

## Trans-boundary Energy and Water Security nexus in South Asia: (in) Action of Pakistan

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### Abstract

Pakistan will face absolute water scarcity by 2025 according to UNDP and Pakistan Council of Research in Water Resources (PCRWR). This water scarcity is owing to multiple factors such as Population explosion, poor farming, water management crisis, rapid and unchecked urbanization etc. Pakistan's economy is dependent on agriculture and water insecurity is directly linked to food insecurity. Unfortunately, despite such an alarming situation the state of Pakistan has not come up with any concrete measures. On the other hand, the last decade has witnessed rapid energy cooperation between Bangladesh, Bhutan, India and Nepal sub region of South Asia. These states have been bilaterally engaging in trans-boundary cooperation and conflict resolution. Recently, electric grid interconnections and hydroelectric cooperation is shifting from bilateral to multilateral arrangements. This shows immense potential for trans-boundary water governance. Four areas are of particular importance and will be examined in this study. Firstly, technical cooperation to manage and regulate water, secondly, Indian hydro-hegemony prospect, thirdly, interstate energy inter-dependencies and lastly, regional co-operation and economic prospects. In this scenario Pakistan is isolated due the (in) action of state to resolve its traditional security challenges. The study will investigate employing content analysis whether Pakistan can continue to ignore non-traditional security challenges and its future implications.

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## Introduction

It is noticeable that SAARC has failed to promote regional cooperation in the region due to multiple factors particularly Indo-Pak rivalry. Due to this failure South Asian states have resorted to alternative means of

cooperation i.e. bilateral and multilateral treaties. Bangladesh, Bhutan, India and Nepal (BBIN) are keen to tackle the non-traditional challenges via bilateral and multilateral co-operation<sup>1</sup>. It is imminent for SAARC countries to establish regional cooperation mechanisms as these countries are facing grave energy crisis, climate disasters and water shortages. The BBIN region shares several trans-boundary Rivers as shown in the following figure<sup>2</sup> and homes more than 10% of the world population.



Water cooperation in South Asia is not a new phenomenon in fact water cooperation in the pre-colonial times was the norm of the day. The established norm of water cooperation was disrupted after the partition of the subcontinent. Since then, multiple initiatives for water cooperation have failed due to different political reasons. Energy-water cooperation and interdependencies have been lauded as most likely solutions for developing economies<sup>3</sup>. Despite the fact energy-water nexus in the BBIN states is still

<sup>1</sup> V. Haran, "Water and Hydropower Cooperation in BBIN Countries: Policies and Way Forward," *International Journal of Water Resources Development* 37 (August 28, 2018): 1–15, <https://doi.org/10.1080/07900627.2018.1503076>.

<sup>2</sup> "Trans-boundary Rivers Shared by South Asian States - Yahoo Image Search Results," accessed February 27, 2024, [https://images.search.yahoo.com/search/images;\\_ylt=AwrOshk3WtxlFdEU4oRXNyoA;\\_ylu=Y29sbwNncTEEcG9zAzEEdnRpZAMEc2VjA3BpdnM-?p=Tranboundary+rivers+shared+by+South+Asian+States&fr2=piv-web&type=E210US91215G0&fr=mcafee#id=0&iurl=https%3A%2F%2Ffastcdn.impakter.com%2Fwp-content%2Fuploads%2F2019%2F07%2FGanges-Brahmaputra-Meghna\\_basins.jpg%3Fstrip%3Dall%26lossy%3D0%26quality%3D92%26sharp%3D1%26w%3D2560%26ssl%3D1&action=click](https://images.search.yahoo.com/search/images;_ylt=AwrOshk3WtxlFdEU4oRXNyoA;_ylu=Y29sbwNncTEEcG9zAzEEdnRpZAMEc2VjA3BpdnM-?p=Tranboundary+rivers+shared+by+South+Asian+States&fr2=piv-web&type=E210US91215G0&fr=mcafee#id=0&iurl=https%3A%2F%2Ffastcdn.impakter.com%2Fwp-content%2Fuploads%2F2019%2F07%2FGanges-Brahmaputra-Meghna_basins.jpg%3Fstrip%3Dall%26lossy%3D0%26quality%3D92%26sharp%3D1%26w%3D2560%26ssl%3D1&action=click).

<sup>3</sup> "Opportunities for Energy-Water Nexus Management in the Middle East & North Africa Opportunities for Energy-Water Nexus Management in the MENA | Elementa: Science of the Anthropocene | University of California Press," accessed February 27, 2024, <https://online.ucpress.edu/elementa/article/doi/10.12952/journal.elementa.000134/112890/Opportunities-for-energy-water-nexus-management-in>.

in its initial stage as these states dealt with food, water, energy and agriculture separately not collectively<sup>4</sup>. In the year 2000 USAID launched a regional initiative for energy cooperation in South Asia<sup>5</sup>. This initiative met success in the BBIN region only.

Several studies have been conducted, published and acknowledged regarding the prospects of trans-boundary water and energy trade. These studies deal with the challenges and prospects and challenges and prospects of trans-boundary cooperation in energy and water<sup>6</sup>. But no similar comprehensive study has so far been conducted on the BBIN region. Trans-boundary energy and water cooperation face the same challenges as any other aspect in South Asia. Some of these challenges are red-tapism, lack of funds, weak institutions, corruption and unreliable infrastructure. Yet the BBIN region have overcome all these barriers and emerged as an exception in the field of trans-boundary energy and water cooperation. The aim of this study is to highlight the success story of BBIN and point out how Pakistan is missing out on regional cooperation and facing stalemate by clinging to the traditional security challenges.

### Political context in the BBIN region

Politics and economics are deeply linked and interdependent in International Relations. Similarly unstable political relations and conflicts directly affect economic relations among states. South Asian states are largely dependent on agriculture and blessed with fertile valleys. As mentioned earlier these states also share various trans-boundary rivers. The agriculture dependency makes water a precious resource. The economic dependency on water has resulted in complicated water relations in South Asian states<sup>7</sup>. The BBIN states mostly enjoy harmonious formal relationships except long standing Indian border and trade conflicts with its smaller neighbors. Despite these perpetual conflicts which could be resolved through comprehensive and conducive negotiations and can most probably lead to better regional integration<sup>8</sup>. India opts for ad hoc settlements with its neighbors' which result in the conflicts reemerging continuously. On the other hand, Bhutan and Nepal being land locked states are dependent for trade routes on its larger neighbor and assert themselves for permanent solutions and political bargains which will be a win-win situation for the region.

A bird's eye view of the region shows that Bhutan-Bangladesh has fair political relations except for Bhutan's patrols on its lowland borders which often sour the relations between the two neighbors. Bhutan

<sup>4</sup> "Full Article: The Nexus Approach to Water–Energy–Food Security: An Option for Adaptation to Climate Change," accessed February 27, 2024, <https://www.tandfonline.com/doi/full/10.1080/14693062.2015.1029865>.

<sup>5</sup> Syed Zagam Abbas et al., "Energy Management in South Asia," *Energy Strategy Reviews* 21 (August 1, 2018): 25–34, <https://doi.org/10.1016/j.esr.2018.04.004>.

<sup>6</sup> "Barriers to Cross-Border Energy Cooperation and Implications on Energy Security: An Indian Perspective with Reference to Energy Trade in South Asia - Tirthankar Nag, 2021," accessed February 27, 2024, <https://journals.sagepub.com/doi/abs/10.1177/0972150919826380>; Haran, "Water and Hydropower Cooperation in BBIN Countries."

<sup>7</sup> Meredith Giordano, Mark Giordano, and Aaron Wolf, "The Geography of Water Conflict and Cooperation: Internal Pressures and International Manifestations," *The Geographical Journal* 168, no. 4 (December 2002): 293–312, <https://doi.org/10.1111/j.0016-7398.2002.00057.x>.

<sup>8</sup> Sumit Vij et al., "Non-Decisions Are Also Decisions: Power Interplay between Bangladesh and India over the Brahmaputra River," *Water International* 45, no. 4 (May 18, 2020): 254–74, <https://doi.org/10.1080/02508060.2018.1554767>.

shares close socio-cultural ties with Nepal the only serious bone of contention was the expulsion of ethnic Nepalese in the early 2000s<sup>9</sup>. It also shares good relations with India as India is often used as a counter balance or ally against Chinese by Bhutan. India also has a rich history of aid and investment in Bhutan<sup>10</sup>. Nepal has cordial lingual, socio-cultural and religious ties with India. Whereas both states have several ongoing conflicts over trade and river treaties<sup>11</sup>. The most unstable conflicts are between India and Bangladesh in the BBIN region. Bangladesh and India have conflicts over water infrastructure, refugees and immigration<sup>12</sup>

## Bilateral Water-Energy Relations among BBIN

This section of the study deals with the bilateral water co-operation between the BBIN states. The region boasts of two river basins namely the Ganges and Brahmaputra. The first river basin is shared by Nepal, Bangladesh and India and the second one is shared by India, Bhutan and Bangladesh. This section will discuss the bilateral water relations of India with the rest of the states as India is the most powerful state in the region and pretty much the center of these arrangements.

Bilateral Water agreements in the BBIN states;

Beneficiary countries		
India-Nepal	Kosi Agreement	<ul style="list-style-type: none"> <li>Signed in 1954 for flood control, irrigation, generation of hydroelectricity and prevention of Erosion</li> <li>Revised in 1975 to accommodate Nepal's demand for sovereign rights over land leased for project Activities</li> </ul>
	Gandak Agreement	<ul style="list-style-type: none"> <li>Twin issues of compensation and unequal benefit-sharing remain a bone of contention</li> <li>Gandak Agreement</li> <li>Signed in 1959 for irrigation of land and generation of power</li> <li>Amended in 1964 to restore Nepal's riparian rights and assume control of regulatory structures but</li> <li>some concerns persist</li> </ul>

<sup>9</sup> "India's Fog of Misunderstanding Surrounding Nepal-China Relations | Policy Commons," accessed February 27, 2024, <https://policycommons.net/artifacts/1850273/indias-fog-of-misunderstanding-surrounding-nepal-china-relations/2596979/>.

<sup>10</sup> "Changing Dynamics of India-Bhutan Relations | SpringerLink," accessed February 27, 2024, [https://link.springer.com/chapter/10.1007/978-981-13-2020-0\\_3](https://link.springer.com/chapter/10.1007/978-981-13-2020-0_3).

<sup>11</sup> "India's Fog of Misunderstanding Surrounding Nepal-China Relations | Policy Commons."

<sup>12</sup> Shamsheer M. Chowdhury, "Bangladesh-India Relations: History and the Way Forward," *Indian Foreign Affairs Journal* 15, no. 3 (2020): 191-98, <https://www.jstor.org/stable/48630179>.

	Mahakali Agreement	<ul style="list-style-type: none"> <li>• Signed in 1996 for integrated development of water resources</li> <li>• Considered a historic treaty by Nepalese analyst as it was prepared mostly on Nepal's terms Controversy still exists over agreed provisions and India's failure to fulfil its commitments (e.g.</li> <li>• Construction of the Pancheshwar hydropower project)</li> </ul>
<b>India-Bangladesh</b>	Ganges Treaty	<ul style="list-style-type: none"> <li>• Signed in 1996 for sharing of the Ganges Waters at the Farakka Barrage, valid until 2026</li> <li>• Issues like flooding, excess withdrawals, unequal division of water flows and the exclusion of no existing water-specific bilateral treaty</li> </ul>
<b>India –Bhutan</b>	Scheme for Hydrometeorological and Flood Forecasting Networks	<ul style="list-style-type: none"> <li>• Strong cooperation on information and data sharing on flood forecasting and disaster management</li> </ul>

### India-Bhutan Trans-Boundary Water and Energy Arrangements

India and Bhutan share several trans-boundary rivers as shown in the map above. India came into being in 1947 and signed one of its first bilateral treaties called the friendships treaty with Bhutan in 1949. Bhutan and India do not have a formal water related treaty in place though all agreements are based on the framework agreed upon in the friendship treaty. Unlike water treaties both states have many hydropower treaties in place. These treaties include cooperation on hydro-power in 2006, this agreement doubled the electric supply from Bhutan to India in 2020. In 2014, both states developed joint hydro-power ventures.

Indo-Bhutan bilateral water cooperation can be traced back to 1955. The cooperation began with India funding rain gauges, river flow stations to monitor and measures flood warnings<sup>13</sup>. South Asia is prone to floods and soil erosion, in this regard since 1979 the meteorological cooperation between India and

<sup>13</sup> Girish Chadha and Ashwin B. Pandya, eds., *Water Governance and Management in India: Issues and Perspectives, Volume 1*, Water Resources Development and Management (Singapore: Springer, 2019), <https://doi.org/10.1007/978-981-13-6400-6>.

Bhutan is used in flood management and forecasting<sup>14</sup>. This model can be followed by other South Asian states to combat climate change.

India and Bhutan initiated the energy cooperation in the late 80s. There have been four joint hydro power projects between India and Bhutan till 2019. The geographical and economic dynamics of the states make the energy cooperation mutually beneficial for them. Bhutan is situated is geographically an upper riparian state with a potential to harness 30,000 MW energy out of which 23,760 MW is feasible<sup>15</sup>. On the other hand, India being a populous and economically developing countries is an excellent market to outsource this energy. The trajectory of energy cooperation in India and Bhutan is gradually shifting towards equality. There is no doubt that India is far stronger than Bhutan in every aspect but since the 80s a lot have changed in Bhutan.

For instance, the first hydropower plant named Chhuka (336MW) established in Bhutan was fully funded by India. Later on, the Kurichhu and Tala power plants were built on the 60:40 ratio. 60% of the investment was provided as aid whereas 40% was provided as loan. In 2009 another significant development took place Bhutan invited private sector investments and other foreign direct investors in the energy field. These developments have led to 70:30 funding ratio currently which implies that Bhutan is moving towards equity<sup>16</sup>. Bhutan's 50% GDP and 2/3<sup>rd</sup> state revenue is drawn from the hydropower sector. Bhutan doesn't have a solid industrial base and is the only carbon negative country in South Asia. The domestic energy consumption is not increasing in Bhutan anytime soon on the other hand private FDI has made the sector pretty competitive. However, Indo-Bhutan bilateral energy and water cooperation will keep evolving in the future<sup>17</sup>.

### India-Bangladesh Trans-Boundary Water and Energy Arrangements

India and Bangladesh have been the same country for centuries until 1947. In 1947 Bangladesh became East Pakistan and yet it was closer to India as they are geographically contiguous. After independence in 1971 given the political instability in Bangladesh both states failed to have any bilateral water related treaty until the late 90s. In 1996, after a long wait a bilateral water treaty was signed for three decades which is coming to end in two years' time<sup>18</sup>. This treaty is solely related to sharing the flow of the river and waters. In 2011, a bilateral agreement was signed for greater use of trans-boundary river waters but it's not functional yet<sup>19</sup>. It is noteworthy that grass root diplomacy is not as successful as the bilateral water agreements despite longstanding water conflicts such as Teesta. Off and on climate concerns and information exchange have led to several disagreements between the two states. These conflicts have

<sup>14</sup> Olli Varis, Asit K. Biswas, and Cecilia Tortajada, eds., *Management of Transboundary Rivers and Lakes*, Water Resources Development and Management (Berlin, Heidelberg: Springer, 2008), <https://doi.org/10.1007/978-3-540-74928-8>.

<sup>15</sup> Cecilia Tortajada and Udisha Saklani, "Hydropower-Based Collaboration in South Asia: The Case of India and Bhutan," *Energy Policy* 117 (June 1, 2018): 316–25, <https://doi.org/10.1016/j.enpol.2018.02.046>.

<sup>16</sup> Tortajada and Saklani.

<sup>17</sup> Dorji, T. "When all one's eggs is energy export." *Kuensel Online* 30 (2015).

<sup>18</sup> Haran, "Water and Hydropower Cooperation in BBIN Countries."

<sup>19</sup> Rashid, H. U. "Indo-Bangladesh Framework Agreement." *The Daily Star* (18 July 2012) (2012).

not stalled the protocol on Inland Water Transit and Trade in 2015 which governs transit and trade in the Brahmaputra region<sup>20</sup>.

Indo-Bangladesh power-corridor has been celebrated as a textbook example of regional cooperation recently<sup>21</sup>. Bangladesh first began importing energy from India for its evolving industrial 2013. Currently, Bangladesh exports 1160 MW hydropower from India which might be raised up to 1540 MW as a result of its new agreements. The two states also have coal based and diesel lines agreements in place both in public and private sectors. This diverse energy cooperation has increased the energy interdependence between two neighbors.

### **India-Nepal Trans-Boundary Water and Energy Arrangements**

India and Nepal share not just any trans-boundary river but the one the most scared rivers in Hindu religion “Ganges”. This river has been a source of socio-cultural linkage between the two states. Formal bilateral relations between the states began in 1874. Nepal devised a national Water governance strategy in 2002 and in 2005 Nepal devised short term and long-term water related goals. So far India and Nepal have signed three bilateral water treaties that encompass flood forecasting and management, agricultural needs and power generation noted in the table above. Furthermore, developing infrastructure like building bridges and barrages are also integrated in the treaties. Nepal's hydropower policy places a high priority on meeting its domestic electricity demand while also aiming to export surplus energy to neighboring countries. Despite this policy, Nepal remained a net importer of energy in the fiscal year 2018-19, with total annual electricity consumption reaching 6394.38 GW h. Domestic power generations accounted for 62.75% of this energy, while the remaining 37.25% was imported from India<sup>22</sup>. With 209 hydropower plants currently under construction, collectively adding up to 7,952 MW of installed capacity, along with additional projects in the pipeline, Nepal anticipates a significant increase in its energy production.

In 2017, the inter-country power trade within the BBIN (Bangladesh, Bhutan, India, Nepal) framework was estimated to be around 2300 MW, which is less than 1% of the total installed capacity of 342 gigawatts (GW). However, there is clear evidence indicating the substantial benefits that could be derived from cross-border power trade. Studies suggest potential cost savings of approximately \$9 billion per year through increased regional electricity integration and trade. Moreover, the overall benefits could amount to as much as \$100 billion (at a social discount rate of 5%) between 2015 and 2040. Importing hydropower could also assist India in reducing its carbon emissions by substituting some of its current fossil fuel-based

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<sup>20</sup> Marufa Akter, “Impacts of Farakka Barrage on Hydrological Flow of Ganges River and Environment in Bangladesh | Sustainable Water Resources Management,” accessed March 1, 2024, <https://link.springer.com/article/10.1007/s40899-017-0163-y>.

<sup>21</sup> “Power Sector Is Hallmark of Indo-Bangla Cooperation, Says Bangladesh Envoy,” accessed March 1, 2024, <https://www.aninews.in/news/world/asia/power-sector-is-hallmark-of-indo-bangla-cooperation-says-bangladesh-envoy20190319185009/>.

<sup>22</sup> From Department of Electricity Development website, [www.doed.gov.np](http://www.doed.gov.np) (Retrieved September, 2023).

domestic demand. Hence, there exists a strong rationale for expanding electricity cooperation and trade, considering both economic and environmental factors.

### **Comparison of the BBIN Bilateral Water and Energy Cooperation**

Cooperation on trans-boundary water management faces a range of challenges stemming from historical, institutional, political, and hydrological factors. Throughout the four to five months of the monsoon season, water resources in the region must be carefully managed due to various issues such as flooding, landslides, sedimentation, soil erosion, cloud outburst floods, and glacial lake outburst floods (GLOFs) in Nepal, Bhutan, and India, as well as inundation in the southern plains of Nepal, northern India, and Bangladesh. Similarly, during the dry season, there is a shortage of water for irrigation, drinking, and hydroelectric power generation across the BBIN countries, leading to significant groundwater contamination, particularly with arsenic in Bangladesh.

In the realm of energy, numerous instances of cooperation have demonstrated mutual benefits. While South Asia may trail behind regions like Southern Africa, Central America, and Nordic countries in intra-regional electricity cooperation and trading<sup>23</sup>, significant efforts are underway within the BBIN region. These efforts include the development of electricity interconnections, joint projects in power generation and trading such as hydropower plants, petroleum transport, and thermal power plants. Moreover, innovative initiatives like 'energy banking,' aimed at addressing seasonal variations in energy production and consumption between India and Nepal, underscore governments' recognition of energy interdependencies and their willingness to explore new avenues in energy trade, potentially replicable in other countries.

### **Implications for Pakistan**

Pakistan is missing out on transboundary water and energy cooperation in South Asia primarily due to its focus on traditional security challenges, which have hindered regional collaboration and trust-building efforts. These challenges stem from historical tensions and conflicts with neighboring countries, particularly India, which has shaped Pakistan's approach to regional cooperation in the energy and water sectors.

**Security Concerns:** Pakistan's traditional security concerns, including territorial disputes and historical conflicts with India, have led to a securitization of water and energy resources. This has resulted in a reluctance to engage in cooperative ventures that involve sharing critical resources with perceived adversaries. It is presumed that cooperation with neighboring countries will enhance economic dependency and undermine state centric security concerns around which Pakistani security policy makers have built their security narrative<sup>24</sup>.

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<sup>23</sup> Ramesh Ananda Vaidya et al., "Electricity Trade and Cooperation in the BBIN Region: Lessons from Global Experience," *International Journal of Water Resources Development* 37, no. 3 (May 4, 2021): 439–65, <https://doi.org/10.1080/07900627.2019.1566056>.

<sup>24</sup> Shabnam Gul, Muhammad Faizan Asghar, and Zara Qurban, "Narrative Building for Comprehensive National Security of Pakistan," *Global Strategic & Securities Studies Review* VI, no. 1 (March 30, 2021): 38–46, [https://doi.org/10.31703/gsssr.2021\(VI-I\).05](https://doi.org/10.31703/gsssr.2021(VI-I).05).



**Water Scarcity:** Pakistan faces significant water scarcity challenges, exacerbated by climate change and population growth. It is now categorized in the top twenty water scarce countries in the world in 2022<sup>25</sup>. The country heavily relies on trans-boundary Rivers like the Indus for its water supply, but disputes over water sharing arrangements and concerns about downstream impacts have hindered effective cooperation with India and other riparian states.

**Energy Deficits:** Pakistan also grapples with energy deficits, leading to frequent power outages and reliance on imported energy sources. While there is potential for cooperation in energy trading and infrastructure development within the South Asian region, security considerations have often overshadowed these opportunities.

**Political Dynamics:** The political dynamics within South Asia, characterized by historical animosities and geopolitical rivalries, further complicate efforts to foster trans-boundary cooperation. Pakistan's relations with India, in particular, have been strained, making it challenging to engage in collaborative initiatives that involve shared resources.

**Lack of Trust:** Deep-rooted mistrust among South Asian countries, including Pakistan, towards each other's intentions and capabilities has hindered meaningful cooperation in the water and energy sectors. Past conflicts and unresolved issues have contributed to a lack of confidence in the feasibility and sustainability of collaborative ventures.

## **Conclusion**

Overall, Pakistan's traditional security challenges, coupled with broader regional dynamics characterized by political tension and mistrust, have limited its engagements in transboundary water and energy cooperation initiatives in South Asia. This coupled with the rise of religious fascism in India and the series of surgical strikes by the Indian government have placed Pakistan in a tricky situation at a time when non-traditional security challenges, economic deficit and political chaos is engulfing the country. Addressing these challenges will require unprecedented efforts and unflinching political will to resolve territorial disputes. The only way forward for Pakistan is to resume peace negotiations with India by involving an International Organization as a mediator with mutual consent. Both states must view the conflicts with fresh perspectives and approach them with a human perspective. It's time to leave the past behind and build a better future for greater good.

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<sup>25</sup> "Pakistan's Water Crisis – The Diplomat," accessed October 25, 2024, <https://thediplomat.com/2022/06/pakistans-water-crisis/>.

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