ORGANISATION FOR RESEARCH ON CHINA AND ASIA

NIICE

TRANSBOUNDARY WATER SECURITY IN SOUTH ASIA

STRATEGIES FOR COOPERATION AND COMPETITION

AN ORGANISATION FOR RESEARCH ON CHINA AND ASIA (ORCA) CO-PUBLICATION WITH NEPAL INSTITUTE FOR INTERNATIONAL COOPERATION AND ENGAGEMENT (NIICE)

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RAHUL KARAN REDDY

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Transboundary Water Security in South Asia: Strategies for Cooperation and Competition

Edited by Rahul Karan Reddy

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"Transboundary Water Security in South Asia: Strategies for Cooperation and Competition" is a Special Issue published by Organisation for Research on China and Asia (ORCA) in collaboration with Nepal Institute for International Cooperation and Engagement (NIICE).

ORCA is a New Delhi NCR-based non-partisan research institution that publishes policy-oriented research on China and Asia. As one of the only think-tanks in India focusing on analysing domestic Chinese politics and policy-making, ORCA adds to international research on topics pertaining to new Sinology. Nepal Institute for International Cooperation and Engagement (NIICE) is an independent, apolitical and non-partisan think tank based in Nepal, which believes in freedom, democracy and a world free from conflict.

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I would like to thank Ms. Eerishika Pankaj and Dr. Pramod Jaiswal for their invaluable support and guidance in bring this publication to fruition. ORCA and NIICE have supported this publication from start to finish and played an invaluable role in enhancing its quality. I would like to thank Mr. Saroj Deo and Ms. Sumitra Karki from NIICE for their assistance in putting this publication together and their diligence in seeing it through to the end.

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A special word of thanks to the scholars and analysts who delivered timely papers despite their demanding schedules. Their expertise in water politics shared in this Issue will greatly enhance the academic discourse on the topic; their crucial insights and recommendations hold long-term durability and must be furthered.

Best,

Rahul Karan Reddy
Editor

PROLOGUE

Transboundary waters generally refer to the underground water resources, as well as the basins of lakes and rivers, that are shared by two or more countries. At a time of increasing scarcity of water, poorly regulated transboundary water resources have the capacity to incite societal upheaval and spark hostilities among states. Transboundary water systems, such as rivers, lakes, and aquifers, frequently extend over political borders, resulting in a complex management process. The shared water resources are vital for sustaining a wide range of ecosystems, agricultural activities, and human communities. An integrated strategy on transboundary water resource management that balances people and the environment to address climate change and population growth is required. Transboundary water security is a crucial subject in the fields of international politics, environmental studies, and water resources management and is one of the most pressing non-traditional security issues of South Asia.

The shared water resource in the Tibetan Plateau and its neighboring Hindu-Kush Himalayan region is known as the 'Asian Water Tower'. It is the source of ten major Asian rivers, wherein there exists glacier reserves which supply freshwater to downstream areas. Transboundary water security became an issue because of the threat that climate change poses, specifically for this region. There is a long-term hydrological, socio-economic, humanitarian, and security challenge posed by the warm temperatures that disrupt the water cycles in the region.

Moreover, black carbon emissions from South Asia are being transported to the Tibetan plateau, where they are deposited on glaciers. This deposit directly contributes to enhanced glacier melt, ultimately reducing the water supply from the southern Tibetan plateau. The increasing concentrations of black carbon have led to a decrease in summer precipitation in the region, resulting in an average glacier deficit mass balance of 11 percent from 2007 to 2016, with this loss rising to 22.1 percent in the Himalayas. Since the early 21st century, black carbon emissions in South Asia have played a significant role in altering summer precipitation over the southern Tibetan plateau, reducing long-range moisture advection and subsequent precipitation patterns in the area. Mitigating South Asian black carbon emissions is crucial to maintaining the water balance of the Tibetan plateau and avoiding potential future water supply scarcities, as well as geohazards such as glacial lake outflow floods. The warming climate contributes to the transboundary water security issue, as it affects all of South Asia's water resources. The long-term adverse effects of this will cause water scarcity, which can lead to increased regional tensions.

The situation in South Asia is alarming as India became a water-stressed country in 2011 with only 4 percent of the world's water resources. The management and use of South Asia's transboundary rivers present increasing hazards of water scarcity, deteriorating water quality, flooding, and unequal water access for communities. For instance, the Brahmaputra basin's water level is dropping, and its water flow patterns are shifting as a result of climate change.

In most of South Asia, water is still a contentious political issue. For instance, for more than fifty years, the competition for water resources has been a source of tension between India and Pakistan. Since the partition in 1947, borders were established along the "Indus watershed", granting India control over upstream barrages that regulate water flow into Pakistan. This geographical setup created an upstream-downstream power dynamic, leading to ongoing disputes over water sharing. Unlike India, Pakistan heavily relies on the Indus, making southern downstream areas particularly vulnerable to strains on the water supply and ranking Pakistan among the world's most water-stressed nations. Similarly, there are irritants between India and Nepal on issues related to water sharing. The prominence of India in Bhutan's hydropower sector is giving rise to growing concerns over the economy and environment. Bangladesh and India share 54 transboundary rivers but the transboundary water management between these two countries is heavily concentrated on the Ganges River basin. The regional issues over water sharing highlight the zero-sum perspective on water security employed by all states in their dealings over water resources.

How can South Asia mitigate this issue without risking regional security? The answer to this is institutional arrangements that facilitate coordinated action, rather than unilateral actions. Unilateral actions make it difficult for states to truly mitigate collective threats and resolve trust deficits. There is a need for collaborative effort in water management, hydropower development, integrated river basin management and water infrastructure development. Countries should also create a framework for data and knowledge sharing for community engagement and capacity building, and jointly deal with challenges such as environmental impact, climate change and disputes over resource sharing.

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ABBREVIATIONS

ADB - Asian Development Bank
Bcm - Billion Cubic Metres
BSF - Border Security Force
CBET - Cross-Border Electricity Trade
Ckm - Circuit kilometre
CMC - Central Military Commission
CPC - Communist Party of China
CoA - Court of Arbitration
COP - Conference of Parties
COVID-19 - Coronavirus Disease of 2019
CPC - Communist Party of China
FYP - Five-Year Plan
G 20 - Group of 20
GBM - Ganga-Brahmaputra-Meghna
GDP - Gross Domestic Product
GtCo2e - Gigatonnes of Carbon dioxide Equivalent
GW - Giga Watt
Hm3 - Cubic hectometres
HVDC - High Voltage Direct Current
IEX - India Energy Exchange
INC - Indian National Congress
IWAI - Inland Waterways Authority of India
IPCC - Intergovernmental Panel on Climate Change
IPE - Institute for Public and Environment Affairs
IRB - Indus River Basin
IRSA - Indus River System Authority
IWT - Indus Water Treaty
JV - Joint Venture
JRC - Joint Rivers Commission
Km - Kilometre
KW - Kilo Watts
kV - Kilo Volts
MCC - Millennium Challenge Compact
MEE - Ministry of Ecology and Environment
MEE - Ministry of Environmental Protection
MEP - Ministry of Environment Program
MOU - Memorandum of Understanding
MRC - Mekong River Commission

MVA - Megavolt-Amperes
MW - Mega Watt
MWR - Ministry of Water Resources
NE - Neutral Expert
NHPC - National Hydro Power Company
NTPC - National Thermal Power Corporation
NW1 - National Waterway 1
NW2 - National Waterway 2
PIWTT - Protocol on Inland Waterways Transit and Trade
PHPA - Punatsangchhu Hydroelectric Project Authority
PIC - Permanent Indus Commission
PPP - Public-Private Partnership
RBMC - River Basin Management Commissions
RCS - River Chief System
SAARC - South Asian Association for Regional Cooperation
SEATO - South-east Asia Treaty Organisation
SNWTP - South-North Water Transfer Project
SOE - State-Owned Enterprises
SRETS - SAARC Regional Trade Study
UNECE - United Nation Economic Commission for Europe
USD - United States Dollar
WB - World Bank
WMO - World Meteorological Organisation
WWO - World Water Organisation

LIST OF EXHIBITS

INTRODUCTION

Water Politics in South Asia: China, Riparian States and Regional Security

Rahul Karan Reddy

Water is arguably the most important natural resource available to humanity. It is all the more precious in South Asia, which accounts for only 4 percent of the world's annual renewable water resources, but is home to 25% of the world's population.[1] The burden of providing water to the region rests on 20 main transboundary rivers.[2] The main river systems of the region — Ganga-Brahmaputra-Meghna and Indus River basins — provide food, water and energy for South Asia but face complex and multi-dimensional challenges.[3] The transboundary nature of these water resources means that actions in one country have an impact on other countries who share the same resource.

Common problems affecting lives and livelihoods of individuals and communities in South Asia require common solution frameworks adopted by states in the region. However, cooperation over water resources and the institutionalisation of cooperation in the form of treaties and institutions are glaringly absent in South Asia. Many of the principles and practices deployed by states to resolve disputes over water use are done within their territorial boundaries, but rarely with other states in the region. The regions multilateral frameworks are also hamstrung by bilateral political disputes that prevent any progress on water governance. Regional institutions like SAARC and BIMSTEC have not developed the capacity to promote cooperation on transboundary water resources.[4] Moreover, extra-regional multilateral institutions have only addressed South Asia's water disputes in an ad-hoc manner, which is insufficient for any meaningful progress.

Limited cooperation over water resources is only one side of the coin. Confrontation and conflicts over water resources are a prominent characteristic of riparian relations in South Asia. States have demonstrated their willingness to instrumentalise water for geopolitical gains. Where bilateral relations are characterised by territorial disputes and other frictions, countries have halted the flow of water, diverted rivers through dam construction and refused to share data on the flow of river waters. Additionally, states are compelled by domestic water demand for human consumption, agriculture and development of industries. These compulsions have driven states to take a combative rather than collaborative approach to water sharing, leading to weak institutionalisation of cooperation and engagement.

This Special Issue details and analyses the landscape of transboundary hydro-relations in South Asia, answering pressing questions about hydro-politics in the region. Each chapter in the issue is about hydro-relations between two countries in South Asia, covers China's role as upper riparian and also addresses the role of climate change and non-traditional security threats facing countries. Authors analyse the drivers of confrontation between states, delineate the logic motivating cooperation in specific sectors and make recommendations for furthering and institutionalising cooperation.

Control amidst Scarcity: Dual Drivers of Security Concerns

Water is a highly securitised issue in South Asia, with states viewing water resources through the prism of national security. This perspective emerges from states' conceptions of control and scarcity. In terms of conceptions of control over South Asia's waters, China looms large. The headwaters of South Asia's major river systems, except the Ganga, originate within a few hundred kilometres of each other in the south-western region of the Qinghai-Tibetan plateau in China. For instance, 50.5 percent of the total basin region of the Brahmaputra is found in China, 33 percent in India and the rest in Bhutan and Bangladesh.[5]

Even some of the major mid-stream tributaries of the Ganga originate in Tibet. The hydrological dependence of South Asian countries on China has major consequences for water security. China has access to more than 50 major international watercourses and only 1 percent of its water comes from outside the country, while the volume of water flowing out of China is 730 billion cubic metres.[6] This makes water a major strategic asset for China to deploy as leverage in its relations with downstream riparian states in South and South-East Asia.[7] China's impact on the water security of South Asia also emanates from its immense demand for water resources.

China's demand for water resources has a significant effect on South Asia's water security. Its approach to transboundary rivers in particular makes downstream countries in South Asia concerned about the regular and unhindered availability of water. Beijing's management of transboundary rivers is partly driven by domestic factors, like uneven distribution of water and shortage of water for agriculture and industry. China's leaders and policymakers like Wen Jiabao have called China's water shortfall a threat to the very survival of the Chinese nation.[8] China's per capita availability of water is just 25 percent of the worlds average and more than 400 Chinese cities are facing water shortages.[9]

Water shortages are compounded by the fact that regional disparities in rainfall and groundwater distribution are significant. Regions in China's north receive much less rainfall that other parts of the country – 20-25 inches per year compared to 80 inches of rain in the southeastern coast.[10] Moreover, the per capita water resources in North China are 225 cubic metres per year, compared to the national average which is 2,300 cubic metres.[11] The North also receives only 12 percent of total precipitation but contributes to 40 percent of total population, 50 percent of GDP and half of agricultural land.[12] Food production is the most significant concern in the context of water scarcity, followed by industrial uses.[13] To attain the twin objectives of securing control over a strategic water resources and meeting domestic demand for scarce water resources, Beijing has embarked on a massive water infrastructure development program, which defines its approach to transboundary rivers that flow into South Asia.

China's Infrastructure-Led Strategy for Attaining Control and Managing Scarcity

China's leaders have long understood the importance of controlling and managing rivers, in order to attain domestic and external objectives. From the time of Yu the Great, who tamed China's rivers and was eventually made emperor, to today's General Secretary of the Communist Party of China, Xi Jinping, the importance of water resource management through

dams and water infrastructure has remained the same.[14] China has built numerous dams on the Brahmaputra to accumulate as much water as possible and control the vital river before it enters India. At the same time, it has embarked on an infrastructure project to transfer water from the South to the North, which was vocalised by Mao Zedong in 1952 when he said, "Water in the south is abundant, water in the north scarce. If possible, it would be fine to borrow a little".[15] The most significant of these water transfer projects is the South-to-North Water Transfer Project (SNWTP), which was initiated in 2002.[16]

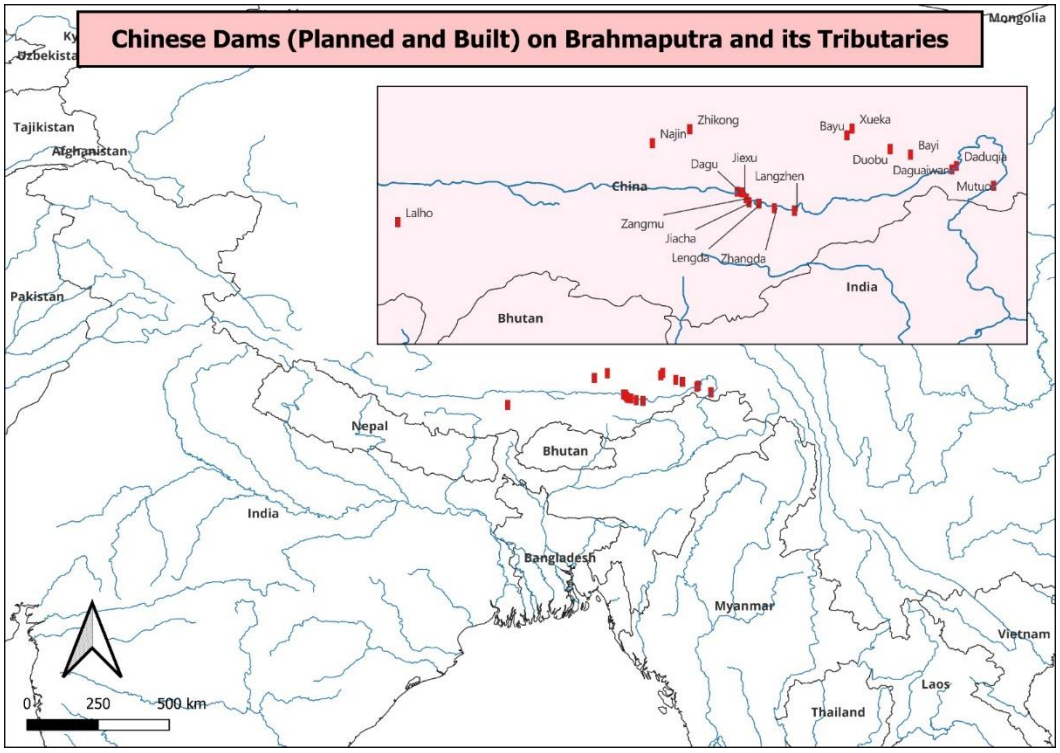
The SNWTP diverts 44.8 billion cubic metres (bcm) of water to water-stressed regions in the West and North via three routes – Eastern, Middle and Western.[17] One particular proposal for the Western route is the most consequential for South Asia's water security as it envisages a diversion of the Brahmaputra River. The Western route is currently in the planning stage but its eventual development, in its current form or otherwise, poses major water security risks for India and other South Asian countries.[18] Besides the highly visible and publicised water transfer projects that spark security concerns in downstream countries, it is mainly China's water infrastructure in the form of dams and hydroelectric facilities that influence water security of South Asia.

By the time the eastern and middle routes of the South-North Water Transfer project were completed in 2014, the State Council of China had already announced 172 major new water infrastructure projects in the form of dams.[19] By 2019, more than 140 of them were already being built, and in 2020 a new round of 150 projects were announced. The Guiding Opinions on the Implementation of Major National Network Projects released in 2022 hinted at further investments into water infrastructure.[20] The projects include large and small dams, hydroelectricity generation plants, diversions and new irrigation systems.

Many of these dams are built on the Brahmaputra River (See Figure 1), adversely impacting India's water security. For instance, for the construction of the Lalho dam project, China blocked the flow of the Xiabuqu River, a tributary of the Brahmaputra River.[21] This sparked concerns in India and downstream countries about the possibility of water diversions by China. Similarly, waters of the Siang River in 2017 turned black and muddy after construction activity took place in China, affecting downstream countries.[22] These incidents have alerted India and other South Asian countries to the possibility that China's upstream water infrastructure activity has a negative and detrimental impact on the water available to South Asian countries.

Besides actions taken to divert water for domestic demand, China's actions also reveal that water is a nested issue, ensconced within broader geopolitical rivalries and disputes. Beijing has demonstrated that water resources and information related to shared water resources can be leveraged to attain geopolitical objectives. For example, during the Doklam standoff between India and China in 2017, China refused to share data with India about the flow of water from three stations in Tibet.[23] Although the data was shared with Bangladesh during the same period, the fact that it was not shared with India reveals that water is an instrument of leverage for states embroiled in confrontations. The pattern of deploying water as leverage in geopolitical confrontations has become characteristic of water politics in South Asia.

Figure 1: Chinese Dams (Planned and Built) on Brahmaputra and its Tributaries[24]



Trickle Down of Infrastructure-Extraction Approach

Driven by China's actions upstream, India's approach to water resources has taken on an infrastructure intensive approach that focuses on dams to counteract the impact of China's hydrological supremacy. The security dynamic between India and China has placed an undue emphasis on hard infrastructure like dams, instead of treaties and other normative structures to manage and govern transboundary waters. For instance, India has planned to develop the Upper Siang Hydroelectric Project to counteract the impact of China's upstream dam construction.[25] Furthermore, India grapples with growing domestic demand for water as a developing country and makes efforts to secure water resources via infrastructure like reservoirs and dams. Often, such actions taken in India to secure water for development and agriculture have the effect of sparking water security concerns in downstream countries, furthering the infrastructure-led approach to rivers. For instance, Pakistan has claimed that India has weaponised water for political leverage and sought to deprive Pakistan of water. One example is the Shahpur Kandi dam which will allow India to use the waters of Ravi, Baes and Sutlej as granted by the Indus Water Treaty (IWT). Nonetheless, Pakistan has claimed that the dam construction exacerbates water security issues.[26] Water security issues between India and Pakistan have escalated over the last few years and continue to be further nested within broader confrontations. Even with the existence of the Indus Water Treaty, which is only an eroding protection against the broader tensions that characterise India-Pakistan relations, dams and hard infrastructure have a destabilising effect on water security of countries downstream. South Asia requires greater institutional protections to guard water security regimes against destabilising factors.

Although India-Bangladesh and India-Nepal relations over water are not as nested within broader confrontations as India-Pakistan or India-China, here too water security issues have

emerged around the construction of water infrastructure. For example, locals of the Bagauda area of the Banke district in Nepal have alleged that the Laxmanpur dam has resulted in inundation of regions in the district.[27] Similar issues have emerged with respect to the Mahalisagar barrage near the India-Nepal border.[28] With respect to Bangladesh, Assam's Barak valley dam project was opposed by Bangladesh due to concerns that the project would damage the ecosystem of the Shylet region.[29] The Tipaimukh dam in India also sparked similar concerns about water availability in the Shylet region.[30] Across South Asia, dams and water infrastructure in upstream countries tend to spark water security concerns, which become intractable when water security issues are bound with disputes over core national interests. Furthermore, the demand for water intensifies the security concerns that states contend with. They are also compounded by a variety of non-traditional security threats like climate change, pollution of surface and sub-surface water resources and other water quality issues.

The state of water security in South Asia is driven by the vulnerability of states to the exercise of control by upper riparian states and to water scarcity. The pressures of urbanisation, industrialisation and population growth are significant and made severe by the shifting monsoon patterns, deterioration of water quality and occurrence of natural disasters like flooding and droughts. Moreover, actions by upper riparian states to build water infrastructure has created a trickle-down effect of actions that make competition the dominant paradigm. With the risk of inter-state conflict over water resources looming over the future of South Asia, institutionalising mechanisms and platforms of cooperation is a priority for the region. However likely or unlikely the proposition of institutionalising cooperation may seem, states like India are in a position to take the lead on laying foundation for a regional water governance framework.

About the Special Issue

The premise of the Special Issue has been to study the scale and state of cooperation between countries in South Asia over scarce and limited water resources. This Special Issue, through the contributions by its authors, will detail and analyse the landscape of transboundary hydro-relations in South Asia, answering pressing questions about hydro-politics in the region. Each chapter in the issue is about hydro-relations between two countries in South Asia, covers China's role as upper riparian and also addresses the role of climate change and non-traditional security threats facing countries. Authors will analyse the drivers of confrontation between states, delineate the logic motivating cooperation in specific sectors and make recommendations for furthering and institutionalising cooperation. The authors will identify gaps in policymaking, explore new avenues of cooperation and make recommendations on how to improve governance of water resources in the decades to come.

The sections in the Special Issue have been created to organise the analysis of the Special Issue into three distinct themes. The first section on resource competition and geopolitical interests details the confrontations over water resources in South Asia. The first chapter, by Shreyas Deshmukh studies the tussle between India and Pakistan over the Indus Water Treaty, detailing their changing approaches to the issue of water sharing. The chapter by D. Purushothaman and Thasnim Kalam studies India's water security issues with respect to the Brahmaputra and

China's role as upper riparian. The paper discusses the politics of India-China in the context of limitations of water and data sharing agreements between the two countries.

The second section of the Special Issue is about navigating complexities of cooperation, with chapters on the sectoral cooperation between states in South Asia. Anuttama Banerji writes on geopolitical factors that have influenced cooperation between India and Bangladesh. She makes the case that functional avenues of cooperation have emerged between the two countries, while larger more contentious issues have remained unresolved. Avinav Singh Khatri writes on the relationship between India and Nepal in the context of cooperation over hydropower resources. He argues that their cooperation faces challenges in the form of policy and regulatory incompatibilities, which governments on both sides are yet to resolve. Nandita Khadgi studies the cooperation between India and Bhutan, to make the case that their cooperation is a successful example of engagement over hydro resources. She details the several challenges that have been overcome and the emerging issues in India-Bhutan hydropower cooperation.

The third section is titled Non-Traditional Security and Governance Challenges, which is focused on climate change and water governance in South-East Asia. The chapter by Ambika Vishwanath and Sanya Saroha is about the complexities of non-traditional security and potential of water conflicts that emanate from climate change. Their chapter outlines the landscape of challenges affecting all countries in South Asia and identifies the threats that state and non-state actors will have to confront in order to limit the possibility of conflict over water resources. The chapter by Dechen Palmo studies the water governance approach by China's central government and the Yunnan provincial government. The paper analyses China's governance of rivers, dam construction and explores its implications for South-East Asia.

Together, these chapters explore the landscape of hydro relations in South Asia, analyse the sources of confrontation and potential conflict, detail sectoral cooperation and make recommendations for the future of transboundary water governance.

ENDNOTES

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PART I

RESOURCE COMPETITION AND GEOPOLITICAL INTERESTS

1. Indus Water Treaty: Changing Approach of Pakistan and India

Shreyas Deshmukh

On January 25, 2023, India's Commissioner of Indus Water issued a notice to Pakistan for the modification of the Indus Water Treaty of 1960 (IWT).[i] According to the government of India, the notice was issued to provide Pakistan with an opportunity to engage in government-to-government negotiations and resolve an ongoing breach of the treaty.[1] What prompted the call for a change in a treaty that has been tried and tested for 63 years?

Both countries have historically approached the treaty differently, possibly due to domestic compulsions, geographical positions, and geopolitical drivers. Moreover, the treaty was the product of a thought process based on fear of a (to avoid) confrontation. The transformation of the Himalayan ecosystem over the last six decades, along with technological advancements, climate change, and changing threat perceptions, requires a different approach to reading the treaty text. This paper will delve into the evolving approach of both countries to the IWT in this new context.

Pakistan's Approach

After signing the IWT, Pakistan's then President Ayub Khan said that "the basis of this agreement is realism and pragmatism".[2] During the negotiations, the World Bank argued for 'principled pragmatism' because in the cooperative mechanism 'principles matter a lot'.[3] Subsequently, this approach morphed into a 'geopolitical pragmatism' and has become an integral part of Pakistan's national policy. Due to the Martial Law declared by General Ayub Khan in 1958, the records of the discussion on the treaty are not available in the public domain, making it difficult to understand what Pakistan's leadership had in mind during the finalisation of the agreement.[ii] The records of National Assembly debates and policy decisions before 1958 and after 1962 offer some insights into Pakistan's approach to IWT. On the other hand, the debates in the Indian National Assembly before and after the signing of IWT provide a comprehensive understanding of the country's leadership approach.

Since gaining independence, Pakistan has raised concerns about Indian projects on the Indus River System related to hydroelectricity, navigation, and irrigation. The premise draws from the 1948 incident, wherein the east Punjab Provincial Government halted the flow of water to the West Punjab canals for a short period during the fog of partition.[4] It was primarily a technical problem that India promptly resolved as Chief Minister of West Punjab (Pakistan), Mumtaz Daulatana, reached out to Prime Minister Jawaharlal Nehru. According to the minutes of the meeting, the East Punjab Government has guaranteed the West Punjab Government that

[i] Indus Waters Treaty, signed on September 19, 1960, between India and Pakistan and brokered by the World Bank. The treaty fixed and delimited the rights and obligations of both countries concerning the use of the waters of the Indus River System.

[ii] Pakistan National Assembly Debates during the 1958-1962 are not listed on the official website of National Assembly of the Pakistan Government. The reason could be that in 1958, Martial Law was imposed in Pakistan.

they won't unexpectedly stop the water flow without giving them time to tap into other sources.[5] The follow-up meeting involving experts and engineers from both sides was held in July 1948 in which it was agreed that 'the existing arrangements will remain in place'.[6]

Pakistan used this incident as a recurring example for decades to bolster its argument that India plans to utilise water as a weapon. Based on this event, it has advocated for its natural right over Kashmir and its rivers to safeguard the country's water security, which is essential for its existence. In January 1950, Senator Feroz Khan, who later became Prime Minister of Pakistan for brief period in 1957, said in the assembly that, "It is not only the question of people of Kashmir but it's a question of life and death for the people of Pakistan. Hence, under any circumstances war or no war, communism or no communism, Pakistan will get Kashmir as part of our state; no matter what the cost in that direction".[7] Another parliamentarian, Shaikh Sadiq Hasan, reiterated the same sentiment in 1953 when he said, "we need not be ominous about Kashmir so much, but we have to be anxious for ourselves and for our existence. Geographically, you see, it is the head of Pakistan, and Pakistan's economy and agriculture entirely depend on Kashmir".[8] The Kashmir issue is more intertwined with the existence of Pakistan than the political and ideological freedom of Kashmiris, as Pakistan claims. This argument convinced the Indian leadership, who referenced it in their debates, but opted to handle the 'Kashmir' and 'Water' issues separately.

Thus, the talks on IWT went on for 13 years under the framework proposed by the World Bank. Throughout this time, certain Pakistani leaders consistently held India responsible for the water scarcity, that resulted in a severe food shortage.[9] The Pakistani Ministers' statements in the assembly point to a different reason for the chaos; internal water mismanagement, severe drought, and the behaviour of zamindars who controlled land and water.[10] Prior to the treaty, the Pakistani government exercised caution in provoking India over the water issue. While answering a question on 'if negotiations fail will Pakistan take its share of water by force?", the Minister of Water, Syed Amjad Ali, responded saying, negotiations are at a delicate stage and he could not disclose Pakistan's options if India halted the historical water supply.[11] This also indicates that India had been allowing water to flow into Pakistan even before signing the treaty.

Following the conclusion of the treaty in 1960, Pakistan's main objective in the next decade was to enhance infrastructure in the Indus Basin. Under IWT, total resources committed for projects amount to USD 1208.5 million of which roughly 60 percent were outright grants from Australia, Canada, West Germany, New Zealand, UK and the US, and the balance was financed through loans and internal resources of Pakistan.[12]

During the treaty negotiations, Pakistan's leadership was also busy securing political support from the US and European countries in the context of the Cold War. In 1954, Pakistan became a South-East Asia Treaty Organisation (SEATO) member and signed a mutual defence treaty with the US. US-Pakistan relations improved significantly under Ayub Khan after the military coup in 1958. This gave Pakistan the confidence to strategically plan for securing water flow in advance for decades. In June 1968, member of National Assembly of Pakistan, Abdul Quasem, said in the Assembly, that, "you can construct the Tarbela Dam, the Mangla Dam, etc. but they are not the substitute for three rivers which we have given over to India, because

according to expert opinion, within 50 years these dams will be filled with silt and will not be in a position to supply water".[13]

For decades, Pakistan has invested in the development of a vast irrigation system,[iii] constructing over 150 dams on the Indus River. The Mangala and Tarbela dams had a profound effect on Pakistan's economy.[iv] The government enacted the Indus River System Authority Act (IRSA) in 1992 to establish rules for managing and allocating surface water between provinces. The Act also mandated the Ministry of Information to widely publicise IRSA in order to enhance national unity. By the end of the last century, Pakistan's progress in overall national development, and specifically in water conservation, slowed. Negligence resulted in decreased capacity of large reservoirs due to sedimentation.[14] Groundwater usage has risen alongside population growth.[15] The 2012 National Climate Change Policy of Pakistan reveals that water-related vulnerabilities constitute six out of nine climate change vulnerabilities, with three specifically associated with the Indus Basin.[16] The policy acknowledges the increasing tension between the upper and lower riparian regions in relation to the sharing of water due to the change in the Hindu Kush-Karakoram-Himalayan glaciers ecosystem.[17]

Inadequate attention to water issues led the country from 'water stressed' to 'water scarce.'[18] Other issues, such as changing precipitation patterns, flash floods and glacier lake bursts added to the risk factors. Considering these climatic shifts and the growing demand for water, Pakistan cannot bear a decline in the current flow in the Indus River Basin (IRB). Consequently, Pakistan's pragmatism has fostered a growing distrust of Indian endeavours involving rivers that flow westward, such as the Indus. While these concerns may be valid, Pakistan's leadership has historically leveraged its lower riparian position to manipulate anti-Indian sentiments for political purposes. Additionally, such issues have been used to malign India's image internationally by threatening to retaliate against India if it does not share water resources.

Pakistan, having accomplished most of the development work in the Indus Basin by 1975, turned to the IWT as a form of coercion against India to impede Indian projects. For instance, work on Tulbul Navigation/Wullar Barrage Storage Project proposed by India in 1984 was suspended in 2023 as Pakistan raised concerns over the project. In January 2010, Sardar Asif Ali, the Pakistan's former Foreign Minister, cautioned that if India persistently refuses to grant Pakistan its rightful share of Indus waters, it could trigger a conflict between the two countries.[19] The issue was also used to shape the public narrative against India by frequently blaming for restricting water flow during the summers.[v]

[iii] Out of a total 86 million acre of land which is under cultivation, the canal system caters to 34.5 million acres.

[iv] The Mangla project has boosted the volume of water for irrigation from the river Jhelum and its tributaries and it can currently irrigate up to 1.3 million acres of land. Tarbela Dam, built in 1974, is one of the world's largest dams and supplies 16 percent of Pakistan's electricity.

[v] Pakistani scholars blamed India for restricting the water flow without any evidence. For example, the conference report which was held to "Understand Water resources in Pakistan," in December 2020, in Isambard, according to the data shared in the paper on difference in water flow in IRS from 1976-1992: 140.45 MCA, and from 1992-2018: 136.39 MCA, the average difference is just 3.7 MCA which can be attributed to change in Himalayan eco system. The report also mentions that the construction of India's Kishan Ganga project will have

The IWT prompted a shift in Pakistan's attitude towards the water issue, with realism gaining prominence in its discourse and behaviour. Pakistan's 'pragmatic' approach for years kept India on the defensive and prevented it from utilising the portion of 3.60 million acre feet of water from rivers flowing westward. India has always prioritised protecting its image and thus ensured enough water in Pakistani dams.

India's Approach

India's policy approach to IWT has consistently remained 'idealistic'. The issue was brought up in 1967 during a parliamentary discussion when PM Indira Gandhi sent a congratulatory message to Ayub Khan for completion of construction of the Mangla Dams.[20] The Indian High Commission to Pakistan was among the attendees at the dam's inauguration ceremony. The opposition led by Jan Sangha, particularly Nath Pai and Atal Bihari Vajpayee, was opposed to the idealistic posturing. These leaders asked, "How can India congratulate an enemy country over the completion of a project in its (India's) occupied territory?" In her defence, PM Indira Gandhi explained India's approach, stating that, "The completion of the irrigation system will now benefit millions of human beings in our neighbouring country and also our own as it will enable us to draw more water for Punjab, Haryana and Rajasthan."[21] Further, she quoted Lal Bahadur Shastri's view, who earlier said, "Under these circumstances, we should not take any wrong decision which gives an opportunity to Pakistan to say that India does not share water with us, therefore we want Kashmir." This view was borrowed from Pakistan.[22]

The Indian Parliament generally agreed on the finalisation of the IWT, except for the article that mandated India to pay Rs 82.75 crores to Pakistan for irrigation infrastructure on IWB.[23] India's foreign currency reserves were Rs 144 crore at the time. And it paid instalments to Pakistan even during the 1965 war. India continued to stick to the preamble of the IWT that it is 'the most complete and satisfactory utilisation of the water of the IRS.'[24]

Over the years, Pakistan raised concerns regarding several Indian projects, including Wullar Barrage/Tulbul Navigational, Baglihar Hydroelectricity Plant, Nimoo Bazgo Hydropower Project, KishanGanga/Ratle, Pakal Dul, Kiru, and Lower Kalnai project. Whenever possible, Pakistan tried to hinder Indian projects through an international tribunal, leading to higher costs and added expenses for arbitration and consultation meetings. For instance, the concern over the design of the Baglihar Hydroelectricity Project was raised in 2000, which was subsequently discussed in eight meetings of the Permanent Indus Commission (PIC) and two meetings at the secretary level.[25] There was no consensus reached in these meetings. Eventually, the Neutral Expert (NE), Professor Raymond Lafitte from Switzerland, was appointed by the World Bank (WB) in May 2005 at the request of Pakistan for the expert determination. During the 18 months of his appointment, the NE held five meetings and visited the Baglihar site and its hydraulic model at Roorkee.[26] Finally, in February 2007, the NE's report confirmed that India's design has been compliant with the basic principles of the IWT.[27]

a great impact on the water supply and will speed up water scarcity issue to an alarming level, without any evidence and references. See: "Understanding the Water Resources in Pakistan", 6th International Conference, December 29-30, 2020, https://t.ly/RzfjG

Despite the conflicts, nuclear tests and terrorism that punctuate India-Pakistan relations, this treaty endured because of the compatibility between Pakistan's realism and India's idealism. However, the Baglihar incident nearly pushed India to reconsider its approach. During the period of 2001 to 2005, India's foreign secretary and foreign minister made efforts to convince Pakistan that India did not intend to harm its interests. India had to reconsider its approach to IWT when Pakistan turned to NE arbitration in 2005. In a press briefing during his visit to Islamabad in February 2005, Indian Foreign Secretary Shyam Saran said, "We find sometimes in the Pakistan media or in some of the comments people make - it is as if this is a project which somehow is giving India the capability either to flood Pakistan or to deny water to Pakistan. The treaty cannot deal with suspicion of this kind."[28] Pakistan's arbitration proceedings on the Kishanganga project led to increased political support for a policy change in India by 2010. The frustration of Indian diplomats was evident in their choice of words. Foreign Secretary Nirupama Rao said in the Afghanistan-India-Pakistan Dialogue organised by Delhi Policy Group in 2010, "breast beating propaganda and baseless charges alleging stealing of water and illegal construction of dams have been spread and poisoned the atmosphere of our relations further. The myth of water theft does not stand the test of rational scrutiny or reason."[29] India made a significant policy change in 2016 when they established a task force to ensure their rights under the IWT were fully utilised, and emphasised Pakistan's obligation to respect those rights.[30]

India refused to endure a repeat of the Baglihar episode with the Kishanganga and other projects. It has suggested an appointment of NE to resolve differences over the Kishanganga project, while Pakistan remained adamant on the establishment of the court of arbitration. The stand taken by the World Bank further complicated the situation, as it has decided to continue to proceed with two parallel mechanisms simultaneously. Therefore, India issued a notice on January 25, 2023 for the modification of IWT to Pakistan on the backdrop of a "material breach of the treaty."

Conclusion

Since 1960, the internal situation and international standing of India and Pakistan has changed substantially. Pakistan's economy has become increasingly vulnerable and reliant on external funding, while the military and political leaders are constantly focused on internal security matters. Conversely, India's economic and military growth has caused Pakistan to lose its conventional parity with India. According to the IWT preamble, mutual trust and cooperation are essential for the treaty's success. India has been consistent in its stand that it does not want to steal Pakistan's share of water, but now it will no longer let Pakistan use the IWT as a tool of subversion and geopolitical leverage. Pakistan has reaped the benefits of the present IWT for a long time and may be inclined to continue with it, while India is pushing for alterations. By resolving differences bilaterally and adding idealism to its policy, Pakistan can meet India halfway in their "realism" approach. Meanwhile, even if tensions ease on this issue, a six decades-old treaty calls for revisions related to climate change, technological advancements, infrastructure norms, and population increase.

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2. India's Water Security: The Case of Brahmaputra - Opportunities and Challenges

Dr. D. Purushothaman and Thasnim Kalam

In the past few years, the division of the Brahmaputra River has become a cause of geopolitical tension between India and China. Originating in Tibet, which is under Chinese control, the river's strategic importance has put China in an advantageous position as the upper riparian nation. China's construction of dams along the river has raised concerns in India and Bangladesh, driven by factors such as population growth, economic development, and the need for energy and food security. Consequently, water resources have the potential to significantly influence India-China relations in the near future. India is particularly concerned about China's ability to use its position as the upper riparian state to weaponize the Brahmaputra against India, which could have serious consequences for India's northeastern states and North Bengal region of Bangladesh. Existing territorial and geopolitical tensions between the two countries could exacerbate this situation.

On the other hand, China downplays India's concerns, prioritising its own developmental needs and water security. Both countries have made efforts to address the Brahmaputra issue, including signing Memorandums of Understanding (MoU) to share information and establishing an Expert Level Mechanism. However, these efforts have proven inadequate, as evidenced by recent tensions over dam construction on the Chinese side of the border. Consequently, the Brahmaputra River has the potential to become a significant point of contention, further complicating the geopolitical and territorial rivalry between India and China. To manage this complex situation, it is crucial for both nations to engage in meaningful multilateral dialogue, implement confidence-building measures, and establish a concrete water agreement among nations. These steps are necessary to navigate the complexities of the Brahmaputra River issue and mitigate the potential for further escalation of tensions between India and China.

Brahmaputra River: Importance to India and China

In order to better understand the Brahmaputra River water issue amid New Delhi and Beijing, it is important to look at the social, economic, political, and environmental significance of the Brahmaputra River. Despite constituting about 17 percent of the world's population, India possesses merely a 4 percent of the its water resources.[1] India is also severely water-stressed, and many urban areas face water shortages during the summer. The Brahmaputra, which is a major river in the region, serves as a vital water resource, providing water for irrigation, which helps agriculture flourish. The river also has immense hydropower potential, which can be harnessed by building dams in the region to enhance the supply of electricity in the region and contribute to energy security. The fishery resources of the river provide livelihood to communities living along the river. It is crucial for trade facilitated by inland navigation as well. Recently, the Inland Waterways Authority of India planned to operate the Indo-Bangladesh Protocol Route on a scheduled sailing between NW1 and NW2, which expands

inland water transportation in Northeast India.[2] Furthermore, the river and its nearby ecosystem have immense ecological importance as they support a wide variety of flora and fauna. The river basin also consists of wetlands, which is important for maintaining ecological balance of the region.[3]

The river holds significance for China too, for several reasons. Despite being home to nearly 20 percent of the world's population, China has only 7 percent of the world's water resources, and its existing resources are increasingly polluted due to rapid industrialisation.[4] China has been engaged in constructing dams on the river and thereby using them for generating hydropower. Additionally, the northern regions of the country are water-scarce, compared to the South. In order to address this imbalance as well, the Brahmaputra River is significant for China.

Existing Legal Provisions for Water Sharing

The Brahmaputra River holds significant importance for security and diplomacy between India and China. Recognising this, both nations have entered into bilateral agreements to collaborate on various river-related issues. These efforts provide insights into the attempts made by both countries to address challenges and also identify potential future actions.

The initial step was the signing of a Memorandum of Understanding (MoU) in 2002, focused on providing hydrological information on the Brahmaputra River.[5] Under this MoU, China agreed to share hydrological data, including water levels, discharge, and rainfall, with India. In 2006, India and China agreed to establish an expert-level mechanism aimed at facilitating dialogue, discussion and cooperation on hydrological data during flood seasons, emergency management, and other trans-border river issues. Additionally, both countries signed a separate MoU in 2013 to enhance cooperation on trans-border rivers.[6] Furthermore, during the visit of the Chinese Prime Minister to India in 2010, the MoU regarding the provision of hydrological information on the Sutlej River by China to India during the flood season was renewed.

Subsequently, in 2018, another MoU was signed which specifically focuses on China providing hydrological information to India about the Brahmaputra River during the flood season, from May 15 to October 15 each year. Moreover, China committed to supplying hydrological data if the water level exceeds the mutually agreed level during the non-flood season.[7] Although there have been several attempts by both nations to address issues covering river water sharing and related issues, there have not been any substantial bilateral agreements or a vision plan to navigate the future of Brahmaputra River water sharing. While China has participated in cooperative mechanisms, its actions suggest that the country is inclined to provide only limited water data in return for broader diplomatic advantages.[8] Appropriate dialogue and discussion on bilateral and multilateral platforms are the best way to ensure transparency and build confidence about intentions and future plans. But in the absence of these conditions and in the context of China’s dam construction activities on the Brahmaputra, India’s concern about China’s actions has grown.

China’s Dam Construction and India’s Water Security

On November 29, 2020, Chinese state media announced plans to construct a large dam on the

Yarlung Zangbo River, also known as the Brahmaputra River in India, near the Line of Actual Control in Tibet.[9] This development could significantly impact water security in India's Northeast region. The river originates from the Kailash ranges of the Himalayas, flows through Tibet, enters India via Arunachal Pradesh, and flows through Assam and Bangladesh before reaching the Bay of Bengal. The Tibetan plateau, one of the world's largest and highest plateaus with an average elevation of around 4 to 5 km above sea level**,** is the source of the Brahmaputra River. As a result of this high elevation, the river enters Arunachal Pradesh with considerable force, carrying a significant amount of alluvial soil. China's aim in building dams along the river is to harness this powerful flow to generate electricity.

Due to China's construction of dams on the Brahmaputra River, India is concerned that the river might be diverted northward into China at the "u-bend" before it reaches India via the state of Arunachal Pradesh. China recently blocked the flow of the Xiabuqu River, one of the Tibetan tributaries of the Brahmaputra, for the Lalho Hydroelectric Project.[10] Additionally, there are fears that China could disrupt transboundary rivers by polluting them, rendering them unsuitable for use. An important incident in this context is the muddying and "blackening" of the Siang River in 2017. This incident sparked worries in India regarding China's actions upstream. The polluted water became unsafe for human consumption and significantly affected agricultural output in the Siang valley, a key rice producing region in the Indian state of Arunachal Pradesh. Moreover, it had a detrimental impact on nearby fishing communities.[11] The diversion of water could result in severe environmental damage in India’s northeasters regions. If China were to use water as a political tool, it could pose a serious threat to India’s water security and ecology.

The management of water through dam projects isn't just about storing water. Regulating the river's flow for power generation and irrigation during dry seasons, as well as releasing water during flood seasons, could present significant challenges for flood management, water availability in dry seasons, and the preservation of ecosystems in northern India and Bangladesh.[12] The nutrient-rich sediments that nourish the soil in these regions might be trapped in reservoirs instead of reaching the river's delta. The people of India's northeastern states rely on the river for agriculture, so China's hydropower projects have made Indian farming more vulnerable to frequent environmental hazards. The reduced water discharge from the Brahmaputra has compounded uncertainty around issues of poverty, migration, violence, and social instability. This situation could give China strategic leverage in the North-East of India.

Additionally, China’s planned hydropower projects are in a highly volatile tectonic zone where the Indian plate meets the Eurasian plate, and thus the mega-constructions in these volatile regions could trigger earthquakes in the region. Another concern raised by India is China’s weaponization of water to gain political leverage, and this view has been further strengthened by several recent incidents. In 2017, amid the Doklam standoff, China ceased sharing water data with India concerning the Brahmaputra River, citing technical upgrades at water stations in the upper riparian region as the reason for the interruption. However, during this same period, Bangladesh continued to receive data from China regarding the water levels of the Brahmaputra.[13]

China’s Arguments

China presents several arguments to justify its construction of hydropower projects and management of transboundary river waters. The country is grappling with increasing desertification in Northern China: approximately 500 million people residing in the northern region have access to only one-fifth of China's total fresh water, whereas the southern part receives four-fifths of the fresh water. To address this imbalance, China aims to bring in sufficient water to its northern region from all available sources. China's per capita water supply is only 28 percent of the global average, significantly below the international benchmarks for sustainable human development.[14] Two factors are likely to restrict expansion of China-India cooperation concerning the Brahmaputra. First, the ongoing border dispute, particularly China’s claims over Arunachal Pradesh, severely inhibits cooperation. Second, mutual distrust, which may exist at the official level, has been pronounced within civil society in both countries over the last decade.[15] Beijing may doubt the motives of their Indian counterparts, whom many in China perceive as biased and sensationalist. These sentiments could limit the potential for productive engagements between both sides.

Regarding the construction of dams, China's stated objective is to generate power without impeding the water flow to the lower riparian states. China’s 12th Five-Year Plan (FYP) includes a push for expanded hydroelectric power usage, as the completion rate of hydroelectric projects under the 11th FYP was only two-thirds of planned projects.[16] Consequently, China is increasingly constructing dams on rivers that cross borders to meet its hydropower goals.[17] From the Chinese standpoint, New Delhi seeks to exert influence over China's management of regional water resources by expanding its presence in Tibet.[18] China asserts that its government consistently upholds the principles of fairness, reasonableness, and equitable consideration of the development and protection of the interests of downstream regions.

Security Threats

Water as a resource is closely linked to security. This makes water a highly political issue when there are multiple states involved. In the case of Brahmaputra, the river is important for both India and China in terms of water security, food security, energy security, etc. The power politics between both nations is closely related to these aspects, which makes the situation more volatile. With the involvement of two economically and militarily powerful states like India and China, often competing and clashing with each other, it is possible that the Brahmaputra River may become an arena of conflict between both nations. Water conflicts often arise when the demand for water is greater than its supply. They can also result from asymmetric power controls over access to and allocation of water between various nations. In the case of Brahmaputra, China, being the upper riparian state, has more access to and control over the Brahmaputra River, which adversely affects India and Bangladesh, which are lower riparian states.[19] A major aspect of security for India is that China could weaponize Brahmaputra River water by controlling its flow or withholding the sharing of information so as to put pressure on India for its own political advantage.

Another aspect of security is the competition for Brahmaputra River water between India and China, which could have serious implications for both conventional and non-conventional security issues as both nations are large military powers locked in a tense standoff over disputed borders. If a water conflict breaks out between India and China, it is possible that other actors are dragged into the conflict, and this could affect regional stability and security. Furthermore, if China succeeds in controlling major river waters in South Asia through dam construction, the water security of the region will be as multiple states depend on the Brahmaputra River. A recent example of the intersection of hydro-politics and geopolitics is when China used its geographic advantage against India by withholding hydrological data following the Doklam border crisis. However, China continued to share this data with Bangladesh, attributing the temporary halt to maintenance of monitoring stations.[20] The environmental concerns posed by dam construction are also an important dimension of regional security.[21] Thus, various security concerns are closely linked and the actions of the actors have dramatic consequences for all countries in South Asia. Hence, while opening a dialogue to identify a framework river management and sharing, security implications need to be carefully reviewed by both sides.

Prospects for Cooperation

The Brahmaputra is a transboundary river that flows across three countries and for both India and China, the river has significant strategic, social, and economic importance. The efforts to cooperate made by India and China are all at the bilateral level. However, experts have argued that both nations could benefit from using a multilateral platform that includes countries from the region, especially Bangladesh since it is also a riparian country. The agreements between India and China exist only at a bilateral level, and neither India nor China have shown any interest in sharing data with their other neighbours. The 2003 UN Water Development Report highlighted that the 'water crisis is primarily a governance crisis', resulting in social, economic, and political barriers across societies. To address these challenges in the future, India should engage in a more robust cooperative effort with China concerning the Brahmaputra River.[22] There does not exist a consolidated agreement among concerned parties on guiding principles and legalities of the sharing of water, as well as a viable dispute settlement mechanism to overcome differences and disputes. It is clear that a sustained and transparent dialogue is the way forward, and both nations could strive to identify common interests and vantage points and start to build cooperation from there. This could also help in finding peaceful and constructive solutions to broader differences and disputes. Along with hydrological data sharing, both nations could also take the initiative to collaborate on the development of hydrological tools, disaster management, pollution control, etc.[23] Since the Brahmaputra River is an issue where people's lives and livelihoods are also intertwined, people-to-people cooperation on this matter could also further progress.

Conclusion

India's concern regarding Chinese dam construction in Brahmaputra is based on multiple reasons, such as the environment and ecological, national security, energy, and economic security. The issue remains unresolved, as, till date, there have not been any substantial bilateral or multilateral treaties except a water data sharing agreement. Furthermore, China is accused

of withholding information during border standoffs and thus weaponizing the river to enhance its political leverage. India's concerns as a lower-riparian state are valid under these circumstances. As a result, mutual distrust is a factor affecting both countries and their ability to cooperate. Indian analysts are expected to continue questioning China's intentions regarding dam construction on the upper Brahmaputra. Similarly, Chinese observers are likely to harbour doubts about the motives of their Indian counterparts.[24] While the transboundary water sharing may not lead to a direct confrontation between India and China in the near future, China has demonstrated that it will use water as a political tool. Additionally, there is minimal coordination at the basin level, despite the signing of a Memorandum of Understanding (MOU) between the two countries regarding the sharing of water data.

China and India should seek to develop a solution based on functional terms rather than political ones and take efforts to build confidence and overcome mutual suspicion and distrust. In order to achieve this, the countries ought to engage in sustained dialogue and confidence-building measures. Other actors and non-state stakeholders, such as village communities near the river, research think tanks, policy experts, and NGOs from both sides, could be engaged in the matter so that a solution beyond the political level could be reached. While it may seem that the Brahmaputra River water issue between India and China could lead to conflict in nature, with appropriate effort from both sides at the bilateral and multilateral level includes multiple stakeholders, more avenues for cooperation over transboundary river water management could be ideated. If India and China succeed in this regard, they both could lead the way in guiding the resolution of other transboundary water issues in South Asia and beyond.

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PART II

NAVIGATING COMPLEXITIES OF COOPERATION

3. India-Bangladesh Geopolitics in Shaping the Outcome of Water Sharing Agreements

Anuttama Banerji

The Bangladeshi Prime Minister Sheikh Hasina recently visited India in 2022 for the G20 Summit and met Prime Minister of India Narendra Modi to deliberate "on the entire gamut of bilateral cooperation, including political and security cooperation, defence, border management, trade and connectivity, water resources, power and energy, development cooperation, cultural and people-to-people links".[1]

While this meeting underscored the growing significance of the bilateral engagement between the two South Asian neighbours and the growing benefits accrued by both parties due to the ongoing talks, water sharing and water management continued to be of peripheral importance, even though it is an issue of critical importance for Bangladesh. Although India and Bangladesh principally share 54 rivers as part of the Ganga-Brahmaputra-Meghna (GBM) river basin — this core issue has remained somewhat sidelined within the existing diplomatic discourse. [2]

This chapter discusses the nature of river water sharing between India and Bangladesh and traces the history of river water sharing between the two states since the formation of the modern-day provincial state of West Bengal within the Union of India and the nation-state of East Pakistan (modern-day Bangladesh) in 1947. This chapter also deliberates on the impact of geopolitics on water issues — with a focus on the all-important Teesta River. This chapter explains how domestic political exigencies impact river water sharing agreements between India and Bangladesh and how subnational diplomacy suffers between the two countries due to existing political issues over water sharing. Finally, this chapter makes policy recommendations to ensure better management of river water issues between India and Bangladesh.

India-Bangladesh Water Sharing & Historical Discourse

Transboundary river water issues have dominated the political discourse between India and Bangladesh since the partition of undivided Bengal and India in 1947. In fact, unlike in the Punjab, demarcation of boundary lines in Bengal during the partition was undertaken keeping in mind the flow of river waters.

For instance, the Muslim majority *thanas* (the territory under the jurisdiction of a single police station) in Malda and Nadia districts of Bengal were claimed by the Indian National Congress (INC) as they were key points in the Ganga-Bhagirathi River systems — deemed essential for agriculture, trade, and drainage in central and southern West Bengal. Moreover, adding these rivers within India's borders was necessary as the Hooghly River in Calcutta (modern-day Kolkata) had decayed. Regular water inflow from Ganga, Bhagirathi, and Nadia was required to revive the Hooghly River in Calcutta (modern-day Kolkata). Therefore, the river systems in Bengal lay at the heart of every negotiation related to the partition of Bengal.[3]

In post-partition Bengal, river waters continued to influence geopolitics in the two states. India's construction of the Farakka Barrage throughout the 1960s and its operationalisation in April 1975 to make the Hooghly more navigable caused a flutter in then-East Pakistan (now Bangladesh), with the latter raising their concerns with the Indian authorities of the time. In fact, India and Bangladesh held five bilateral meetings to resolve the issue in the 1960s, where India maintained that the negotiations be based on facts after the exchange of relevant data.[4]

With the emergence of modern-day Bangladesh in 1971 and the creation of the Joint Rivers Commission (JRC), India expressed its willingness to deliberate the Farakka Barrage issue. In fact, in successive bilateral statements, both sides attempted to build consensus on the resolution of the Farakka Barrage issue and other conflicts associated with river water sharing. For example, the joint communiqué issued at the end of the 1972 visit of the Prime Minister of Bangladesh, Sheikh Mujibur Rahman to India, stated, "the two Prime Ministers emphasised that the geography of the region provided a natural basis for co-operation between the two countries in the development and utilisation of the resources for the benefit of the people of the region".[5] In 1975, Bangladesh allowed India to divert 310-450 m^3/second of water from 21st April to 31st May 1975. Interestingly, Bangladesh also took the matter to the United Nations to resolve the water dispute. Later, several meetings took place to resolve the contentious issue.[6] Negotiations resumed with the signing of the Water Sharing Treaty in 1996 for 30 years. This treaty is up for revision in 2026.[7]

Teesta Waters Treaty: A Lost Opportunity

The 2010s saw renewed engagement on the river water sharing issue, with the Teesta River water issue coming up for negotiation. India expressed its willingness to share 37.5 percent of the Teesta waters while retaining 42.5 percent during the lean season between December and March.[8] However, West Bengal Chief Minister Mamata Banerjee's refusal to share the waters of the Teesta derailed the agreement — despite consensus building taking place between India and Bangladesh at the federal level.

The Teesta waters issue has emerged as an emotive one in India and Bangladesh as the 'lived experiences' of local people depend on the waters of the Teesta. In fact, the farming community in northern West Bengal in India and northern Bangladesh both depend on the Teesta waters for their quotidian lives. This makes a deal on sharing the Teesta waters even more necessary.

However, Indian intransigence on the issue since the 2010s has affected ties between the two countries at the people-to-people level. Despite the ties reaching their golden period or Shonali Adhyaya, limited progress on water sharing, especially the Teesta waters, has emerged as a major impediment in ties.[9] In fact, despite diplomatic engagement, progress on the Teesta has remained negligible. In fact, the regional Mamata Banerjee-led West Bengal government's decision to dig two canals under the Teesta Barrage Project to divert water for agricultural purposes in Jalpaiguri and Cooch Behar districts has emerged as a new bone of contention between the two countries.[10]

Domestic Political Compulsions & Geopolitics

Robert Putnam introduced the 'two-level games' to explain how domestic indicators impact foreign policy or international relations. However, there was limited focus on the nature of the connection between domestic politics and international relations. Rajesh Basrur has, however, stepped in and critically examined how 'involuntary drifts' have affected foreign policy outcomes in India's case. In such a situation, politicians at the federal level are unable to affect political outcomes. For instance, Basrur has explained how a domestic political party attempted to rupture negotiations between India and the United States — as the Manmohan Singh-led government faced a 'no-confidence' vote in the Parliament over the signing of the all-important India-U.S. nuclear deal.[11] Using his framework, it could be argued that the Mamata Banerjee-led West Bengal government's objection to the deal is an example of an involuntary drift.

The West Bengal Chief Minister, Mamata Banerjee, is attempting to subvert a river water sharing agreement that was already in the making at the federal level. At the same time, she is also subverting opportunities to practice subnational diplomacy. This two-pronged assault on diplomatic overtures is reducing the space for diplomacy between India and Bangladesh — at a time when the relationship has seen maximum success. For instance, Mamata Banerjee's visible non-participation in recent negotiations between India and Bangladesh cast a shadow over the outcome of the bilateral talks.[12] Despite visible overtures by the Hasina government in the form of mango diplomacy, cultural ties etc.,[13] limited engagement between the West Bengal government and the Indian central government is affecting ties between India and Bangladesh.

While India-Bangladesh ties are witnessing their golden era in ties — with both states celebrating the fiftieth anniversary in 2021, a potentially divisive political discourse within India is percolating into neighbouring Bangladesh and vice-versa, leading to consistent ebbs and flows in the bilateral relationship. At a time when other contentious issues like the border killings issue that has seen the death of several Bangladeshi civilians at the hands of Indian security agencies at the India-Bangladesh border can derail ties, resolving the Teesta issue can provide a fillip to the relationship.

However, for a resolution of the Teesta water sharing treaty to come through, India will have to build domestic consensus within the Indian central government and the regional state government of West Bengal — to limit the influence of external players within India's natural backyard. In fact, Indian domestic intransigence on the Teesta has provided China an opportunity to emerge as a major diplomatic player in Bangladesh. Moreover, the Mamata Banerjee-led West Bengal government's attempts to subvert the river water sharing agreement has also had geopolitical implications for India.

The China Factor

India's policy of going back-and-forth on a crucial treaty has enabled China to gain a strategic foothold in Bangladesh — as China has proposed "to dredge and embank large portions of the Teesta River so that it forms a single manageable channel".[14] Moreover, as the river has acquired a braided form over the years, the Chinese have proposed to straighten the river.

The Chinese have also proposed to build industrial parks, satellite towns and roads after reclaiming land along the river basin using the dredged material.[15] Finally, Chinese assistance on Teesta River Management within Bangladesh is being viewed positively by the Bangladeshi populace — especially the farming community within North Bangladesh who battle inundations and erosion during the monsoon season and water shortages during the dry season.[16]

While the proposed solution by the Chinese is likely to benefit Bangladesh, Chinese intervention in India's immediate neighbourhood is likely to limit Indian influence — especially in a friendly nation like Bangladesh. Since the proposed treaty on the Teesta has been stuck between India and Bangladesh for more than a decade, Chinese intervention on the Teesta may swiftly shift public opinion within Bangladesh in favour of China. At a time when India has federal ties with Bangladesh, but has failed to make inroads at the people-to-people and local level,[17] Chinese intervention on the Teesta issue may further the divide between India and Bangladesh at the people-to-people level as China may be able to influence public opinion its favour.

Finally, as Bangladesh chooses to hedge between India and China, any movement on contentious issues like the Teesta could potentially lead to Bangladesh tilting towards China — a state that has no legacy issues with Bangladesh and who may appear as a problem solver in South Asia. India, despite being a preferred partner of Bangladesh may have limited leverage on key diplomatic issues if it fails to resolve the Teesta water sharing issue within a stipulated period of time.

Way Forward

Despite the Teesta issue acquiring grave significance in both countries and Bangladesh being the biggest beneficiary of India's Neighbourhood First Policy that sees India prioritizing diplomatic and economic ties with its immediate neighbours, the deadlock over the Teesta has continued. However, this deadlock has also paved the way for deliberation on other significant transboundary rivers like Kushiyara and Feni. The water sharing agreement on the Kushiyara River was formalised in 2022 that will benefit the people of Southern Assam and Sylhet in Bangladesh.[18]

The two sides have also reached an interim agreement on sharing the Feni River waters that will enable the people of Sabroom in Meghalaya to have access to clean drinking water.[19] Similarly, the meeting of the Joint Rivers Commission between India and Bangladesh took place after twelve years in August 2022 and saw deliberations on water sharing of other transboundary rivers like Muhuri, Monu, Dharla, Khowai, Gumti and Dudhkumar.[20]

While these steps enable the creation of a positive environment for talks and bring a focus back on transboundary river water sharing issues with respect to the other rivers that India and Bangladesh share, both states need to take steps to ensure a rapid resolution of the Teesta River issue. This will lead to greater trust between the domestic populations on both sides as well as political elites.

In addition to the signing of the Land Boundary Agreement (2015) and the Coastal Shipping Agreement (2015), Protocol on Inland Waterways Transit and Trade (PIWTT) (Renewal), and the delineation of the maritime boundaries between the two countries in 2014, the signing of the treaty on Teesta will act as the next major confidence building measure between India and Bangladesh. In fact, signing the treaty will enable greater trade along the riverine route — a hitherto under-utilised domain that can promote connectivity between the two countries.

In fact, by signing the treaty, India will be able to send a positive signal to its neighbours like Nepal about its willingness to negotiate other treaties concerning transboundary rivers. For instance, signing a treaty on the Pandai River shared by India and Nepal may assuage the concerns of the local populations.[21]

Similarly, signing the Teesta River water treaty will expand river water cooperation between India and Bangladesh as both states can improve riverine connectivity between the states through legal channels — potentially reducing infiltration attempts by smugglers and other non-state actors. Signing the river water treaty on the Teesta could facilitate further engagement between the security forces and lead to the signing of more treaties on river water sharing of other rivers — leading to cultural interactions between the local populations along the riverine route. For example, the Indian Border Security Force (BSF) so far allows limited interactions between the Indian and Bangladeshi sides on the Ichamati River during the Durga Pooja celebration in 2018 due to heightened fears of infiltration from the Bangladeshi side.[22] However, signing a treaty on the Teesta River could be viewed as a significant trust building measure between India and Bangladesh that could potentially lead to joint water management of the riverine resources by India and Bangladesh collectively. This measure could potentially reduce infiltration on the Indian side enabling further interaction between local populations during popular festivals.

Furthermore, it is possible that the cultural interactions between the two sides could strengthen after the signing of the treaty — with joint security and joint management of rivers becoming a reality. In this light, the creation of a joint Indo-Bangladesh water management force may strengthen policing on both sides of the riverine border.

The signing of the Teesta could facilitate greater water management on both sides as well. For instance, after signing the Teesta agreement, the two sides can consider the risks of climate change and sign agreements on ground water supply, reservoir building, and consolidated rainwater harvesting. Ensuring abundant groundwater supply and efficient rainwater management will ensure the overall health and well-being of the populations on both sides. Moreover, the signing of the treaty can enable the farming communities on both sides to share the existing best practices with each other enabling greater interaction between the local populations.

India and Bangladesh could also come together to develop a joint river water management institute — along the lines of other academic institutions for the better management of its shared rivers. This state-of-the-art institution could focus on the study of geo-economics and geopolitics while establishing academic centres for technical disciplines like Hydrology, River

Morphology, and Water Science Engineering, among others. This institute should also play a proactive role in educating domestic populations about the risks attached to the construction of dams (case in point Tipaimukh Dam on the Barak River — as it affects both the domestic populations of India and Bangladesh) — and informing them about the significance of sustainable water management so that the issue of cross-boundary river water sharing becomes a mainstream subject of discussion within the diplomatic discourse. Moreover, the creation of a state-of-the-art institute on river water management could lead to farming communities on both sides incorporating the best farming practices amenable to them — such as eschewing growing water intensive crops.[23]

These steps are likely to reinforce a more nuanced understanding of the importance of rivers among the public — ensuring a harmonious coexistence between the local populations while ensuring better diplomatic ties between India and Bangladesh in the coming years.

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4. Expanding Hydropower Synergy between India and Nepal: Amidst a 'Handshake across the Himalayas'

Avinav Singh Khatri

In the formidable embrace of the Himalayan range lies a shared opportunity for India and Nepal, the potential for an unprecedented expansion of hydropower synergy. Aptly referred to as the "Handshake across the Himalayas", this metaphor encapsulates not only the geographical proximity of India and Nepal, but also the promise of mutual prosperity through harnessing abundant hydropower resources.[1] As neighbouring states with deep-rooted riparian ties, both nations stand at the precipice of a transformative collaboration that could redefine the energy landscape in the region.

This paper makes a case for expanding hydropower synergy between India and Nepal. The imperative for such collaboration is underscored by the untapped potential of their shared rivers and the pressing global need for sustainable energy solutions. The introduction sets the stage by briefly navigating the contours of hydropower cooperation. It details the rich hydropower potential nestled within the landscapes of India and Nepal. Subsequently, it delves into the driving forces behind the synergy and outlines the roadmap for future cooperation in the subsequent sections.

The paper presents an analysis encompassing the challenges and opportunities inherent in this collaborative pursuit and contends that by strategically addressing these challenges, a profound synergy can emerge, bringing economic, environmental, and regional integration benefits to both nations. The analysis engages with the complexities of India and Nepal's hydropower landscape, and also discusses the way forward for a collaborative future.

Hydropower potential in India and Nepal

India and Nepal share fluid geographical borders, a common cultural outlook, close bilateral relations, and abundant freshwater resources. Many rivers, including the four significant tributaries of the Ganges: the Mahakali, Karnali, Sapta Gandaki, and Sapta Kosi, flow downstream from the Himalayas in Nepal into India. These river systems traverse Nepal's plains before flowing into India's flat subtropical plains and merging into the Bay of Bengal. Both the fertile Indo-Gangetic plains of India and the low-lying regions of Nepal benefit from the irrigation and silt provided by these rivers.[2] Moreover, these rivers hold immense potential for hydropower synergy between India and Nepal. Of all the electricity production methods, hydropower stands out as the most commonly used and reliable.

With their considerable hydroelectric potential, India and Nepal can be key players in ensuring South Asia's energy security. India offers a wide range of hydropower options due to its

different geographical settings, which include the powerful rivers in the north and the peninsular rivers in the south. However, India's resources alone are insufficient to meet the subcontinent's escalating energy requirements. According to India's Central Electricity Authority, the country has only developed 29 percent of its total hydroelectric potential of 145,320 MW, with an additional 10.3 percent under construction. Presently, 42104.6 MW has been developed, and 15023.5 MW is under construction.[3]

Similarly, Nepal is blessed with an abundance of perennial rivers originating from the Himalayas and possesses immense untapped hydropower resources. "It (Nepal's water assets) encompasses approximately 6,000 rivers with a total length that exceeds 45,000 kilometres (km). About 220 billion cubic metres of water per year are typically discharged out of these rivers. The technical potential for hydropower in Nepal has been assessed to be 83 gigawatts (GW). Typically, due to various limitations, not all the available water resources will be developed. Consequently, 42 GW is projected to be economically feasible (for hydropower)."[4]

Drivers of Hydropower Synergy

South Asia is home to a large portion of the world's population and some of the world's fastest-emerging economies. Moreover, rising demand for electricity for economic growth from South Asian countries is necessary to facilitate rapid expansion of the regional economies.

However, these countries are facing energy deficits because the production of electricity is insufficient and the region faces a shortage of electricity transmission infrastructure. These challenges were pointed out by some previous studies like SAARC Regional Trade Study (SRETS) and SAARC Vision 20.

For instance, in India, the power deficit is noticeable. Power producers supplied 10,12,249 million units in April-November 2022, against the demand of 10,17,940 million units, resulting in a power deficit of 0.6 percent.[5] The primary reason for this power deficit is inadequate transmission infrastructure. While the transmission grid either stays the same or is steadily upgrading, installed power capacity has expanded recently. "To address the issue of inadequate transmission grid infrastructure, the country's Green Energy Corridor plan called for the construction of over 9,400 Circuit kilometres (ckm) of intra-state transmission lines by March 2020".[6]

Similarly, Nepal is working on upgrading its transmission grids. According to the Nepal Electricity Authority, the total lengths of transmission lines under construction at the 132 kV, 220 kV, and 400 kV levels are 1,111 ckm, 988 ckm, and 754 ckm, respectively, a total of 2,852 ckm.[7] Additionally, the construction of additional substation capacity amounting to 15,565 Megavolt-Amperes (MVA) is planned within the next few years.

Addressing deficits by concentrating efforts on synergies in electricity production and transmission infrastructure is a cost-effective and mutually beneficial solution. Some of the existing frameworks to upgrade transmission infrastructure include the India-Bhutan grid Reinforcement plan, India-Sri Lanka High Voltage Direct Current (HVDC) link, Bangladesh-India HVDC link, India-Pakistan 220/400 kV link. Furthermore, Nepal-India transmission

links projects are ongoing, with the United States assisting Nepal through Millennium Challenge Compact (MCC) to build and upgrade transmission lines.[8]

Furthermore, expanding hydropower synergy by leveraging Nepal's abundant water resources and India's technological expertise can help meet the growing demand for electricity and energy. It would ensure a more secure and reliable energy supply for both countries, reduce dependence on fossil fuels, and promote clean energy alternatives in an ecologically sensitive region. Hydropower projects also offer significant economic opportunities for both countries by generating revenue through power exports, creating jobs, facilitating infrastructure development, and promoting tourism.

Increased electricity production is crucial for Nepal due to its potential to address energy shortages, spur economic growth, and enhance overall quality of life. With a reliable power supply, industries can thrive, attracting investments and creating job opportunities. Improved electricity access also facilitates advancements in education, healthcare, and technology. Furthermore, energy independence enhances the country's resilience and reduces dependency on external sources, contributing to national security and stability.

In recent years, electricity exports hold a sizeable position in Nepal's GDP. "Electricity worth Rs. 11.8 billion was exported as of October 16, 2023. Since the beginning of the fiscal year 2023-24 in mid-July, electricity worth Rs. 9.64 billion has been sold in India's power market".[9] The figures themselves show how crucial it is for Nepal to produce and trade more electricity as the earnings can bridge the trade deficit. On the other hand, "India's ever-increasing energy demands underscore its vital interest in Nepal, particularly its largely untapped hydropower capacity".[10] With its burgeoning population and rapidly expanding economy, India will continue to increase its energy requirements.

Additionally, establishing a hydroelectric partnership with Nepal is the key to bridging the energy deficit and achieving energy security in North India. The production of electricity through hydropower is crucial for ensuring a reliable and sustainable energy source, reducing dependence on volatile global markets for fossil fuels.

India possesses advanced hydropower technology, infrastructure, and project implementation experience, which complements Nepal's abundant water resources and provides the region with connectivity infrastructure for development. By combining these resources and competencies, both countries can foster a mutually beneficial partnership. Expanding hydropower synergy between India and Nepal also stems from environmental drivers. Hydropower, as a clean and renewable energy source, aligns with the global goals of reducing carbon emissions and combating climate change.

At Conference of Parties (COP) 26, India announced its ambition to become a net-zero emitter by 2070—an important milestone in the fight against climate change. Despite low per-capita emissions (1.8 tonnes of CO_2), India is the third-largest emitter globally, emitting a net 2.9 gigatonnes of carbon dioxide equivalent ($GtCO_2e$) every year as of 2019.[11] On the other hand, during the COP26, Nepal announced key commitments to remain cumulatively 'net zero carbon' from 2022-2045 and become carbon negative after that; to halt deforestation and increase forest cover to 45 percent by 2030, and to ensure all vulnerable people are protected

from climate change by 2030.[12] By tapping into hydropower potential in Nepal, both countries can diminish their reliance on fossil fuels, mitigate greenhouse gas emissions, and combat climate change, contributing to a greener and more sustainable future.

Collaborative efforts in the hydropower sector can also drive regional integration and stability. This synergy would include the development of interconnected power grids, enabling efficient power transmission and ensuring a reliable and stable supply of electricity across the region. By sharing the benefits of hydropower projects, both countries can strengthen their bilateral relations, which have been turbulent time and again over the last few years. Hydro-cooperation can introduce some much-needed stability in India-Nepal relations by fostering a sense of trust and economic interdependence and promoting cross-border trade. Additionally, this cooperation can lay the foundation for further collaboration in transportation and connectivity infrastructure, leading to overall regional development and integration and reminding both sides of the border what each country has to offer.

Challenges and Opportunities

The realisation of hydropower synergy between Nepal and India encounters specific challenges that necessitate attention at the leadership, operational, and local levels through regulatory harmonisation and policy coordination. Strengthening regulatory and policy frameworks is pivotal for standard harmonisation and dispute resolution. For example, under India's established rules, it cannot purchase electricity from Nepal produced from Chinese investment or involvement, be it equipment, workers, or subcontractors.[13] This provision results in the wastage of surplus energy, leading to substantial losses. The hydropower sector in both countries face challenges due to a complex regulatory environment. Streamlining regulations, permits, and licensing processes is necessary for facilitating seamless cooperation. Presently, Nepal has been allowed to sell 452.6 MW of electricity generated by 10 hydropower projects in the Indian power market. However, these ten projects require annual renewals of their permissions, with the Nepalese side requesting permits for a minimum of five years.[14]

Technical and operational challenges, including project planning, financing, and infrastructure development, require collaborative efforts and knowledge sharing. Due to their remote locations and restricted accessibility, the majority of Nepal's large hydropower projects incur higher than average development costs. The transportation of large machinery and equipment to these distant locations imposes significant expenses on contractors. Additionally, installing long transmission lines across steep terrain is necessary to transmit power to major grids, further increasing project costs.

Regulatory frameworks need harmonisation for cross-border projects to address concerns about water sharing, environmental impact assessment, and dispute resolution. The Cross-Border Electricity Trade (CBET) is a regulatory framework providing a mechanism for joint power cooperation between countries in South Asia. The India Energy Exchange (IEX), as the primary energy marketplace in India, serves as the central platform for cross-border power exchange throughout South Asia. In April 2021, the IEX started trading electricity across international borders from Nepal, making it the first nation to have access to India's "Electricity Day Ahead" market platform.[15] Currently, India and Nepal have around 20 transmission interconnections,

with the majority serving regional energy exchange purposes.[16] Two significant cross-border transmission lines facilitate significant power exchanges: one from Raxaul, India, to Parwanipur, Nepal, and another from Kataiya, India, to Kusaha, Nepal. Utilising the IEX also simplifies power trading with Bangladesh and Bhutan. Until October 2022, Bangladesh imported about 1160 MW of power units from India via the IEX.[17]

Officials from Nepal and India, along with private sector stakeholders, consider the Nepal-India Joint Vision Statement on Power Sector Cooperation a turning point in energy cooperation, opening the world market to Nepal's potential to supply surplus electricity. Released in April 2022, the joint vision statement aims to enhance mutually advantageous bilateral collaboration in the power industry through cooperative development of power projects in Nepal.[18]

Regulatory agreements addressing power trade between India and Nepal, along with a South Asian power trade agreement extended to Bangladesh, will enable Bangladesh to purchase hydroelectricity from Nepal through India's grid, reshaping the region's energy landscape. According to representatives from Bangladesh's Ministry of Power, Energy, and Mineral Resources, the proposed three-way agreement is anticipated to be signed within the next month after authorities from Bangladesh, whereas Nepal recently finalised an agreement with the Indian side on the use of a high-voltage transmission line.[19] Ensuring coherence between national policies, energy plans, and environmental regulations is crucial. Coordinated policy efforts like the one between India, Nepal, and Bangladesh can promote hydropower synergy and address concerns related to social and environmental impacts.

In addition to regulatory and policy challenges, technical and operational hurdles limit cooperation on transboundary water resources. The Himalayan region's geological complexities require innovative engineering solutions, comprehensive geotechnical assessments, and risk mitigation strategies. Developing hydropower infrastructure involves constructing dams, transmission lines, and reservoirs, which involves overcoming logistical challenges such as transporting equipment to remote areas. Efficient integration of hydropower into the national grid is essential for a stable power supply. An important aspect is managing the variability of hydropower generation, which depends on factors such as rainfall and river flow. Advanced technologies such as smart grids and energy storage systems play a critical role in balancing supply and demand. For example, excess hydropower generated during periods of high-water flow can be stored or diverted to meet demand during periods of low-water flow. Additionally, the grid infrastructure must be able to handle fluctuations in hydropower production to ensure reliable and consistent power supply to consumers. Addressing issues such as grid infrastructure upgrades, load balancing, and grid stability will optimise the benefits of hydropower and ensure reliable electricity supply.

The hydropower sector faces significant financing and investment challenges. Hydropower projects are capital-intensive, requiring substantial investment for construction, equipment, and infrastructure development. Attracting private sector investment through public-private partnerships, international collaborations, and innovative financing models can bridge the funding gap. Kabeli A hydropower project of Nepal, Tangir Hydro Power project of Pakistan, Rampur Hydropower project of India are few examples of public private partnerships for

hydropower projects. Moreover, engaging multilateral institutions like the World Bank, Asian Development Bank, and International Finance Corporation can provide financial support and technical expertise for large infrastructure projects. For instance, the Dagachhu Hydropower Project in Bhutan is funded by ADB and supported by India.[20]

Furthermore, strengthening partnerships with these institutions will unlock investment opportunities and facilitate project implementation. Exploiting the potential for carbon credits and clean development mechanisms under international agreements can create financial incentives for hydropower development. However, the development of hydropower projects necessitates comprehensive environmental impact assessments, ensuring the preservation and conservation of fragile ecosystems and biodiversity in the Himalayan region.

In hydroelectric projects between India and Nepal, potential environmental challenges arise due to the alteration of river ecosystems and landscapes. Large-scale dam construction can lead to habitat disruption, affecting aquatic life and local biodiversity. Reservoir creation may also necessitate the displacement of communities, causing social and environmental impacts. Undertaking projects responsibly requires rigorous feasibility studies to assess environmental and social impacts. Environmental clearances are essential to ensure compliance with regulations and mitigate adverse effects. Additionally, compensation mechanisms for displaced communities should involve fair rehabilitation, addressing social and economic needs. Balancing energy needs with environmental and social considerations is complex, highlighting the importance of thorough planning, international cooperation, and adherence to sustainable practices in transboundary hydroelectric projects.

By addressing regulatory and policy frameworks, overcoming technical and operational challenges, and leveraging financing and investment opportunities, India and Nepal can enhance hydropower synergy. Proactive measures, strategic partnerships, and efficient resource management will unlock the immense potential of hydropower for India and Nepal.

India-China Strategic Competition and Regional Security

In the realm of India-China strategic rivalry in South Asia, the dynamics of competition for hydropower projects in Nepal can offer insights into how great power politics in the Himalayas influence hydropower cooperation. This competition illuminates how both countries aim to extend their influence and secure strategic advantages through infrastructure development in neighbouring states.

The strategic competition between India and China in South Asia, particularly in the Indian Ocean, is a pivotal element in recent bilateral relations with Nepal. This competition involves intentions, capabilities, and the policy courses each country deems desirable in dealing with the other.[21]

Recently, hydropower projects in Nepal have become a contested domain between India and China. The 750-megawatt West Seti Hydroelectric Project in western Nepal exemplifies how geopolitics influences engagements. Initially, a Memorandum of Understanding was signed with the China Three Gorges Corporation in 2012, estimating the project's cost at USD 1.2 billion. A USD $1 billion joint venture deal was struck in 2017, but in 2018, the Chinese

corporation withdrew due to lower-than-anticipated profits and challenges with development in certain regions. Subsequently, the West Seti project was handed over to India's state-owned National Hydro Power Company (NHPC).[22]

"India is investing billions in infrastructure, including hydropower plants, as New Delhi seeks to expand its influence in its neighbourhood, where China is also increasingly active".[23] Often termed a "handshake across the Himalayas," China's outreach in the region involves 'comprehensive' security agreements, infrastructure-oriented aid, heightened focus on trade, public-private partnerships, and more recently, increased economic and security cooperation during the COVID-19 pandemic.[24]

This India-China strategic competition has significant implications for regional security in the Himalayan region. The strategic importance of water for sustaining agriculture, energy production, and human consumption in densely populated regions of India and China sparks competition for this resource. Disputes over Transboundary Rivers, originating in Tibet and flowing through India, have intensified, raising concerns about potential conflicts for resources. Increased infrastructure development, including dams and hydropower projects, by both countries exacerbates competition and amplifies security dilemmas. Disruptions in the natural flow of rivers and the diversion of water can adversely affect downstream regions, leading to conflicts and exacerbating existing geopolitical rivalries.

For instance, along with the Sutlej, Brahmaputra, and Indus, India and China share a number of transboundary rivers. The potential for Beijing to exploit waterways, without concern for the adverse impacts on lower riparian states, adds complexity to the situation. As the international community remains focused on China's belligerent activities in the South China Sea, Beijing has made swift progress in its dam construction activities along shared cross-border rivers in South and South-East Asia. This has stoked concerns about Beijing's ability to control and alter the water flow in downstream India.[25]

The strategic competition is also intertwined with broader security implications, intersecting with regional issues like territorial disputes and power projection. The competition for water resources between India and China adds a layer of complexity to an already sensitive geopolitical environment. It is imperative for both nations to engage in dialogue, establish effective communication channels, and seek cooperative mechanisms to address shared water challenges. Sustainable water management, joint monitoring systems, and confidence-building measures can foster regional stability and mitigate the security risks arising from this competition.

Strategies for Expanding Hydropower Synergy

The expansion of hydropower synergy between India and Nepal requires the implementation of approaches that foster collaboration and maximise benefits for both nations. Central to establishing a robust and enduring partnership is the strengthening of bilateral agreements and frameworks. Enhancing the legal and institutional frameworks governing hydropower cooperation is crucial. This ensures transparency, streamlines decision-making processes, and addresses issues of water sharing, project implementation, and dispute resolution.

In the context of the India-Nepal partnership, the Joint Commission between the two nations, founded in 1987, plays a pivotal role. Its aim is to foster cooperation and mutual understanding in various fields, including trade, industry, transit, economy, and the diverse uses of water resources. Notably, India's External Affairs Minister, S Jaishankar, visited Kathmandu in the first week of January 2024 for the seventh meeting of the Nepal-India joint commission.[26] High-level exchanges like these provide opportunities for exploring new avenues for partnership.

During S. Jaishankar's visit, the two sides inked four agreements, one of which was a long-term electricity trade pact between the two countries. An agreement to export 10,000 MW of electricity over the next ten years, which builds on the positive momentum of Nepalese Prime Minister Prachanda's visit to New Delhi in May 2023, was sealed.

Other Agreements include "a Memorandum of Understanding (MoU) between India's National Thermal Power Corporation (NTPC) Limited and Nepal Electricity Authority", which will focus cooperation on renewable energy development.[27] The external affairs minister also inaugurated cross-border transmission lines (Raxaul-Parwanipur line, Kataiya-Kusaha line and New Nautanwa-Mainhiya line).

High-level exchanges like these provide opportunities for exploring new avenues for partnership. Moreover, enhancing technical cooperation and knowledge exchange is instrumental in sharing expertise, best practices, and technological advancements in the hydropower sector. For instance, joint expert teams have been formed for projects such as Pancheshwar Multipurpose project, Karnali Chisapni, and other projects. International collaboration, as facilitated by the Asian Development Bank (ADB) and the World Bank, strengthens Nepal's hydropower sector and prospects for cooperation with India. Their collaboration focuses on projects like Upper Arun and Dudh Koshi, fostering capacity building, innovation, and efficiency gains.[28] Such international collaboration facilitates capacity building, innovation, and efficiency, leading to sustainable and cost-effective hydropower projects.

Encouraging private sector participation and investment is also vital for leveraging financial resources, expertise, and entrepreneurial drive necessary for successful project development. "The government's offer to the private sector to construct new projects under a public-private partnership (PPP) model has been impactful. This, coupled with a guaranteed 10 percent project share for the affected public, has seen successful projects like Chilime Hydropower in 2003 and is the same model identified in five more power projects, totalling 570 MW".[29] The successful implementation of these strategies will facilitate the expansion of hydropower synergy between India and Nepal, leading to enhanced energy security, regional integration, and sustainable development.

Conclusion

The present moment is opportune for India and Nepal to forge a robust and mutually beneficial partnership in the hydropower sector. Both countries have recognised the strategic significance

of harnessing hydropower resources in the Himalayan region, aiming to address energy demands while promoting economic growth.

The conducive political climate further enhances the prospects of cooperation. The willingness on both sides to leverage their strengths is evident in the reference to a "handshake across the Himalayas," signalling diplomatic openness and a shared vision for regional integration, sustainable energy supply, and shared prosperity. Environmental sustainability is a key aspect, aligning with contemporary global concerns and making the collaboration not only economically beneficial but also environmentally responsible.

In summary, the convergence of economic, strategic, and environmental interests creates a favourable environment for cooperation in the hydropower sector. By capitalising on their strengths, India and Nepal can establish a transformative partnership, unlocking the immense hydropower potential of the Himalayan region. This collaboration addresses India's energy demands, contributes to Nepal's economic growth, and fosters environmental sustainability, regional integration, sustainable energy supply, and shared prosperity. The bid to expand hydropower synergy amid the "handshake across the Himalayas" beckons, offering a compelling path towards a brighter future for both nations and the entire South Asia.

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5. Prospects for Formalising Water Cooperation Between India and Bhutan

Nandita Khadgi

The growth of population and changes in the world economy have made water sharing between nations critically important. South Asia has become the most water stressed region in the world, facing the immediate and pressing challenge of climate change.[1] The World Bank states that South Asia will face extreme shortages of water resources by 2025, which could lead to climate migration and possible conflicts over transboundary water resources. The international collaboration over the 1960 Indus Water Treaty between India and Pakistan and the 1996 water sharing agreement between India and Bangladesh did ease tensions over the water resources. However, initiatives by upper riparian states in South Asia to divert the major rivers have raised the question of potential conflicts in the region.

In spite of the challenges faced by India and its South Asian neighbours, contention over transboundary waters especially between Bhutan and India are comparatively less.[2] Hydropower cooperation has always enhanced bilateral relations between these two countries beginning with the 1961 Jaldhaka Project, where the major part of electricity was exported to southern Bhutan.[3] However, all transboundary water resource projects have been undertaken only through a people-to-people network.[4]

India and Bhutan share a long-standing and special relationship characterised by close historical, cultural, economic and political ties. Bilateral relations are guided by the Treaty of Friendship signed in 1949, which was revised in 2007 to further enhance cooperation.[5] This treaty concentrated on the extension of economic cooperation through the areas of education, science and technology as well as culture. Hydropower cooperation governed by the Treaty of Friendship outlines the principles of mutual benefit as well as utilisation and management of rivers that flow through both nations. The major rivers shared by India and Bhutan are the Brahmaputra and its tributaries, such as the Sankosh, Manas, and Raidak.[6]

The bilateral relationship between Bhutan and India has deepened in the hydropower domain after the Jaldhaka Project to include the Chukha Hydroelectric Project, Kurichu Hydroelectric Project, Tala Hydroelectric Project, Punatsangchu Hydroelectric Project, Punatsangchu II Hydroelectric Project and Mangeduechhu Hydroelectric Project, which were developed between India and Bhutan to develop Bhutan's economy.[7] This has become part of several mutually beneficial linkages as India has been receiving clean electricity and on the other hand, is able to enhance Bhutan's export revenue.[8] Bhutan is a small nation, and its water resources have always shaped its growing economy. Of the 70,576 cubic hectometres (hm^3) of annual freshwater generated in Bhutan, only 1 percent is consumed in Bhutan itself and 99 percent drains to India.[9]

Hydro Cooperation between India and Bhutan

The bilateral relationship between Bhutan and India is based on win-win hydro cooperation. The two countries signed the 'Framework Inter- Government Agreement' for joint ventures on April 22, 2014.[10] Bhutan has an estimated hydro potentiality of 30000 MW and the bigger countries in South Asia - India, Pakistan and Bangladesh serve as large export markets for Bhutan's hydropower.[11] The huge energy demand forms the basis for cooperation and positive collaborations between two countries. As stated by India's Foreign Minister S. Jaishankar, hydropower is the most visible symbol of mutually beneficial bilateral cooperation between India and Bhutan.[12]

India and Bhutan have collaborated on several hydroelectric projects over the years (See Table 1). India has been instrumental in supporting Bhutan's efforts to harness this potential, particularly when the two countries signed an Agreement on Cooperation in the Field of Hydroelectric Power in 2006. This agreement did provide a notable framework for collaboration in other hydroelectric projects between India and Bhutan.

Table 1: Large Hydropower Projects in Bhutan[13]

Development partner	Project Name	Location	Duration	Capacity	Amount (million)
Government of India	Chukha Hydroelectric Project	Wangchu River, South-western Bhutan	1974-2002	336 MW	Rs. 2465 60 percent grant, 40 percent loan
	Tala Hydroelectric Project	Wangchu River, Western Bhutan	1997-2007	1020 MW	Rs. 41258
	Punatsangchhu-I Hydroelectric Project (implemented by Punatsangchhu Hydroelectric Project	Punatsangchhu River, Western Bhutan	2008-2017	1200 MW	Rs. 94000

	Authority)				
	Punatsangchhu-II Hydroelectric Project, (implemented by PHPA)	Punatsangchhu River	2009-2018	1020 MW	Rs. 54000
	Mangeduechhu HEP	Trongsa District	2012-2019	720MW	Rs. 38007 70 percent loan, 30 percent grant
	Kholongchhu Project	Kholongchhu River, Eastern Bhutan	2008-2025	600 MW	Rs 54.82 billion 50:50 Joint Venture

With 18 percent of the world's population and accounting for only 4 percent of global water resources, India has been one of the most water stressed regions in the world, facing frequent floods and droughts across the country.[14] As mentioned by United Nations Educational, Scientific and Cultural Organisation (UNESCO) Director-General Audrey Azoulay in a UN report, in Asia 80 percent of people are under water stress, and India alone is expected to face water scarcity affecting 1.7- 2.4 billion people in 2050.[15]

The water resources originating in Bhutan, such as rivers like the Brahmaputra's tributaries, are crucial for India's water security. They support agriculture and irrigation in India. Cooperation between India and Bhutan ensures the sustainable management of these shared water resources to address water-related issues, mitigating floods, and managing drought situations in the region. Through cooperative efforts, both countries work together to optimise water usage, improve irrigation techniques, and promote agricultural development.

On the other hand, India provides technical expertise, financial assistance, and investment for the construction of hydropower projects in Bhutan. Besides the engagement in the hydropower projects, India's contribution in the industrial as well as service sectors have assisted Bhutan which is one of the fastest growing economies in the world.[16] In return, India receives a share of the electricity generated from these projects. This cooperation has helped India meet its growing energy demands and reduce its dependence on fossil fuels, contributing to a cleaner and more sustainable energy mix.

The India-Bhutan Agreement on Cooperation in the Field of Hydroelectric Power of 2006 also outlines the framework for collaboration, investment, and power purchase agreements. It has targeted an increment of power production from 5000 MW to 10,000 MW by 2020. This agreement consisted of 12 Articles that highlight the need for energy security and contributions to economic development of both countries.[17]

Challenges and Issues

Although Bhutan's development foundation is being guided through 'The Sustainable Hydropower Development Policy 2008', it has also led to increases in debt, driven by its hydropower sector despite its abundant resources.[18] Hydropower exists as a major pillar in Bhutan's economy and encompasses 27 percent of its revenue and about 14 percent of its GDP.[19] The major concern for Bhutan is its overreliance on India for trade and economic opportunities. Over 80 percent of its total trade and export is connected with India, which is its largest trade partner. Since India is in need of water resources, its involvement in hydroelectric projects has made New Delhi a critical partner for Bhutan.

Bhutan's hydro partnership with India has generated challenges in the form of opposition and concerns about the unfairness of power tariffs for the sale of electricity to India. The issue raised over the last decade has been the financial burden that Bhutan faces due to India's shift from a 60 percent grant and 40 percent loan to a 30 percent grant and 40 percent loan model of financing.[20] With the demand of 51 percent ownership of projects and the financing terms of hydroelectric projects, questions have been raised about India's development assistance programme.[21] This demand had the effect of deteriorating the mutually beneficial cooperation over hydroelectric projects since 1947.[22] Construction of hydro power projects also suffer from delays due to financial as well as technical concerns. Some of these issues also stem from the vulnerability of Bhutan's power sector, resulting from seasonal fluctuations in water and electricity. These delays can impact the overall timeline and cost of the projects, leading to potential disputes between the two countries.[23]

Furthermore, the involvement of Indian private companies in hydro-electric projects as well as the increasing numbers of Indians from 8000 to 10,000 in Bhutan, termed as 'floating population' who cross the border every day, adding to the already residing 60,000 Indian nationals who work in construction and power sectors has fuelled the arguments of Indians taking away the employment opportunities of the indigenous communities in Bhutan.[24] This eventually led to the ban on Indian nationals from entering Bhutan, widening the split. Despite India and Bhutan enjoying the benefits of positive cooperation in many domains, conflicts have also emerged over water resources, resulting in the blockage of water in the Baksa district of Assam in June 2020.[25] The conflict over water sharing was exacerbated during the COVID-19 pandemic. Although these issues and conflicts punctuate cooperation, it cannot be denied that Bhutan has achieved significant economic development gains through joint hydropower activities and investment with India.[26]

Prospects and Opportunities

The prospects for hydroelectric cooperation between Bhutan and India remain significant. First, Bhutan's untapped hydropower potential offers an opportunity for greater investment from India due to growing demand for clean energy and hydropower. Additionally, the cooperation between the two countries extends beyond energy, with joint efforts to manage shared river basins and promote sustainable water resource management. For instance, the 'Comprehensive Scheme for Establishment of Hydro-meteorological and Flood Forecasting Network on rivers Common to India and Bhutan' maintained by Bhutan and funded by India, has enhanced the possibility of the cooperation of transboundary rivers.[27]

The scarcity of water and its impacts has affected the entire the economy, by ranging from climate issues to industrialisation as the country is experiencing rapid urbanisation.[28] However, it is worth noting that the development of hydropower projects can also raise concerns regarding environmental impact, displacement of local communities, and cultural preservation. Both countries need to ensure that the projects are carried out in a sustainable and socially responsible manner by the concerned stakeholders. The changing geopolitical dynamics and environmental factors must also be deliberated since the regulation of water use is a politically sensitive subject.

Conclusion

In the face of escalating challenges posed by population growth, climate change and global economic shifts, the imperative for water sharing among nations, especially in water-stressed South Asia has become increasingly apparent. The collaborative water management efforts between Bhutan and India stand as proof of the possibility of harmonious transboundary cooperation. Rooted in the historical agreements and sustained by mutual benefits especially through the hydropower collaboration, presenting a successful model of shared gain amidst the complex challenges and disputes will have a powerful demonstration effect.

For India, relying on the water resources of Bhutan has been significantly important in coping with water stress as well as agricultural and irrigation needs. Furthermore, these collaborative hydropower projects have not only strengthened bilateral ties but have also significantly contributed to Bhutan's economic development, while providing India with a sustainable source of clean electricity. However, challenges including shifts in financing models and concerns about power tariffs have surfaced. Looking forward, the promising outlook for future cooperation fuelled by Bhutan's untapped hydropower potential, presents opportunities for increased investment.

To ensure a sustainable trajectory, careful attention must be directed towards addressing environmental and social concerns emanating from project development. Overall, the water cooperation mechanisms between Bhutan and India serve as a model of equilibrium, striking a balance between mutual benefit and shared responsibility. Despite challenges, the positive outcomes in terms of economic development, enhanced energy security and effective water resource management provide a robust foundation for sustained collaboration. Emphasising the importance of a sustainable and inclusive approach, this partnership exemplifies the

potential for cooperative efforts to meet the pressing needs of both nations.

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PART III

NON-TRADITIONAL SECURITY AND GOVERNANCE CHALLENGES

6. Complexities of Transboundary Water Conflict in South Asia

Ambika Vishwanath and Sanya Saroha

Transboundary waters account for over 60 percent of the world's freshwater and 153 countries share at least one of the 286 transboundary rivers and lakes.[1] In South Asia[i], every single country share two or more major rivers and countless tributaries with one or more neighbours, with the obvious exception of Sri Lanka. As a region, it is one of the fastest growing in terms of population, with a vast disparity in economic growth and development across the region and within countries. There is a long history of conflict and a lack of diplomatic cohesion in the region. It is also one of the most sensitive regions when it comes to water security. It is also one of the least water secure regions of the world. There are also challenges posed by uncertainties in the climate, rapidly shifting weather patterns and a paucity of granular hydrological data. The existing treaties and agreements do not reflect the changing realities of present times and are constantly under threat due to political disagreements and regional security concerns. Although water may not be the direct cause of conflict, it often is embroiled in ongoing unrest and becomes a threat multiplier.

According to the World Water Organisation, more than 1200 conflicts are linked with water, dating back to 2500 BC.[2] The use of water as an instrument in a conflict is an old practice to consolidate a nation-state's position. Poisoning water resources, cutting off supply, using water as a bargaining tool, diverting flow, or deliberately releasing water to flood an area are all methods of water warfare and date back centuries. During the second stage of the Sino-Japanese War in 1938, Chiang Kai-shek, a Chinese nationalist who served as the leader of the Republic of China, ordered the removal of dikes of the Huayuankou (the Henan section of the Huang He (Yellow) River) to flood the area and prevent the movement of Japanese forces from overtaking the area.[3] Another example is of the former Iraqi dictator Saddam Hussein, who drained the Hammar marshes in southern Iraq to punish Shiites in the area for rebelling against his regime.[4]

Water data and water security are often seen as a national security issue in South Asia, where economies are still heavily water-dependent for economic development in sectors like agriculture, industry, energy, and sanitation, leading to further shrinking of potential cooperative spaces. Moreover, the lack of data collection and sharing also proves detrimental to creating effective mechanisms for cooperation. For instance, while most countries adhere to the World Meteorological Organisation (WMO)'s unified data policy, the focus is more on meteorological data rather than hydrological data.

As we experience extreme climate events, the demand for an overused but underappreciated resource is likely to soar, bringing forth further areas of competition yet to be examined. Growing populations and urbanisation with higher standards of living and consumption

[i] For the purpose of this articles, countries referred to are – Afghanistan, Pakistan, India, Nepal, Bhutan, China, Bangladesh

patterns, create systems that rely heavily on scarce water resources. This often forces governments and non-state actors to justify any and all means of acquiring the resource, be it by stressing the environment or enacting policy that further widens existing socio-economic gaps. The resulting conflict might then seem disconnected from water, but the intersections still exist. The degradation of the environment and destruction of resources provided by the environment can compromise security and cause conflict. This conflict in turn influences the environment, surrounding ecology, and resources by causing direct damage and disruption of productivity. Equally, poor environmental and resource practices can increase vulnerability and the risk of conflict. In South Asia, a region so closely intertwined by the environment and shared ecology, we see this occurring on a regular basis – from monsoons to earthquakes and glacial floods to rising heat and pollution.

A Difficult Neighbourhood

The South Asian region, marked by persistent border disputes and tensions among two nuclear powers, faces additional complexities driven by relations with China. These issues create a double challenge, mixing two types of risks.[5] First, there's a growing concern about security due to the complex relationships and historical grievances among the nations in the area. Second, there is an added concern with the changing climate and environment, displaying how ecological problems add to the overall risks in the region. The case of the Indus Water Treaty and Greater Brahmaputra Basin are illustrative of this complexity.

On 25 January 2023, India decided to issue a notice to Pakistan in accordance with Article XII of the treaty for modification in the 1960 Indus Water Treaty (IWT).[6] The treaty establishes the terms for the allocation of water from the Indus River and its tributaries[ii], which are crucial for agricultural and economic activities in both northern India and Pakistan. While the IWT is often hailed as a success story in the larger discourse of geopolitical conflict resolution between two countries which have a fraught relationship at best, it has remained a source of tension and its effectiveness is diminishing. Incendiary statements by representatives on both sides and threats of abrogation have become increasingly frequent. Much of this also stems from the fact that there is room for interpretation of technical details with regards to development on the rivers. Additionally, the 64-year-old treaty has little connection to the present. In light of escalating climate change impacts, a critical need emerges for the integration of climate proofing within the IWT framework. Presently, there exists a notable absence of an adaptable framework that addresses current issues of water availability and quality which has started to decline in the region. For a stronger Indus Water Treaty both countries need to change their focus from water sharing to equitable benefit sharing.

Amidst regional tensions, Pakistan consistently objects to India's construction of dams and hydropower projects. This is evident in actions like the convening of a Court of Arbitration (CoA) to address disputes concerning the Kishenganga and Ratle hydroelectric projects in Jammu and Kashmir.[7] Indian officials threatened to use water as a tool in response to the Uri attack in 2016 carried out by the Jaish-e-Mohammad, highlighting the challenges of hydro diplomacy in a politically charged environment. On Pakistan’s western front with Afghanistan,

[ii] Indus, Jhelum, Chenab, Ravi, Beas and Sutlej

there are uncertainties over the shared Kabul River Basin, one of the most populated basins in Afghanistan. Pakistan has been trying to reach a deal with Afghanistan over the Kabul River for decades.[8] However, the likelihood of the two countries signing a deal to regulate water use and distribution is low. Afghanistan is upstream from several major river basins in the region, and all its neighbours, including Pakistan, are dependent on the country. Afghanistan's waters are badly managed, with little hydro-diplomacy to support the management of resources with any of its neighbours.[iii]

Furthermore, Afghanistan's internal political challenges have resulted in the suspension of critical water projects, such as the Pashdan Dam, a hydroelectric facility situated in the Karokh district, where only 85 percent of the construction has been completed.[9] While the current Taliban government has proposed to resume+ work on the facility, there is a budget issue.[10] The country continues to suffer from ineffective water utilisation, contributing to low economic growth. This not only impacts the country's overall development but also hinders the prospects of fostering regional cooperation. While Pakistan might hope for increased cooperation with the current Taliban government, there is little guarantee that existing flashes of conflict over water will abate.

In eastern part of South Asia, the Ganga-Brahmaputra/Yarlung Tsangpo-Meghna Basin, shared by five countries, in one of the least integrated regions globally.[11] The Brahmaputra River often serves as a geopolitical tool for both India and China, influencing the dynamics in South Asia. This impact is felt by all countries in the region, including Bangladesh, Nepal, and Bhutan, as they experience negative consequences of unilateral actions. The construction of dams and other infrastructure by all, sometimes aimed at controlling the river flow, has led to conflict of interest and power struggles. China has been constructing a 60,000-megawatt project on the Yarlung Tsangpo, close to India's borders in the northeast.[12] In response, India initiated a significant hydroelectric project, to generate 11,000 megawatts,[13] in Upper Subansiri, Arunachal Pradesh. This competition exacerbates existing bilateral tensions and triggers a race to build dams, resulting in detrimental consequences for the delicate ecology and human security of the region.[14] It is also worth noting that a significant number of streams and rivers traverse national boundaries, interacting with political and sectoral divisions and exacerbating complexities.

In 2017, during the 73-day Doklam stand-off, China stopped sharing Brahmaputra water flow data with India.[15] Both countries have a Memorandum of Understanding (MoU) under which China shares water flow data from May 15 to October 15 every year with India. While China stated that the two events were unconnected, better cooperation and open channels of communication could ensure that water and subsequently lives and livelihoods do not get entangled in larger geopolitical events, borrowing from the cooperation on joint research over glaciers for example. There is a need to look beyond the existing challenges and border issues for establishing an institutional mechanism that ensures transparency and accountability in the sharing of the Brahmaputra River, safeguarded from political posturing.

[iii] While Afghanistan has had a history of small cooperation mechanisms and MoUs with Central Asian neighbours and one treaty with Iran, since 2022. The future of these discussions is unclear.

The profound ramifications of China and India's ambitious dam construction initiatives on downstream riparian states have significant implications for the neighbourhood. While India has agreements with Bangladesh and Nepal, basin-wide cooperation that fundamentally examines the rivers beyond political boundaries remains elusive. Though data sharing between India and China resumed in 2018 and the decision was made to continue cooperation on hydrological information, water resources are a controversial issue between India and China. Therefore, sharing of information and data over shared water is a new tool complicating diplomatic engagements and dialogues regarding transboundary water conflict.

Future Climate Shocks

Climate change remains a major factor contributing to water conflict between neighbouring countries in the form of floods, uncertain rainfall, longer periods of drought and heat amongst other weather uncertainties. They heighten the stress among communities and countries, making water, a trigger and a cause in regional conflict. The displacement of vulnerable groups, like ethnic Pashtuns escaping floods in northern Pakistan, Muslims leaving drought-affected rural areas in India, and Rohingya refugees fleeing flooded cities in Bangladesh, could escalate communal tensions and violence in the communities they relocate to. The historical resentment from the local population towards previous waves of migrants adds a layer of complexity to the situation, emphasising climate-induced conflict.

Historically, the four months of the monsoon are responsible for 80 percent of the annual rainfall in South Asia. But due to climate change, the water cycle has shifted, resulting in both intense downpours and extended drought. In 2022, some parts of Pakistan received 400–500 percent more precipitation than usual.[16] This led to devastating floods with a loss of life in thousands and billions of dollars in damage (approximately USD 14-15 billion). The rising temperatures, and erratic rainfall patterns are all impacting the Indus River, a primary source of food security in Pakistan. These environmental changes are increasingly affecting agricultural practices, food production, and overall livelihoods. Presently, 39 percent of the population grapples with multidimensional poverty,[17] further intensifying the loss of livelihoods and potentially increasing instances of violence.

In many parts of South Asia, agriculture relies on the extraction of groundwater, accounting for up to 90 percent of usage.[18] The over-extraction of groundwater is a significant issue, especially in Bangladesh, India, Nepal, and Pakistan, where an estimated 23 million pumps are in use.[19] Groundwater utilisation is inherently more resilient to an erratic climate and despite the absence of substantial recharge demand will grow. While energy requirements and food security continue to challenge the growth of riparian states, changing monsoon patterns increase the potential for conflicts over scarce resources – land, water or energy.

Simultaneously, the ongoing global phenomena of ocean warming and ice cap melt contribute to the escalation of sea levels on the one hand and unpredictable avalanches and damage to the Himalayan ecosystem on the other. Sea level rise, compounded by the intensification of cyclones and storms, poses a heightened risk to coastal aquifers. Notably, Bangladesh and Pakistan are particularly susceptible to the repercussions of rising sea levels, with coastal areas in India and Sri Lanka also poised to encounter significant impacts.[20] The melting ice caps and

rising heat will have ramifications that are still not yet completely understood, both to the mountain communities of India, Nepal, Tibet and Bhutan but also to the dependant riverine communities in the plains of India, China and Bangladesh.

Conclusion

The projected global fresh water demand is anticipated to exceed supply by approximately 40 percent to 50 percent by the year 2030.[21] It is imperative to recognise that climate change's most conspicuous impact manifests through alterations in water dynamics, affecting all countries. As these communities reliant on transboundary rivers grapple with various crises, fostering cooperation becomes paramount. Addressing longstanding issues, renegotiating water treaties, and adapting to evolving climate patterns are essential steps towards a sustainable and secure water future for the entire region. While basin wide lasting cooperation will be difficult, the process matters and dialogue on smaller issues matter as well. A paradigm shift from the traditional concept of river control towards holistic river management is imperative. The shared waters of the river basins in South Asia demand a collaborative and forward-thinking approach from upper riparian nations like India and China. Achieving more efficient and transparent risk-informed water governance across South Asia is essential.

Using existing mechanisms could be the way forward in building trust and subsequently expanding them to include other areas and countries. The data sharing MoU between India and China, the joint research on glacial changes or existing agreements on smaller rivers are potential entry points to begin cooperation in other areas. Creating more robust economic integration in the region to boost food and energy production through shared development of flood plains are ways to maximise output and generate faster growth. With the proliferation of urban centres within the river basins across the region and the heightened vulnerability to climate induced disruptions, a fundamental shift in financial and future development strategies is necessary. India has a number of domestic strategies that promote resilience, comprehensive urban growth and water security that can be adapted to the regional context. The targeted "Catch the Rain: Where it Falls and When it Falls" campaign, aims to involve the community and address multiple issues of groundwater depletion, scarcity and drought. It involves collecting, storing, conveying, and purifying rainwater from rooftops, parks, roads, and open grounds.[22] Not only does it place a certain onus on the community, involving everyone, it ensures that there is collective responsibility that is easy to scale. Even if one ignores the need to safeguard a resource that seems unlimited or the calls for more cooperation that seem highly unrealistic and optimistic, cooperation makes good economic sense for countries that have high growth ambitions.

While large-scale conflict over transboundary waters is less likely and often easier to predict and thus prevent, water often becomes a threat multiplier or a casualty in political posturing. While no major war in South Asia has been fought over water, the same can no longer be held for the future. In any case, the local populations are the hardest hit, which leads to a cycle of discontent, migration, and potentially further conflict. Along with climate change, technology and energy security are also beginning to play an important role in this dynamic, forcing societies to change how they examine their relationship between water and security. We can let our politics influence our shared waters until one day there is little left to share, or we can

let the water serve as a catalyst for cooperative efforts to foster sustainable development and, potentially, peace.

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7. China's Governance of the Mekong River in Yunnan: Challenges for South-East Asia

Dechen Palmo

Transboundary waters are water resources shared by two or more countries. According to the United Nation Economic Commission for Europe (UNECE), approximately 40 percent of the world's population live in transboundary river and lake basins, which accounts for 60 percent of the world's freshwater flows.[1] There are over 286 transboundary rivers and lakes basins and 592 transboundary aquifer system that flow through 153 countries.[2] These water resources are at the centre of economic and social development of all countries. There are 2.3 billion people that live in water-stressed countries of which 733 million live in high and critically water-stressed countries.

There are many scholars who argue that water crisis in the 21st century in many ways is a crisis of governance.[3] This means that the water crisis is because of mismanagement of water resources and its unequal distribution. Rogers and Hall define water governance as the range of political, social, economic and administrative systems established for the development and management of water resources and water services at all scales.[4] It is about who gets what, when and how much water, and who has the right to use its related services and their benefits. Good water governance is key to achieving water security and avoiding disputes.

According to Intergovernmental Panel on Climate Change (IPCC), the Mekong River is one of the three most vulnerable deltas in the world.[5] Despite its social and economic importance, the river is under threat from the mismanagement of the water resources.

Due to its transboundary nature and lack of trust between the riparian countries in South-East Asia, it has become a challenge to govern the Mekong. China being an upper riparian state, how it governs its water resources has a profound impact on people's livelihood and sustainability of water resources downstream.

The objective of this paper is to examine China's governance of the Mekong River in Yunnan province and identify the major challenges facing management of transboundary water resources in South-East Asia. The paper first briefly details China's water crisis and its water governance mechanisms. The paper evaluates China's policies under Xi Jinping to govern its water resources, and its implementation in the context of the Mekong River in Yunnan. Finally, the paper explores the major challenges facing the Mekong River and its implications for South-East Asia.

Water Governance and Water Crisis in China

China is central to water security in Asia. Since most major transboundary rivers in Asia have their source in Chinese territory, many of China's neighbours are, to varying degrees, dependent on China for water. Most of these countries have struggled with a steep decline in water availability.[6] China has been largely reluctant to negotiate comprehensive water sharing treaties and has instead initiated unilateral projects to dam and reroute some of Asia's rivers.

Historically, China has been a water scarce country with uneven distribution of water resources. The regional disparity in water resources is stark. Four-fifths of water resources are located in the south. The north is home to about half of the total population and is also the centre of economic and agricultural activity, but contains only 20 percent of China's water resources. China also suffers from over extraction of groundwater. Most of the ground water resources in urban areas of China are severely polluted which further exacerbates water scarcity. According to the Chinese government, nearly 60 percent of its groundwater is polluted.[7] Reports from China's Ministry of Environmental Protection (now Ministry of Ecology and Environment) have indicated that less than half of China's water can be treated to the point where it is safe for drinking and a quarter of surface water is so polluted that they are unfit even for industrial use.[8]

This is exacerbated by the fact that the agricultural sector, which uses 70 percent of China's water, and the coal industry, which utilises 20 percent of the water resources, are both largely concentrated in the extremely water stressed northern China.[9] While residents of the sparsely populated south have access to 25,000 cubic metres of freshwater per person annually, residents of the populous north, which includes China's biggest and fastest growing urban areas such as Beijing and Tianjin, have less than 500 km^3 (cubic metres) per person annually.[10] The increasing water scarcity in northern China has compelled the Chinese government to act.

Due to China's large population and the rising standard of living, the demand for water is also increasing. Although China is the sixth most water abundant country in the world, in terms of water resources availability, with 2,812.4 km^3, its per capita water supply is only 28 percent of the world average, which is precariously below international standards for human sustainability.[11]

In 1998, the then Chinese deputy prime minister, Wen Jiabao stated that the very "survival of the Chinese nation" was threatened by looming water shortages.[12] Securing control over water resources has been fundamental to China's national interest. In the recent years, the Chinese government has made significant efforts to address water scarcity through improved water resource management. Since the ascension of Xi Jinping as General Secretary of the Communist Party of China (CPC) and Chairman of the Central Military Commission (CMC) in 2012, there are striking changes in the system of management of the water resources within China. China’s decision-making system has become more centralised and Xi has emphasised coordinated regional development.[13] Wang Zhou and Wen-Hsuan Tsai in their paper argue that Xi has weakened the power of local governments at the provincial level and below through intergroup politics and manipulation of the riverine macro regions.[14] Scholars like Kazuko Kojima and others have written widely on the centralisation of power, where all the policies implemented at the local level must be in line with those of party centre.

China's 12th Five Year Plan recognised that China's water crisis could be a bottleneck for its economic development. The central government published a number of policy documents aimed at improving water provision and conservation in China. As a result, since the 18th National Congress of the CPC in 2012, 150 major water conservancy projects have been completed. Over the past decade, China's investment in water conservancy projects reached 6.6 trillion Yuan, up five times that of the previous decade.[15]

Water Management Policy Since 2011

On January 29, 2011, the Central Committee of the CPC published "The No. 1 Central Document" (yi hao wenjian 一号文件) for accelerating development of water conservancy as its theme.[16] The document sets targets for improving the country's underdeveloped water conservancy works over the following 5 to 10 years. It said the government would double average annual investment in water conservancy over the subsequent 10 years. In 2012, the central government issued a call to implement the most stringent water resource management system generally known as the "Three Red Lines". This policy sets specific targets for 2015, 2020 and 2030 on total water use, water use efficiency, and water quality.[17]

People have long used the phrase "nine dragons rule the waters" to describe the fragmented roles and responsibilities of different government department for managing the rivers in China. Ma Jun, a prominent environmentalist and director of the Institute for Public and Environment Affairs (IPE), observed that "groundwater, agricultural effluents and river basin management each fall under a different government department, leading to buck-passing and infights".[18]

These overlapping functions of different ministries have become an obstacle to integrated water resources management. To cope with the challenges and strengthen the comprehensive management of river basins, China established a River Chief system (RCS) in 2016.[19] RCS is a river and lake management system in which the overall responsibility for the management of rivers and lakes is given to local leaders.

River Chiefs are key leaders of the CPC and governmental officials at provincial, municipal, county and town levels, who are responsible for combating river pollution and managing rivers within their jurisdiction. According to Professor Jia Shaofeng and his colleague, this is the single most important water governance reform initiated in China.[20] In this system, high ranking party cadres in large administrative units covering inter-jurisdictional river basins now receive targets for water quality.

Under the 'one river, one leader' system, formalised in a 2009 Ministry of Environment Program (MEP) document, higher-ranked officials at the provincial or municipal level are designated as 'river chief' and tasked with managing lower–level officials who oversee tributaries that flow into the river basin.[21] With the restructuring of central ministries in 2018, Ministry of Environmental Protection (MEP) was dismantled and replaced by a much larger and powerful Ministry of Ecology and Environment (MEE). By shifting accountability from governments to party organisations, party leaders increasingly play important roles in environmental management.

China released its first 14th Five Year Plan (2021-2025) for Water security[22] in January 2022 and the overall aim was to strengthen China's national water security by 2025. During this period, China aims to implement a national water-saving initiative and advance the construction of major water projects. As China Water Risk notes, it is an umbrella plan for all previous significant water policies and actions.[23]

China's water policies have relied heavily on the construction of massive water conservancy projects.[24] Chinese hydraulic engineers have conventionally resorted to physical infrastructure

like hydropower dams, water transfer projects, wastewater treatment plants, long-range sewers, embankments, and agricultural reservoirs. According to the Ministry of Water Resources, in 2022, China's investment in water related infrastructure has reached 238.8 billion Yuan (34.3 billion USD), a record high.[25]

The Chinese government also sees hydropower development as an integral component of China's shift away from coal towards cleaner energy sources.[26] China is now seen as a global leader in renewable energy after becoming the largest wind, solar and hydropower producer since 2010.

Water Governance in Yunnan

The province of Yunnan lies on the southeastern edge of the Tibetan plateau. It has an area of 394,000 square kilometres, accounting for 4.1 percent of China's total land area and shares a borer of 4,060 km with Myanmar to the west, Laos to the south and Vietnam to the southeast.

Yunnan is rich in water resources. In 2014, the total amount of water resources in the province was 172.7 billion cubic metres, ranking third in China. There are more than 900 rivers and 40 natural lakes, each of whose catchment area is over 100 square kilometres.[27]

With its rich water resources, Yunnan has one of the highest hydropower potentials within China. As of 2022, Yunnan had 81.12 GW of installed hydropower capacity second to Sichuan's 97.49 GW.[28]

In spite of Yunnan's water resources, the region has suffered from severe water shortages causing shortage of drinking water for millions of people. Yunnan is also vulnerable to both drought and flood due to its distinctive topography and local climate.

During the drought in Yunnan, which coincided with China's annual parliamentary session in March 2013, the then Deputy Party Secretary, Qiu He, blamed the drought on underdevelopment of infrastructure and called for massive investment in reservoir, dams and water diversion projects.[29]

There are a number of infrastructure projects to reduce the impact of droughts. Under the "No. 1 document", the central government has spent huge sums of finance on water resource infrastructure in Yunnan. Within nine months of the "No. 1 document" being published, the province obtained 824 million Yuan in water infrastructure grants, a 45 percent increase from 2010.[30] The Chinese government promised to develop more effective flood control and drought relief systems by the end of 2020.[31]

For the Yunnan provincial government, hydropower provides much needed revenue and increased electricity to support a growing regional economy. The provincial government has built nearly fifty large hydropower stations throughout Yunnan.[32]

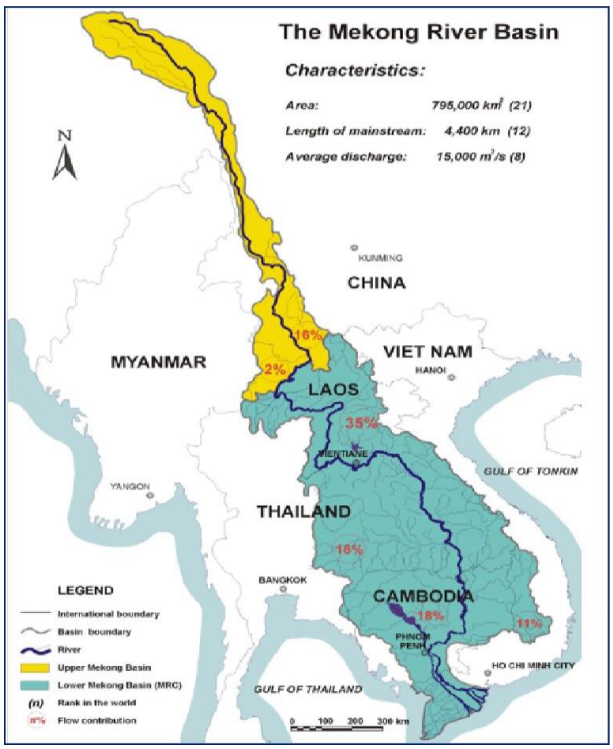
In spring and early summer of 2019, Yunnan experienced the most severe seasonal drought on record.[33] It resulted in a decrease in agricultural production, impacting the lives of the people in Yunnan. This suggests that the infrastructure development projects alone may not necessarily solve problems of water scarcity and there is a need for proper water governance to balance water supply and demand.

Due to a series of tax reforms in China, the financial income of local governments at the township level have been dwindling over the past decades. This led to further dependence of local governments on the central government for funds. Therefore, to generate more income, local governments have been quick to undertake water resources development, investing in water infrastructure as one of the main sources of income for the province.

Yunnan is home to many transboundary rivers and Mekong is one such river that flows through Yunnan (See Figure 2). The Mekong River begins at 5160 metres above sea level in Tibet where it is known as Zachu and flows from Tibet to China, Myanmar, Thailand, Lao PDR, Cambodia and Vietnam. It is the world's twelfth longest river and the third longest in Asia covering a distance of nearly 5000 km from its source on the Tibetan plateau to South China Sea. It is a lifeline for around 300 million people.[34]

The Mekong basin is home to one of the richest areas of biodiversity in the world, with more than 20,000 plant species and 850 fish species discovered to date. It is second only to the Amazon River in terms of fish biodiversity. The river produces 4.5 million tons (9.9 billion pounds) of fish every year, contributing about 80 percent of the protein consumed by the region's households.[35] The river is also critical for growing rice, which provides more than half of the daily caloric intake in countries across the region and provides livelihood to tens of millions of people.

Figure 2: Map of Mekong River[36]



Every level of the Chinese government has an interest in water governance along the Mekong River. The central government sets broad goals and guidelines for all provincial governments to follow. Economic growth is the single-most important priority of the Chinese government and fulfilling China's energy needs is essential to attain economic goals. There is a hierarchical control on water infrastructure development and resource governance in Yunnan.

Dam construction is dominated by Chinese State-Owned Enterprises (SOE's). Xi Jinping has stressed their national importance and given clear indications that they will continue to drive China's economy. The institutions responsible for management of the Mekong River are fragmented horizontally across multiple ministries and vertically from provincial level down to the village level. The overlapping responsibilities and goals of these institutions are the primary obstacles to successful cooperation with downstream countries.

The Ministry of Water Resources (MWR) is the most powerful national level body directly related to water management issues. The ministry leads the design and implementation of the state council's water plans, manages hydropower projects, and monitors water quantity and use efficiency.

Although River Basin Management Commissions (RBMC) were developed to manage the cross-boundary rivers, they have thus far lacked the power to enforce regulations on local governments. The challenge of coordinating policy action between these various bodies makes it difficult for water governance at the regional level.

China has always claimed it has taken a responsible attitude towards the development and utilisation of cross-border rivers, and adopted a policy of protection that goes together with development. However, there are many short comings within the current water management system. China has used upstream dams as leverage against downstream countries. Even though evidence, such as that provided by the Mekong Dam Monitor, shows that Chinese dams are damaging the environment around the Mekong, China is resistant to alter its course. China has largely refused to share valuable data to downstream countries about potential changes in the flow of the river.

In addition, there is no room for local people affected by the water infrastructure to participate at any level of the decision-making process. Current institutional arrangements for water resource management are not well adapted to emerging situations in the region and do not meet all of society's needs.

Major Challenges Facing the Mekong River and South-East Asia

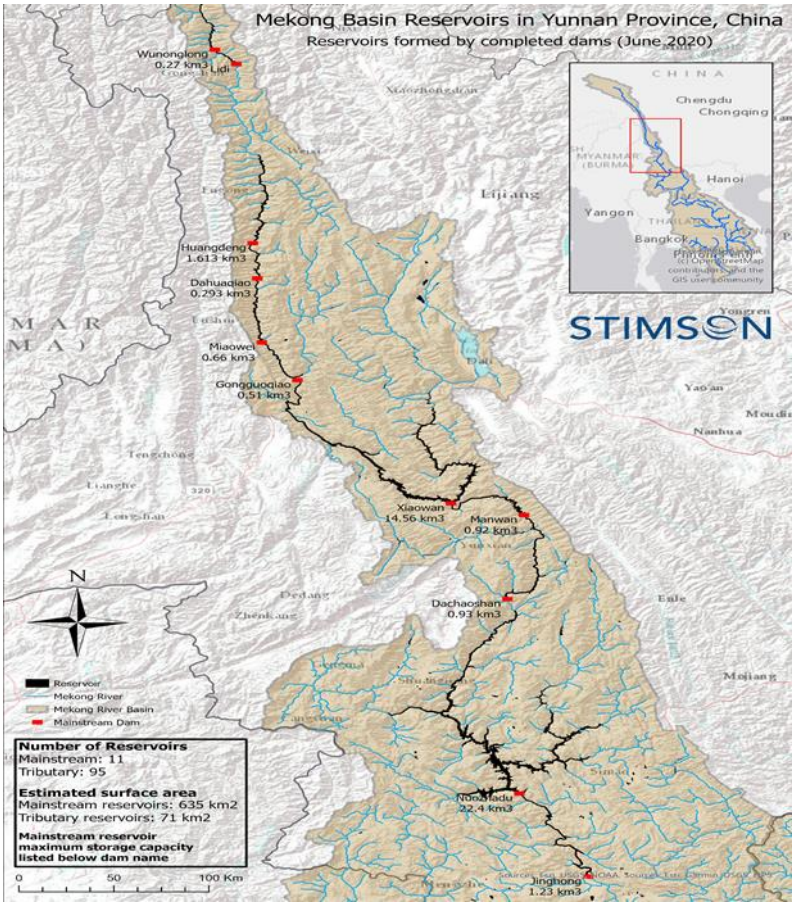
Millions of people who rely on the Mekong River's natural resources will see their water supplies shrink as temperatures rise and precipitation patterns shift. In the Mekong River basin, the impact of this is affecting the livelihoods of communities who depend on the river. Over the last few years due to climate change, mainland South East Asia has faced a severe drought and dramatically reduced water levels on the Mekong River.[37] The Mekong River Commission has found that "hydrological regime" of the Mekong River has changed significantly with more water flowing in the dry season month and less in the wet season due to increased storage.[38]

Human activity has irreversibly transformed the region. China has built large number of hydropower plant on the Mekong. Figure 3 shows more than 100 reservoirs in Yunnan province on China's portion of the upper Mekong tributaries and another 11 dams on the mainstream in Yunnan Province alone.[39] According to the Mekong River Commission, the value of the energy from the hydropower dams in the upper Mekong River basin is estimated as 4 billion USD per year. There are dozens more dam planned in upper Mekong region. State-owned Huaneng

Lancang River Hydropower, tasked with developing the river's resources, aims to double the network's 21.3 GW capacity by 2025, its chairman Yuan Xianghua told Reuters.[40]

These hydropower stations in China hold back water and precious sediment from the millions of people living downstream. Dams have further led to disruption of fish migration.[41] Upstream actions can have implications downstream and vice versa and the policy implemented by one country may pose direct and significant cross-border implications for countries in South-East Asia.

Figure 3: Hydropower dam on the upper Mekong River[42]



Sediment flow from the upper Mekong River has been severely depleted due to cascade of hydropower dams built by China on the upper stretch of the river. Using data derived from thousands of satellite images, EOMAP and Reuters analysed sediment levels around four major dams on the Mekong - two in China and two further downriver in Laos. The analysis showed that the presence of each dam drastically reduced the sediment that should have otherwise flowed through the river at those locations – by an average of 81 percent of sediment load flowing across the four dams.[43]

According to the MRC's development scenarios mapped out in 2018, the total weight of fish in the Lower Mekong Basin will fall by 40-80 percent by 2040, while sediment in the Mekong could be reduced by 67-97 percent.[44] The fisheries sector, the report states, is likely to decline substantially in all four lower Mekong countries.[45]

These issues are compounded by is the fact that there is not any integrated basin water organisation established to formulate and implement programs for the sustainable use and development of the river. To address these challenges and to ensure equitable and sustainable utilisation and management of transboundary water resources, there is a need for good governance and management across all levels of governing institutions and engagement of all stakeholders in riparian countries.[46]

Despite the establishment of Mekong River Commission (MRC), an inter-governmental organisation to jointly manage the shared water resource, the basin has continued to experience water conflicts and other social, economic and political challenges. Many scholars have attributed these challenges to poor governance systems in the basin. Moreover, with the absence of China and Myanmar within the grouping, the MRC has proven to be ineffective in managing the water conflict and other social, economic and political challenges in the Mekong River basin.

There are many scholars who note that the Mekong River is susceptible to both intra and inter-state conflicts arising from poor utilisation and competition for scarce water resources.[47] Okurut and Weggoro suggest that water conflicts which emanate from management challenges could be addressed by effective water governance through institutional frameworks which can ensure proper utilisation and management of resources.[48]

Table 2: China's mainstream dams on the Mekong River[49]

Dam Name	**Year of Completion**	**Installed Capacity (in megawatts)**	**Water Storage Capacity (in cubic meters)**
Manwan	1993	1750	920,000,000
Dachaoshan	2002	1250	940,000,000
Jinghong	2008	1750	249,000,000
Xiaowan	2009	4200	15,000,000,000
Gongguoqiao	2012	900	120,000,000
Nuozhadu	2012	5850	27,490,000,000
Miaowei	2017 (January)	1400	660,000,000
Huangdeng	2017 (November)	1900	1,613,000,000
Dahuaqiao	2018 (February)	900	293,000,000
Lidi	2018 (June)	420	75,000,000
Wunonglong	2018 (December)	990	284,000,000

Conclusion

The Mekong River supports some of the world's most biologically diverse habitats that sustains rich networks of life including millions of people in South-East Asia. It faces challenges from the combined onslaught of climate change, incessant damming of the river and mismanagement. Due to its transboundary nature, managing the Mekong River in an equitable and sustainable manner is challenging. The challenge is made more difficult in times of water

scarcity. Since 2019, the Mekong region has suffered from the most severe droughts on record.[50] China's excessive damming of the river, especially in Yunnan, has enabled it to assert its dominance over the flow of the river. This is becoming a concern for the lower Mekong states owing to the irreparable damage to the eco-system on which the livelihood of the region depends.

In its quest for securing its energy and water requirements, there are number of policies implemented by China without considering the ecological and environmental impact it could have on the downstream countries. Furthermore, climate change is also increasingly having an effect; visible in the dangerously low levels of the Mekong River affecting downstream countries, especially Vietnam and Cambodia.

Water quantity, quality and proper governance are fundamental requirements for water security. Water security for human populations, as well as for ecosystems and food production is at the centre of the sustainability dynamic. Poor water resource management and inappropriate institutional arrangements have undermined the effective governance of water along the Mekong. These challenges must be addressed by governance reforms. All the riparian countries in South-East Asia must collaborate to manage water collectively in a holistic way by creating institutions and platforms for multi-stakeholder and participatory governance.

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CONCLUSION

Institutionalising Cooperation: The Way Forward

Rahul Karan Reddy

Transboundary water security in South Asia is most often viewed by states as a zero-sum game, a nexus of concerns involving national security, territorial boundaries and resource scarcity. The subject of river waters and their use is a source of friction between nation-states, compounded by the fact that six of the eight countries in South Asia are dependent on three major river systems – the Indus, Ganga and Brahmaputra.[1] Given the regions water scarcity, competition for water resources is a highly political subject for most countries. As a result, cooperation between states in the region is hindered by a myriad of entanglements. As the chapters in this Special Issue have detailed, engagements between states to resolve conflict and deepen cooperation over water resources have taken different routes. However, very few efforts have produced substantial institutionalisation of cooperation or dispute resolution. Instead, cooperation has remained functional, concentrated on issues of immediate interest and is subject to political currents.

As countries largely view water resources from the narrow prism of national and resource security, institutional arrangements are few and fragmented. One telling example is India and Bangladesh, who share fifty-four rivers, and yet have only three water sharing agreements till date.[2] The same is true for India and Nepal, who have water sharing agreements for four major rivers, but do not have any institutional agreements in place for the 6,000 or so smaller rivulets that flow between them.[3] Although Nepal and India have leveraged the benefits of hydropower to drive engagement on transboundary rivers, cooperation is still characterised by dissatisfaction about the sharing of resources and benefits. It is also just limited to the hydropower sector and issues related to water sharing remain unresolved.

Broader geopolitical issues between countries have also produced trust deficits, hindering progress on institutionalisation. In this regard, China as an upper riparian has embarked on massive dam construction on major river systems originating in Tibet, sparking concerns of a potential conflict with India over water.[4] China has also demonstrated a willingness to leverage its control over rivers to disadvantage India and lower riparian states. Overall, the role of institutions and treaties in diffusing tensions and fostering cooperation has been rendered ineffective by the structure of riparian relations, existing legacy issues and domestic political factors.

The chapters in this special issue have detailed specific drivers that explain weak institutionalisation of governance and limited progress made by states in their bilateral engagements. The analysis and findings of the authors are relevant to understanding the dynamics of transboundary water sharing, governance and cooperation in South Asia.

Drivers of Limited Institutionalisation in South Asia

Institutionalised cooperation and engagement on transboundary river waters in South Asia is largely limited by the structure of relations between states as upper and lower riparian states. Upper riparian states by default have the upper hand, since they can dam and divert the course

of rivers without any intimation or consultation with downstream riparian states. The inherent asymmetry in power and control over water resources fosters threat perceptions between states, of each other as rivals or competitors for a scarce resource.[5] These structural dynamics are compounded by existing geopolitical issues like boundary disputes, historical grievances and other political issues like terrorism, migration and trade. Legacy issues like the India-Pakistan partition, Bangladesh War, Nepal Earthquake of 2015 and India-China war of 1962 continue to influence bilateral relations for many countries in South Asia. Together, these drivers interact to override considerations of cooperation

The most prominent example of how the structure of relations between states inhibit cooperation and prevent deeper institutionalisation is the case of India and Pakistan. Shreyas Deshmukh's paper on India and Pakistan's historical and contemporary approach to the Indus Waters Treaty makes it clear that Pakistan's threat perception of India as upper riparian influenced its approach to transboundary water sharing. Conversely, for India, it was an apprehension that its role as upper riparian would be exploited by Pakistan to claim that India was weaponising water. Deshmukh's paper reveals how Pakistan's misuse of water scarcity as a political tool has produced a reaction by India to seek modification of the treaty. The undoing of a major institutional arrangement in South Asia, like the Indus Waters Treaty, is the function of changing threat perceptions that stem from the asymmetry of riparian relations, as well as legacy issues related to disputed borders and terrorism.

In the case of Bangladesh, the role of domestic political actors operating to secure their self-interest is important to consider while discussing the drivers of weak institutionalisation. Anuttama Banerjee's paper makes the argument that involuntary drifts have affected outcomes on water security between India and Bangladesh. Domestic political parties in a federal system have impeded the settlement of fractious issues like the Teesta River, even though central governments from both countries are capable of arriving at a solution. The paper underlines the difficulties of including several state and non-state stakeholders in a democratic and consultative process to arrive at a solution on water sharing. West Bengal's unavoidable significance for any settlement on the Teesta River means political parties driven by vested interests and election issues are in a position to act unilaterally. The West Bengal government's decision to dig two canals under the Teesta Barrage project and divert water for agriculture in Jalpaiguri and Cooch Behar districts has soured the possibility of an agreement on the Teesta River water sharing issue.

The actions and perceptions of states in the domain of hydro-politics in South Asia are largely determined by the above-mentioned factors related to the structure of riparian relations, legacy/historical disputes and domestic political compulsions. Together, they have disincentivised cooperation for states, and in the absence of an enforcement mechanism to coordinate and ensure cooperation, transboundary rivers have become a realm of unilateral action. As a result, water resources have become a securitised issue for most states in the region, forcing political actors to view the issue through the lens of national security and geopolitical competition. Without dialogue mechanisms and a consultative approach to institutionalisation, with multiple stakeholders included in the process, it is increasingly unlikely for states to avoid a zero-sum mentality. Moreover, with the prominence of a zero-sum approach, states remain

unprepared to confront collective challenges in South Asia, which threaten economic progress and the lives of millions.

China as Uppermost Riparian

The confluence of the above discussed factors is best observed with China's position as upper riparian. Tibet's position as water tower of the world has given China the strategic advantage of shaping the flow of water into South and South-East Asia. The resulting asymmetry in power relations between upper and lower riparian states is instrumentalised when legacy issues like boundary disputes and border skirmishes are added to the mix. These two drivers of weak institutionalisation can explain the limited cooperation on transboundary waters between India and China. In fact, the cooperation is nested within a larger geopolitical rivalry, which has often been sacrificed to attain strategic objectives. As D. Purushothaman and Thasnim Kalam note, during the Doklam standoff between India and China in 2017, China stopped sharing data on the flow of river water with India. The asymmetry in riparian relations along with legacy issues have created a trust deficit that limits India-China cooperation on transboundary waters to the bare minimum of data sharing agreements. These too are subject to changing political winds.

China's dam construction on rivers is fuelled by domestic political compulsions as well. As discussed by Dechen Palmo in the chapter on Yunnan's water governance policies and their impact on South-East Asia, local governments in Yunnan have built large numbers of hydroelectric dams and other water infrastructure to divert the flow of rivers draining into South-East Asia. There are more than 100 reservoirs and 11 dams on China's portion of the upper Mekong tributaries, with more on the way. China's drive to build dams on rivers of South and South-East Asia stems from water scarcity in the Northern regions, for which the central government has directed provinces in the South to undertake water transfer projects. The environmental and ecological impacts of dam construction have serious implications for the food security of millions in South-East Asia. However, China's domestic economic and political compulsions supersede the significance of a consultative and equitable approach to water sharing. In this context, institutional mechanisms like the Mekong River Commission (MRC) have been rendered irrelevant by the non-participation of China, a blow to regional water governance structures.

China's strategic geographic location has placed Beijing in command of South Asia and South-East Asia's river systems.[6] Its pursuit of dam construction and hydropower is partly due to the necessity of water for industrial use as well as human consumption. It is also motivated by China's desire to instrumentalise water resources as political leverage against its regional rivals, mainly India. However, Beijing's reluctance to enter into water sharing agreements stems from its advantageous position as uppermost riparian of South Asia. China has one of the lowest water dependency ratios, which means that South Asian states and China engage over transboundary rivers in a vacuum. With no incentive to participate in bilateral and multilateral cooperative frameworks, China continues to operate outside South Asia's limited water governance regime, while exerting great influence on the water security of states in the region.

Functional and Sectoral Cooperation

The landscape of transboundary water governance in South Asia is also characterised by functional cooperation, limited to specific sectors - mainly hydropower. Hydro-diplomacy has been one particular example of institutionalised cooperation practiced in cases where bilateral relations are stable and there are little to no contentious issues between states. In South Asia, scope for cooperation is greater in cases where countries share common cultural heritage, have none or few geopolitical disputes and both states can perceive mutual benefit.

Avinav Khatri argues that the scope for cooperation is significant in the case of India and Nepal in the realm of hydropower. He explores the logic of cooperation between Nepal and India, locating the synergies and mutual benefits at the centre of why India and Nepal choose to engage successfully over hydropower. He makes the case that hydropower has emerged as a positive outcome of cooperation on transboundary water security, even though this cooperation is nested within larger rivalries and India-Nepal relations are punctuated by their fair share of friction. Such partnerships are few in South Asia, but signpost the way for other bilateral engagements. The key to furthering this "handshake across the Himalayas" is to address the regulatory, legal and operational challenges facing the execution and planning of hydropower projects between India and Nepal.

Another successful example of sectoral cooperation is in hydropower between India and Bhutan. The development of hydropower infrastructure and treaties relating to water use can be attributed to the special bilateral relationship between India and Bhutan. The special relationship has eliminated any scope for geopolitical disputes between the two states. As Nandita Khadgi points out in her paper, India and Bhutan enjoy strong political and economic ties that form the basis for hydro cooperation. More importantly, the mutual benefit from cooperation is crucial for India's water security and vital for Bhutan's development. However, India's deep involvement in Bhutan's hydropower sector has created issues about Bhutan's external debt and sustainability of its energy mix. These emerging challenges require India to engage with stakeholders outside of the government and address growing concerns about its involvement in Bhutan's hydropower sector. Fostering a productive avenue of cooperation with a formal basis is necessary for further expansion and deepening of cooperation.

One particular avenue that could be leveraged to build confidence between states in South Asia is climate change. As Ambika Vishwanath and Sanya Saroha detail in their chapter, climatic factors like uncertain rainfall, droughts and calamities heighten the stress between communities and countries. The effects of climate change have serious implications for food security, can spark massive migrations and increase climate-induced violence. Focusing on climate change cooperation is vital to avoid the increased stress of environmental disasters and also build cooperation in a direction of mutual interest.

As a result of selective focus on cooperation in sectors like hydropower, engagement on pressing and emerging issues like climate change and non-traditional security has taken a back seat. Regional responses to environmental degradation, pollution of groundwater resources, natural disasters and externalities of climate change are limited. These non-traditional security issues ought to be integrated into the framework of water security. Regional leaders in South Asia, like India along with Nepal, have the opportunity to take the lead to ideate and implement the normative framework for dealing with these emerging challenges.

Recommendations for Institutionalisation

The authors of this Special Issue have, through their study of South Asia's rivers, identified the primary drivers of limited institutionalisation. They have also detailed the sectors in which cooperation has been possible, the logic driving cooperation and benefits of institutional arrangements. Based on their analysis and insights, the following recommendations for policymakers and decision-makers are relevant for enhancing the governance of water resources in South Asia:

- Cultivate goodwill and political capital between countries that enjoy favourable relations by undertaking cooperation in domains free of major contentions. Avoiding contentious issues or shelving them in the interest of expanding cooperation to more fruitful avenues can establish a functional dynamic and generate much needed political trust.

- Prioritise increased engagement with multiple non-state stakeholders within a particular region considered relevant for the signing and implementation of water sharing agreements to avert the effect of unilateral political action by vested interests within a democratic system. By engaging interest groups, political parties and civil society groupings, India can create domestic consensus around water sharing agreements and other institutional arrangements.

- Establish minilateral arrangements within larger regional groupings like SAARC and preferably, BIMSTEC, to enhance institutionalisation of governance and cooperation. Leveraging minilaterals for specific issues has proven effective for regional agreements like the Motor Vehicles Agreement, Coastal Shipping Agreement and other proposed regional integration initiatives. The same approach could prove fruitful in the case of transboundary water resources.

- Establish dedicated hydrology and joint river management institutes to study water science engineering, water morphology and sustainable water management practices that promote the benefits of transboundary water cooperation. These institutes can supply stakeholders with accurate data on river systems, dams and information sharing to local communities and governments.

- Given the significance of hydropower as a functional avenue of cooperation in South Asia, addressing and resolving challenges facing hydro cooperation is necessary to avert a breakdown in cooperation. Developing a comprehensive regulatory framework to govern hydropower projects, ensure its implementation, evaluate sustainability and resolve disputes can enhance transparency, streamline decision-making and expedite dispute resolutions.

- Instituting water data sharing mechanisms in the region through a single portal which can assist planning systems that mitigate natural disasters like flooding. This

mechanism can be extended to states with friendly riparian relations, where water has not been weaponised as a political tool.

- Establish treaties that regulate water use of smaller rivers between countries in South Asia to build a platform for more substantial cooperation on transboundary water management issues.

- Establish a code of conduct and normative framework for water governance that is accepted by countries in South Asia. These principles can be adopted and integrated into water sharing agreements, reflecting a South Asian-approach to water governance.

ENDNOTES

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