan, "China Gives Go-ahead for Three New Brahmaputra Dams," *Hindu*, January 30, 2013, http://www.thehindu.com/multimedia/dynamic/01346/TH30_CHINA_1346288g.jpg.

Hydropower development in Tibet is part of a broader effort to economically develop western China. A key element of this effort is the campaign to "Open Up the West" (*xibu da kaifa*; 西部大开口), which was launched in 2000 to encourage economic progress in a historically impoverished part of the country.[34] The program was also

[33] *12th Five Year Plan Energy Development Plan.* PRC State Council, 2013, http://www.nea.gov.cn/2013-01/28/c_132132829.htm. In addition, Chinese engineers have explored the possibility for constructing a massive 38 gigawatt hydroelectric dam further downstream at Motuo, but this has not been officially endorsed and does not appear in the 12th five year energy plan. For details, see: Jonathan Watts. "Chinese Engineers Propose World's Biggest Hydro-electric Project in Tibet," *The Guardian,* May 24, 2013.

[34] For an introduction to the program, see: David S.G. Goodman, "The Campaign to 'Open Up The West': National, Provincial, and Local-Level Perspectives," *The China Quarterly* 178 (2004): 317-334.

likely meant to support the migration of ethnic majority Han citizens into minority-dominated areas such as Tibet and Xinjiang, and to develop natural resources and minerals in these areas to facilitate national economic growth.[35]

As part of the "Open Up the West" campaign, China has devoted significant effort to improving water resources in western China. Spearheaded by China's Ministry of Water Resources, this effort has included a total of $4.87 billion spent on water resource infrastructure in Tibet through 2014. According to PRC data, this investment has led to improved access to safe drinking water for 2.39 million people and has brought electricity to some 360,000 Tibetan herdsmen.[36] Moreover, China's five-year economic plan for 2011–2015 places the main emphasis for water resource development in China on the southwestern Mekong region and on the Tibetan Plateau, with a focus on building new water pumping and power storage facilities.[37]

Chinese sources frequently argue that the purpose of hydroelectric dam construction in Tibet is to develop an underutilized resource to meet local energy needs. A state media report noted, for example, that Tibet's per-capita electricity consumption in 2014 was less than one-third of the national average, and yet the region possesses a full 30 percent of the nation's water resources, capable of producing over 200 million kilowatt hours of electricity.[38] According to one Chinese expert, the Brahmaputra has the lowest hydropower utilization rate of all China's large rivers but also has the greatest potential for development. The expert argues that seizing this opportunity would help meet Tibet's energy needs.[39] Likewise, at the opening ceremony of the Zangmu Dam, an official from the state electric grid boasted that the new dam would help "solve Tibet's power shortage, especially in winter."[40]

Aside from economic advantages, China's drive to develop hydropower resources in Tibet supports a national emphasis on clean energy development. China's national

[35] Elizabeth Economy, "Asia's Water Security Crisis: China, India, and the United States," In *Strategic Asia 2008-09*, Mercy Kuo Ashley J. Tellis, and Andrew Marble, eds., Seattle, WA: National Bureau of Asian Research, 2008.

[36] "China Invests 30 Billion Yuan on Tibet Water Infrastructure," Xinhua, Aug. 23, 2014.

[37] "Outline of the 12th Five-Year Program for National Economic and Social Development of the People's Republic of China, Xinhua, March 16, 2011. Also, see ibid.

[38] "China Focus: Major Hydroplant Begins Operations In Power Thirsty Tibet," 2014.

[39] Liu Peng, "Chinese and Indian Interests in Transboundary Rivers: Demands and Interdependence" (*ZhongYin zai kuajie heliu shang de liyi: suqiu yu xianghu yilai), South Asian Studies* (Nanya Yanjiu) 4 (2013): 33-45.

[40] "China Focus: Major Hydroplant Begins Operations In Power Thirsty Tibet," 2014. However, the validity of this argument is questionable, since there could be considerable line losses tied to transmission of power over long distances.

energy policy states that over half of the contributions to the goal of raising non-fossil energy consumption to 15 percent by 2020 will come from hydropower. To meet this goal, the plan mandates that China accelerate construction of hydropower stations on key rivers, such as the Brahmaputra.[41] Similarly, a State Council official has stated that a main reason for increased dam-building in Tibet is that these facilities will help reduce carbon emissions by providing clean energy.[42]

Limited opposition

One of the potential obstacles to the fulfillment of these plans is opposition by local citizens and civil society groups, especially environmental non-governmental organizations (NGO). The record of China's efforts to build dams is checkered with cases of domestic opposition. For instance, plans to build 13 dams along the Nu River in Yunnan Province were halted in 2004 following an environmental campaign.[43] Likewise, activism by groups such as Green Watershed has led local authorities to set up resettlement funds for displaced residents along the Mekong.[44]

However, it is doubtful that domestic opposition will play a significant role in halting or slowing the speed of dam construction along the Brahmaputra. One reason is that, given the social controls present in Tibet, it is unlikely that civil society groups will have the political space needed to operate as they do in other parts of the country. In addition, Chinese sources suggest that the population along the Brahmaputra is so scant that any local opposition will be negligible.[45] For instance, a researcher with China's Ministry of Water Resources has argued that relocation programs for displaced residents will be facilitated by the small size of the population. Nevertheless, he added that local officials should proactively communicate with local residents to help them see that the construction projects are "for their own benefit."[46]

[41] "Full Text: China's Energy Policy 2012," Xinhua, Oct. 24, 2012.

[42] "Hydro-Power Dam Stirs Debate," *Global Times,* Nov. 18, 2010.

[43] "Brahmaputra: Towards Unity," The Third Pole.net, 2014. Those plans, however, were revived in 2013.

[44] Selina Ho, "River Politics: China's Policies in the Mekong and the Brahmaputra in Comparative Perspective," *Journal of Contemporary China* 23 (2014): 1-20; Pichamon Yeophantong, "China's Lancang Dam Cascade and Transnational Activism in the Mekong Region: Who's Got the Power?" *Asian Survey* 54 (2014): 700-724, doi: 10.1525/AS.2014.54.4.700.

[45] "Brahmaputra: Towards Unity," 2014.

[46] "Hydro-Power Dam Stirs Debate," 2010.

Water diversion

A more controversial use of the Brahmaputra lies in the possibility that China may seek to divert the river to meet domestic needs, especially for irrigation. By way of context, China currently faces serious water scarcity challenges at a national level. Overall, China holds 20 percent of the world's population but only 7 percent of its fresh water resources.[47] Moreover, China's limited water resources are unevenly distributed: northern China possesses only an estimated 14 percent of the country's fresh water, but 60 percent of its farmland and 45 percent of its total population.[48] In addition, 70 percent of northern Chinese villages have been described as short of water, with the per-capita water endowment of some areas less than one-tenth of the world average.[49] This situation has been exacerbated by factors such as weak pollution controls, poor conservation efforts, and inefficient irrigation methods.[50]

To correct these imbalances, China has embarked on a massive water transfer project known as the South-North Water Diversion Project (*nan shui bei diao gongcheng*: 南水北□工程).[51] Begun in 2002, the project consists of three planned routes: the eastern, central, and western. The eastern and central routes focus on diverting water from southern China's Yangtze and Han Rivers, respectively, to the Yellow River in the north. These two routes have already been completed and are currently supplying water to northern cities, such as Beijing and Tianjin.[52] According to China's official plans, the western route, still in its early planning stages, will concentrate on diverting the headwaters of three tributaries of the Yangtze (the Tongtian, Yalong,

[47] Zhang Hongzhou, "Confronting China's Water Insecurity," *RSIS Commentary,* Mar. 27, 2014.

[48] Sebastian Biba, "Desertification in China's Behavior Towards Its Transbounday Rivers: the Mekong River, the Brahmaputra River, and the Irtysh and Ili Rivers," *Journal of Contemporary China* 23 (2014): 21-43.

[49] Peter MacKenzie and Marcus King, *Climate Change in China: Socioeconomic and Security Implications,* CNA, Jan. 2010, 3.

[50] Kenneth Pomeranz, "Asia's Unstable Water Tower: The Politics, Economics, and Ecology of Himalayan Water Projects," In *Himalayan Water Secuirty: The Challenges for South and Southeast Asia,* Seattle, WA: National Bureau of Asian Research, 2013, 5.

[51] For more details, see: Susan Chan Shifflett et al., *China's Water-Energy-Food Roadmap: A Global Choke Point Report,* Washington, D.C., Woodrow Wilson International Center for Scholars, 2015, 19-21, https://www.wilsoncenter.org/sites/default/files/Water-energy-food%20Roadmap.pdf.

[52] Kiki Zhao, "Water From China's South-North Transfer Project Flows to Beijing," *The New York Times*, Dec. 25, 2014, http://sinosphere.blogs.nytimes.com/2014/12/25/water-from-chinas-south-north-transfer-project-flows-to-beijing/?_r=0.

and Dadu Rivers, which are all domestic rivers on the Tibetan Plateau) to the Yellow River by 2050.[53] These routes are depicted in Figure 4.

Figure 4. Current and planned routes of the South-North Water Diversion Project

Source: Map drawn by Mike Markowitz, CNA, 2016. Sources consulted include Wang Yizhi, "China's South-North Water Diversion Project," China Central Television, September 18, 2012, http://english.cntv.cn/program/newshour/20120918/104994.shtml.

Over the past three decades, various Chinese scholars have proposed diverting the Brahmaputra as a remedy above and beyond the official South-North Water Diversion Plan. The best-known plan, put forward by a senior researcher at the Yellow River Water Conservancy Commission in 1990, envisions diverting the river via a series of canals and dams through Sichuan Province and into the Yellow River.[54] Other plans

[53] Carla Freeman, "Quenching the Dragon's Thirst: The South-North Water Transfer Project—Old Plumbing for New China?" China Environment Forum, https://www.wilsoncenter.org/publication/quenching-the-dragons-thirst-the-south-north-water-transfer-project-old-plumbing-for-new.

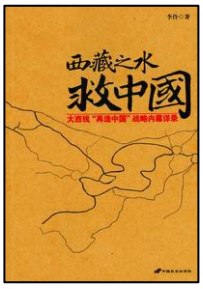
[54] Pan Wei, "China Is Planning To 'Divert Water via West Line,'" Xinhua, Jun. 7, 2011. See also: Jonathan Holslag, "Assessing the Sino-Indian Water Dispute," *Journal of International Affairs* 64 (2011): 19-35.

have been proposed and studied by scholars at the Chinese Academy of Sciences, the Yangtze River Commission, and elsewhere.[55] The box on the following page provides additional details on one plan, offered by a former People's Liberation Army (PLA) officer, that gained significant attention within China and internationally.

Although none of these proposals have been officially endorsed, some Chinese and foreign scholars contend that China's water shortages may become so severe that the government will have no choice but to attempt to tap into the Brahmaputra. For instance, water scarcity, combined with the effects of climate change and desertification, may become so intense that a more radical scheme to divert the Brahmaputra will be needed.[56] Similarly, a failure of the South-North Water Diversion Project to alleviate water shortages in northern China could make a plan to divert the Brahmaputra "very tempting" for PRC authorities.[57]

Will Tibet's Waters Save China?

Notions of diverting Tibetan rivers to alleviate the water needs of northern China entered the Chinese popular imagination with the publication of the book *Tibet's Waters Will Save China* by former PLA officer Li Ling in 2005. The book argues that waters from four rivers, including the Brahmaputra, could be diverted to the Yellow River. The book has gained international attention: Indian scholar Brahma Chellaney has cited it as evidence that China harbors plans to divert the river despite official assurances that it has no such plans.[58] Other Chinese scholars, though, have panned the book as "bravado" and "folk theory."[59]



[55] Zhang Ke, "Diversion Debate," *China Dialogue*, Jun. 13, 2011.

[56] Pan Wei, "China Is Planning To 'Divert Water via West Line,'" 2011. See also: Liu Peng, "Chinese and Indian Interests in Transboundary Rivers: Demands and Interdependence" (*ZhongYin zai kuajie heliu shang de liyi: suqiu yu xianghu yilai),* 2013.

[57] Pomeranz, "Asia's Unstable Water Tower," 2013, 6. See also: Biba, "Desertification in China's Behavior Towards Its Transboundary Rivers," 2014.

[58] Chellaney, *Water: Asia's New Battleground*, 2011, 154.

[59] Zhang Jincui, "An Indian Hawk's China Outlook: The Case Study of Professor Brahma Chellaney" (*Yindu "yingpai" xuezhe de Zhongguo guan: dui Bulama Qielani jiaoshou de gean yanjiu), Forum of World Economics & Politics* (Shijie Jingji yu Zhengzhi Luntan) 2 (2012): 66-79. Liu Peng, "Chinese and Indian Interests in Transboundary Rivers: Demands and Interdependence" (*ZhongYin zai kuajie heliu shang de liyi: suqiu yu xianghu yilai*), 2013.

However, plans to divert rivers from western China have several shortcomings. First, from a cost perspective, inter-basin water transfers are among the most expensive ways to increase water availability. Methods such as increasing irrigation efficiency, shallow groundwater pumping, and even intra-basin water transfers tend to be more cost-effective.[60] Indeed, China is already moving ahead with various water conservation measures, such as building fewer water-intensive coal plants.[61]

Second, diverting water from the Tibetan Plateau also raises serious feasibility concerns. The director of the PRC State Council's office responsible for the South-North Water Diversion Project has described a "significant gap" between preliminary work done on the western route and the "actual requirements" of the project.[62] CNA interviews conducted in 2015 also indicated that Chinese experts have concerns about the western route on technical grounds, including the view that the Tibetan Plateau is too geologically unstable to support such a massive endeavor.[63] Moreover, given its potentially disruptive effects, plans for the western route are likely to encounter resistance on social and ecological grounds.[64]

Compared to the western route of the official South-North Water Diversion Project, Chinese experts tend to be even more dismissive of proposals to divert waters from the upper Brahmaputra. CNA interviews suggest that the Chinese government has given no serious consideration to these proposals in recent years.[65] In fact, a study commissioned by the Ministry of Water Resources in 2000 reportedly concluded that such plans would be neither necessary nor feasible.[66] Moreover, former minister of water resources Wang Shucheng stated on at least two occasions that plans to divert the Brahmaputra were not feasible.[67] Thus, while China may eventually give some consideration to such ideas, there is no evidence to suggest that this is likely in the near future.

[60] Water Resources Group, *Charting Our Water Future,* 2009, 77.

[61] Renee Cho, "How China Is Dealing With Its Water Crisis," State of the Planet, http://blogs.ei.columbia.edu/2011/05/05/how-china-is-dealing-with-its-water-crisis.

[62] Liu Peng, "Chinese and Indian Interests in Transboundary Rivers: Demands and Interdependence" (*ZhongYin zai kuajie heliu shang de liyi: suqiu yu xianghu yilai*), 2013.

[63] CNA interviews, Beijing, 2015.

[64] Zhang Hongzhou, "China-India Water Disputes: Two Major Misperceptions Revisited," *RSIS Commentary*, Jan. 19, 2015.

[65] CNA interviews, Beijing, 2015.

[66] Zhang Hongzhou, "China-India: Revisiting the 'Water Wars' Narrative," *The Diplomat*, Jun. 30, 2015.

[67] Zhang Ke, "Diversion Debate," 2011.

China's bilateral water diplomacy

Although the Brahmaputra offers potential economic and energy opportunities for China, it also presents two major international challenges. First, Beijing has had to respond to Indian concerns that China's upstream development activities will have adverse consequences for India. Second, many in China are concerned that Indian development activities farther downstream will firm up New Delhi's "actual control" over disputed territory in Arunachal Pradesh and thereby complicate border negotiations between the two countries. Despite these challenges, there may be opportunities for at least a limited expansion in Sino-Indian cooperation related to Brahmaputra issues.

Assuaging Indian concerns

Over the past decade, China has attempted to reduce two major Indian concerns with respect to the Brahmaputra: flooding that could be prevented with access to Chinese data; and potential Chinese development activities along the river.

Many of the concerns about flooding developed as a result of a major flood that took place in June 2000. In this incident, a natural dam that had formed due to a landslide on a tributary of the Brahmaputra in Tibet, broke. As a result, 3–4 billion cubic meters of water poured into Arunachal Pradesh and Assam, killing 30 Indian nationals and leaving 50,000 homeless. Many in India asserted that China withheld hydrological data that could have prevented the disaster; this led to friction in Sino-Indian relations.[68]

In response to Indian concerns about flooding, China and India have established a series of agreements to share hydrological data. In April 2002, China agreed to provide India with hydrological data from three monitoring stations on the Brahmaputra between June 1 and October 15 of each year, corresponding to the annual flood season. During a visit by Chinese president Hu Jintao to India in November 2006, the two countries agreed to establish an expert-level group to discuss hydrological data and emergency response measures.[69] In October 2013,

[68] Wang Yan, "The River Wild," *News China*, Jan. 2012, http://www.news chinamag.com/magazine/the-river-wild.

[69] Lan Jianxue, "Water Security Cooperation and China-India Interactions" (*Shui ziyuan anquan hezuo yu ZhongYin guanxi de hudong*), *China International Studies* (Guoji Wenti Yanjiu) 6 (2010): 37-43.

China extended the data-sharing period from May 15 to October 15.[70] Data supplied by China have been used by India's Central Water Commission to inform flood forecasts.[71]

Chinese willingness to share hydrological data has been well received by India. This is evident in a series of joint statements reached during China–India summits. For instance, in a joint statement following Chinese president Xi Jinping's visit to India in September 2014, India thanked China for providing flood season data, and the two sides agreed to continue cooperation in data sharing and in emergency response. The joint statement following Indian prime minister Narendra Modi's visit to China in May 2015 contained a nearly identical statement.[72] Thus, China appears to have gained at least some diplomatic goodwill as a result of its overtures.

Second, China has sought to assuage Indian concerns over Chinese development activities along the river. Indian analysts have suggested that China may seek to use its dams on the Brahmaputra to disrupt the flow of water into India in the event of a conflict, or to use its control over water resources as a form of diplomatic leverage.[73] Some in India also speculate that China could attempt to store river water (or even divert the river), which would result in reduced river flow to India at a time when water sources are increasingly stressed due to population growth and global climate change effects.[74]

Indian concerns[75] regarding Chinese upstream activities reflect a deeper problem of mutual distrust in Sino-Indian relations. This is driven by factors such as the ongoing border dispute, Chinese concerns over Indian ambitions and relations with the United States, Indian concerns over China's rapid military modernization and ties with Pakistan, and lingering resentments stemming from the 1962 China-India

[70] Government of India, Ministry of Water Resources, River Development, and Ganga Rejuvenation, http://wrmin.nic.in/forms/list.aspx?lid=349.

[71] Ibid.

[72] "Joint Statement between India and China during Prime Minister's Visit to China," Government of India Ministry of External Affairs, May 15, 2015. See also: "PRC-Republic of India Joint Statement on Building Closer Partnership for Development (Full Text)," Xinhua, Sep. 19, 2014.

[73] Vijai Nair, "The Chinese Threat: An Indian Perspective," *The China Brief* 1 (2001); Chellaney, "China's Hydro-Hegemony," 2013. See also: Mark Christopher, *Water Wars: The Brahmaputra River and Sino-Indian Relations,* U.S. Naval War College, 2013.

[74] Chellaney, *Water: Asia's New Battleground*, 2011.

[75] For India's perspectives on the Brahmaputra, see the India chapter for this project by Satu Limaye.

border conflict.[76] While Chinese interviewees contended that Sino-Indian relations have made progress under the recent efforts of President Xi Jinping and Prime Minister Narendra Modi, most concurred that distrust remains a central problem for the two countries.[77]

Nevertheless, China has sought to quell Indian concerns through official rhetoric and media commentary. In particular, Chinese sources have repeatedly asserted that China plans to build only "run of the river" dams that cannot be used to reduce or stop the flow of the river into Indian-controlled territory.[78] Moreover, China's Ministry of Foreign Affairs spokesman has stated that China's planned dams will not pose flood risks or ecological challenges to downstream areas.[79] China has also responded to Indian speculation over potential river diversion schemes. For instance, a *PLA Daily* article denies any diversion plans and claims that China took Indian interests into account when it chose not to include the Brahmaputra in the South-North Water Diversion Project.[80]

China's public rhetoric has largely failed to assuage Indian concerns. While Indian officials have not publicly rejected Chinese pledges that Tibetan dam-building will not harm Indian interests, India's official position has been close to that adopted by the United States in its arms control negotiations with the Soviet Union in the 1980s: "Trust but verify."[81] Specifically, New Delhi asserts that it accepts the Chinese statements but will continue to monitor China's upstream activities and convey concerns through diplomatic channels when necessary.[82] In addition, PRC public diplomacy has not deterred Indian analysts such as Brahma Chellaney from continuing to circulate the argument that China harbors ulterior motives in its dam-building efforts. Thus, China still faces a trust gap with India on these issues.

[76] Murray Scot Tanner, *Distracted Antagonists, Wary Partners: China and India Assess their Security Relations,* CNA, Sep. 2011, 5-9.

[77] CNA interviews, Beijing, 2015. See also: Lan Jianxue, *Sino-Indian Relations in the New Era: Current Status, Development Trend and Policy Recommendations,* 2015.

[78] Biba, "Desertification in China's Behavior Towards Its Transboundary Rivers," 2014.

[79] "Transcript of Regular News Conference by PRC Foreign Ministry on 24 November 2014," *Ministry of Foreign Affairs of the People's Republic of China,* Nov. 24, 2014.

[80] Sun Peisong, "China-India Friendship Is Basis for New Order in Future of Asia," *PLA Daily*, Oct. 22, 2013.

[81] Li Li,"An Exploration of the Maturation of Sino-Indian Relations and Its Causes" (*ZhongYin guanxi zouxiang chengshu ji qi yuanyin tanxi), Contemporary International Relations* (Xiandai Guoji Guanxi) 3 (2013): 49-55.

[82] "Hydropower Station on Brahmaputra: India to Monitor Situation," *Times of India,* Oct. 15, 2015.

Chinese concerns regarding Indian hydropower activities

A second challenge for China relates to Indian efforts to develop the Brahmaputra in Arunachal Pradesh. At present, the river is largely undeveloped as it flows through the northeastern Indian state. However, India's Ministry of Water Resources has announced plans to build dams in that section of the river in order to control flooding and to increase electricity production. The ministry also contends that dam construction is necessary for securing water usage rights under international practice.[83] This appears to be a step forward in firming up India's claims to Arunachal, which China regards as its own territory under the name "southern Tibet."

Arunachal Pradesh is one of two major areas of dispute along the Sino-Indian border. The other is Aksai Chin, which lies farther to the west, and has been controlled by China since 1951.[84] Arunachal was the main theater of the 1962 China-India border conflict, in which Chinese forces advanced into Indian-controlled territory and then withdrew, pending negotiations. At the core of China's contention is the view that Beijing has sovereignty over lands formerly held by the Tibetan kingdom, including Aksai Chin and Arunachal. India rejects these claims and argues that these lands belong to India as part of a 1914 treaty.[85]

Indian infrastructure development along the Brahmaputra is of particular concern for China because it could grant India leverage in border negotiations and complicate Chinese efforts to gain control of this territory.[86] Li Zhifei, an expert at the Chinese Academy of Social Sciences (CASS) who has extensively studied this issue, writes that India has used several means to strengthen its "actual control" over Arunachal, including an increasing military presence, migration of citizens into the region, and development of water resources on rivers such as the Brahmaputra.[87] Li also argues

[83] "India Plans to Build Big Dams Over Brahmaputra, Says Uma Bharti," *The Economic Times*, Jun. 4, 2015.

[84] John Garver. *Protracted Contest: Sino-Indian Rivalry in the Twentieth Century*. Seattle: University of Washington Press, 2001.

[85] Ibid.

[86] CNA interviews, Beijing, 2015.

[87] Li Zhifei, "Water Security Issues in Sino-Indian Territorial Disputes" (*ZhongYin lingtu zhengduan zhong de shui ziyuan anquan wenti*), *South Asian Studies Quarterly* (Nanya Yanjiu Jikan) 4 (2013): 29-34.

that India is seeking to build dams in Arunachal to gain an "advantageous" position in border talks with China.[88]

In addition to sovereignty concerns, Chinese observers also point to environmental risks posed by Indian development of the river. One Chinese claim, albeit made without a clear scientific explanation, is that Indian industrial activity in Arunachal could increase sedimentation of the river, which might raise the risks of flooding in parts of Tibet.[89] Other Chinese sources assert that rising Indian carbon emissions connected to greater industrial activity in the region could contribute to glacial melt in the Himalayas, and threaten the long-term flow of the river.[90] These arguments may reflect genuine ecological concerns, but also may be designed in part to provide an additional basis for opposing Indian development in the disputed region.

Despite these concerns, China has taken only modest steps to counter Indian plans to build hydroelectric dams in Arunachal. One tactic that China has used in recent years has been to leverage its influence in international institutions such as the Asian Development Bank to deny India funding for infrastructure projects in the disputed area.[91] It is possible that China will also seek to use its leading position in the newly established Asian Infrastructure Investment Bank (AIIB) for a similar purpose.[92] However, given Indian domestic resources and New Delhi's impetus to develop the northeastern part of the country, it is questionable whether China will have the necessary power or influence to successfully oppose the future development of dams.

Outlook for China-India cooperation

Two factors will likely limit a major expansion of China-India cooperation related to the Brahmaputra. First is the ongoing border dispute. Contested ownership of Arunachal Pradesh means that Beijing and New Delhi will probably be unable to reach a major accord on transboundary river rights and obligations, such as a water-

[88] Ibid., 32.

[89] Lan Jianxue, "Water Security Cooperation and China-India Interactions" (*Shui ziyuan anquan hezuo yu ZhongYin guanxi de hudong),* 2010.

[90] CNA interviews, Beijing, 2015. For background on potential climate change effects on the river, see: Immerzeel et al., "Climate Change Will Affect the Asian Water Towers," 2010, 1382-1385.

[91] Sudha Ramachandran, "Chinese Antics Have India Fuming," *Asia Times,* 2009.

[92] Moreover, CASS's Li Zhifei argues that China should continue to press these institutions to reject Indian requests for financial assistance. Li Zhifei, "Water Security Issues in Sino-Indian Territorial Disputes," (*ZhongYin lingtu zhengduan zhong de shui ziyuan anquan wenti*), 2013.

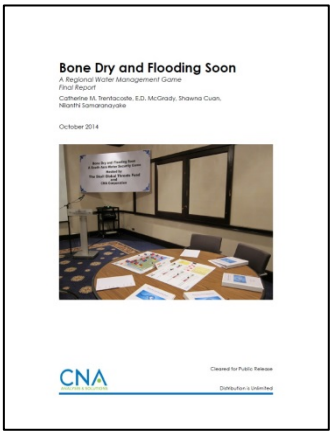
sharing treaty. As of 2015, there are no signs that this dispute is set to abate in the near to medium term.[93] Second is mutual distrust. While this may be a factor at the official level, it may be more pronounced within civil society in both countries. Indian analysts such as Brahma Chellaney will likely continue to question Chinese intentions regarding dam-building on the upper Brahmaputra. Meanwhile, Chinese observers will likely doubt the motives of their Indian interlocutors, whom many in China regard as biased and sensationalist.[94] These sentiments could limit the prospects for productive engagements between scholars on both sides. The following box discusses additional factors that could limit cooperation between Beijing and New Delhi.

[93] Vivek Raghuvanshi, "India-China Talks Fail to Make Progress on Border Dispute," *DefenseNews*, Nov. 17, 2015.

[94] Li Zhifei, "Water Security Issues in Sino-Indian Territorial Disputes" (*ZhongYin lingtu zhengduan zhong de shui ziyuan anquan wenti*), 2013. Lan Jianxue, "Water Security Cooperation and China-India Interactions" (*Shui ziyuan anquan hezuo yu ZhongYin guanxi de hudong*), 2010; Li Li, "Nontraditional Security and China's Relations with South Asia," in *Ecological and Nontraditional Security Challenges in South Asia*, Farooq Sobhan, Dennis Pirages, Stacy D. VanDeveer, Li Li, eds., Seattle, WA: National Bureau of Asian Research, 2011. One scholar even penned an extensive review of the writings of Indian analyst Brahma Chellaney with respect to China, critiquing Chellaney's assertions about China's intentions to use water as a weapon as biased and unsubstantiated. Zhang Jincui, "An Indian Hawk's China Outlook," 2012.

China-India Cooperation: Insights from a CNA Water Security Game

In January and June 2014, CNA conducted two tabletop exercises designed to explore water security dynamics in South Asia. Experts were assigned to play the roles of countries, including China, India, and Bangladesh, and emulate the positions of these states in water conflict scenarios. The games suggested that mutual distrust and larger political disputes, such as border tensions, could greatly reduce the chance for meaningful cooperation. The games also highlighted the role of domestic politics. As CNA's report on the games argued, "Countries must be able to govern internally in order to…effectively engage their neighbors." This suggests that China and India may have challenges in cooperating if one or both states are facing a major internal crisis.[95]



Nevertheless, there may still be opportunities for a modest expansion of Sino-Indian cooperation on Brahmaputra issues. This is most likely on narrow, technical subjects that can be separated from the border dispute.[96] Specifically, China may be receptive to cooperation in areas such as disaster management, environmental protection, and river safety, or on scientific topics, such as the effects of climate change on long-term river flow.[97] Some of these issues may be discussed at an official level, such as between the water resource ministries of both states, while others may be more usefully deliberated initially at the Track 2 level, perhaps involving specialists from Chinese and Indian government-funded research institutes.[98]

[95] Catherine M. Trentacoste et al., *Bone Dry and Flooding Soon: A Regional Water Management Game*, CNA, Oct. 2014.

[96] More broadly, Lan Jianxue of the China Institute of International Studies argues that Sino-Indian cooperation is most likely in "low politics" areas, such as on economic, humanitarian, and cultural endeavors, than on "high politics" areas such as the border dispute. See: Lan Jianxue, *Sino-Indian Relations in the New Era*, 2015, 30-31.

[97] CNA interviews, Beijing, 2015.

[98] Ibid.

There are several drivers that could promote enhanced cooperation on these issues. First, a positive overall direction in China-India relations, symbolized by fruitful high-level exchanges and economic agreements, could remove obstacles and set the stage for cooperation on transboundary river issues.[99] Second, China may be able to draw on its own initiatives related to the Brahmaputra to portray itself as a responsible upper riparian. For Beijing, modestly enhancing outreach on water security challenges could be a relatively low cost way to foster diplomatic goodwill with New Delhi. Third, additional progress may be facilitated if initiatives are proposed and encouraged by the Indian side. This would address the argument of some Chinese analysts that Beijing has been proactive in sharing hydrological data and that the onus is now on India to reciprocate.[100]

Water security and China-Bangladesh relations

Compared to those with India, China's interactions with Bangladesh related to the Brahmaputra have been relatively free of controversy. This is unsurprising, since the two countries do not share a border. Beijing's cooperation with Dhaka has proceeded on several fronts. In 2008, China agreed to share hydrological data on the Brahmaputra with Bangladesh.[101] At a summit held in 2010, China and Bangladesh agreed to improve cooperation on water resource management, hydrological data sharing, flood control, and disaster reduction. China also agreed to assist Bangladesh with riverbed dredging and personnel training.[102] Another memorandum of understanding (MOU) was signed in March 2015 on the sharing of rainfall data in the river's catchment area in China, which would help inform Bangladeshi flood forecasting.[103]

Sino-Bangladeshi cooperation on Brahmaputra issues is consistent with a broader expansion of the bilateral relationship in recent years. As of 2015, Beijing is Dhaka's largest trade partner, and Bangladesh plays an important role in China's vision of

[99] Li Li, "An Exploration of the Maturation of Sino-Indian Relations and Its Causes" (*ZhongYin guanxi zouxiang chengshu ji qi yuanyin tanxi*), 2013.

[100] CNA interviews, Beijing, 2015.

[101] "China Assures Preferential Treatment for Bangladeshi Products," *Bangladesh Economic News,* Sep. 24, 2008.

[102] *Joint Statement Between the People's Republic of China and the People's Republic of Bangladesh,* 2010, http://www.fmprc.gov.cn/mfa_eng/wjdt_665385/2649_665393/t674421.shtml.

[103] Abu Bakar Siddique, "China To Give Brahmaputra Flow Data to Bangladesh," The Third Pole.net, Sep. 29, 2015.

creating a "21st Century Maritime Silk Road" stretching from Asia to Europe.[104] China also vies for influence in Bangladesh with India, which is also reaching out to Dhaka with various agreements and incentives.[105] In this context, Chinese willingness to share hydrological information and provide assistance in river dredging may simply be designed to cultivate diplomatic goodwill with Bangladesh. Moreover, Beijing has sought to reassure Dhaka (as well as New Delhi) that it has no plans to divert the Brahmaputra.[106]

In a sense, the perceived threats that Bangladesh faces from Indian development activities upstream have become a counterpoint to India's concerns about Chinese dam-building in Tibet. Various Chinese analysts have highlighted India's water diversion plans as a challenge that could have severe economic and ecological effects on its downstream neighbor.[107] For instance, in a CNA interview in Beijing, one Chinese expert argued that potential Indian diversion plans could harm Bangladeshi interests, and that Bangladesh "has a right to say something" as a threatened downstream riparian. The subtext of these comments appears to be that India may be applying a double standard in critiquing China's upstream development initiatives.

Multilateral cooperation in the Brahmaputra basin: The view from China

China has centered its diplomatic outreach on Brahmaputra issues at a bilateral level. It has signed hydrological data sharing agreements with both India and Bangladesh, but has not engaged the two countries in a multilateral setting. This is consistent with a larger pattern of bilateralism in China's water diplomacy. However, there are signs that Beijing could be willing to expand cooperation with both New Delhi and Dhaka at a basin-wide level.

[104] ASMG Kibria, "Bangladesh Juggles Chinese, Japanese Interest," *The Diplomat,* Jan. 5, 2015.

[105] See, e.g. "India's Modi Hopes to Tamp Down China's Influence in Bangladesh," *VOA News,* May 27, 2015.

[106] For Bangladesh's perspectives on the Brahmaputra, see the Bangladesh chapter for this project by Nilanthi Samaranayake. For India's perspectives on the Brahmaputra, see the India chapter by Satu Limaye.

[107] Holslag, "Assessing the Sino-Indian Water Dispute," 2011.

Limited multilateralism

In general, China's water diplomacy has focused on achieving bilateral agreements with neighboring states. Aside from its agreements with India and Bangladesh, China has signed accords on boundary and cross-border rivers with Russia, Kazakhstan, Kyrgyzstan, Mongolia, North Korea, and others. These agreements are diverse in scope, covering issues such as water navigation, hydrological projects, environmental protection, emergency notification, and data sharing. Many are more substantial than the limited China–India pacts on the Brahmaputra, largely because China has no border disputes with these other countries.[108]

By contrast, China has avoided multilateral diplomacy as a way to solve shared water challenges. China was one of three states (the others being Turkey and Burundi) that voted against the 1997 United Nations Watercourses Convention, which outlines principles for cooperation related to international waterways, such as transboundary rivers, and procedures for dispute resolution. The reasons China's UN representative gave for his country's opposition to the treaty include inadequate protection of state sovereignty and an "imbalance" between the rights and duties of upper and lower riparians.[109] China has also declined to participate in the World Commission on Dams, which provides guidelines for dam construction.[110]

In addition, China has been reluctant to participate in multilateral water agreements at a regional level. This is illustrated by China's approach to the Mekong River Commission (MRC), which was established in 1995 to govern activities among Mekong River states. Although China has been a dialogue partner of the Commission since 1996, it has not sought full membership, largely due to the concern that doing so would impose restrictions on its upstream dam-building plans.[111] Rather, as Selina Ho, an expert on Chinese transboundary river issues argues, China has opted to seek agreements with Mekong states on a bilateral basis.[112] Nevertheless, China has adopted limited multilateral cooperation with the MRC. This is discussed in greater detail in the following section.

[108] Chen Huipeng et al., "Exploring China's Transboundary Water Treaty Practice Through the Prism of the UN Watercourses Convention," *Water International* 38 (2013): 217-230.

[109] "General Assembly Adopts Convention on Law of Non-Navigational Uses of International Watercourses," News release, May 21, 1997, http://www.un.org/news/Press/docs/1997/19970521.ga9248.html.

[110] Ho, "River Politics," 2014.

[111] Ibid., 8. See also: Beth Walker, "China and India Ignore UN Watercourses Convention," Chinadialogue, Aug. 18, 2014.

[112] Ho, "River Politics," 2014."

China's preference for bilateral diplomacy on Brahmaputra issues is consistent with this larger pattern. This preference may be underscored by two factors. First is the absence of existing institutions relevant to discussions among all three riparians. The South Asian Association for Regional Cooperation (SAARC), for instance, does not include China, while the Shanghai Cooperation Organization (SCO) does not include Bangladesh. Second is the deeper problem of mutual distrust, not only in China-India relations, but also in India-Bangladesh relations, which some PRC analysts argue would undermine any plans to promote cooperation on a basin-wide scale.[113] In effect, Beijing may have concluded that it is more practical and effective to work with New Delhi and Dhaka separately than to work with them together.

Possible cooperation

However, there several reasons why China may revisit its current preference for bilateralism on Brahmaputra issues. First, at a broad level, China has participated in, and even shaped, multilateral regimes and institutions since the 1990s.[114] This is evident, for example, in China's role in organizing the Six Party Talks on North Korea and in its participation in the Association of Southeast Asian Nations (ASEAN) Regional Forum. China has also sought to play a more prominent role in SAARC, which includes both India and Bangladesh.[115] Thus, if anything, China's bilateral approach to water diplomacy is increasingly out of step with its confidence in other policy arenas that multilateralism can support Chinese interests.

Second, there is a precedent for Chinese participation in water diplomacy at a basin-wide level. Namely, China signed an agreement with the MRC in 2002 to supply hydrological data from June 15 to October 15 of each year, a period corresponding to the monsoon season. That agreement was expanded in 2008, and again in 2013. China has also cooperated with the MRC through technical exchanges in areas such as river navigation and hydropower development.[116] In December 2014, China's vice

[113] CNA interviews, Beijing, 2015

[114] Joel Wuthnow, Xin Li, and Lingling Qi, "China's Diverse Multilateralism: Four Strategies in China's Multilateral Diplomacy," *Journal of Chinese Political Science* 17 (2012): 269-290; Kuik Cheng-Chwee. "Multilateralism in China's ASEAN Policy: Its Evolution, Characteristics, and Aspiration." *Contemporary Southeast Asia* 27 (2005): 102-122. Hongying Wang, "Multilateralism in Chinese Foreign Policy," *Asian Survey* 40 (2000): 475-491; Joel Wuthnow, *Chinese Diplomacy and the UN Security Council,* New York: Routledge, 2013.

[115] Nilanthi Samaranayake, *The Long Littoral Project: Bay of Bengal*, CNA, Sep. 2012, 69, https://www.cna.org/CNA_files/PDF/IRP-2012-U-002319-Final.pdf.

[116] "Mekong River Commission and China Boost Water Data Exchange," News release, Aug. 30, 2013, http://www.mrcmekong.org/news-and-events/news/mekong-river-commission-and-china-boost-water-data-exchange/.

minister of water resources stated that Beijing hoped to strengthen cooperation with the MRC, such as in conducting a joint scientific study on water flow fluctuations in the river basin.[117] The box below discusses Chinese cooperation within the Greater Mekong Subregion (GMS).

In addition to the MRC, China has also cooperated multilaterally with the GMS, which is an economic cooperation program with participation of the six Mekong riparians: China, Laos, Cambodia, Myanmar, Thailand, and Vietnam.[118] China's agreements as part of the GMS included a 2006 agreement for an oil shipping program and a 2011 agreement on joint patrols to ensure safe navigation of the river.[119] Moreover, in October 2015 law enforcement officials from the GMS countries agreed to expand cooperation on issues such as human smuggling and illegal immigration.[120] Although river navigation is less relevant to the upper Brahmaputra, which is non-navigable, the GMS is a model of potentially effective cooperation for the Brahmaputra riparians in that it is focused on a narrow, technical challenge and avoids becoming enmeshed in broader political tensions.

Third, the barriers to basin-wide cooperation on the Brahmaputra are likely not insurmountable. For one thing, the lack of an existing mechanism does not necessarily rule out cooperation. In other contexts, China has established new bodies to address transnational challenges when one did not currently exist. For instance, China helped establish the SCO to address terrorism and other challenges in Central Asia.[121] China may also be receptive to the possibility that existing bodies, such as the Bangladesh–China–India–Myanmar (BCIM) forum, could be expanded to address water issues.[122] In addition, mutual distrust has not prevented China from engaging in productive bilateral talks with India, and there is no reason why it would preclude similar discussions at a multilateral level. The key appears to be whether cooperation

[117] Zhang Hongzhou, "China-India: Revisiting the 'Water Wars' Narrative," 2015.

[118] For further details, see: "Greater Mekong Subregion," http://www.adb.org/countries/gms/main.

[119] Ho, "River Politics," 2014.

[120] "Joint Declaration Issued to Enhance Mekong River Security," Xinhua, Oct. 24, 2015.

[121] Wuthnow, Xin Li, and Lingling Qi, "China's Diverse Multilateralism: Four Strategies in China's Multilateral Diplomacy," 2012.

[122] CNA interviews, Beijing, 2015.

can be insulated from higher-level political tensions and focus instead on shared technical or humanitarian issues.[123]

Finally, China has several incentives to cooperate with other Brahmaputra riparians in a multilateral context. First, China's reputation would benefit if the Chinese took a leading role in proposing basin-wide cooperation.[124] As it has with other regional initiatives, such as the AIIB, China could argue that it is engaging proactively as a responsible regional stakeholder.[125] Second, basin-wide cooperation could help reduce a source of friction on China's western periphery at a time when it is facing increasing challenges in its eastern maritime region and in its relations with the United States and others.[126] Third, at a practical level, a basin-wide approach could yield a more holistic understanding of the river system and insights into how to address flooding and other challenges.[127] Thus, while a major multilateral accord may not be possible, China will likely be willing to explore lower-level cooperation with its downstream neighbors.

[123] CNA interviews, Beijing, 2015.

[124] Lan Jianxue, "Water Security Cooperation and China-India Interactions" (*Shui ziyuan anquan hezuo yu ZhongYin guanxi de hudong*), 2010.

[125] "Brahmaputra: Towards Unity," 2014, 20-21.

[126] CASS's Li Zhifei even argues that basin-wide cooperation would reduce the chances that outside powers, such as the United States, would be able to interfere in regional affairs. Li Zhifei, "Water Resource Diplomacy: A New Topic in Constructing China's Peripheral Security" (*Shui ziyuan waijiao: Zhongguo zhoubian anquan goujian xin yiti*), *Academic Exploration* (Xueshu Tansuo) 4 (2013): 28-33.

[127] Alastair Iain Johnston, *Social States: China in International Institutions, 1980-2000*, Princeton, NJ: Princeton University Press, 2008.

The Middle Riparian's Quandaries: India and the Brahmaputra River Basin

Satu Limaye

Chapter summary

- Measured by population and territory, India is *physically* implicated in the Brahmaputra basin marginally; certainly compared to the impact of other major river systems in India. Only an estimated 3 percent of India's population resides in the basin (for China, the figure is roughly 1 percent and for Bangladesh an estimated 70 percent). About 6 percent of India's national territory lies within the Brahmaputra basin (for China it is 3 percent and for Bangladesh 27 percent).[128] The region of India through which the river flows is not highly industrialized nor a major area of agricultural productivity, though agriculture is among the main sources of livelihood for the citizens who live there.

- The Brahmaputra River however is of great *political* significance for India because it is a trans-boundary river that originates in China, flows into disputed territory in India's isolated and under-developed northeast, and

[128] Author's estimate calculated using multiple sources, mainly United Nations Food and Agriculture Organization (FAO), "SECTION III Transboundary River Basins: Ganges-Brahmaputra-Meghna River Basin," in *Irrigation in Southern and Eastern Asia in Figures, AQUASTAT Survey – 2011*, Karen Frenken, ed., Rome: FAO Land and Water Division 2012, 111-113; National Research Council, *Himalayan Glaciers: Climate Change, Water Resources, and Water Security*, Washington, D.C.: The National Academies Press, 2012, 51, doi:10.17226/13449.

continues into Bangladesh, with which India has critical but difficult riparian relations.

- In addition to managing the political implications of a trans-boundary river, three other drivers influence India's policies concerning the Brahmaputra River: China's plans to dam and possibly divert the river; New Delhi's desire to uphold user rights on the river and consolidate its existing hold on disputed territory; and India's need to manage flooding and soil erosion in its northeastern states.

- Two realities complicate India's policy approaches to the Brahmaputra River: First, a contentious domestic debate complicates decision-making. Second, as a middle riparian country, India has starkly different concerns and interests vis-à-vis upper riparian China and lower riparian Bangladesh.

- India's perspectives and policies on the Brahmaputra River are also influenced by northeast India's increasing institutionalization in India's government structure, its higher political profile, and its rising role in India's international relations. Furthermore, India seeks to build dams in order to produce electricity as well as manage the flooding and soil erosion that affect livelihoods and development in its northeastern states. To date, however, India has built very few of its planned dams on the Brahmaputra and its tributaries. The growing weight of the "northeast India subnational factor" has fused with concerns about China's upstream activities and the salience of trans-boundary rivers in India-China relations.

- Over the past decade, India and China have steadily increased their dialogue and water-related information-sharing agreements on the Brahmaputra and other shared rivers. However, a deep political distrust continues to shadow this new area of India-China relations. Unless the border/territorial dispute is resolved, India and China will have difficulty reaching a water-sharing agreement.

- With Bangladesh, relations concerning the Brahmaputra are a subset of wider riparian relations conducted through the Joint Rivers Commission and specific agreements on the Ganges and Teesta Rivers.

- India has opportunities with both China and Bangladesh to further modest cooperation by fully and finally implementing existing agreements and being more transparent about its own dam-building and river-linking project plans. In fact, because of the relatively measured and longer-term physical impacts of the river on India's population, industry and agriculture, there is more space for India to experiment with innovative approaches to cooperation with its upper and lower riparian neighbors.

- India's current emphasis on bilateral approaches regarding the Brahmaputra does not rule out future multilateral cooperation, but India's middle riparian position militates against multilateralism as a means to pursue its interests. India should introduce elements of eco-system management and ecological protection into discussions of cooperation with China along the lines of the efforts between India and Bangladesh. There may also be space for the three countries to develop common research on preserving and monitoring Himalayan glaciers as part of the region's common heritage.

Introduction

India is the middle riparian country, between China and Bangladesh, on the Brahmaputra River (see Figure 5 below). The river's unruly, braided physical flow through the three countries parallels a tricky political configuration. The river originates in troubled Tibet, a recurring source of India-China discord since the Dalai Lama fled to India in 1959.[129] It flows through land that is still contested by China and India following a 1962 border conflict and is the basis of an evolving competitive-cooperative relationship. The river serves as both a socio-economic resource and occasional threat to livelihoods in India's isolated northeast region, which is increasingly being integrated into "mainland" India. And finally the Brahmaputra becomes a critical lifeline for Bangladesh, whose India-centric historical origins and land, as well as riparian connections, create fraught relations.

[129] Raja Mohan, a leading Indian analyst, argues that Tibet is a key to overall India-China relations. Cited in Ellen Bork, "Caught in the Middle: India, China and Tibet," http://worldaffairsjournal.org/article/caught-middle-india-china-and-tibet.

Figure 5. Map of the Brahmaputra River

Source: Map drawn by Mike Markowitz, CNA, 2016. Composite relying on d-maps, http://www.d-maps.com, Library of Congress, http://www.loc.gov/resource/g7653j.ct000803, and University of Texas, http://www.lib.utexas.edu/maps/middle_east_and_asia/china_india_e_border_88.jpg.

India's middle riparian position provides it with a whole-of-basin perspective. But its discrete, distinct interests and troubled relations with its upper riparian and lower riparian neighbors, combined with the domestic dynamics of center-state relations in northeast India, pull India's concerns, drivers, and cooperative and competitive

activities in complex, inconsistent directions—shaping India's intense debate and mixed policies regarding the Brahmaputra River.

This chapter first analyzes Sino-Indian relations regarding the Brahmaputra River. It then examines the northeast India subnational dimensions of Brahmaputra River issues. Third, it evaluates India-Bangladesh relations on the Brahmaputra River. This "north-south geographical" analytical approach accurately captures not only the physical flow of the river but also the relative hierarchical primacy of China, India's northeast, and Bangladesh to India's Brahmaputra River policies. Finally, it examines India's perspectives on prospects for multilateral cooperation in the basin.

India-China relations regarding the Brahmaputra River: The character of India's debate

In India's open society, freewheeling press, and robust democracy, a divide generally characterizes debates over the "China factor" and the Brahmaputra River. Indian scholars, policy analysts, retired government officials, the media, and some in parliament (mostly representatives from the northeastern states of Arunachal Pradesh and Assam)[130] express the most acute concerns and worse-case assessments about China's activities—particularly its plans to dam and divert the river.[131] India's government, however, tends at least publicly to downplay concerns about whether India will have an adequate quantity and quality of water, and focuses on emerging cooperation with China. India's government and civil society are more closely aligned in expressing worries about China's transparency on upper riparian activities. In other words, distrust of China is shared broadly in India, even as intense debates persist about China's activities and intentions as well as their implications for India.

[130] A search of India's Ministry of External Affairs (MEA) website on Oct. 27, 2015, returned approximately 100 references to the Brahmaputra River. Except for government statements, articles, and other documents included in these search findings, a high percentage of Lok Sabha (lower house) and Rajya Sabha (upper house) questions come from representatives of the northeastern states of Arunachal Pradesh and Assam.

[131] A small, representative sampling of the voluminous writings that focus on India's views of China's potential threats include: Brahma Chellaney, *Water: Asia's New Battleground*, Washington, D.C.: Georgetown University Press, 2011; Simon Denyer, "Chinese Dams in Tibet Raise Hackles in India," *Washington Post*, Feb. 7, 2013; Archana Chaudhury, "India Plans Dam on Tsangpo-Brahmaputra to Check Floods and China," Bloomberg, June 4, 2015; R.N. Bhaskar, "What Chinese Dam Means to India," Nov. 27, 2014.

The parallel development and current co-existence of India's robust debate about threats from China on the one hand, and incremental and limited but still steady increase in dialogue and hydrological information sharing between the two governments on the other, have led even Indian interlocutors to dispute whether conflict or cooperation is the dominant or counter narrative in India-China relations regarding the Brahmaputra River.

Finally, India's debate about the China factor regarding the Brahmaputra reflects something of a divide between technical experts and international relations or political experts. Technical experts tend to see *both* Indian and Chinese plans for dams and other activities on the Brahmaputra as problematic, whereas India's political experts tend to focus on the problematic features of China's activities for India. This is not surprising, but in the swirling, cacophonous debate within India, the technical versus political divide adds to the complexity of the government's policy challenges towards the Brahmaputra River.

Poor Sino-Indian relations and contested territory

The poor state of Sino-Indian relations generally and the fact that the Brahmaputra River runs through disputed territory drive India's anxieties. India-China relations, 53 years after a brief October 1962 border war ended in India's defeat, now mix competition and cooperation, but remain mired in historical animosity, distrust, and serious unresolved issues. China claims at least part of the area where the Brahmaputra River enters into what India regards as the state of Arunachal Pradesh but China considers "southern Tibet."[132]

Three additional drivers most influence India's policies regarding the Brahmaputra River: China's plans to dam and possibly divert the river; New Delhi's desire to uphold user rights on the river and consolidate its existing hold on territory; and India's need to manage flooding and soil erosion in its northeastern states.

China's damming and possible diversion of the Brahmaputra River

By far India's most intensely debated concern is China's damming and possible diversion of the river to meet the needs of northern and western regions of China

[132] One example is the ongoing controversy over China and India's dueling depictions of the territory in maps and on passports. Other sources are Ellen Bork, "Caught in the Middle: India, China and Tibet" and CNA interviews, Beijing, 2015.

that are more populous, agricultural, industrial, and/or urban than remote, under-populated southern Tibet.[133]

India's debate about China's upper riparian activities took off in 2005 following publication of the book *Tibet's Waters Will Save China*, by Li Ling, an officer of the 2nd Artillery Corps. It suggests various options for diversion of river waters in the amount of 200.6 billion cubic meters (BCM), of which the Brahmaputra would account for the overwhelming share at 118.8 BCM.[134] Reportedly, soon after the book was published, India began to undertake numerous cross-ministry and -agency studies to investigate and respond to Chinese activities.[135]

After construction of China's first major dam, Zangmu, began on the upper reaches of the Brahmaputra in 2010 (it became operational in November 2015) India's government issued a key statement in June 2011 reflecting its perspective:

> Recent reports about Chinese plans to construct a dam on the Brahmaputra and possibly divert the waters to Northern China are not new but based on previously known facts. It is a fact that China is constructing a dam at Zangmu in the middle reaches of the Yarlung Tsangpo (as the Brahmaputra is called in Tibet). We have *ascertained from our own sources* [presumably a reference to work by India's NRSA and NTRO—emphasis added] that this is a run of the river hydro-electric project, which does not store water and will not adversely impact the downstream areas in India. *Therefore I [External Affairs Minister S. M. Krishna] believe there is no cause for immediate alarm. I would like to share with you the fact that a large proportion*

[133] For China's perspectives on the Brahmaputra, see the China chapter for this project by Joel Wuthnow.

[134] The contemplated amount of diversion is taken from information provided during CNA interviews, New Delhi, 2015.

[135] Reportedly, the government of India convened the first inter-ministerial Committee of Secretaries, or CoS, meeting in October 2006 to investigate the issue of diversion of water by China. Subsequently, at least two meetings were held, though it seems likely that several were held. India also initiated efforts by the National Remote Sensing Agency (NRSA) and National Technical Research Organization (NTRO) to gauge China's activities. The Central Water Commission also undertook studies around this time "to compute the potential of water generated on the Indian side and updated [an] earlier assessment." A media account of India's approach is by Utpal Bhaskar, "India Firms up Its Strategy on Brahmaputra Water Diversion," *LiveMint*, Nov. 2, 2015.

> *of the catchment of the Brahmaputra is within Indian territory* [emphasis added].[136]

The Indian government's assertion of adequate water flows has been much debated and contested. A 1996 World Bank report asserts that the Brahmaputra River and its 52 major tributaries have a total catchment area of 580,000 square kilometers: 33.6 percent of that lies within India; 50.5 percent in China; 8.1 percent in Bangladesh; and 7.8 percent in Bhutan.[137] The debate in India focuses on where most of the flow of water comes from. Estimates vary, but at least some in India argue, "Significantly, only 40 percent of the water comes from the Chinese catchment area. Some policymakers in Delhi believe that the precipitation in China contributes only 7 percent to the flow. *It is the Brahmaputra's tributaries in Arunachal Pradesh, along with the rains in India that contribute to the rest of the river's water supply* [emphasis added]. That could explain the absence of any shrill reaction from New Delhi."[138]

Prominent experts such as Brahma Chellaney dismiss the government's assurances and argue that China's dam building is expanding, moving closer to India's border and providing China with "its growing capacity to serve as the upstream controller by re-engineering transboundary flows through dams."[139] Others, such as former secretary of water resources Ramaswamy Iyer, argue that, for technical hydrological reasons, even China's run-of-the-river projects are "a matter of utmost concern to lower riparian countries…."[140]

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[136] Government of India, Ministry of External Affairs, "Reports of Construction of a Dam on Brahmaputra River by China," Jun. 14, 2011.

[137] World Bank, *Development and Growth in Northeast India: The Natural Resources, Water, and Environment Nexus*, 2007, 33.

[138] See Bhaskar, "What Chinese Dam on Brahmaputra Means to India," 2014.

[139] See Brahma Chellaney, "India Must Treat Water as a Strategic Resource, Fight China's Throttlehold," *The Hindustan Times*, Nov. 28, 2015.

[140] Cited in Sudha Ramachandran, "Water Wars: China, India and the Great Dam Rush," *The Diplomat*, Apr. 3, 2015. Mr. Iyer goes on to say that China's run-of-the-river hydroelectric project "spells death for the river" because the turbines operate intermittently in these projects, "which means that the waters are held back in pondage and released when the turbines need to operate, resulting in huge diurnal variations—from 0 percent to 400 percent in a day—in downstream flows. No aquatic life or riparian population can cope with that order of diurnal variation." In Mr. Iyer's final book, released by India's Vice President Ansari, he had a "pox on both houses" critique: "In particular, the most well known of them, the Brahmaputra, is now the victim of project planning by both China and India, with Bangladesh also involved in the controversy as the anxious lower riparian…. *One shudders to think of… the consequences of interventions in this river by the state, whether Chinese or India* [emphasis added]." Cited in R. Umamaheshwari, "A Visionary on Water Issues," *The Hindu*, Sep. 14, 2015.

China's expanding dam construction continues to split Indian assessments between the government and civil society critics and create fissures between Indians who see China's dams as the main problem versus those who see *all* dams on the Brahmaputra River as a problem. Meanwhile, India continues to pursue incremental and limited riverine cooperation with China—even though it is unable to influence China to cease dam construction. India is also faced with considerable constraints to moving forward with its own dam-building plans, and beset by discord with the state governments in Arunachal Pradesh and Assam.

India's user rights and consolidating its hold on disputed territory

Another priority for India vis-à-vis China has been establishing its riparian rights. A Technical Expert Group (TEG) headed at the joint secretary level in the Ministry of Power reportedly was established in 2008 (based on the recommendations of an earlier Committee of Secretaries, or CoS, meeting held on October 21, 2008) to include representatives of the Ministry of Water Resources, Department of Road Transport and Highways, Ministry of Environment and Forests, Ministry of External Affairs (MEA), and Arunachal Pradesh state government "to *draw up an Action Plan for establishing India's user rights on Brahmaputra and its tributaries* [emphasis added] coming from China."[141] The TEG's first recommendation was that "[i]n order to establish the *'First User' Rights* [emphasis in original], the first priority would be to complete Lower Subansiri…the Lower Siang…and Demwe Lower [dams]…." A second recommendation "would be for State Government of Arunachal Pradesh to expeditiously allot at least one major project in these basins as close to the international border as possible, and get them implemented promptly, in order to quickly and more firmly establish 'Existing User' rights."[142]

During the past decade India's officials have repeatedly invoked India's riparian rights vis-à-vis China and linked dam building to asserting these rights. For example, Minister of State for External Affairs E. Ahmad stated in parliament that India "[i]s a lower riparian state with considerable established user rights to the water of the River…."[143] In mid-June 2015, India's Additional Secretary in the Ministry of Water Resources, Amarjit Singh, tied India's dam building directly to establishing India's riparian rights, saying, "Once we have a storage dam, we get the right for that

[141] Information provided during CNA interviews, New Delhi, 2015.

[142] Ibid.

[143] Government of India, Ministry of External Affairs, "Q.1898 Construction of Dam on Brahmaputra by China," Mar. 14, 2013.

quantum of water as a riparian state under the international practices. If you have a storage dam in India on an international river, it gives us [the] right for that much water."[144] Indian media have picked up government statements that dam building is motivated by the desire to establish user rights on the river—not appreciating that India already has user rights as a lower riparian on the transboundary river.[145]

India's anxiety about asserting its riparian rights on the Brahmaputra River does not appear to stem from a legal or political challenge to these rights by China: there is no evidence that Beijing has challenged these rights, and official statements between the two countries repeatedly reference that China will respect these rights. More likely, its anxiety comes from the objective of *consolidating* India's rights to the *territory* where the trans-boundary Brahmaputra flows rather than to the waters of the river per se. India believes this is a prudent course of action given the disputed territory through which the river flows and China's international efforts to challenge India's claims to the territory. In March 2009 China moved to oppose a nearly $3 billion Asian Development Bank (ADB) loan to India because it included funding for a $60 million flood management and hydro program in Arunachal Pradesh.[146] Not surprisingly, some Chinese certainly see India's goal as consolidating its hold over disputed territory.[147]

But establishing its user rights by dam building has been an extremely slow and limited process in India, largely due to political and civic opposition to dam construction but also because of financial and technical constraints. This stands in contrast to the robust dam building on China's portion of the upper Brahmaputra River. India has plans to build several dams to consolidate its hold on territory and further establish riparian rights, control flood and soil erosion, develop hydro-electric power, and contribute to the overall development of the northeast region. The precise number of planned dams is not easy to nail down. During interviews in New Delhi, the number cited ranged in the mid one hundreds. However, few believe that even a fraction of these dams will be built. Recently, Himanshu Thakkar of the South Asia Network on Dams, Rivers and People, said:

[144] Press Trust of India (PTI), "Govt Plans to Build Big Dams Over Brahmaputra: Uma Bharti," Jun. 4, 2015.

[145] An example is Chaudhury, "India Plans Dam on Tsangpo-Brahmaputra to Check Floods and China," Bloomberg, 2015.

[146] See National Research Council, *Himalayan Glaciers: Climate Change, Water Resources, and Water Security*, 2012, 89; Girish Shirodkar, "Playing Chinese Checkers with India's Hydro Sector," *New Spotlight*, Nov. 1, 2015.

[147] For China's perspectives on the Brahmaputra, see the China chapter for this project by Joel Wuthnow.

> There are close to 200 big hydropower projects planned for the Himalayas in Northeast India. Most of them are yet to be approved. Almost all have generated significant protest from people in the region, and from local government leaders. The big projects are difficult to build, and dangerous to manage in mountains that are on highly silt laden rivers, in a region rich in biodiversity and prone to earthquakes and flooding. The lives and livelihoods of so many millions are dependent on these resources. Most of the dams will never be built.[148]

India's official Water Resources Information System lists only 16 dams for the Brahmaputra Basin and notes that even some of these are under construction.[149] Brahma Chellaney, a leading Indian expert on water issues, has written "Plans for large water projects in India usually run into stiff opposition from influential NGOs, so that it has become virtually impossible to build a large dam, blighting the promise of hydropower."[150]

However, even taking into account China's dams, the United States National Research Council concluded that "the Brahmaputra is the least dammed of the major rivers in the region. In contrast, both the Ganges and the Indus are highly dammed."[151] Figure 6 below provides a perspective on the limited number of dams in the Brahmaputra River basin compared to South Asia's other major river basins.

[148] Cited in Keith Schneider, "Big India Dam, Unfinished and Silent, Could be a Tomb for Giant Hydroelectric Projects," *Circle of Blue*, Apr. 6, 2015.

[149] Government of India's Water Resources Information System, "Dams in Brahmaputra Basin," Mar. 27, 2015.

[150] Brahma Chellaney, "South Asia's Growing Water Insecurity," *Defense Dossier*, American Foreign Policy Council, May 2013, Issue 7: 17.

[151] National Research Council, *Himalayan Glaciers: Climate Change, Water Resources, and Water Security*, 2012, 61.

Figure 6. Brahmaputra River basin has fewer dams than other major South Asia river basins

Source: Mike Markowitz, CNA, 2016. This work is a derivative of "Figure 3.5" by National Research Council, *Himalayan Glaciers: Climate Change, Water Resources, and Water Security*, Washington, D.C.: The National Academies Press, 2012, 61, doi:10.17226/13449, http://www.nap.edu/catalog.php?record_id=13449. "Figure 3.5" is licensed by CNA Corporation. Basins drawn over original image using the following sources: South Asia Water Initiative, https://www.southasiawaterinitiative.org/node/3 and https://www.southasiawaterinitiative.org/indus; Water Resources Information System of India, http://india-wris.nrsc.gov.in/wrpinfo/index.php?title=Ganga.

Managing flooding and soil erosion

A third driver and activity of India in terms of the Brahmaputra is controlling flooding and soil erosion. Soil erosion is a major feature in the northeast India catchment area. According to the Brahmaputra Board of India's Ministry of Water Resources, "Due to heavy deposition of silt, the river has frequently changed its course. Excessive silt deposition has also given rise to [a] braiding and meandering

pattern in the alignment of the river system."[152] High siltation arises from many factors, including landslides due to heavy rainfall in the area, earthquake shocks, and manmade actions such as changes in cultivation patterns and exploitation of forest resources in the hills above the valley through which the river runs. Specialists of northeast India whom we interviewed often highlighted the fact that adapting to floods and soil erosion is a major struggle for the residents of the region.

But flooding is the driver that directly initiated India's cooperative outreach to China, resulting in the current ongoing dialogue and limited hydrological data sharing agreements. India's concerns about flooding in its northeastern states date from the early 2000s.[153] In 2000, in reply to a parliamentary question, Ajit Kumar Panja, the minister of state for external affairs at the time, replied, "Following the recent flash flood in Arunachal Pradesh in June 2000, the matter was taken up with the Chinese Government. They conveyed that there was no dam on the Chinese side on the river Brahmaputra and attributed the occurrence of floods on the Indian side to natural causes."[154] India's government seems to have concurred that the flood was a natural disaster. Information provided during interviews in New Delhi referred to an incident in which NTRO monitoring revealed "some water blockage…at Great Bend in the Brahmaputra river Basin possibly due to a *natural landslide* [emphasis added]."[155]

But the importance of flood management, whether because of China's activities (intentional or unintentional) or natural causes, is a driver of India's approach vis-à-vis China and the northeastern states. India-China bilateral discussions on cooperation about the river began in the early 2000s as a result of these flooding concerns—well before any Chinese dams had been constructed on the upper portions of the Brahmaputra and well before debates erupted in India about China's plans to divert the river waters.

During a press briefing during the January 2002 visit to India of China's prime minister Zhu Rongji, India's government reiterated that flood control and disaster prevention were driving efforts at bilateral cooperation and mechanisms with China.

[152] India's Ministry of Water Resources, Brahmaputra Board, http://www.brahmaputraboard.gov.in/NER/Activities/activities.html.

[153] For a media report at the time, see Nitin Gogoi, "Army Suspects Chinese Hand Behind Flash Floods in N-E," *Rediff*, http://www.rediff.com/news/2000/aug/22assam.htm.

[154] Government of India, Ministry of External Affairs, "Q. 2104—Breach Of Dams Constructed By Chinese Authorities," Aug. 10, 2000, http://www.mea.gov.in/rajya-sabha.htm?dtl/8587/Q+2104++Breach+Of+Dams+Constructed+By+Chinese+Authorities.

[155] CNA interviews, New Delhi, 2015.

> The Memorandum of Understanding on the provision of Hydrological Information of the Brahmaputra river is *basically being signed and agreed upon in order to meet the demand of flood control and disaster mitigation* [emphasis added] in the down stream of the Brahmaputra river and the Chinese side agrees through this MOU that China would provide information on water level discharge, rainfall data and also information on water levels not only ***during the flood season but also during the non-flood season*** [emphasis added]…. As far as diversion of the river is concerned, (since you have asked me a question in this regard) I believe that these reports have been denied by the Chinese side. There is a level of mutual confidence inherent to this agreement.[156]

Since this statement, India's government has continued to link hydrological data sharing by China with flood control and disaster mitigation, and has acknowledged publicly that the data provided by China has been helpful to this end.[157] Hydrological data sharing between China and India has gone hand in hand with a more unilateral Indian approach to controlling floods: dam building.[158]

However, the number of dams actually being built still appears to be extremely limited. According to India's Water Resources Information System, as of March 2015, only 16 dams are in the Brahmaputra basin—and some of these have yet to be completed.[159] Given the delays in completing dams already agreed to (such as the dam on the Subansiri River), the depth of anti-dam movements both in the northeast and broadly in India (with considerable support from international anti-dam NGOs), and inadequate financing, it is unclear just how many dams will actually be completed on India's portion of the Brahmaputra River and its tributaries.

Thus, the need to control flooding and soil erosion—along with the threat of China's dams and possible water diversion, and India's need to establish user rights and

[156] MEA Press Briefing, Jan. 14, 2002, http://www.mea.gov.in/media-briefings.htm?dtl/2943/Summary+of+Press+Briefing+by+the+Official+Spokesperson.

[157] See, for example, http://www.mea.gov.in/media-briefings.htm?dtl/3705/In+response+to+questions+on+a+news+report+on+the+Brahmaputra+river+project+in+China. The 2006 India-China Joint Declaration noted, "The on-going provision of hydrological data for the Brahmaputra/Yarlung Tsangpo and the Sutlej/Langqen Tsangpo Rivers by the Chinese side to the Indian side has *proved valuable in flood forecasting and mitigation* [emphasis added]." See "Joint Declaration by the Republic of India and the People's Republic of China," Nov. 21, 2006, http://www.mea.gov.in/bilateral-documents.htm?dtl/6363/Joint+Declaration+by+the+Republic+of+India+and+the+Peoples+Republic+of+China.

[158] PTI, "Govt Plans to Build Big Dams Over Brahmaputra: Uma Bharti," 2015.

[159] India's Water Resources Information System, "Dams in Brahmaputra Basin," Mar. 27, 2015.

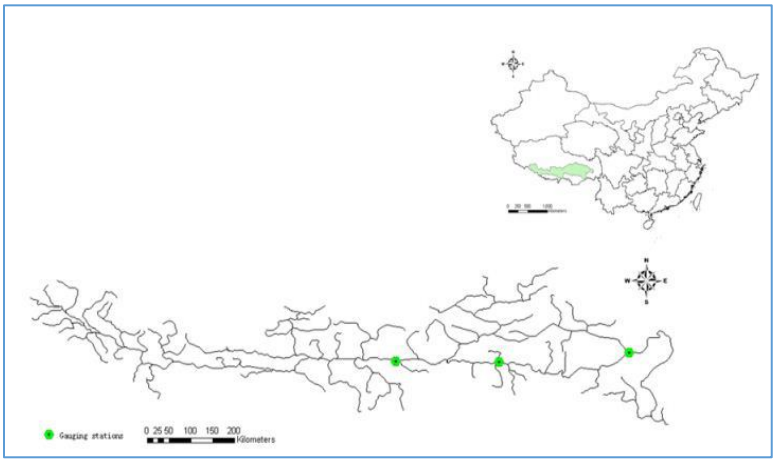
consolidate a hold on territory—appears to be a key driver of the government of India's activities vis-à-vis China regarding the Brahmaputra River.

India-China cooperation: Progress and limits

Since the early 2000s, India-China relations concerning the Brahmaputra River have included a new element: dialogue and cooperation.

Following a major flood in India's northeast in June 2000, the *Memorandum of Understanding (MOU) on Provision of Hydrological Information on Brahmaputra River in Flood Season* was signed in 2002 (and renewed in 2008). China agreed to provide hydrological information, including water level, discharge, and rainfall amount from three stations (see Figure 7 for a map showing the approximate location of the three stations) during the June 1-October 15 monsoon season. India has acknowledged that this information "was utilized in the formulation of flood forecasts by [the] Central Water Commission."[160] A 2005 MOU (renewed in 2010) expanded the data sharing to include the Sutlej River in India's northwest.

Figure 7. Map of Chinese monitoring stations on the Yarlung Tsangpo



Source: He Chen, "Assessment of Hydrological Alterations from 1961 to 2000 in the Yarlung Zangbo River, Tibet," *Ecohydrology & Hydrobiology* 12 (2), 2012, 93-103 (Figure 1, 94), 2012.

Note: Three stations on Yarlung Tsangpo – Nugesha, Yangcun and Nuxia (the green spots in the map represent these stations).

[160] A detailed listing and explanation of the cooperative mechanism as of Sep. 19, 2014, is available at the website of India's Ministry of Water Resources, River Development and Ganga Rejuvenation, at http://wrmin.nic.in/forms/list.aspx?lid=349.

A 2006 Joint Declaration signed during the November visit of President Hu Jintao to India established an expert-level mechanism to discuss "emergency management" as well as "other issues regarding transboundary rivers" but without providing further public details about the specifics of either.[161] This declaration specifically discussed ongoing hydrological data sharing on the Brahmaputra (Yarlung Tsangpo) and Sutlej (Langqen Zangbo) and referenced the need to reach similar agreements on the Yarlung Zangbo and Lohit/Zayu Qu rivers. India's acknowledgment that the data provided by China has been valuable for flood forecasting and mitigation may be designed as much to reassure India's domestic skeptics about the utility of this information as to provide reassurance in India-China relations.

Indian critics have dismissed data-sharing cooperation as useless at worst and limited at best. One said "information had been exchanged but is not actionable because the data provides only volume of water figures and not from where or what time." Others have said "we need regular information, not on annualized basis." Another said India "[n]eed[s] to know what spots the data comes from." Some Indians dismissed water data sharing as useless in the absence of a water-sharing agreement.[162]

In any case, further cooperation on hydrological data sharing has been incremental and marginal. During Chinese premier Li Keqiang's May 2013 visit to India, the two sides agreed that China would provide data twice a day.[163] Prime Minister Manmohan Singh's visit to China in October 2013 led to the more grandiosely titled *MOU between the Ministry of Water Resources, India and the Ministry of Water Resources, China on Strengthening Cooperation on Trans-border Rivers*. But the only substantively new element was that China agreed to provide data starting on May 15th instead of June 1st —an extra two weeks of data coverage.[164]

India's press accounts have emphasized what Prime Minister Singh did *not* achieve in terms of cooperation—i.e., providing at least some insight into what would constitute more substantive cooperation from the perspective of India. Prime Minister Singh reportedly

[161] Government of India, Ministry of External Affairs, "Joint Declaration by the Republic of India and the People's Republic of China," Nov. 21, 2006.

[162] CNA interviews, New Delhi, 2015.

[163] Government of India, Ministry of External Affairs, "List of Documents Signed during the State Visit of Chinese Premier Li Keqiang to India (May 19-22, 2013)," May 20, 2013.

[164] Government of India, Prime Minister's Office, "MOU between the Ministry of Water Resources, India and the Ministry of Water Resources, China on Strengthening Cooperation on Trans-border Rivers," Oct. 23, 2013.

> sought a joint mechanism with China for better transparency on 39 project sites that Beijing has apparently identified on tributaries of the Yarlung Tsangpo (Brahmaputra), including seven on the main river. New Delhi had pressed for a joint mechanism because in the absence of a river water–sharing treaty between the two countries, such a mechanism will allow India to seek specific information about the upstream projects in China, their construction schedule, the likely impact on people, environment and downstream river flows.[165]

Other media reports claimed that Prime Minister Singh sought a water commission or inter-governmental dialogue to deal with water issues.[166] In the absence of reliable public information on what New Delhi proposed to Beijing through diplomatic channels, what seems clear is that the government of India was keen to advance up the cooperation ladder but did not get very far, suggesting an ongoing gap between India and China on river management.

As evidence of the cooperation eked out between India and China, it was only in 2014, during the visit of India's vice president Hamid Ansari to China, that the two countries signed the *Implementation Plan: Provision of Hydrological Information on the Yarlung Zangbu/Brahmaputra River in Flood Season by China to India.*[167] This document is fascinating in several respects.

First, it lays out in great detail the precise nature of information to be shared (to the decimal points), the mechanisms by which information is to be shared (including specific emails of respective officials), and related details of hydrological information sharing. Second, almost parenthetically, the document states, "The Chinese side also agrees to provide hydrological information if water levels of above-mentioned stations are close to or reach warning water levels in *non-flood season* [emphasis added]." This appears to be the first publicly available mention of *non-flood season* data sharing in an official document of the two countries. And the clause about providing information in the case of stations reaching "warning water levels" also appears to address the vague references in the 2006 Joint Declaration to "emergency management."

[165] Wasbir Hussain, "MOU on the Brahmaputra River," India article #4149, Institute of Peace and Conflict Studies, 24 Oct. 2013.

[166] See PTI, "China Less Than Enthusiastic to Indian Proposal on Water Issue," *Economic Times*, Aug. 20, 2013.

[167] Embassy of India, Beijing, China, "Implementation Plan: Provision of Hydrological Information of the Yarlung Zangbu/Brahmaputra River in Flood Season by China to India," Jun. 30, 2014.

Third, the document lays out the terms and mode of payment. The cost to India for China's provision of the data is approximately 850,000 Yuan per year—or just under $134,000 per year at current exchange rates. A fourth interesting element of the implementation plan document is its articulation of *Indian* obligations. Much of India's public and media narrative on river waters issues with China has focused on the need for transparency from Beijing. This document notes that the "Indian side will provide the Chinese side information regarding data utilization in flood forecasting and mitigation" and that the "Indian side will also inform the Chinese side [of] the information of the hydrological station which lies on the mainstream of the Yarlung Zangbu/Brahmaputra River and is close to China's Nuxia station (see Figure 3). The information includes [the] station's name, latitude and longitude, [and] type of data being observed." The *mutual* transparency inherent in this implementation plan adds further nuance to the ongoing narrative on bilateral river relations.

Finally, in an element that has received almost no media or public attention, the implementation plan permits the parties, "after mutual consultation through diplomatic channels," to "dispatch hydrological experts to each other's country to conduct study tour[s] according to the principle of reciprocity." The purpose of this element is "to ensure normal provision of hydrological information…" All in all, the implementation plan suggests a clear and established framework for data sharing on the Brahmaputra River. However, it is not clear how the implementation plan is actually being implemented. For example, it is not clear that the data have in fact been shared per the agreement or that any study tours of hydrological experts have taken place. And, of course, hydrological data sharing does nothing to address transparency on issues such as mutual dam building, alleged Chinese interest in diverting the waters, or water sharing of the Brahmaputra River. These "big-ticket" items of riverine cooperation remain off the table for now, and there is little to suggest that they will be picked up for action any time soon.

Indeed, India-China cooperation on the Brahmaputra River seems to have reached a plateau. Prime Minister Modi's May 2015 visit to China brought no new announcements for cooperation, though he specifically called for "tangible progress" on the issue and described it as an "irritant." One can only speculate as to why no new agreements were signed (in contrast to the preceding decade, when several small steps were taken), but it seems likely that this first visit was seen by China as a "get to know you" event and Prime Minister Modi himself went to China emphasizing economic issues, including attracting investment to bolster his new "Make in India" manufacturing campaign. A broader interpretation is that cooperation on the Brahmaputra River, because it overlaps with the contested territorial issue, will be a painstaking and drawn-out process similar to India-China negotiations on the border and the territorial dispute itself.

We share the assessment of a Chinese specialist on the issue, who said "since China still has border disputes with Bhutan and India, it is understandable that there would not be any substantial negotiations on the use and protection of transboundary waters before more vital and urgent border disputes are resolved."[168]

India, northeast India, and the Brahmaputra River: The subnational factor

India's perspectives and policies on the Brahmaputra River are also influenced by northeast India's increasing institutionalization in India's government structure, its higher political profile, and its rising role in India's international relations. The growing weight of the "northeast India subnational factor" has fused with concerns about China's upstream activities and the salience of trans-boundary rivers in India-China relations.

Though the Brahmaputra River flows through only two of eight northeast Indian states—one of which is disputed territory with China—its drainage area and catchment affect a wider area of the region.[169] By state, the areas are: Arunachal Pradesh, Assam, Meghalaya, West Bengal, Nagaland, and Sikkim.[170] The Brahmaputra River is thus a socio-economic resource (but occasionally also a source of destructive floods) for an isolated and under-developed Indian region. The region is essentially an "island" separate from India (Indian interlocutors spoke of India as the "mainland" vis-à-vis the northeast) because it is connected to peninsular India only by the narrow "Siliguri Corridor" or "Chicken's Neck" (25-km wide at its narrowest) and surrounded by Bangladesh and/or Myanmar. Integrating the isolated northeast region into India's mainland is a state- and nation-building project within India's larger national project. Even as India's government has dealt with differences

[168] Chen Huiping, "The 1997 UNWC and China's Treaty Practice on Transboundary Waters," paper presented at the United Nations Watercourses Convention Global Symposium, University of Dundee, Jun. 10-14, 2012, 21. This paper also draws on research from the forthcoming paper (Wouters and Chen), "China's 'Soft-Path' to Transboundary Water Cooperation Examined in the Light of Two UN Global Water Conventions—Exploring the 'Chinese Way,'" 22 *Journal of Water Law* (2013): 229-247.

[169] The drainage area is spread across Arunachal Pradesh (42%), Assam (33%), Meghalaya (6%), and Nagaland (6%). See Shirodkar, "Playing Chinese Checkers," http://www.spotlightnepal.com/News/Article/-Playing-Chinese-checkers-with-Indias-hydro-secto.

[170] Government of India's Water Resources Information System, http://india-wris.nrsc.gov.in/wrpinfo/index.php?title=River_Info#Brahmaputra_River_System.

regarding the Brahmaputra River with China, it has kept the northeast dimension of the issue in mind.[171]

The Department of Development of the North Eastern Region (NER) was established in 2001 and upgraded to a full ministry in 2004, "underscoring [India's] complete commitment to ensure development with equity for the NER to unleash the potential of its human and natural resources."[172] A part of this development involves the construction of dams as discussed above. Politically, the northeast has received more attention in the past decade because India's third longest serving prime minister, Manmohan Singh (2004-2014), had his upper house parliamentary constituency in Assam. It was Prime Minister Singh who, in cooperation with the World Bank, initiated an important study on the region's water resources, which was released in 2007.[173] Furthermore, it was Prime Minister Singh who emphasized the need to make northeast India a key part of the country's expanded ties to Southeast Asia as part of a "Look East" policy. Prime Minister Modi has continued this emphasis on developing India's northeast and linking development to ties with Southeast Asia.[174]

A key challenge for the central government of India is balancing the northeast region's persistent questioning of New Delhi's attention and response to China's activities while addressing criticisms about the central government's dam building and other initiatives for the region.[175] Some Indian and Chinese analysts suggest that northeast Indian state governments exaggerate the dangers posed by China's plans on the upper Brahmaputra while simultaneously complaining about India's approaches to handling flooding, drought, and erosion problems in the region, because they seek to manipulate the central government in order to increase their

[171] In June 2011, India's external affairs minister, S. M. Krishna, stated, "It is important that the States of Arunachal Pradesh and Assam of India harness and utilize the waters of the Brahmaputra. This is the really important issue." See http://www.mea.gov.in/media-briefings.htm?dtl/3145/Reports+of+construction+of+a+Dam+on+Brahmaputra+River+by+China.

[172] Ministry of Development of Northeast Region, Government of India, http://mdoner.gov.in/content/why-mo-doner.

[173] World Bank, *Development and Growth in Northeast India,* 2007.

[174] See, for example, Edmund Downie, "Narendra Modi's Northeast India Outreach," *The Diplomat*, Dec. 14, 2014, and Elizabeth Roche, "PM Modi Seeks Singapore's Investment to Develop the Northeast," *LiveMint*, Feb. 9, 2015.

[175] For an informed view of northeast Indian perspectives, see Mirza Zulfiqur Rahman, "Dams on the Brahmaputra: Concerns in Northeast India," Institute of Peace and Conflict Studies (IPCS), Sep. 2010.

leverage for project funding.[176] Last year, Assam's chief minister Tarun Gogoi of the Congress party—a party in opposition to the central government led by the Bharatiya Janata Party (BJP)—complained about India's plans to build a new dam on the middle part of the Siang even as Indian officials explained that the purpose of the dam was to prevent flooding in Arunachal Pradesh and Assam.[177]

Also complicating matters is the lack of consensus between the two main Brahmaputra-bearing states—Arunachal Pradesh and Assam. Indeed, one Indian analyst explained that there is anxiety between Arunachal Pradesh, the upper riparian state, and Assam, the lower riparian state. The latter worries primarily that the contemplated dam construction in Arunachal will interrupt river flow downstream in Assam and that the seismic vulnerability of the state will lead to dam breakage and population displacement, among other dangers. More than one interlocutor in India reported that the water ministries of Arunachal Pradesh and Assam do not share river waters data with each other "so why complain about the PRC not giving data when even state ministries don't talk." In the mid 2000s, as part of India's policy of increasing the region's political institutionalization, a proposal called for establishing a Northeast Water Resources Authority to overcome state-level resistance to information sharing and cooperation. But, according to one leading Indian water expert and former government official, B.G. Verghese of the Centre for Policy Research, Arunachal Pradesh preferred to deal bilaterally with lower riparian Assam.[178]

Apart from the two key state governments, citizen groups and various local and international NGOs have been highly critical of dam-building projects in the region, for a range of environmental,[179] cultural, and economic reasons. Jabin Jacob, director

[176] For Chinese perceptions, see "Indian Critics of Tibet's First Dam 'Exaggerating' Dangers: Chinese Experts Stress Cooperation Over Competition as Solution to Water Disputes," *ChinaFile*, Asia Society, Dec. 4, 2014, http://www.bloomberg.com/news/articles/2015-06-04/india-plans-dam-on-tsangpo-brahmaputra-to-check-floods-and-china.

[177] Z News, "Assam opposes Centre plan to build mega dam on Siang River," Jun. 5, 2015.

[178] See B. G. Verghese, *Water Resources in the Northeast: Development Options in a Cooperative Framework,* Centre for Policy Research, Background Paper No. 1, Aug. 2006. This was the first in a series of papers done to support the eventual World Bank study entitled *Development and Growth in Northeast India: The Natural Resources, Water, and Environment Nexus*, 2007.

[179] For example, research scholar Mirza Zulfiqur Rahman writes: "The huge number of big and small dams in Arunachal Pradesh has the potential to damage the rich biodiversity and eco-system of the state considered to be one of the global biodiversity hotspots, result in huge displacement of people in Arunachal Pradesh and Assam, increase the risks of flash floods and environmental disasters in a particularly active seismic zone, and induce conditions for further conflict situations in the region. Many of these effects have already been seen, with some

of the Institute for Chinese Studies, highlights the inadequate local labor supply, which would require the influx of labor from elsewhere in India and thereby add stress to a region "that is already the site of various forms of political instability, including ethnic insurgencies."[180]

Despite the dissonance between New Delhi and the northeast states, and their persistent need to work on center-state alignment, there is almost no evidence that northeast India is making new, non-India-centric alignments to influence outcomes. Northeast Indian states are not seeking or cutting deals even with neighboring Bangladesh, much less with China—though interactions between Northeast Indian states and Bangladeshi officials do take place. The absence of such linkages, and the reasons for the absence, means that multilateral cooperation on the Brahmaputra basin must be driven by national capitals rather than regional ones—though at least in the Indian case there must be some mechanism to involve or inform state-level governments about such efforts.

Northeast India's place in the dynamics of the Brahmaputra River is curiously both central and marginal. Physically, northeast India is where the Brahmaputra River flows. Politically, northeast India is where the Brahmaputra River flows through contested terrain with China. And yet, while Delhi has included the key state governments in shaping its approaches to national policy, the role of the northeastern states is far less significant to driving India's Brahmaputra River policies than bilateral India-China relations and, to some extent, even India-Bangladesh relations. It is to the latter relationship that this chapter now turns.

India-Bangladesh relations regarding the Brahmaputra River

The physical, historical, and political interdependence of India and Bangladesh shapes bilateral relations, including those regarding the Brahmaputra River. India's northeastern states surround Bangladesh for approximately 2,500 miles, broken only by a stretch of roughly 200 miles along the southeast corner where Bangladesh and Burma share a border. If Bangladesh is "encircled" by India, India is "separated" by Bangladesh. India's northeastern states are essentially separated from peninsular

projects almost near completion, and the damage done in the past five years is starkly noticeable in the state." Rahman, "Dams on the Brahmaputra."

[180] Jabin T. Jacob, "Political Economy of Infrastructure Development in the Sino-Indian Border Areas," *China-India Brief* 22, Feb. 12-25, 2014, http://lkyspp.nus.edu.sg/cag/publication/china-india-brief/china-india-brief-22.

India by Bangladesh—except for the narrow Siliguri Corridor. Historically, Bangladesh actually emerged from what is today India. It was first partitioned from the province of Bengal by the British in 1905 (reunited in 1911) and then split off as East Pakistan in 1947 at the time of British India's partition into independent India and Pakistan. Finally, East Pakistan became today's Bangladesh when it was separated through secession from Pakistan and military intervention from India during the India-Pakistan War of 1971/Bangladesh War of Independence.[181]

This intricate linkage carries over into riverine relations. Most of Bangladesh's 57 major rivers originate in or flow through India. Upon entering Bangladesh, the Brahmaputra, for example, becomes the Jamuna River, which joins with the Ganges River (called Padma in Bangladesh), which in turn joins the Meghna River to flow into the Bay of Bengal.

India-Bangladesh relations concerning the Brahmaputra River focus on three elements: cooperation on the Ganges River, waiting for implementation of an agreement on the Teesta River, and implications of India's Rivers-Linking Project for Bangladesh. These are discussed below.

Cooperation on the Ganges River

A 1996 water-sharing agreement on the Ganges River is seen in India as an example of India's accommodative and cooperative behavior on riverine issues.[182] Bangladeshis see India as less generous, often noting India's use of the Farakka Barrage to divert water from the Ganges to flush the silt-heavy Hooghly River in Kolkata.[183] The Ganges River Treaty clearly does not solve all of the difficulties faced by lower riparian Bangladesh, but it is one of just three water-sharing agreements on major rivers in South Asia.

[181] This section is drawn from Nilanthi Samaranayake, Satu Limaye, Dmitry Gorenburg, Catherine Lea, and Thomas Bowditch, *U.S.-India Security Burden-Sharing? The Potential for Coordinated Capacity-Building in the Indian Ocean*, CNA, Apr. 2013, https://www.cna.org/CNA_files/PDF/DRM-2012-U-001121-Final2.pdf.

[182] See Chellaney, "India Must Treat Water as a Strategic Resource," 2015.

[183] For Bangladesh's perspectives on the Brahmaputra, see the Bangladesh chapter for this project by Nilanthi Samaranayake.

Waiting for implementation of an agreement on the Teesta River

A second India-Bangladesh water-sharing agreement, reached in 2011 on the Teesta River, awaits political approval for implementation. India's West Bengal chief minister has held up implementation due to political sensitivities in the state. (India's constitution identifies water as a state-level issue, and therefore a chief minister is able to exercise such a role.) Prime Minister Modi's June 2015 visit to Dhaka did nothing to move forward implementation of the Teesta Agreement. However, both in India and in Bangladesh, there is currently optimism that the Teesta Agreement will go forward in due course—though this might require further political alignment between New Delhi, Dhaka, and Kolkata. Such political alignments, both between the center in New Delhi and the state in Kolkata, West Bengal, and between these two jurisdictions and Dhaka, Bangladesh, are unpredictable and not necessarily decisive. For example, while the Teesta Agreement could not move forward during either Prime Minister Singh's or Prime Minister Modi's visits, final ratification and implementation of an India-Bangladesh land boundary agreement, whose negotiation has been complete for decades, occurred during Prime Minister Modi's June 2015 visit to Bangladesh in the absence of political alignments among the three key jurisdictions.

Implications of India's river-linking project for Bangladesh

A third issue in India-Bangladesh relations regarding the Brahmaputra River relates to India's plans for a river-linking project (RLP). Variations of this project have been on the drawing board for centuries, since the days of British colonial rule. Two recent factors have brought attention to the project. The first is a 2012 Indian Supreme Court ruling calling for speeding up the plan's implementation, and the second is the return to power in 2014 of a BJP government regarded as favorable to the RLP project's implementation.[184]

While the RLP overwhelmingly deals with inter-linking rivers *within* India, there are implications for trans-boundary flows. The precise impact on trans-boundary water flows appears to be a subject of significant debate and rests in part on the technical as well as political decisions that are made in any implementation of such a project. Figure 8 depicts the RLP as it would affect the Brahmaputra River.

[184] For a recent overview See G. Seetharaman, "Testing the Waters," *The Economic Times Magazine Special Report*, Oct. 4-10, 2015.

Figure 8. India's river-linking project applicable to Brahmaputra River

Source: Map drawn by Mike Markowitz, CNA, 2016. Composite relying on d-maps, http://www.d-maps.com; Indian Ministry of Water Resources, National Water Development Agency, "Manas-Sankosh-Tista-Ganga Link," Mar. 14, 2012, http://india-wris.nrsc.gov.in/wrpinfo/?title=Manas-Sankosh-Tista-Ganga_Link; International Water Management Institute, "Strategic Analysis of India's National River-Linking Project," http://nrlp.iwmi.org/main/maps.asp.

One technical study[185] examines "the scope for linking the existing bilateral agreement between India and Bangladesh on sharing water from the Ganges River to an additional provision allowing for mutually beneficial water transfers from the Brahmaputra River." Other analysis is highly critical of such a project, saying:

> The project will alter the natural flow of rivers, cause water-logging, hamper transportation of silt, affect fisheries, submerge forests and reduce water flow in transboundary rivers in downstream Bangladesh…. By diverting water from the Ganga, India would break its formal promises to Bangladesh under the 1996 Ganga Water Treaty—that no water would be diverted away from the Ganga above the barrage at Farakka, a few kilometres from the India–Bangladesh border.[186]

However, whatever the impacts might be, the prospect for implementing the RLP in the near term in a way that would affect Bangladesh is widely regarded, both in India and in Bangladesh, as unrealistic for a host of technical, financial, and political reasons. Concerns about the RLP in India-Bangladesh relations are trumped by differences over the existing Ganges water-sharing agreement and implementing the completed Teesta Agreement, as well as over managing overall India-Bangladesh riverine relations through the Joint Rivers Commission (JRC).

Beyond these three priorities, India-Bangladesh cooperation is limited. Each recognizes its dependence on the other: India knows that transit rights through Bangladesh will help boost development in India's northeast, and Bangladesh appreciates India's upper riparian position. However, such mutual dependence has led to only limited cooperation beyond directly bilateral issues and approaches. Based on interviews in India, interest in multilateralizing cooperation that would include Bangladesh appears very low. There is little evidence from interviews in India or Bangladesh, for example, that India is using cooperation with Bangladesh to pressure China. Bangladesh has its own concerns about China's planned activities on the upper reaches of the Brahmaputra and is engaged in discussions directly with Beijing on these issues.[187]

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[185] Anik Bhaduri and Edward Barbier, *Linking Rivers in the Ganges-Brahmaputra River Basin: Exploring the Transboundary Effects,* International Water Management Institute, 2008.

[186] Juhi Chaudhury, ""India Renews 'Disastrous' River-Linking Project," The Third Pole.net, Nov. 20, 2014.

[187] For Bangladesh's perspectives on the Brahmaputra, see the Bangladesh chapter for this project by Nilanthi Samaranayake.

Multilateral cooperation in the Brahmaputra basin: India's perspective

India currently takes a bilateral approach to the Brahmaputra River for several reasons. First, India mostly favors bilateral diplomacy with its neighbors—especially on sensitive issues. Second, India's main interlocutor and challenge on the Brahmaputra River, China, also emphasizes bilateral diplomacy. Third, India, as a middle riparian country, has different concerns and interests vis-à-vis upper riparian China and lower riparian Bangladesh that are likely better addressed bilaterally. It is unclear what benefits would accrue to India from "multilateralizing" Brahmaputra River issues. Indeed, some Indians express the view that a multilateral setting would allow Bangladesh to gain China's support for criticisms of India's river policies. Fourth, India already has bilateral water sharing and hydrological information sharing agreements with South Asian riverine neighbors and with China. Indeed, one former Indian government official recounted that India used the example of India-Pakistan riverine cooperation to make the case to China in the early 2000s to share hydrological data regarding the Brahmaputra River.

India's current emphasis on bilateral approaches to Brahmaputra issues does not rule out future multilateral cooperation. First, India is a member of numerous organizations and arrangements that bring together countries with shared river waters, including the widest such organization relevant to the region—the South Asian Association for Regional Cooperation (SAARC). Improved relations across South Asia over time could theoretically create a mechanism along the lines of the Mekong River Commission (MRC). But this seems like a distant prospect indeed, given the current poor state of intra-South Asia relations. An additional constraint is that the membership of these organizations and arrangements are not consistent with the three key Brahmaputra riparian states—China, India, and Bangladesh.

The closest organization in terms of membership and relevance to Brahmaputra River management is the Bangladesh-China-India-Myanmar (BCIM) forum. While Myanmar is not a Brahmaputra riparian, BCIM could theoretically address water issues. However, India remains quite cautious regarding BCIM and appears to want that organization to continue to focus on land transportation connections for now rather than expand its agenda. There was little enthusiasm among Indian interlocutors to bring the Brahmaputra River issue to BCIM. Second, in the absence of a Brahmaputra-specific arrangement, India and other riparians could create a trilateral, Brahmaputra River-only organization. But such a major initiative seems some distance away because India does not seem interested.

Multilateral cooperation on the Brahmaputra River does not elicit much support from India at the current time and is not likely to do so for the foreseeable future.

Bangladesh: Lowest Riparian with the Most to Lose, Strongest Advocate of Basin-Wide Management

Nilanthi Samaranayake

Chapter summary

- Bangladesh faces its greatest potential threat on the Brahmaputra River from upper riparian activities, but its most immediate threats stem from internal challenges. The country's capacity constraints, dense population, and high dependence on external water sources exacerbate the effects of Brahmaputra riverbank erosion, flooding, and diminished dry season water flow and groundwater availability.

- As the lowest riparian in the Brahmaputra basin, Bangladesh is most at risk from the cumulative impacts of India's and China's self-interested river management, which shows little concern for the downstream ecosystem. India's planned River-Linking Project; the failed 2011 Teesta River accord, including current diversions of this Brahmaputra tributary; and India's consumption of Ganges River resources and the resulting lower dry-season flows and salinity intrusion are all regarded by Bangladesh as a cautionary precedent for what may happen with the Brahmaputra. Although China's dam building and lack of transparency also worry Bangladesh, Dhaka's fraught relations with New Delhi raise more complex and proximate concerns.

- There are, however, factors that mitigate some of Bangladesh's external fears. For example, both India and China share seasonal water flow and rainfall data to aid Bangladesh with flood forecasting. Also, under Prime Minister Narendra Modi, relations between India and Bangladesh have been reinvigorated, and both countries are optimistic that the Teesta agreement will be signed in 2016.

- As a capacity-constrained state that has long promoted multilateral approaches to augment its power, Bangladesh is the strongest advocate among the three key Brahmaputra riparians for cooperative multilateral management and development of the basin. It faces the greatest threat from the poor practices of upstream countries and has the most to gain from improved river management. Furthermore, Dhaka believes that multilateral cooperation would help produce much-needed regional economic integration with beneficial results for all three countries.

Introduction

Water is aptly characterized as "Bangladesh's blessing and curse":[188] Bangladesh gets too much water during the rainy season (June to October), resulting in flooding; and it gets too little water during the dry season (November to May), resulting in droughts. Flooding and droughts contribute to riverbank erosion, agricultural disruption, and migration. To give outsiders a sense of the landscape in Bangladesh, one water expert remarks, "The whole ecosystem of Bangladesh is water-based."[189] The confluence of three major rivers (Brahmaputra, Ganges, and Meghna) occurs in Bangladesh. Roughly 90 percent of the river catchment area for the country comes from outside its borders.

Although only 8 percent of the 580,000-square-kilometer basin area of the Brahmaputra is in Bangladesh,[190] it is Bangladesh's largest water system, followed by the Ganges, then the Meghna. The Brahmaputra annually provides approximately 65 percent of the country's river water. Upon entering Bangladesh from India's Assam state, the Brahmaputra is called the Jamuna[191] and travels through eastern Rangpur division.[192] It forms the boundary between Mymensingh and Dhaka divisions and Rajshahi division. See Figure 9 for a map of Bangladesh's river geography.

[188] International Rivers, "Bangladesh," https://www.internationalrivers.org/campaigns/bangladesh.

[189] CNA interview, Dhaka, 2015.

[190] South Asia Water Initiative, "Brahmaputra Focus Area Strategy: 2013-2017," 2015.

[191] The Brahmaputra is known as the Jamuna in Bangladesh. For consistency, this report uses the term "Brahmaputra" to identify the river throughout the basin.

[192] In India, the administrative level beneath national governance in India is the state, and in China it is the province. In Bangladesh, this level is called the "division."

Figure 9. Brahmaputra in Bangladesh

Source: Map drawn by Mike Markowitz, CNA, 2016. Composite relying on d-maps, "Bangladesh," http://www.d-maps.com/pays.php?num_pay=71&lang=en.

After it leaves India, the Brahmaputra runs for nearly 250 kilometers (or about 150 miles) through Bangladesh, before connecting with the Ganges River,[193] which empties into the Bay of Bengal through the Meghna River. The Teesta River—which is a tributary of the Brahmaputra and the cause of a heated political dispute between Bangladesh and India—crosses the northern Rangpur division before it merges with the Brahmaputra. The Teesta River is significant because a water-sharing agreement was drafted but not signed in 2011, which would have been only the second water-sharing agreement between the two countries.

[193] The Ganges is known as the Padma in Bangladesh. For consistency, this report uses the term "Ganges" to identify the river throughout the basin.

This chapter considers the Brahmaputra basin from Bangladesh's perspective. It is organized into three sections. The first begins at the domestic level of analysis by seeking to understand the predominant perceptions of internal challenges and threats in Bangladesh. The second section moves to the bilateral level of analysis by examining Bangladesh's perceptions of external threats from India and China. Both sections consider the factors that exacerbate these challenges at the domestic and bilateral levels. The third section examines the potential opportunities for multilateral cooperation that exist despite current obstacles.

Domestic analysis: The primacy of Bangladesh's internal challenges

This section examines Bangladesh's main concerns about water security as they apply specifically to the Brahmaputra. Overall, Bangladesh is more focused now on the Ganges basin than on the Brahmaputra basin, due to India's consumption of water resources from the Ganges River and the downstream impacts that are evident in southwestern Bangladesh.[194] Nevertheless, the Brahmaputra is still an important source of concern given the implications for the management of this largest source of water resources for Bangladesh. While much public discussion analyzes Dhaka's perceptions of threats emanating from India and China on the Brahmaputra, this section sets those issues aside and focuses instead on the many challenges that confront Bangladesh domestically in this river basin. These internal challenges raise the most immediate problems for Dhaka to address.

Internal challenges on the Brahmaputra

Riverbank erosion

The Brahmaputra is generally seen as a young river that "has yet to take its shape."[195] In fact, there is a separate segment of the Brahmaputra in Bangladesh known as the Old Brahmaputra that was created when the river changed its course in the late 18th or early 19th century,[196] likely due to an earthquake. Today, riverbank erosion is

[194] CNA interviews, Dhaka, 2015; Gareth Price et al., *Attitudes to Water in South Asia*, Chatham House, London: Royal Institute of International Affairs, Jun. 2014, 22, 24, 51.

[195] CNA interview, Dhaka, 2015.

[196] Richard F. Nyrop et al., *Area Handbook for Bangladesh*, DA Pam 550-175, Washington: Foreign Area Studies of the American University, 1975, 62.

particularly stark along the Brahmaputra and is a modern reminder of the river's continually changing geography.[197]

Riverbank erosion commonly occurs in the rainy season, due to high water flows and the natural process of the braided river. In particular, land in Kurigram and Gaibandha districts on the west bank and in Jamalpur on the east bank of the Brahmaputra is being lost as riverbanks collapse. Floods exacerbate this problem and entail severe impacts on human security; erosion renders an estimated 10,000-20,000 families homeless in Bangladesh every year.[198] Many have had to rebuild their homes, in some cases multiple times, due to erosion.[199] (See Figure 10 for a detailed subnational view of the Brahmaputra's course through Bangladesh.)

[197] A study by Bangladesh's Center for Environmental and Geographic Information Services found the effect of riverbank erosion increased the Brahmaputra's width from 8.5 km in 1973 to 12.2 km in 2009. A measurement in October 2015 found that the river was roughly 15 km wide at the time. Sources: Abu Bakar Siddique, "Historic Chilmari Port Disappears," *Dhaka Tribune*, Aug. 9, 2014; CNA interview, Dhaka, 2015.

[198] Quamrul lslam Siddique, "Integrated Water Resource Management in the Ganges, Brahmaputra, and Meghna River Basins in South Asia: Prospects and Challenges," Workshop on 'Policy Priorities for Sustainable Mountain Development' organized by the International Centre for Integrated Mountain Development (ICIMOD) in Nepal, Sep. 18-20, 2006, http://qisiddique.com/article.php; Bangladesh Water Development Board, cited in Abu Bakar Siddique, "Bangladesh to Tame Brahmaputra with Concrete Embankments," The Third Pole.net, Jun. 2, 2015.

[199] Abu Bakar Siddique, "Brahmaputra Erosion Hits People's Livelihood Hard," *Dhaka Tribune*, Oct. 26, 2013.

Figure 10. Brahmaputra in Bangladesh: The subnational view (by divisions and districts)

Source: Map drawn by Mike Markowitz, CNA, 2016. Composite relying on Wikitravel, "Bangladesh regions," http://wikitravel.org/upload/shared/archive/c/c8/20080824191509!Bangladesh_regions_map.svg; d-maps, "Bangladesh," http://www.d-maps.com/pays.php?num_pay=71&lang=en.

With impacts on people's homes, land, and livelihoods in Bangladesh, riverbank erosion on the Brahmaputra hurts the retention of local culture, provokes local protest,[200] and disrupts families, such as through the migration of males to find work elsewhere in the country. Many go to Dhaka—the most densely populated city in the world—thereby intensifying national challenges.

Flooding

As devastating as floods can be, they are not necessarily unwelcome in Bangladesh. Flooding provides much-needed replenishment of the soil—a process that benefits agriculture. However, Bangladesh's inability to accurately forecast heavy floods beyond three days in advance and its lack of water storage capacity have damaged or destroyed people's livelihoods and property. Reduced sanitation and educational resources are secondary impacts of flooding, especially in the *chars* (river islands). The Brahmaputra is the major cause of flood disasters in Bangladesh. In 2007, it reportedly "burst its banks" twice, killing 600 people and destroying crops in roughly 39 of Bangladesh's 64 districts.[201]

Diminished water flow in the dry season

Bangladesh as a whole sees wide pendulum swings from flooding to drought—all in the course of a year. Whereas reduced water flows in the Ganges have resulted in salinity intrusion and thus decreased cultivable land and fish stocks, water shortages from the Brahmaputra by comparison are not a major source of immediate concern. Nevertheless, Bangladesh is increasingly nervous about trends in the Ganges and their implications for the future supply of Brahmaputra resources in the dry season.

The Brahmaputra is Bangladesh's largest source of water and provides about 75 percent of its total water resources in the dry season.[202] Bangladesh needs nearly all of this water in the dry season to fulfill its national water resource requirements, such as irrigation and flushing out salinity.[203] After the Brahmaputra enters Bangladesh at Bahadurabad, the average monthly flow of the river during the rainy season (from June to October) is 1.3 million cubic feet per second (cusecs). By contrast, during the dry season (from November to May), the average monthly

[200] See the following Kurigram newspaper story for a picture of a human chain protesting insufficient official attention to the preservation of Chilmari Port: Abdul Wahed, "Human Chain Held to Protect Chilmari Port from Erosion in Kurigram," *Kurigram News*, Oct. 2, 2010.

[201] "Bangladesh: Precarious Lives of River Island Dwellers," IRIN, Mar. 18, 2008.

[202] CNA interview, Dhaka, 2015.

[203] Ibid.

minimum flow is 157,000 cusecs; yet, Bangladesh requires about 210,000 cusecs from the Brahmaputra to meet its national flow requirements.[204]

A critical requirement for the Brahmaputra in Bangladesh is pushing back the salinity that creeps up from the Bay of Bengal coastline. Essentially, decreases in Brahmaputra flow directly translate into increases in salinity. Whereas the Ganges is increasingly not providing enough water to repel saltwater intrusion in southwest Bangladesh, at present the southeast coastline of Bangladesh is protected due to freshwater supply from the Brahmaputra. Yet, Bangladesh sees the impact of the diminished flow of the Ganges on the salinity of the southwest coastline and worries about the negative implications of diminished flows of the Brahmaputra for the south-central and southeast coast.

Diminished groundwater availability in dry season

In terms of agriculture, the Brahmaputra is the main source of groundwater for Bangladesh during the dry season. Rice is a water-dependent crop, and Boro rice is cultivated in the dry season, with 80 percent of it grown using groundwater irrigation.[205] Northwest Bangladesh already has a problem with declining groundwater levels, because Brahmaputra water is being extracted by tube wells at a rate faster than it is being recharged.[206] Despite NGO adaptation activities,[207] farmers are not taking significant action to shift their crops away from rice cultivation and remain vulnerable to reduced groundwater availability in the dry season, which increases the threat of food insecurity for Bangladeshi citizens.[208] National government policy does not appear to be incentivizing farmers to effect meaningful change in agricultural and irrigation practices.

Fisheries also depend mostly on groundwater in the dry season, but fishermen are seeing diminishing availability of this resource.[209] A factor compounding this problem is the amount of arsenic that naturally occurs in the soil throughout Bangladesh: it is contaminating the dwindling supplies of groundwater and reducing

[204] CNA is grateful to a government official for kindly providing these data, 2016.

[205] CNA interview, Dhaka, 2015.

[206] "Bangladesh: 'Invisible Hazard' of Groundwater Depletion," IRIN, Dec. 13, 2011.

[207] NGO activities in Bangladesh are trying to help farmers adapt to diminishing availability of groundwater by encouraging the growth of maize and sunflower, which consume one-fifth of water demand and reap higher profits than rice, for example. CNA interview, Dhaka, 2015.

[208] National Research Council, Himalayan Glaciers: Climate Change, Water Resources, and Water Security, Washington, D.C.: The National Academies Press, 2012, 73, doi:10.17226/13449.

[209] CNA interviews, Dhaka, 2015.

water quality.[210] Another factor that hurts freshwater fish stocks in the low land and flood plains of the Brahmaputra basin is farmers' use of pesticides.

Factors that exacerbate Bangladesh's domestic challenges concerning the Brahmaputra

Several factors exacerbate Bangladesh's difficult domestic situation. These factors are not specific to the Brahmaputra itself, but form the context of vulnerability in Bangladesh's policy outlook. This section examines a handful of those stressors.

Growing, dense population

Of the three riparian countries studied in this report, Bangladesh is the most densely populated. In fact, it is one of the most densely populated countries in the world. Notwithstanding successful policies that have managed high rates of population growth since independence, Bangladesh has a population of nearly 170 million people, making it the eighth most populated country in the world.[211] More than 15 million people live in the capital, Dhaka, which is the densest urban area in the world, with approximately 112,700 people per square mile.[212] Clearly, rising populations require considerable water resources, especially in the context of environmental pressures.[213] While a constellation of factors motivate people to migrate, Bangladesh has seen internal migration of many citizens to Dhaka and elsewhere in the country when fishermen and farmers lose their livelihoods due to water stress and salinity intrusion impacts in the southwestern part of the country (i.e., the Ganges basin).[214] They often become day laborers and rickshaw drivers. Challenges regarding Brahmaputra water flows are likely to continue exacerbating overall population and migration trends in Bangladesh.

[210] Sara V. Flanagan et al., "Arsenic in Tube Well Water in Bangladesh: Health and Economic Impacts and Implications for Arsenic Mitigation," *Bulletin of the World Health Organization*, Sep. 14, 2012.

[211] CIA, "Country Comparison: Population," *The World Factbook*, July 2015.

[212] Dhaka has a population of 15,669,000 and a density (people per square mile) of 112,700. See data from *Demographia World Urban Areas: 11th Annual Edition: 2015* cited in Shane Croucher, "UN World Population Day 2015: These Are the 10 Most Densely Populated Cities on the Planet," *International Business Times*, Jul. 11, 2015.

[213] David Michel and Ricky Passarelli, "Conflict Basins: Powderkegs to Peacepipes," *SAIS Review of International Affairs* 35, No. 1 (Winter-Spring) 2015: 145.

[214] CNA interview, Dhaka, 2015.

Adverse natural circumstances and climate change

In addition to human pressures on resources, Bangladesh faces adverse environmental conditions. The country is prone to natural disasters, and climate change renders Bangladesh vulnerable due to its low-lying geography. Bangladesh is one of the "20 countries and regions most at risk"—and the only Asian country on this list—according to the Intergovernmental Panel on Climate Change (IPCC), the top international authority on climate change.[215] Adding to these environmental impacts, the IPCC finds with "very high confidence" that climate change produces socioeconomic impacts: specifically, it tends to "further entrench poverty."[216] The IPCC also projects that as many as 27 million Bangladeshi citizens could be at risk from sea level rise due to climate change by 2050. While sea level rise is generally considered to be a serious threat facing Bangladesh (especially in the Ganges River basin and coastal areas),[217] its impact will be magnified if the Brahmaputra's flows are reduced in the dry season and cannot help flush out salinity intrusion.

Capacity constraints

Despite a strong economic growth rate of roughly 6 percent annually, Bangladesh has the lowest gross domestic product (GDP) of the three riparian countries in this study. Although in mid-2015 the World Bank elevated Bangladesh from a low-income to a lower-middle income country, it lacks sufficient water management facilities (e.g., water storage in the dry season) and bureaucratic coherence to address its water problems. Considering how often floods occur and the country's flat terrain, Bangladesh needs better storage capacity solutions for excess water so that it can use the resource in the dry season. Furthermore, interagency coordination—for example, between the Ministry of Water Resources, the Ministry of Shipping, the Bangladesh Inland Water Transport Authority, and the Power Division—is reportedly difficult to achieve.[218]

[215] L. Olsson et al., "Livelihoods and Poverty," in *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Impacts*, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, edited by C.B. Field et al., Cambridge, UK, and New York, NY: Cambridge University Press, 2014, 810.

[216] Ibid.

[217] Susmita Dasgupta et al., "River Salinity and Climate Change: Evidence from Coastal Bangladesh," World Bank Group, WPS6817, Mar. 2014.

[218] CNA interview, Dhaka, 2015.

Bilateral analysis: India and China pose the greatest, but not most imminent, threats

At present, India and China do not appear determined to construct storage dams or divert the flow of the Brahmaputra River away from Bangladesh.[219] However, any reductions in water quality and flow from India and China will affect Bangladesh, especially in the dry season, and with cumulative effects on the country. Bangladesh views the two upper riparians—especially India—as problematic regarding its own water security, although the current upswing in bilateral relations with India under the Modi administration has mitigated some of Bangladesh's immediate fears.

Bangladesh-India: The view from Bangladesh

Sharing a history and a border with India has resulted in difficult bilateral ties due to disputes over territory, border crossings, immigration, and insurgencies. Bangladesh is surrounded by India on three sides and perceives itself as vulnerable on water security as on much else. Of the 57 rivers that enter Bangladesh, 54 come from India.[220] There is a water-sharing agreement on only one—the Ganges River. A much anticipated agreement on the Teesta and Feni Rivers failed to be concluded at the last minute in 2011 due to domestic politics in New Delhi, leaving a bad impression in Dhaka. This outcome reinforced Bangladeshis' view of India as an overbearing "big brother" in terms of its overall disposition and water management practices. Furthermore, the bilateral Joint Rivers Commission (JRC)—the only mechanism through which data sharing can be negotiated—is often criticized as being "in effect, two parallel national river commissions, instead of one joint commission."[221]

Beyond water disagreements, Bangladesh has had a complex relationship with India, believing that it exerts excessive influence on Dhaka's policies due to its dominance in the region.[222] As a result, the politicization of issues involving India has a long history in Bangladesh. There is a common view of India as representing the worst threat, given Bangladesh's geography vis-à-vis India. Particularly before the Modi

[219] For India's perspectives on the Brahmaputra, see the India chapter for this project by Satu Limaye. For China's perspectives, see the China chapter by Joel Wuthnow.

[220] The other three rivers come from Myanmar.

[221] Sundeep Waslekar, "India-Bangladesh Roundtable on Blue Peace in the Eastern Himalayas," Strategic Foresight Group, Jul. 1-2, 2013.

[222] Nilanthi Samaranayake, *The Long Littoral Project: Bay of Bengal—A Maritime Perspective on Indo-Pacific Security*, CNA, Sep. 2012, 29.

administration entered office, Dhaka felt that India's Border Security Force was being heavy-handed towards Bangladeshi citizens when policing the porous border.

Difficult bilateral relations have often been exacerbated by polarized domestic politics in Bangladesh, which are often depicted through a lens of either "pro-India" leadership (i.e., Sheikh Hasina of the Awami League) or "anti-India" leadership (i.e., Khaleda Zia, former prime minister and current opposition leader of the Bangladesh Nationalist Party). In addition, even those whose disposition may not necessarily be anti-India harbor doubts about New Delhi's ability to influence the water policies of Indian states—the result of which works against Bangladesh's interests.

The strongest evidence to support this view is that in 2011 Indian prime minister Manmohan Singh went to Bangladesh to sign the proposed Teesta water-sharing agreement but was unable to do so because he had failed to secure support from West Bengal chief minister Mamata Banerjee. This event subsequently hurt bilateral relations, including greater economic cooperation. At the time, Dhaka linked the Teesta pact with progress on giving New Delhi long-sought full transit rights across Bangladesh so that India can access its landlocked northeastern states.

Against this larger context and the importance of water resources as an issue in Bangladesh, a lack of effective water cooperation was a major hindrance to improving bilateral relations in the final years of the Singh administration. Under Modi, the relationship has been reset to some degree; progress has been seen in areas outside water management, such as the conclusion of a historic land boundary agreement and progress in power cooperation. Still, Bangladesh has concerns about India's current management of water resources in view of downstream impacts and future plans. Specifically, three issues have largely contributed to Bangladesh's perceptions of India as a threat: India's river-linking project, the failed Teesta agreement and diversions, and India's withdrawals from the Ganges River basin.

Threat perceptions

India's river-linking project

The prospect of India diverting rivers, specifically through its river-linking project (RLP), is what Bangladesh sees as the greatest potential threat to its own water security in the Brahmaputra. The RLP seeks to increase India's internal water security by connecting rivers with surplus river flow to those with deficit flow in order to guarantee optimal flow of water within India.[223] Based on CNA interviews and water security literature, Bangladesh is far more concerned about the RLP than it is about the possibility of water diversion by China. Specifically, Bangladesh fears India's

[223] For India's perspectives on the RLP, see the India chapter by Satu Limaye.

diversion of the Manas and Sankosh Rivers in the Brahmaputra would mean diversion of resources from the Brahmaputra basin to the Ganges basin. CNA interviews in Bangladesh found consensus that this project, if achieved, would be catastrophic to the country's water supply, the biodiversity of its already fragile ecosystem, and agriculture and fish stocks, while raising the potential for drought.

Even though India does not have immediate plans to implement the RLP in the Brahmaputra basin, the logistics of completing the RLP are daunting given the sheer engineering feat that would be required to divert rivers on such a wide geographic scale. In the words of one Bangladeshi water expert, India's RLP represents a "Herculean task."[224] In addition to the sheer logistical challenge, domestic water politics in India are difficult because even states are at odds with each other. Thus, gaining support from all stakeholders within India would delay the full implementation of this project.

Despite the low likelihood of India carrying out the RLP in the Brahmaputra in the near future, there are reasons for the salience of this threat in Bangladesh. First, Bangladesh's often difficult relationship with India heightens this baseline sense of concern. Second, Dhaka believes that India has previously acted against Bangladesh's interests with regard to water supplied through Indian barrages in the Ganges and Teesta Rivers and may do so again under the RLP. See Figure 8 in the India chapter of this project for a map of the RLP.[225]

As of 2016, India has made little progress on this effort. In fact, the previous Congress Party government was seen to have let the RLP stall because it was proposed under the previous BJP government. However, Bangladesh sees the current BJP government as being more determined to pursue this project. In fact, there has been some modest movement of the RLP under the Modi administration, albeit outside the Brahmaputra basin. In September 2015, the Godavari and the Krishna Rivers were finally linked in Andhra Pradesh. Rivers in Madhya Pradesh and Uttar Pradesh are the next targets of the RLP. As a result, Bangladesh's concerns are high, and most respondents believe that India will eventually carry out the RLP.

Teesta: Failed agreement and current diversions

Unlike the Indian RLP, which represents a potential threat, diversions of the Teesta River in India are of current concern to Bangladesh. A tributary of the Brahmaputra, the Teesta River begins in India's Sikkim state, traverses West Bengal state, then flows across Rangpur division in Bangladesh and into the Brahmaputra. Out of the

[224] CNA interview, Dhaka, 2015.

[225] For India's perspectives on the Brahmaputra, see the India chapter for this project by Satu Limaye.

rivers that Bangladesh shares with India, the Teesta ranks high in importance due to its role in supplying water for rice grown by farmers. As noted earlier, Indian prime minister Singh could not sign the proposed Teesta water-sharing agreement during a visit to Dhaka in 2011 because he had failed to secure support from West Bengal chief minister Mamata Banerjee. If signed and implemented, this would be only the second river water-sharing agreement between the countries.

Bangladesh sees West Bengal diverting large amounts of Teesta water through its Gazaldoba Barrage during the dry season for agricultural purposes.[226] Northwest Bangladesh has seen the detrimental impacts of lower river flow on agriculture, fisheries, and boat travel in the Teesta region. Last year, Bangladesh received roughly 300 cusecs on the Teesta in the dry season, compared with 5,500 cusecs only a few years ago.[227] Observers claim that the area looks like a desert, with homes once on the banks of the Teesta now on a sandbar.[228] For Teesta River stakeholders in Lalmonirhat district in Rangpur, the diminished flow of water in the dry season is already a major problem for farmers, who fault government agencies for the situation.[229] Moreover, the reduced river flow has human security impacts on the role of women in Bangladeshi society[230] and people's livelihoods in the dry season. Even Sugata Bose, an Indian member of parliament from West Bengal's Jadavpur Constituency, acknowledges that the fundamental problem with the Teesta River is "a shortage of water… [and] having to share what is, in fact, a very scarce resource."[231] Such a contest for Teesta resources on both sides of the border illustrates the need to finalize an equitable water-sharing accord.

India's current withdrawals from the Ganges River basin

Bangladesh's experiences with India *outside* the Brahmaputra—i.e., India's use of water resources in the Ganges River basin—magnify its threat perceptions about

[226] Md. Ataur Rahman, "Ensuring Proper River Flow is Essential to Ensure Better Functioning of the Blue Economy," in "Blue Economy: Future of Bangladesh," *Market Pulse* 102 (Jul. 2015): 44.

[227] CNA interviews, Dhaka, 2015; Md. Shariful Islam, "Water Scarcity and Conflict: A Bangladesh Perspective," *The Daily Star Forum* 5, Issue 6 (Jun. 2011).

[228] CNA interview, Dhaka, 2015.

[229] Åshild Kolås and Farzana Jahan, "Chapter 7: Stakeholder Mapping and Analysis," in Åshild Kolås et al., *Water Scarcity in Bangladesh: Transboundary Rivers, Conflict and Cooperation*, Oslo: Peace Research Institute Oslo (PRIO), 2013, 67.

[230] Water scarcity impacts gender advancement opportunities because females tend to be water carriers in Bangladesh. Often girls will drop out of school to perform the task of locating and bringing back water to the family. Paul Faeth and Erika Weinthal, "How Access to Clean Water Prevents Conflict," *Solutions Journal* 3, Issue 1 (Jan. 2012).

[231] Sugata Bose, "FPRC Interview with Prof. Sugata Bose (Part-2)," Diplomatically Speaking – Mahendra Gaur, Jan. 3, 2016, https://www.youtube.com/watch?v=UHL2pW6-M_E.

what India could eventually do *inside* the Brahmaputra basin. The water treaty that the two countries reached in 1996 for the Ganges River basin was a major breakthrough for bilateral relations as their first water-sharing accord. Dhaka was greatly concerned about West Bengal's diversion of water for desilting the Hooghly River, which was adversely impacting agriculture in Bangladesh. Given the importance of water for both countries, the treaty helped address a difficult situation at the time.[232]

Despite the Ganges accord, India's consumption of shared river resources continues to cause deep concern in Bangladesh, with many faulting India for not living up to its treaty obligations.[233] India's West Bengal state is seen as consuming the potential Ganges augmentation flows for itself, thereby not providing all the water it should under the treaty.[234] Article VIII states the need to cooperate on finding a solution to the problem of augmenting dry season flows; yet, 20 years later, there has been little progress on this front. On balance, the goodwill created by the treaty persists, and the consensus view is that the monitoring regime of scientists from both countries is working well. Still, Bangladesh sees India's current actions as acting against the spirit of the treaty—laid out in Article IX's clause about the principles of equity, fairness, and causing no harm—by providing less water through the Farakka Barrage in the dry season, increasing the likelihood of droughts across the border.[235]

In the years since signing the treaty in 1996, Bangladesh views the absence of flow guarantees and an arbitration clause as major shortcomings of the agreement.[236] As discussed earlier, southwestern Bangladesh is facing a significant problem of salinity intrusion.[237] Insufficient water levels from India do not allow the Ganges in

[232] Government of the People's Republic of Bangladesh, "Treaty between the Government of the People's Republic of Bangladesh and the Government of the Republic of India on Sharing of the Ganga/Ganges Waters at Farakka," New Delhi, Dec. 12, 1996, http://www.jrcb.gov.bd/attachment/Gganges_Water_Sharing_treaty,1996.pdf.

[233] CNA interviews, Dhaka, 2015; Kolås and Jahan, "Chapter 7: Stakeholder Mapping and Analysis," 2013, 66-67.

[234] CNA interviews, Dhaka, 2015; Siddique, "China to Give Brahmaputra Flow Data to Bangladesh," 2015; Mir Sajjad Hossain, Member, Joint Rivers Commission, Ministry of Water Resources, Bangladesh, "Ganges Water Treaty between Bangladesh and India, 1996 and Its Prospects for Sub-regional Cooperation," Mekong River Commission Summit, Apr. 2014, 44, http://www.mrcsummit.org/presentations/track3/1.3-b-Conges-water-treaty-MirSajjad.pdf.

[235] A.N.M. Muniruzzaman, "Water and Disaster Management in South Asia: Threats to Peace and Security," *South Asia Journal* 12 (Winter 2015).

[236] Hossain, "Ganges Water Treaty between Bangladesh and India, 1996," 2014, 44.

[237] A study by Bangladesh's Institute of Water Modelling (IWM) and the World Bank finds that freshwater supplies in coastal districts could drop significantly by 2050, affecting between

Bangladesh to flush out the salinity that creeps in from the Bay of Bengal. Impacts are already being seen with threats to drinking water in Gopalganj, for example.[238] With no flow guarantee or arbitration clauses and doubts about New Delhi's ability to restrain state water diversion activities, renewing the 30-year agreement which expires in 2026—only a decade from now—will be difficult unless such fundamental issues are addressed. When discussing the future of the Brahmaputra, experts in Bangladesh thus see an unsettling precedent in the Ganges basin. See Figure 11 for a map of the Ganges basin in India and southwestern Bangladesh.

Figure 11. Ganges, Farakka Barrage, and southwestern Bangladesh

Source: Map drawn by Mike Markowitz, CNA, 2016. Composite relying on d-maps, http://www.d-maps.com; Quamrul Islam Siddique, "Integrated Water Resource Management in the Ganges, Brahmaputra, and Meghna River Basins in South Asia: Prospects and Challenges," Workshop on 'Policy Priorities for Sustainable Mountain Development' organized by the International Centre for Integrated Mountain Development (ICIMOD) in Nepal, Sep. 18-20, 2006, http://qisiddique.com/article.php.

three to five million people. Pantho Rahaman, "Rising Salinity Threatens Bangladesh's Coastal Communities: Experts," Reuters, Oct. 13, 2015.

[238] Mashura Shammi et al., "Investigation of Salinity Occurrences in Kumar-Madhumati River of Gopalganj District, Bangladesh," *Journal of Nature Science and Sustainable Technology* 6, No. 4, 2012, 311-312.

Factors that mitigate threats from India

For all of Bangladesh's concerns, two factors mitigate its anxieties about current and potential threats from India: water cooperation with India and improved political relations.

Water cooperation with India

As discussed above, Bangladesh and India signed their only treaty on water sharing in 1996 over the Ganges. Even before this agreement, the two countries founded the Joint Rivers Commission (JRC) in 1972, soon after Bangladesh became independent. Bangladeshi and Indian representatives continue to meet and exchange information through the JRC. For example, the latest discussions about proportions of water resources sought in the Teesta River have occurred during the commission's meetings. Notwithstanding aforementioned criticisms of the JRC's effectiveness as a dialogue mechanism, an official in the Bangladesh government emphasizes that there has been "a tremendous amount of goodwill between the countries" on the discussion of water issues.[239] In fact, in November 2015, India's water resources minister Uma Bharati hosted Bangladesh's minister of water resources Anisul Islam Mahmud, who invited her to the next round of the JRC in Dhaka. During their meeting, Bharati stated that New Delhi is actively seeking to finalize the Teesta accord, including by reaching out to West Bengal chief minister Mamata Banerjee.[240]

Regarding the Brahmaputra, one saving grace is that India does not use much of the water flow compared with the Ganges.[241] Also, India cooperates on sharing flood forecasting data, which it provides to Bangladesh without charge. It shares water level and rainfall data on the Brahmaputra from a few stations in its territory, and since 2010 has agreed to share data twice a day during the monsoon season (June to October).[242] While a positive step, this data sharing arrangement is simple: India notifies Bangladesh how much rain has fallen in particular catchment areas so that Bangladesh can calculate the time before the water will arrive. As a result, Bangladesh can now forecast floods accurately up to three (sometimes even five) days in advance. While data sharing can be expanded, these interactions on water resources are beneficial to bilateral relations.

[239] CNA interview, Dhaka, 2015.

[240] "New Delhi Reassures Dhaka over Teesta Water-sharing Deal," bdnews24.com, Nov. 16, 2015.

[241] CNA interview, Dhaka, 2015.

[242] There is some question about whether data are only provided once a day and from April to October, based on varying interview responses. CNA interviews, Dhaka, 2015.

Recent positive trends in India-Bangladesh relations

Progress in bilateral relations, especially under the Modi administration, is helping mitigate some of Bangladesh's larger threat perceptions with regard to India. For example, in July 2014, the two countries saw their long-standing maritime boundary dispute resolved through the Permanent Court of Arbitration. Then Modi's visit to Bangladesh in June 2015 and the historic signing of the Land Boundary Accord, which had been delayed for decades, finally resolved the unsettled land border dispute. India is also trying to cultivate deeper, positive ties with Bangladesh through efforts such as selling electricity from Indian power plants and approving an additional $2 billion of development financing in 2016. On the Bangladeshi side, the Sheikh Hasina administration is generally seen as favorable to working with India on common security interests, such as counterterrorism and intelligence cooperation.

As a result of these developments in bilateral relations, there is much optimism in Dhaka that the two neighbors will finally sign the Teesta accord. Bangladeshi and Indian experts believe that the agreement may be concluded in late 2016, likely after the West Bengal elections so that the agreement does not become a lightning rod during Mamata Banerjee's reelection campaign.[243] Furthermore, Bangladesh has been reassured that New Delhi is working with Mamata Banerjee to seek her concurrence on the accord. The momentum following the election of the Modi administration in 2014 is still strong as of this writing. Finalization of the Teesta accord would be a notable indicator of how lasting this renewed foundation will be for closer Bangladesh-India ties.

Bangladesh-China: The view from Bangladesh

Threat perceptions

Not surprisingly, Bangladesh's overall relations with China are not as fraught as those with India. In addition to the absence of disputes with a neighbor, Bangladesh's relations with China are more positive because they give Dhaka more economic and military options than relying solely on New Delhi.[244] For example, China is Bangladesh's largest supplier of military equipment and is set to sell Bangladesh two submarines in the coming year. India, by contrast, has not supplied Dhaka with

[243] CNA interviews, Dhaka and New Delhi, 2015.

[244] Nilanthi Samaranayake, "China's Relations with the Smaller Countries of South Asia," *China and International Security: History, Strategy, and 21st Century Policy*, edited by Donovan Chau and Thomas Kane, Santa Barbara: Praeger, 2014, 226-227.

military equipment since the early years after independence in 1971, according to data from the Stockholm International Peace Research Institute (SIPRI).[245]

Bangladesh sees China as less of a direct threat to water security than India because most of the Brahmaputra is sourced farther south, within Indian borders. Nevertheless, poor management of upstream water resources without regard to the ecosystem or potential diversion activities by China are seen in Bangladesh as harmful to the entire Brahmaputra basin. A recurring theme across CNA interviews in Dhaka is that Bangladesh could face a worst-case scenario through the cumulative effect of India's current and feared activities and potential diversions and/or irresponsible upstream practices by China. Any reductions in the flow or quality of water coming from India and China will adversely affect Bangladesh, especially in the dry season.

Officially, Beijing continues to assure Dhaka that it has no plans to divert the Brahmaputra. Bangladeshi officials asked Chinese officials about this issue as recently as March 2015, and they were reassured that the dams are for the purpose of producing electricity.[246] Moreover, China is a cooperative partner with Bangladesh in the Brahmaputra even though the countries do not share a border. (This section will conclude with examples of such cooperation.)

Although this approach seems to satisfy Bangladesh at the present time, China's activities elsewhere, such as assertiveness in the South China Sea, call into question its verbal commitments to stability. Beyond assurances, Bangladesh wants China to be more transparent about its long-term intentions and plans in the basin: lack of clarity causes distrust.[247] Interestingly, interview respondents in Bangladesh do not doubt China's ability to construct storage dams or divert water to other Chinese rivers, despite the technical difficulties associated with doing so (examined in other chapters of this study).

Water cooperation with China

While not a neighboring riparian, China shares flood warning data with Bangladesh, as it does with India. Beijing charges New Delhi for this information, yet it does not

[245] SIPRI Arms Transfers Database, "Transfers of Major Conventional Weapons; Deals with Deliveries or Orders Made for Year Range 1971 to 2014," and "Trend Indicator Value Tables (TIV) of Arms Exports to Bangladesh, 1971-2014," Stockholm International Peace Research Institute (SIPRI), generated on Jan. 24, 2016.

[246] Siddique, "China to Give Brahmaputra Flow Data to Bangladesh," 2015.

[247] The implications of insufficient trust were seen in CNA's 2014 simulation on water security in South Asia. See Catherine Trentacoste et al., *Bone Dry and Flooding Soon: A Regional Water Management Game*, CNA, Oct. 2014, 17-18.

charge Dhaka. Beijing agreed to share data in 2005 to reduce the potential threat from natural disasters in Bangladesh.[248] China also agreed to help Bangladesh dredge its riverbeds and provide capacity building in this area.

In March 2015, Bangladesh updated cooperation with China through a memorandum of understanding (MOU) on data sharing on the Brahmaputra. China agreed to provide water flow data from three measuring stations in Tibet once a day, over email, during the monsoon season months from June to October.[249] China also agreed to provide rainfall data. These data are shared exclusively for the purpose of flood forecasting, because the underlying intent is disaster prevention.[250]

Although Bangladesh believed that China would begin the data sharing in June 2015,[251] as of late 2015 the data sharing had not begun.[252] A Bangladeshi official minimized the level of the March 2015 MOU by reasserting that it is only an "understanding" with China rather than an "agreement."[253] From time to time, Bangladesh gets data from China, but not as systematically as was sought in the MOU. Bangladesh is optimistic, however, that this process will be regularized soon. Nevertheless, this gray area in the understanding of the MOU demonstrates the need to go beyond MOU-level cooperation to formal agreements that would guarantee Bangladesh consistent access to Chinese water data.

[248] Excerpt from the 2010 Joint Statement: "(f) The two sides agreed to carry out sustainable cooperation on hydrological data sharing and flood control of river Yarluzangbu/Brahmaputra, in view of its necessity to the disaster reduction in Bangladesh. The two sides agreed to strengthen cooperation on water resources management, hydrological data sharing, flood control and disaster reduction, based on the exchange of letters between the Ministries of Water Resources of the two countries in 2005. At the request of the Bangladesh side, the Chinese side agreed to provide assistance for dredging of riverbeds and for capacity building through training of personnel." See Ministry of Foreign Affairs, the People's Republic of China, "Joint Statement Between the People's Republic of China and the People's Republic of Bangladesh," Mar. 22, 2010.

[249] Siddique, "China to Give Brahmaputra Flow Data to Bangladesh," 2015.

[250] CNA interview, Dhaka, 2015.

[251] Siddique, "China to Give Brahmaputra Flow Data to Bangladesh," 2015.

[252] CNA interview, Dhaka, 2015.

[253] Ibid.

Bangladesh's support of multilateral cooperation in the Brahmaputra basin

Of the three basin stakeholders, Bangladesh is the most interested in pursuing basin-wide cooperation. This is not surprising as Bangladesh has the most to lose, given its lowest position in the basin and the large extent to which rivers shape the country's topography. As one of the leaders in creating the South Asian Association for Regional Cooperation (SAARC), Bangladesh is a strong proponent of multilateral approaches.

Water experts in Bangladesh generally advocate integrated river basin management (IRBM), a school of thought that has gained support in water security studies.[254] The Danube, for example, is cited as a river basin where stakeholders have committed to supporting the principles of IRBM.[255] Bangladeshi experts and officials consistently report their desire to encourage this approach to basin management, given the Brahmaputra countries' own challenges and threat perceptions.

Bangladesh sees water cooperation as opening up greater possibilities for regional integration, such as through increased river navigation with India[256] and hydroelectric power generation with India and China. Bangladesh believes that its geographic location is key to achieving "connectivity," meaning connecting mainland India with its landlocked northeastern states as well as promoting interactions between China and South Asia and between South Asia and Southeast Asia. As a result, a retired Bangladeshi official envisages the Brahmaputra as a "river of cooperation" to

[254] The U.S. Water Partnership, launched by Secretary of State Hillary Clinton in 2012, features a definition of IRBM on its H2infO web portal from the Nature Conservancy: "The collaborative process of integrating the conservation, management, and development of water, land, and related resources across sectors within a given river basin. The purpose is to improve economic and social benefits derived from water resources in an equitable manner while preserving and, where necessary, restoring freshwater ecosystems." H2infO, "River Management," undated, http://www.h2info.us/explore/river?resource_keyword=&page=2.

[255] International Commission for the Protection of the Danube River (ICPDR), "15 Years of Managing the Danube Basin," undated, https://www.icpdr.org/main/publications/15-years-managing-danube-basin.

[256] River navigation between Assam, India and Bangladesh has a deep history, declining after the 1965 India-Pakistan war, which affected East Pakistan (Bangladesh): Tariq A. Karim, "Towards South Asian Regional Economic Integration: A Bangladeshi Perspective," *Huffington Post*, Sep. 30, 2015.

contrast the benefits of working together in the Brahmaputra with the more frequently heard narrative of river conflict and water wars.[257]

Regarding India, Bangladesh believes that trade and transportation opportunities can help improve Indian mainland connectivity to the country's northeast.[258] Specifically, the possibility for transit from Kolkata to Guwahati through Bangladesh on the Brahmaputra is seen as presenting a mutually beneficial opportunity for cooperation.[259] Bangladesh believes that it not only has the moral authority,[260] as lowest riparian, but the diplomatic justification to promote basin-wide cooperation with India on the Brahmaputra.[261] Under the 2011 Framework Agreement between India and Bangladesh, India agreed under Article 2 to "common basin management of common rivers for mutual benefit."[262] Because the two countries agreed to "provide necessary assistance to each other to enhance navigability and accessibility of river routes and ports," Bangladesh thinks it can draw on this bilateral agreement to encourage cooperation in the Brahmaputra basin.

Like India, China prefers to work bilaterally. Bangladesh and China signed a 2010 joint statement whereby they "agreed to enhance transport links."[263] Road and rail transit were the two methods discussed, given the obvious continental distance; yet the full spectrum of connectivity entails navigation along the Brahmaputra. Opportunities for cooperating on hydropower generation are also worth exploring. For example, the two countries might draw on China's dam-building expertise to help

[257] CNA discussion, Dhaka, 2015.

[258] Currently, most movement of goods and people occurs between a few land corridors. Modi's June 2015 summit to Bangladesh freed up another avenue by getting coastal shipping access to Chittagong and Mongla ports, whereas previously Indian ships needed to travel to Singapore or Colombo and transship goods instead of sailing directly to neighboring Bangladesh.

[259] CNA interviews, Dhaka, 2015.

[260] Trentacoste et al., *Bone Dry and Flooding Soon,* 2014.

[261] CNA interviews, Dhaka, 2015.

[262] Article 2 full text: "To enhance cooperation in sharing of the waters of common rivers, both Parties will explore the possibilities of common basin management of common rivers for mutual benefit. The Parties will cooperate in flood forecasting and control. They will cooperate and provide necessary assistance to each other to enhance navigability and accessibility of river routes and ports." See Government of India, Ministry of External Affairs, "Framework Agreement on Cooperation for Development between India and Bangladesh," Sep. 6, 2011.

[263] 2010 Joint Statement excerpt: "(d) The two sides agreed to enhance transport links and, in this connection, to continue to discuss the possibility of building road and rail links between the two countries." People's Republic of China, Ministry of Foreign Affairs, "Joint Statement Between the People's Republic of China and the People's Republic of Bangladesh," Mar. 22, 2010.

Bangladesh address its need to store monsoon water for use in the dry season. Although this idea was not specifically suggested by Bangladeshi interview respondents, they often expressed admiration for China's engineering and construction capabilities and may support such an idea if it were pursued cooperatively.

Given the openings for basin-wide cooperation that Bangladesh feels it has with India and China separately, the Bangladesh-China-India-Myanmar (BCIM) Forum for Regional Cooperation offers an existing multilateral framework that Bangladesh could use to encourage the two upper riparians in the Brahmaputra basin to cooperate with each other. Bangladesh participates in various multilateral organizations and frameworks such as BCIM, SAARC, and the Bangladesh-Bhutan-India-Nepal (BBIN) initiative. They are all oriented toward development and regional integration. Bangladeshi interview respondents did not suggest BCIM as a framework for Brahmaputra cooperation, but this venue holds the most promise because—unlike SAARC and BBIN—Bangladesh, India, and China are all equal members.

Started by China in 1999 as the Kunming Initiative to pursue regional connectivity and development, the Track 2 BCIM Forum for Regional Cooperation has progressed to gain Track 1 support for a BCIM Economic Corridor. The Joint Study Group (JSG) of the BCIM Economic Corridor is exploring the possibilities for regional integration, even listing the prospect for "cooperative undertakings" on "water resources [that] may be conserved, developed and tapped beneficially" and on "climate change challenges" in the minutes of the JSG's first meeting in 2013.[264] The JSG meetings have taken place so far in Bangladesh and China, and the next meeting is due to be held in India sometime in 2016. Despite India's and China's preference to work bilaterally, New Delhi remains formally committed to the BCIM Economic Corridor[265] while Beijing continues to be an active proponent of BCIM.

The interactions arising from Bangladesh's bilateral efforts to encourage India and China to work for basin-wide development and cooperation in the Brahmaputra could lay the foundation for what Bangladeshi experts envision as a Brahmaputra Basin Organization, a Brahmaputra Commission, or a Brahmaputra River Basin Authority.[266] This formal body would be the most ambitious means of managing and developing the Brahmaputra basin. It would involve all riparians as equal parties,

[264] Consulate General of India, Guangzhou, "Minutes of the First Meeting of the Joint Study Group of BCIM Economic Corridor," Dec. 18-19, 2013, http://cgiguangzhou.gov.in/news/news_detail/60.

[265] Patricia Uberoi, "Problems and Prospects of the BCIM Economic Corridor," *China Report* 52, No. 1, 19-44 (2016), 30-31, http://chr.sagepub.com/content/52/1/19.abstract.

[266] CNA interviews, Dhaka, 2015.

require regular interaction and communication, and specify a dispute-settlement mechanism.[267] Before the situation in the Brahmaputra worsens, Dhaka, as the lowest riparian, could launch a serious effort to encourage New Delhi and Beijing to consider forming a "Brahmaputra Basin Commission."

Because two of the basin riparians are nuclear-armed and have a border dispute, the creation of a formal commission could be a confidence-building measure that preserves communication and insulates water interactions from political-military crises. The Permanent Indus Commission between India and Pakistan is seen as having such utility, despite the multiple conflicts that have broken out since the Indus Waters Treaty was signed in 1960.[268] Creating such an organization to facilitate basin-wide water-sharing and development in the Brahmaputra would probably take at least a decade. Yet, Bangladesh is the most eager of the riparians to see basin-wide cooperation materialize in the Brahmaputra and believes it has the diplomatic justification and moral authority to encourage this course of action if it chooses.

[267] For example, the Permanent Indus Commission is the body that was created to implement the 1960 Indus Waters Treaty. Drawing on IRBM principles, the Strategic Foresight Group in India also lends weight to the creation of a multilateral water management body by devising a detailed, hypothetical Himalayan River Commission that also includes Nepal. Strategic Foresight Group, *Himalayan Solutions: Co-operation and Security in River Basins*, Mumbai: Lifon Industries, 2011, 30-33.

[268] Jessica Troell and Erika Weinthal, "Harnessing Water Management for More Effective Peacebuilding: Lessons Learned," in *Water and Post-Conflict Peacebuilding*, E. Weinthal, J. Troell, and M. Nakayama, eds., London: Earthscan, 2014, 436.

Recommendations

The key Brahmaputra River basin stakeholders—China, India, and Bangladesh—do not appear ready to sign a trilateral water-sharing and basin development accord for the foreseeable future. This is not a pessimistic finding. The fact that neither interstate relations nor the water security situation in the basin is in crisis allows China, India, and Bangladesh to proceed with cooperation at a measured rather than crisis management pace. Indeed, seen from a structural vantage point, the intensity of implications for population, territory, and industrial and agricultural development increase the further south one moves from the origins of the Brahmaputra River in southern Tibet to its exit in the Bay of Bengal. The portions of the Brahmaputra that run through China and India are among the least populated, least developed, least industrialized and least farmed areas of their vast countries. It is really only in Bangladesh that the combination of population density and industrial as well as agricultural activity faces the most dependence upon the Brahmaputra; and even in Bangladesh's case the implications of river management on the Ganges and Teesta may be more immediately relevant than what is happening regarding the Brahmaputra. If the *physical* relevance of the river is greatest for Bangladesh, the *political* relevance is sharpest for China and India.

These conditions do not make cooperation on the Brahmaputra less significant. In fact they make the need for cooperation and good behavior by China and India even more important because of the downstream humanitarian impacts on Bangladesh and for China-India bilateral political relations in particular. In fact, incremental and limited steps are being taken in the respective bilateral relationships among the Brahmaputra riparians as noted earlier in this study. But the current situation offers strong possibilities for win-win cooperation multilaterally. Advocating cooperation solely for the narrow aims of water-sharing rights does not appeal to upper riparians. More promising is an appeal to the shared interests of these countries for the development of the river basin and greater regional economic integration. This connectivity would facilitate the expansion of transport and infrastructure options such as through river navigation networks and joint hydropower projects.

Fostering water security is a long-game effort. Over time, there are steps that India, China, and Bangladesh could take at the subnational, bilateral, and multilateral levels to lay the groundwork for the three countries to work together toward bilateral accords, trilateral consultations, and even a multilateral MOU, if not eventually a formal accord, over the next decade to advance security in the Brahmaputra River

basin. This final chapter presents recommendations for how all three countries can begin to work together bilaterally and multilaterally, as well as improve their domestic management of Brahmaputra resources.

Domestic recommendations

China

China should expand access to information regarding its dam construction plans on the Brahmaputra. There are a number of steps that China can take, both on its own and in cooperation with India and Bangladesh, to improve trust and help to address common challenges related to the Brahmaputra. Despite China's assurances that its planned hydroelectric dams on the Brahmaputra will pose no risks to downstream countries, the Chinese have placed relatively little information about these facilities in the public domain. The data that are available are somewhat difficult to locate and are often not published in English.[269] China should consider ways in which it can further reduce misperceptions about the goals behind its dam-building activities, such as releasing more detailed information about the planned dams or inviting specialists from downstream countries to visit the sites. It is also reasonable for China to expect that its co-riparians will similarly offer increased public access to data on their own development plans.

India

The government of India should continue efforts to enhance coordinated hydrological data sharing between the center and northeast India state governments. It should also do this between the state governments in order to monitor upstream and downstream impacts on the Brahmaputra River.

The Indian government should consider how to improve consultation with northeast India state governments on the implementation of major dam construction projects in the region. This would be important given center-state and civil society differences that constrain completion of projects.

[269] For instance, China's 12th five-year energy plan merely states the names of planned hydroelectric dams, without providing timelines, technical details, or other relevant information. *12th Five Year Plan Energy Development Plan*, 2013.

India's central government and northeast Indian state governments should also cooperate on the production of a clear, updated, and comprehensive report on India-China relations regarding the Brahmaputra River. This report could incorporate northeast Indian views of concerns posed by China's actions as well as how recent dialogue and hydrological information sharing addresses these concerns.

The Indian government and the state governments of the northeast should consider how they may better cooperate on eco-system management and ecological protection initiatives. These initiatives could also be developed with China and Bangladesh.

Bangladesh

Bangladesh should include more stakeholders in its national water management policies as they apply to the Brahmaputra basin, yet aim for coordination. First, Dhaka should make a greater attempt to bring in all relevant domestic stakeholders—such as those living along the banks of the Brahmaputra—when making policies for this basin. Seeking community-based participation will be key to improving the effectiveness of water management policy subnationally.[270] Dhaka recognizes that Bangladesh needs to encourage greater adaptation to agriculture that uses less water resources; policymakers should create more incentives for farmers to achieve this outcome. Dhaka should also explore more options for the storage of monsoon rains and more sustainable use of groundwater in the dry season. Finally, Dhaka should increase coordination of stakeholders, especially between all Brahmaputra-relevant government organs such as the Ministries of Water Resources, Agriculture, Environment and Forests, and Shipping; the Inland Water Transport Authority; the Ministry of Local Government, Rural Development and Co-operatives; the Local Government Engineering Department; and the Power Division. The various issues relating to the Brahmaputra are cross-cutting and beyond the ambit of a single ministry. Connecting all interagency stakeholders will be an important step in beginning to think strategically about the Brahmaputra and the potential crises that could emerge if Dhaka continues to give most of its attention to the Ganges basin and focus on the day-to-day problems of the Brahmaputra basin rather than its big picture.

Bangladesh should seek assistance from the international community to conduct evidence-based assessments of human security impacts in the Brahmaputra basin. For example, there is much conjecture about the estimates of how many Bangladeshi citizens are forced to migrate due to Brahmaputra erosion or about the projections

[270] CNA discussion, Dhaka, 2015.

that millions of citizens will be affected by sea level rise impacts in the country. Yet, there is insufficient scientific data on these impacts or data that specifically link these impacts to the Brahmaputra basin. The International Organization for Migration concluded that insufficient data collection efforts have prevented a complete, evidence-based assessment of permanent and cross-border migration in Bangladesh, especially as a result of climate change.[271]

Bangladesh is already heavily investing in tools that will directly help improve its ability to address water issues such as flood forecasting capabilities. Yet, Dhaka could use assistance with the collection of evidence that systematically documents the human security problems that Bangladesh faces on the Brahmaputra, including how they may be exacerbated by climate change. Extraregional countries that have previously funded efforts covering the Brahmaputra basin (e.g., the United Kingdom and the Netherlands) or international financial institutions would be ideal sponsors of these important studies. Dhaka would find the results of this analysis useful for more informed domestic planning in this basin as well as for making a more convincing argument to upper riparians India and China about the importance of sustainable, basin-wide practices in the Brahmaputra.

Bilateral recommendations

China

China should consider hydropower as a potential area of cooperation with India. China and India are both considering plans to expand hydropower development along the Brahmaputra. Although this has become a source of tension on both sides, there may also be ways in which such development can be mutually beneficial. At a minimum, the two sides should exchange information on how hydropower supports their respective development strategies, and what their long-term intentions are with regard to development of the Brahmaputra. China and India should also explore the feasibility of cooperative activities, such as joint hydropower development and cross-border electricity trade.[272] These discussions could occur on an ad hoc basis or on the sidelines of existing development forums, such as the BCIM or the Trans-Himalayan Development Forum, which is a Track 2 initiative sponsored by the China Institutes

[271] International Organization for Migration, *Assessing the Evidence: Environment, Climate Change and Migration in Bangladesh*, 2010, 19, 29.

[272] Michael Pollitt, "Power Pools: How Cross-Border Trade in Electricity Can Help Meet Development Goals," The World Bank blog, Oct. 1, 2014.

for Contemporary International Relations and partner institutions from Bangladesh, India, and other South Asian countries.[273]

China should consider ways to enhance sharing of hydrological data with India. China currently provides India with hydrological data on the Brahmaputra during the flood season. In order to improve flood forecasting, China should consider offering real-time, year-round river flow data to India. Meanwhile, as a gesture of goodwill, India should consider offering reciprocal hydrological data to China.

China should expand humanitarian and ecological cooperation related to the Brahmaputra with India. There appears to be room for China and India to expand cooperation in the management of humanitarian and ecological issues related to the Brahmaputra. While such cooperation will not eliminate underlying tensions, it might help improve trust at a low level while addressing practical challenges. To this end, the Chinese and Indian water resource ministries should hold a regular dialogue on river management. This might include working groups on topics such as pollution control, biodiversity protection, dam safety, flood prevention, and emergency response.[274] These discussions might also cover "lessons learned" from other river basins, which could involve contributions from third-country specialists. Where possible, these working groups should make recommendations to their respective governments on steps that can be taken unilaterally or bilaterally to reduce risks and improve safety.

India

India should move ahead with China on the exchange of hydrological information sharing for the Yarlung Tsangpo and Lohit/Zayu Qu Rivers as called for in the 2006 Joint Declaration between the two countries. To date, exchange of hydrological information on these two additional rivers does not appear to have taken place.

India's government should consider issuing a clear, updated, and comprehensive report on India-China relations regarding the Brahmaputra River. Such a report could dispel misunderstanding, incomplete information, and speculation on the current state of India-China riverine relations.

India should clarify its plan for the construction of dams on the Brahmaputra River and its tributaries. When asked how many dams it plans to build, India gives

[273] Li Xinyi, "Conference Opens on Himalayan Issues," *China Daily*, August 24, 2015.

[274] China and India have already agreed to conduct working-level groups on hydrological data and emergency measures, but it is unclear whether or how often these groups actually meet.

only a range of figures. As it seeks clarification on China's plans for dam construction and their potential impacts, India should be willing to provide the same information about its own plans.

India should move expeditiously to provide China with information as called for under the bilateral *Implementation Plan: Provision of Hydrological Information on the Yarlung Tsangpo/Brahmaputra River in Flood Season by China to India*. India should provide China with information about its monitoring site on the Brahmaputra River as called for under the agreement.

India's central government should continue to try and implement the Teesta River Agreement with Bangladesh as quickly as possible by working closely with the West Bengal state government. While the alignment of central and state governments must result from elections and not from political engineering, pressing for implementation of Teesta would go a considerable way towards building on recent progress in India-Bangladesh relations.

India's government should clarify plans for the river-linking project as they apply to impacts on Bangladesh. Though there is little prospect for the RLP being implemented in the near term, India should consider providing further information to Bangladesh on plans for this initiative in light of the recent Supreme Court ruling and the intentions of the new BJP-led government.

Bangladesh

Bangladesh should seek water flow and rainfall data from India and China year-round, not only in monsoon season, and request site visits to dams and barrages in both upper riparians. The current purpose of the data sharing is to enable flood forecasting in order to avert disasters downstream. However, Bangladesh would benefit from dry season and historical data from India and China as well, because this information would help enhance Dhaka's planning and forecasting ability in general. Dhaka should request site visits to dams and barrages upstream on the Brahmaputra and its tributaries to encourage transparency as well as increase technical capacity for scientists in Bangladesh who seek to expand their understanding of sedimentation and its effects. They also want to better understand the positive use of dams and barrages to control sedimentation. Given the sensitivities of water data and infrastructure, agreeing to such requests for data sharing and site visits would be a gesture of goodwill by India and China, which they can then highlight to enhance their own international reputations.

Bangladesh should seek greater cooperation with India on river navigation in the Brahmaputra. Due to their shared interest in increasing regional integration and connectivity, Bangladesh and India signed on to the goal of basin-wide management and development in their 2011 Framework Agreement. Dhaka could elevate requests

relating to the Brahmaputra basin—regarding its development and navigability in particular—from the Joint Rivers Commission to the foreign minister level, given that the Framework Agreement was signed by both heads of government.[275]

Bangladesh should continue to seek to finalize the Teesta water-sharing accord with India. Many expect that the chances for the accord's conclusion will improve in the coming year, after the election in West Bengal. Nevertheless, assuming that the Modi administration does eventually sign the accord, disputes may emerge as they have over the Ganges treaty. Dhaka and New Delhi should work to ensure that these disputes do not fester and potentially damage the wider bilateral relationship. Including a dispute resolution mechanism would be helpful.

Bangladesh should formalize its 2015 MOU with China to ensure the consistent provision of water data and encourage Beijing to improve transparency with India for the benefit of other multilateral issues. From time to time, Bangladesh gets water flow and rainfall data from China, but not as consistently as was agreed to in the March 2015 MOU. In addition to formalizing the MOU, Dhaka should encourage Beijing to participate in multilateral dialogues with India. At present, China assures Bangladesh of its goodwill regarding water security, but Bangladesh could impress upon China that BCIM—an idea that began in China and is still actively resourced by Beijing—will have a greater chance of success when India gains more confidence in China's intentions in the region.

Basin-wide recommendations

China

China should convene a Track 2 dialogue with India and Bangladesh to discuss shared water challenges. Despite the lack of institutionalized cooperation at a basin-wide level, there may be avenues for increased engagement among all three riparians. A starting point would be the establishment of an annual Track 2 dialogue with participation from university and think tank scholars from China, India, and Bangladesh. While there are many promising topics for discussion, one possibility would be to limit the focus initially to technical and scientific subjects, such as the

[275] India's Ministry of External Affairs (i.e., foreign ministry) has also displayed interest in river transit through its funding of the Kaladan multi-modal transport project, which ironically began as a way to avoid Bangladeshi territory when connecting the Indian mainland to the northeast. Under this project, people and goods could transit between Kolkata in West Bengal state across the Bay of Bengal to Sittwe, Myanmar, and then use Kaladan River transit into India's state of Mizoram.

effects of climate change on river flow and potential mitigation strategies. Such talks could also involve input from international specialists on a case-by-case basis. Over time, these Track 2 interactions might form the basis for cooperation at the Track 1 level.

India

India should introduce the elements of eco-system management and ecological protection into discussions of cooperation with China, along the lines of the efforts between India and Bangladesh. Over time, India, China and Bangladesh could consider how these efforts could be linked across the basin.

India should also consider how existing basin-wide mechanisms such as the BCIM grouping could facilitate development of common research and action on preserving and monitoring Himalayan glaciers as part of the region's common heritage. India apparently has been successful in citing India-Pakistan and India-Bangladesh riparian cooperation in pursuing dialogue and data sharing with China. As confidence and habits of cooperation are developed, opportunities for multilateral discussions should be explored, including through official and unofficial dialogues.

Bangladesh

Bangladesh should encourage dialogue with India and China on basin-wide management of the Brahmaputra. Bangladesh understands that a paradigm shift will be needed regarding perceptions of water resources in the Brahmaputra basin. The traditional, zero-sum view of water as a scarce resource that nations consume internally—and should therefore withhold from neighbors—is gradually losing credibility in other basins such as the Danube and Rhine. Instead, "non-consumptive views" are emerging where water is seen as a shared resource that is worth investment for developmental and connectivity benefits to the entire region.[276] Dhaka wants to promote this line of thinking in the Brahmaputra basin and to encourage discussion of non-consumptive uses of water resources such as the potential for greater river navigation and downriver trade in a region that is not well integrated.[277] Furthermore, discussion that emphasizes shared interests such as biodiversity of the

[276] CNA discussion, Dhaka, 2015.

[277] South Asia is among the least integrated regions in the world. The World Bank estimates that only 5% of trade in South Asia is within the region, with most trade flowing externally. This stands in contrast to the 25% of intraregional trade that flows within ASEAN. World Bank Group, "South Asia Regional Integration: Program Brief," Apr. 2015.

river will help minimize the current mindset focused on solely consumptive uses of Brahmaputra resources.

Bangladesh should assemble representatives from India and China on the sidelines of meetings of the Track 2 BCIM Forum for Regional Cooperation and the Joint Study Group (JSG) of the Track 1 BCIM Economic Corridor to discuss Brahmaputra cooperation.[278] Because BCIM's focus is improving connectivity and regional economic relations, the subject of Brahmaputra water resources is a natural topic for BCIM to address formally or informally at meetings.

Dhaka should utilize the capabilities of its active think tank community to analyze specific aspects of basin-wide management of the Brahmaputra with upper riparian counterparts. Bangladesh could expand dialogues on the Brahmaputra by relying on its think tanks to arrange meetings with counterparts in China and India. Think tanks in Dhaka include the Bangladesh Enterprise Institute (BEI)—which is CNA's partner in Dhaka for this research—as well as the Bangladesh Institute of Peace and Security Studies (BIPSS) and the Centre for Policy Dialogue (CPD). These organizations can organize confidence-building dialogues and technical meetings that focus on pollution, erosion, sedimentation, flood prevention, and flood forecasting ability. Bangladesh should seek participation by subnational stakeholders in each of the three countries. Assam in India, for example, is also concerned about sedimentation and riverbank erosion on the Brahmaputra.

In addition to technical analysis, Dhaka's think tanks can work with counterparts in India and China to study the lessons learned from other river basins that could be applied to the Brahmaputra. For example, water experts in Bangladesh view the International Commission for the Protection of the Rhine as a positive model of the type of organization to which Brahmaputra stakeholders should aspire.

These kinds of regular interactions with focused discussions will lay the foundation for a new entity—a Brahmaputra Basin Commission—through which a water management accord could be implemented in the coming decades.

[278] Myanmar is the other member of BCIM and shares three rivers with Bangladesh. Including Myanmar in these meetings could therefore be an option to help its neighbors resolve water resource tensions, even if its inclusion would be outside the scope of Brahmaputra basin cooperation.

For the international community

The international community should be alert to the long-term security implications of discord between Brahmaputra riparians and, alternatively, to the potential cooperation that could advance economic integration in the region. International financial institutions (IFIs), such as the World Bank and Asian Development Bank, and extraregional countries with capacity-building arms, such as the United Kingdom, the United States, and the Netherlands, have an important role to play. They can encourage China, India, and Bangladesh to work together in the Brahmaputra in order to promote economic development on water issues as well as political-military stability in how water-related disagreements are addressed in the basin. For example, the World Bank was critical to achieving the Indus Waters Treaty between India and Pakistan in 1961, because it recognized the importance of such an accord to promoting stability and interactions between governments that are often hostile to each other. Furthermore, such efforts by the international community also can help promote the economic integration that South Asia so badly needs, as well as connectivity between subregions such as the BCIM Economic Corridor linking China and Myanmar to India and Bangladesh.

First, multilateral development banks such as the World Bank, Asian Development Bank, and Asian Infrastructure Investment Bank, should take advantage of opportunities to advance the physical and economic connectivity that is evident in the Brahmaputra basin, such as efforts to reinvigorate river navigation networks.

Second, IFIs and extraregional countries should invest more in both technical dialogues between scientists and regional capacity-building on Brahmaputra hydrology, to help develop norms of information sharing, especially when focusing on the improvement of flood forecasting capabilities.[279] Whereas think tanks in Bangladesh, India, and China can serve as effective conveners for policymakers through Track 1.5 or 2 confidence-building dialogues about diplomatic challenges in the Brahmaputra basin, IFIs and extraregional countries can help make progress on scientific capabilities in the Brahmaputra.[280] For example, the U.S. Army Corps of Engineers is an important provider of technical assistance on water security around

[279] For example, the joint World Bank-UK-Australia-Norway partnership called the South Asia Water Initiative (SAWI) and its predecessor, the Abu Dhabi Dialogue, have been useful in catalyzing discussion between Brahmaputra stakeholders, especially for the development of a hydrological database and modeling platforms to inform scientists in the region.

[280] While not limited to the Brahmaputra, the International Union for Conservation of Nature (IUCN) launched a Track 3 dialogue called "Ecosystems for Life" which brought together Bangladeshi and Indian experts from civil society to workshops in Bangkok. The initiative was funded by the Netherlands government.

the world and could give greater attention to the Brahmaputra basin. Multilateral development banks and extraregional countries may be able to suggest creative solutions to the pressing problem of ensuring sufficient access to river flow in the dry season, possibly through storage of monsoon rains throughout the basin.

Finally, the most important recommendation for IFIs and extraregional countries is to conduct scientific studies on projections for future dry and wet season flows in the Brahmaputra and the impacts of stressors to the basin such as climate change and sedimentation. Experts writing about the region have noted the difficulty in coming to clear, evidence-based conclusions about the full impacts of trends in the Brahmaputra, given the dearth of scientific assessments. Forging progress from all Brahmaputra countries on basin management will require consensus on basic hydrological facts, compared to the current situation of claims by each riparian and little transparency on how countries come to their conclusions.

These recommendations will be quite costly to implement, but IFIs and extraregional countries with capacity-building arms are well positioned to conduct such efforts in the Brahmaputra. They can help advance stability in a highly populated region that is often characterized by bilateral disputes and internal challenges.

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