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Geopolitics of Water in South Asia

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Abstract

South Asia is faced with water scarcity, with possible water conflict in the future. The challenges in the water sector largely relate to disputes and difficulties arising from unequal flow distribution of transboundary rivers, as well as engineering interventions like dams, barrages and storages, with complete disregard for the agreements signed bilaterally between various states. India is a source of conflict in the water-sharing arrangements with its co-basin countries. Low riparian states have been raising concerns over India's tendency to use water of common rivers unilaterally without taking into account its human, social, economic and ecological cost. This paper focuses on conflict over water-related problems and their effects on inter-state relations in South Asia. It highlights the challenges of water development such as mismanagement of shared water resources and suggests ways to overcome water-sharing disputes in South Asia and promote peaceful coexistence.

Key words: South Asia, Pakistan, India, Nepal, Bhutan, Bangladesh, China

Introduction

The principal South Asian transboundary rivers are, in fact, a lifeline for over 1.721 billion people,[1] i.e. about one-quarter of humankind.[2] These rivers flow from the shared Himalayan basins in Pakistan,

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[1] World Bank, "South Asia: Data," accessed April 27, 2016, http://data.worldbank.org/region/SAS.

[2] Iram Khalid, Asia Mukhtar and Zanib Ahmed, "Water Scarcity in South Asia: A Potential Conflict of Future Decades," *Journal of Political Studies* 21, no. 1 (2014): 259.

Bangladesh, Bhutan, China, India and Nepal,[3] which constitute the Ganges-Brahmaputra-Meghna (GBM) and the Indus, which are two of the world's largest river systems. It is, indeed, unfortunate that the region, known as the 'ancient cradle of the principles of ecological harmony' and sophisticated water management system, as evident through its civilisations, now faces dire ecological imbalance and a grim water outlook.[4] 'The region only holds about 6.8 per cent of the world's annual renewable water resources.'[5] The paucity of water is a big challenge for the South Asian riparian countries during the dry season, especially for the downstream ones, whereas 'South Asia's per capita water availability has dropped by 70 per cent since 1950.'[6]

The issue of sharing waters between co-riparian countries is of great importance in South Asia. Cooperation or conflict between states can induce competition over resources; if the conflict becomes violent, it creates hindrances between smooth inter-state relations. The water problem in the region is aggravating due to Indian hegemonic behaviour, violation of existing water co-operative regimes and unilateral diversion of water, creating regional tension and mistrust. The co-riparian countries blame India for turning a blind eye to international laws and practices, which are generally observed by others in the region.[7] Consequently, the conflicts over the trans-border rivers have negatively impacted relations between India and other South Asian countries for several decades. Moreover, the harmful effects of water disputes are likely to shrink economic development, and gradually damage the social fabric of the affected countries that may evoke violence when security and welfare of the masses are endangered by interruptions in the ecosystem. According to Michael Kugelman, the water scarcity issue may likely be the main source of potential conflict in the subcontinent in the future, whereas, the essential nature of the water dispute will remain political, it is likely to turn into a possible war especially between Pakistan and India because of their

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[3] K.C. Neelam, "Water as a Source of International Conflicts an Experience from South Asia (Water, Women and Peace)," High Beam Research, June 22, 2004, accessed April 27, 2016, https://www.highbeam.com/doc/1G1-124261679.html.

[4] Suman Sharma, "Existential Threat to Human Security in South Asia and Regional Response: A Case Study of Climate Change and SAARC Initiatives" (paper, Department of Political Science, University of Delhi, Delhi, 2011).

[5] K. N. Adhikari, "Conflict and Cooperation on South Asian Water Resources," *IPRI Journal* XIV, no. 2 (2014): 4.

[6] "South Asia's Water Woes," *Dawn*, July 23, 2012, http://www.dawn.com/news/736635/south-asias-water-woes.

[7] Nitya Nanda, Abu Saleh Khan and K. Dwivedi, *Hydro-Politics in GBM Basin: The Case of Bangladesh-India Water Relations* (New Delhi: Energy and Resources Institute, 2015), 23.

historical baggage; other small South Asian states will have strained relations with India due to fear of its asymmetric power.[8]

Further, water has gained more importance as a critical resource.[9] This significance lies in the fact that it is a shared natural reserve, the course of which is not confined to politically demarcated boundaries.[10] Ecosystems surpass political topographies and water is the universally-acknowledged essential means of sustenance in all biological systems. All irrational schemes to restrict water to man-made political boundaries would definitely cast severe repercussions on natural river courses.

In this backdrop, the paper seeks to analyse certain aspects of the geopolitics of water in South Asia: such as water as a potential source of conflict or cooperation; ineffective mechanism of regional water cooperation; religio-political sensitivity towards water; impact of geopolitical imbalances on water disputes; and lastly, the impact of dams given climate change and their hydrological effects on the environment. It will also focus on water disputes between India and other South Asian countries such as Pakistan, Bangladesh, Nepal and Bhutan, with emphasis on unilateralism as an instrument of state policy and violations in implementing bilateral agreements. Keeping in view the geostrategic importance of China and being a co-riparian of the Himalayan basin, the water dispute between India and China is also touched upon in this study.

Water in South Asia

Religio-Political Importance

Water issues need to be viewed in the context of culture and politics in South Asia, especially the cultural and religious sensitivities of the people towards water, particularly of sacred rivers, e.g. Ganga and Jamuna in India. Hindu folklore and spiritual customs define river waters as firmly tied-up with identity, mysticism, religion, ethos which hold superiority in Hinduism.[11] In this context, goddess Ganga is referred as Ganga Ma and the Ganges River is named after her.[12] This is one among many reasons that bars Indian leadership from proclaiming the Ganges an international river.[13]

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[8] "South Asia's Water Woes," *Dawn.*

[9] Mahfuz Ullah, ed., "Hydro Politics in South Asia: Threats to Security," in *Water Disputes in South Asia: Threats to Security* (Dhaka: Probe Printers, 2010), 24.

[10] Roshni Chakraborty and Ismail Serageldin, "Sharing of River Waters among India and its Neighbours in the 21st Century: War or Peace?" *Water International* 29, no. 2, (2004): 201.

[11] Elhance, *Hydropolitics in the Third World*, 175.

[12] "Religious and Cultural Significance," Ganga River, accessed May 2, 2016, http://www.gangariver.co.in/religious-and-cultural-significance.htm.

[13] Elhance, *Hydropolitics in the Third World*, 175.

Secondly, leaders usually look at water issues from the angle of different political calculations. Water is a natural resource, but Indian religio-political leadership uses it as a tool to exert political pressure. For instance, 'the Hindu right-wing (especially Rashtriya Swayamsevak Sangh) groups in India call on the government to stop flow of water to Pakistan or flood it.'[14] Furthermore, former Prime Minister Manmohan Singh withdrew from India's commitment to Bangladesh over Teesta due to domestic political pressure and warnings from West Bengal's political leadership, which held that either it would dissolve the state government or quit the coalition, thereby putting political pressure on the Congress government, the fear of which compelled the Manmohan government not to sign the Teesta River Agreement. Thus, when regional water issues are combined with local political motives, they become complicated and hard to resolve.

Geographical Importance

South Asia has inherited the geographical partition of a mass of land. No major river has its origins in South Asia's populous countries like Pakistan and Bangladesh. All of them flow into Pakistan and Bangladesh through India. India's size, both in terms of its area and population and its economic and military capabilities, have placed it in a potentially hegemonic position vis-à-vis smaller neighbours. And also, India takes geographical advantage that all the other neighbours are physically separated from each other by Indian territory. These geopolitical imbalances have often generated fear, suspicion, and envy among the smaller states. Emerging out of colonial experiences, the smaller states in the region have been especially sensitive to the issues of national sovereignty, identity and autonomy and the actual possibility of cultural and economic domination by their bigger neighbour.

Source of Conflict or Cooperation: An Overview

Water-sharing is a complex problem which needs a logical solution for its equitable distribution.[15] However, it is often difficult for the most amiable border nations to reach a unanimously agreed water-sharing formula for regulating their transboundary water reserves.[16] On the one hand, the upper-riparian nations claim their water rights on the basis of 'absolute territorial sovereignty', including the water resource, regardless of the effects of

[14] Muhammad Akbar Notezai, "The India-Pakistan Water Dispute," *Diplomat*, November 21, 2014, http://thediplomat.com/2014/11/interview-the-india-pakistan-water-dispute/.

[15] Ibid.

[16] Joseph W. Dellapenna, foreword "Bringing the Customary International Law of Transboundary Waters into the Era of Ecology," *Intl J. Global Environmental Issues* 1, no. 3 (2001): 244.

exercising absolute power on other riparian nations.[17] On the other hand, the lower-riparian nations claim their water rights on the basis of 'absolute integrity of the river', demanding that upper-riparian nations cannot have the absolute authority to affect the quantity or quality of a commonly shared watercourse.[18] To avoid contradictory claims of the riparian nations, which may lead them towards water conflict, drafting and implementing water law is crucial for resolving water conflict through cooperation under the guidance of international conventions and laws on transboundary water-sharing. The United Nations (UN) has held several important conventions on water law such as the 'no-harm rule,' and 'equitable utilisation.' Basically, the conventional international law empowers international actors by legitimising as well as limiting the claims they can make.

In this regard, the UN has codified the rule of 'Equitable Utilisation' in Article 5 of the United Nations Convention on Non-Navigational Uses of International Watercourses.[19] The Article demands riparian states to use an international waterway in a rightful manner for optimising the benefits of the watercourse, while ensuring its protection and development. Besides, the UN Convention enlists 'No-Harm Rule,' in its Article 7, which is subordinate to the previous rule. It requires riparian states to take adequate measures for preventing any significant harm to low lying states.[20]

Furthermore, South Asian countries have signed various water treaties to resolve their water disputes, however, in most cases under these treaties, the dispute resolution mechanisms are either not fully evolved, e.g. Ganges Water Treaty, or demand full implementation of all the clauses of the treaties in true letter and spirit, e.g. the Indus Water Treaty (IWT). As mentioned earlier, water in South Asia is 'a source of both conflict and cooperation.'[21] According to Craig:

> Conflict is a concept that is independent of cooperation; not always opposite to it. In certain circumstances, conflict may be an integral part of inducing and sustaining cooperative behaviour and the two may coexist in various social settings.[22]

[17] *Water Encyclopedia*, s.v. "Law, International Water," accessed May 27, 2016, http://www.waterencyclopedia.com/La-Mi/Law-International-Water.html.
[18] Ibid.
[19] *Water Encyclopedia*, s.v. "Law, International Water."
[20] Ibid.
[21] Mahfuz Ullah, "Hydro Politics in South Asia," 27.
[22] J. G. Craig, *The Nature of Cooperation* (Montréal: Black Rose, 1993), 15, quoted in Naho Mirumachi, *Transboundary Water Politics in the Developing World* (New York: Routledge, 2015), 40.

One of the examples of cooperation in the region is the IWT 1960 signed between Pakistan and India[23] that shows riparian cooperation facilitated through third party mediation, in this case, the World Bank. The treaty has survived two major wars. If high levels of conflict and cooperation exist, there can be 'strong commitment to achieve a goal by the participants, but there may be equally strong disagreement over the precise definition of that goal and particularly over the means of achieving it.'[24] Since water is a politically charged, emotive issue it is subject to various interpretations and disputes. In this regard, there is also a conflict over the shared water resources between Pakistan and India such as the former claims that the latter manipulated the treaty in its favour. Islamabad has shown its concern that Delhi has 'moved far away'[25] from its obligation and has been twisting the clauses and violating the IWT, which hampers its implementation (in this context two case studies, e.g. Wullar Barrage and Kishanganga Hydro-power projects are discussed at the end of the paper). The IWT is beset with the following challenges:

- The inclusion of permissive and restrictive provisions in the treaty creates an inbuilt situation which provides scope for different interpretations, thus causing friction between the two countries.
- There is no clause in the treaty prohibiting India from the construction of new run-of-the-river hydro projects. Therefore, India may construct these projects under the 'permissive and restrictive provisions'[26] of the IWT, within the designed criteria under the limitations provided, without interfering or disturbing the natural flow the Indus, Jhelum and Chenab rivers.

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[23] The Indus Waters Treaty 1960, India-Pak., September 19, 1960, http://siteresources.worldbank.org/INTSOUTHASIA/Resources/223497-1105737253588/IndusWatersTreaty1960.pdf.
Article II states "All waters of the Eastern Rivers shall be available for the unrestricted use of India….except for Domestic Use and Non-Consumptive Use, Pakistan shall be under obligation to let flow, and shall not permit any interference with, the waters of the Sutlej Main and the Ravi Main in the reaches where these rivers flow in Pakistan and have not yet finally crossed into Pakistan." Article III states "Pakistan shall receive for unrestricted use all those waters of the Western Rivers which India is under obligation to let flow…and shall not permit any interference with these waters, except.." as under the provisions of Paragraph 2 for the following (i) Domestic Use; (ii) Non-Consumptive Use; (iii) Agricultural Use, as set out in Annexure C; (iv) Generation of hydro-electric Power, as set out in Annexure D; (V) India cannot store any water or construct any storage works on the Western Rivers as set out in Annexures D and E.

[24] Craig, *The Nature of Co-operation*, quoted in Mirumachi, *Transboundary Water Politics in the Developing World*, 40.

[25] Ibid.

[26] Uttam Kumar Sinha, Arvind Gupta and Ashok Behuria, "Will the Indus Water Treaty Survive?" *Strategic Analysis* 36, no. 5 (2012): 744.

- The issue of climate change was not considered in 1960, which has now become a serious issue which requires renewal of the treaty.

Large-scale diversions by constructing dams in violation of the Indus Water Treaty, has far reaching consequences for socio-economic growth and national politics regarding water distribution within the provinces in Pakistan. [27] Pakistan's water scarcity can be analysed in the context of per capita annual water availability which is 3,500 cubic metres in the Ganges-Brahmaputra-Meghna Basin (GBM), and 1,330 cubic metres in the Indus Basin.[28] This shows that the GBM Basin is not water stressed,[29] whereas the Indus Basin is in serious decline. Pakistan is largely dependent on this system, whereas India is largely dependent on the GBM and Indus Basins. The water supply in Pakistan fell from 5,000 cubic metres per capita to 1,000 cubic metres per capita in 2010.[30] If this situation continues, the per capita water availability will be 711 cubic metres by 2037.[31] The Asian Development (ADB) has also labelled Pakistan 'one of the most water stressed countries in the world.'[32] As compared to Pakistan, per capita water availability in India was 25, 00 cubic metres[33] during 1997 which reduced to 1,869 cubic metres.[34] China's per capita water availability is 2,200 cubic metres.[35] India has adequate average water availability as compared to Pakistan and the latter's water outlook is grim.

Another case from South Asia is the co-operative water agreement between Bangladesh and India, in which the former has been in constant strife with the latter to receive its agreed share.[36] Although, the Ganges

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[27] Enum Naseer, "Pakistan's Water Crisis," special report (Lahore: Spearhead Research, 2014), http://spearheadresearch.org/wp-content/uploads/2014/01/Pakistans-_Water_Crisis_part-1.pdf.

[28] Mukand S. Babel and Shahriar M. Wahid, *Freshwater under Threat: South Asia*, report (Nairobi: United Nations Environment Programme, 2008), http://www.unep.org/pdf/southasia_report.pdf.

[29] As per international standards, a country is considered water-stressed if per capita annual water availability falls down to 1800 cubic metres and water scarcity intensifies if the rate further diminishes to 1000 cubic metres.

[30] Satish Kumar, ed., *India's National Security: Annual Review 2012* (New Delhi: Routledge, 2013), 264.

[31] Raja Muhammad Atif Azad, "Water Woes and Energy Policies," *Express Tribune*, June 17, 2015.

[32] Satish Kumar, ed*., India's National Security*.

[33] Mark W. Rosegrant, *Water Resources in the Twenty-First Century: Challenges and Implications for Action* (Washington, D.C.: International Food Policy Research Institute, 1997), 1.

[34] Babel and Wahid, *Freshwater Under Threat: South Asia*.

[35] Abdul Zahoor Khan Marwat, "Water Shortage in Pakistan," *News International*, July 13, 2015, https://www.thenews.com.pk/print/51023-water-shortage-in-pakistan.

[36] Mohammad Amjad Hossain, "Bangladesh's Relations with India with Change of Government in New Delhi," *Foreign Affairs Insights & Reviews*, March 24, 2015, accessed November 9, 2015, http://fairbd.net/bangladeshs-relations-with-india-with-change-of-government-in-new-delhi-an-analysis/.

Water Treaty, signed in 1996, was initially considered major progress by the political regimes of both countries, yet the treaty failed to address or resolve all bilateral disputes of the Ganges' waters.[37] The treaty is considered to be 'imperfect' by the political realists in Bangladesh. Dhaka has been protesting against the violation of GWT by India.[38] Various allegations and suspicions continue to fuel criticism of the treaty by the Bangladesh Nationalist Party and have created tensions in their bilateral relationship.[39] The nature of water conflict between Bangladesh and India is a high conflict and low cooperation dynamic because unlike the IWT, there is no dispute resolution mechanism. The annual per capita water availability in Bangladesh is 8,051 cubic metres — which is high — but with large temporal variation.[40] Closer scrutiny shows that despite having high per capita annual water availability, the country still has water security issues due to the upper riparian's limited cooperation to address equity issues that cause 'suffering from monsoon floods followed by severe dry season water shortage.[41] Hence, Bangladesh's water outlook is not optimistic because of its dependency on transboundary rivers. Its internal annual renewable per capita water is 666 cubic metres, in total. Its total renewable water dependency is 91.3 per cent. Evidently, this inadequacy is a consequence of its unequal share of the GBM catchment area. This makes Bangladesh vulnerable vis-à-vis external developments and freshwater policy decisions.[42]

Unlike Bangladesh, the nature of water conflict between India and Nepal is of high conflict and high cooperation — given exploitation and interference by India for obtaining Nepal's water resources — which has led to strong disagreement over the precise definition of the clauses of their o-operative water treaty. For instance, the age-old disagreement still persists in India and Nepal over the 'interpretation of the Sugauli Treaty signed in 1816 between Nepal and British East India Company, which delineated

[37] Arun P. Elhance, *Hydropolitics in the Third World: Conflict and Cooperation in International River Basins* (Washington, D.C.: United States Institute of Peace Press, 1999), 180.

[38] Robert G. Wirsing, Christopher Jasparro and Daniel C. Stoll, *International Conflict Over Water Resources in Himalayan Asia* (Basingstoke: Palgrave Macmillan, 2013), 66.

[39] Elhance, *Hydropolitics in the Third World*, 180.

[40] Rezaur Rehman and M. Shahjahan Mondal, "Role of Water Resource Management in Ensuring Food Security," in *Food Security and Risk Reduction in Bangladesh*, eds. Umma Habiba, Anwarul Abedin, Abu Wali Raghib Hassan, Rajib Shaw (Tokyo: Springer, 2015), 213.

[41] Mark W. Rosegrant, *Water Resources in the Twenty-First Century: Challenges and Implications for Action* (discussion paper no. 20, International Food Policy Research Institute, Washington, D.C., 1997), 1.

[42] Wirsing, Jasparro and Stoll, *International Conflict Over Water Resources*.

the frontier along the River Maha Kali in Nepal.'[43] In 1997, when Nepal planned to work out a treaty on hydroelectric development of the river, the Indo-Nepal rift deepened when both failed to decide which stream constituted the source of the river. Nepal considers the Limpiyadhura as the source stream, while India claims Lipu Lekh to be the source stream.[44] Nepal wants to utilise its water resources for generating electricity, which is not only necessary to meet its energy demand, but also to generate revenue while exporting energy to other South Asian countries. However, its wish to export electricity and develop hydro projects is also tied to India's will, due to its border blockade by India.

On the contrary, the water dynamic between India and Bhutan is one of low conflict and low cooperation owing to the hegemonic behaviour of India towards the Himalayan states. Resultantly, both countries have little interaction between them over shared water resources. Although Bhutan and Nepal have highest per capita annual water availability in South Asia — such as Nepal has 8,900 cubic metres[45] and Bhutan 109,000 cubic metres[46] — both countries also grapple with water security challenges due to lack of capacity-building and insufficient resources to overcome these problems and Indian hegemonic behaviour towards them. In case of Bhutan, the internal challenge is water accessibility. Households across the country face drinking water issues. Bhutan also needs water storage capacity which is subject to its lower riparian, i.e. India's will.

In this context, despite having water agreements with India, the Himalayan states of Nepal and Bhutan, unfortunately, receive unequal share of their mountainous water resources.[47] India, a low riparian state, uses upper riparian privileges while influencing and dictating the water projects of these two landlocked mountainous states. Thus, the water issues between the co-riparian countries of the region remain 'a potential *casus belli*.'

The nature of water-related issues between India and China is based on high conflict and low cooperation. According to Prof. Brahman Chelani from the Center for Policy Research, New Delhi, water disputes between India and China are stronger and more serious than border disputes. The

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[43] Pia Malhotra, "Water Issues between Nepal, India and Bangladesh," report (New Delhi: Institute of Peace and Conflict Studies, 2010), http://www.ipcs.org/pdf_file/issue/SR95.pdf.

[44] Ibid.

[45] Ashutosh Shukla, "Wastewater Production, Treatment and Use in Nepal" (country paper, UN-Water Activity Information System, 2016), http://www.ais.unwater.org/ais/pluginfile.php/232/mod_page/content/134/Nepal_Country Paper.pdf.

[46] Dawa Gyelmo, "Bhutan Struggles with Local Water Shortages," *thethirdpole.net*, April 21, 2016, https://www.thethirdpole.net/2016/04/21/bhutan-struggles-with-local-water-shortages/.

[47] Mahfuz Ullah, ed., "Hydro Politics in South Asia," 28.

sources of water for both originate in Tibet, which lies in China. Therefore, Tibet is of high importance for stabilising or destabilising Indo-China relations.

Hypothetically, can these water conflicts escalate into wars in South Asia? The existing channels of dialogue, bilateral agreements and dispute resolution mechanisms, require that India display firm commitment in fulfilling the requirements of existing water agreements; cooperate with its riparian states on water; maintain ecological and biodiversity balance; discard unilateral actions on run-of-the-rivers and restrict itself in constructing massive hydro projects/dams, especially on western rivers (Indus, Jhelum and Chenab). Only then, the possibility of water conflict turning into a full-fledge war can be avoided. If India does not act accordingly and continuously violates the sensitivity of South Asian water cooperative regimes then water could likely become a threat for regional security.

In addition to bilateral cooperation in South Asia through different water treaties signed by the regional countries, there are also other joint cooperative mechanisms at regional level — irrespective of their effectiveness or ineffectiveness in terms of their outcomes and regional cooperation — for minimising the effects of natural disasters. For example, the 'Hindu Kush–Himalayan [Hydrological Cycle Observing System] HYCOS project for sharing real-time data and information.' Since this region is extremely vulnerable to climate change impacts, possibly leading to an increased incidence of floods, four South Asian countries, Bangladesh, Bhutan, Nepal and Pakistan initiated the HKH-HYCOS project in 2001 with the assistance of foreign funding. Its main objective is to provide protection to lives, livelihoods, and property of vulnerable populations and infrastructure by increasing flood risk management capability in the Hindu Kush – Himalayan region.[48] Undoubtedly, such endeavours are necessary not only for strengthening regional cooperation frameworks among the riparian countries, but also for improving 'flood forecasts for flood risk management through building capacities of hydro-meteorological services in member countries.[49]

Water cooperation demands the protection and development of basins and requires states to weed out irritants and employ modern mechanisms

[48] World Hydrological Cycle Observing System, "Proposal under Implementation: Hindu Kush Himalaya-HYCOS," accessed May 27, 2016, http://www.whycos.org/whycos/projects/proposals-in-advanced-development-stage/hindu-kush-himalaya-hycos.

[49] Ibid.

and modalities for settling water disputes.[50] Therefore, riparian countries should fully respect bilateral treaties to increase mutual trust and resolve water conflicts peacefully. The mechanisms, provided under bilateral treaties, may require further sophistication, even updating, without changing their basic spirit. For instance, the adoption of Disaster Risk Management (DRM) in water treaties, where there is none or advancing it where there is, would require political maturity and incentive to negotiate a DRM framework. Therefore, 'risks and vulnerability over the growing knowledge on hydrological variability' can drive such mechanisms.[51]

Issues of Dispute: Climate Change, Melting Glaciers and Dams

The construction of dams in the upper riparian locations is considered one of the major hurdles in resolving transboundary water issues in South Asia. India is the 'third country'[52] in the world in terms of dam construction, after China and the United States. At the time of independence in 1947, there were less than 300 large dams in India. However, 2000 witnessed growth in the number of dams which exceeded 4000, out of which more than half were constructed during 1971-1989.[53] Regarding ramifications of the construction of dams on human and ecological life, some scientists are convinced that they can seriously damage the climate. They argue that large concentrations of carbon dioxide are released in trees and plants when a reservoir is flooded initially,[54] making the plants decay. Afterwards, the plant litter accumulated in the reservoir's basin rots without oxygen producing concentrations of dissolved methane, which gets released into the atmosphere when water runs through the dam's turbines.[55] Thus, carbon dioxide is transformed into damaging methane in the atmosphere through

[50] Yona Shamir, "Alternative Dispute Resolution Approaches and their Application in Water Management: A Focus on Negotiation, Mediation and Consensus Building" (paper, United Nations Educational, Scientific and Cultural Organization-International Hydrological Programme, Paris, 2013), http://www.un.org/waterforlifedecade/water_cooperation_2013/pdf/adr_background_paper.pdf.

[51] Helen Ingram and Joanna Endter-Wada, "Frames and Ways of Knowing: Key Considerations for Policy Responses to Climate Risk and Vulnerability" (conference proceedings, *Human Dimensions of Global Environmental Change*, IHDP Open Meeting, Bonn, April 26-30, 2009), http://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1169&context=envs_facpub.

[52] P. Karunakar, "Building of Large Dams and the Rights of Tribes in India," *Fourth World Journal* 11, no. 1 (2012): 27.

[53] Kamal Kumar, "Sustainable Development via Big Dams: The Victimisation of Affected People," *International Journal of Humanities and Social Studies* 2, no. 4 (2014): 91, http://theijhss.com/april2014/17.HS1404-046.pdf.

[54] Tony Seba, *Solar Trillions: 7 Market and Investment Opportunities in the Emerging Clean-Energy Economy* (San Francisco: Seba Group, 2009), 37.

[55] Ibid.

man-made water reservoirs, which results in increased global warming, that is 24 times more intense than carbon dioxide.[56] Besides ranking third in dam building, India is also the world's third-leading emitter of carbon dioxide.[57]

Due to climate change, the Himalayan glaciers are receding at an alarming rate.[58] Many are melting at rates of 70 to 100 meters per annum. [59] According to the Intergovernmental Panel on Climate Change, one-third of the Himalayan glaciers will vanish by 2050 and two-third by the next century, owing to rapid warming of the Himalayas.[60] The models for assessing the impact of climate change currently in use predict that the melting process will be faster in the western than the eastern Himalayas, making the situation quite grim for Pakistan and Northwest India.[61]

Between India and Pakistan

India has built multiple barrages and dams on the western rivers. These projects are causing major water shortages in Pakistan or causing floods through former's mal-operation. Pakistan's believes, 'India is holding back water of rivers flowing from Kashmir'[62] by building run-of-the-river storage dams and barrages, and unilateral diversion of water, which is in clear violation of the IWT. One example is flood storage on River Jhelum- India is required to empty storage water as soon as floods recede. The Wullar Barrage storage capacity is 0.32 MAF[63]. It affects the water flow of River Jhelum especially during the dry season. India is constructing a barrage at the outlet of Wullar Lake and if this Barrage is constructed, India would

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[56] Duncan Graham Rowe, "Hydroelectric Power's Dirty Secret Revealed," New Scientist, February 25, 2005, https://www.newscientist.com/article/dn7046-hydroelectric-powers-dirty-secret-revealed/.

[57] Tim Newcomb, "Will Himalayan Dams Solve India's Energy Woes?" Popular Mechanics, January 15, 2013, http://www.popularmechanics.com/science/energy/a8701/will-himalayan-dams-solve-indias-energy-woes-14982175/.

[58] Ramesh Bhushal, "Himalayan Glaciers Disappearing at Alarming Rate, Says New Study," *thethirdpole.net*, May 20, 2014, http://www.thethirdpole.net/2014/05/20/nepal-and-bhutan-glaciers-disappearing-at-alarming-rate-says-new-study/.

[59] Jeffrey Hays, "Tibet, The Himalayas, Melting Glaciers and Global Warming," Facts and Details, July 2011, http://factsanddetails.com/world/cat52/sub328/item2116.html.

[60] Binayak Ray, *Climate Change: IPCC, Water Crisis, and Policy Riddles with Reference to India and her Surroundings* (Maryland: Lexington Books, 2011), 46.

[61] Claude Arpi, "Strategic Aspects of Climate Change," *Indian Defence Review* 26, no.3 (2010): 12, http://www.claudearpi.net/maintenance/uploaded_pics/Climate_Change.pdf.

[62] Khalid Chandio, "Water Security: Pakistan and Regional Perspective," *IPRI Journal* XII, no. 1 (2012): 136.

[63] Mirza Asif Baig, "Implementation of Indus Waters Treaty: Perceptions and Reality," *IPRI Insight* 1, no. 2, 3 (2014): 86-87.

have control over 0.32 MAF. When Pakistan objects to India's illegal transgressions (a) India carried out construction without sharing requisite information with Pakistan;[64] and (b) the construction work is in violation of Paragraph 7 of Annexure-E of the IWT,[65] and wants to take the case to neutral experts, India suspends construction.

Another example is the Kishanganga Hydro-power project which has become a bone of contention between both countries. Initially, the dispute was about water diversion from one tributary to another.[66] Pakistan claimed that this is the violation of Article (clause) 1V-3-c of the IWT.[67] Consequently, this divergence would reduce maximum natural flow of water of the Neelum-Jhelum River. According to some reserved estimates, Pakistan would face 27 per cent[68] (in case of maximum diversion of total water flow) water deficit with the construction of 22km long tunnel for diverting water from the Kishanganga to the Wuller Lake.[69] Due to Indian obstinacy and inflexibility for resolving this issue through the Permanent Indus Commission, Pakistan, approached the International Court of Justice, which permitted India — while taking into account the basic essence of the IWT to protect the water rights of low riparian countries — to divert minimum water flow from Kishanganga for generating power under certain parameters and limits, i.e. without disturbing the natural flow of River Neelum. Besides, 'India will be unable to divert permanently complete winter flows over a period of six to eight months in a year.'[70]

Furthermore, there are two other issues in this regard: faulty design and inappropriate pondage size of the Kishanganga dam. Initially, again Pakistan adopted the bilateral mediating procedure through Permanent Indus Commission as documented in the IWT to express its concerns, but in vain. Therefore, Pakistan has decided to take this case to a third party.[71] India's understanding of the pondage size of Kishanganga dam is 6136 AF,[72] whereas Pakistan's interpretation is that India is only allowed 1000 AF[73] storage capacity. On finalisation, the project would certainly shrink

[64] "India has Started Construction/ Planned over 100 Dams," EnvoInfo, March 4, 2011, http://www.envoinfo.com/index.php/2011/03/india-has-started-construction-planned-over-100-dams/.
[65] Baig "Implementation of Indus Waters Treaty."
[66] "Kishanganga Dam: No Headway in Talks," *Dawn*, June 3, 2005.
[67] "Managerial Issues Hamper KHEP Construction," *Daily Times*, July 10, 2012.
[68] "Kishanganga Dam -Another Set of Failed Water Talks," *Dawn*, December 5, 2005.
[69] Ibid.
[70] "Kishanganga: India Allowed to Divert Minimum Flow of Water: Commissioner," *Business Recorder*, December 22, 2013.
[71] "Objectionable Designs of 330MW Kishanganga and 850MW Ratle Hydropower Projects," *News International*, August 7, 2015.
[72] Baig, "Implementation of Indus Water Treaty."
[73] Ibid.

the course of River Neelum, which will in turn reduce power generating capacity of 969-MW Neelum-Jhelum hydropower project in Azad Jammu and Kashmir (AJK) by more than 20 per cent or about 100-MW.[74] The construction of Kishanganga is a part of India's water strategy which is exclusively designed to impact Pakistan adversely on socio-economic fronts.

Pakistan has shown its apprehensions about transparency relating to 'insufficient data sharing about the building of Indian hydro works like Hanu Small Hydroelectric Plant, Chutak, Nimoo Bazgo, Baglihar, Wullar Barrage, Dul-Hasti, Uri-II, Marpachoo Hydroelectric Plant and Kishenganga hydroprojects, etc., which has deepened its fretfulness.'[75] It has also raised concerns that project designs made by India are in violation of the IWT criteria, particularly high pondage, deep orifice spillways, excessive freeboard, etc., which lends India high control over water.[76] The Article Vll (2) and paragraph 9 Annexure-D of the IWT state that India is obligated to provide data to Pakistan about its projects at the planning stage, i.e. six months prior to the construction of river projects. [77]

Instead, India is not following the IWT as it usually takes more time in deciding its projects. Salal project, for instance, which was settled amicably and Baglihar project, settled by a third party, remained under negotiation for eight and fifteen years, respectively, before both parties reached any decision.[78] Basically, this is an Indian tactic to delay resolving water issues for gaining maximum time to complete larger part of the work with the intent that by the time Pakistan goes to the Court of Arbitration or a neutral expert to protest, the procedural time lag involved therein would enable it to have substantial on-ground evidence needed to prove its stakes in front of mediators for the continuation of its projects, thereby seeking maximum concessions against the will of Pakistan.

Furthermore, Pakistan has also made several requests to India for sharing real-time flood data and water level in its dams and expected rains ahead of the crucial monsoon season, but India has refused on many occasions. For instance, the Pakistani High Commission, in 2012, sought forecast data about water flow from dams built on Sutlej, Bias and Ravi, but the request was declined.[79] On the other hand, Pakistan has been facing floods of various magnitudes from 1950 to 2015. The country has suffered

[74] "Pakistan to Move Arbitration Court on Kishanganga Project," *Dawn*, May 3, 2010.
[75] Shaheen Akhtar, "Quest for Re-Interpreting the Indus Waters Treaty: Pakistan's Dilemma," *Margallah Papers* XV, no. 1 (2011): 30.
[76] Baig, "Implementation of Indus Waters Treaty."
[77] The Indus Waters Treaty 1960, India-Pak.
[78] Baig, "Implementation of Indus Waters Treaty," 86.
[79] "India Refuses to provide Dam Water Data to Pakistan," *Nation*, June 27, 2012.

huge financial losses, amounting to $38 billion from 1947 to 2014.[80] In addition, the Indus Water Commissioner of Pakistan has demanded the Indus Water Commissioner of India to schedule meetings on time so that Pakistan would be abreast of Indian hydro-projects, but the latter has been delaying the meetings unnecessarily.[81] When relations are strained between both, cooperation level in the water sector also drops since it is seen through the prism of high and low politics in South Asia.

Moreover, India's strategies of releasing floodwater or choking water without prior notice are also disconcerting. Reduction in the river water supplies is certainly a security issue for Pakistan having potential to endanger the country's survival.[82] Pakistan consumes 93 per cent of water for agricultural purposes; and 7 per cent for domestic and industrial purposes. Undoubtedly, Pakistan being an agrarian economy, water plays a critical role which 'accounts for 24 per cent of the national GDP, 48 per cent of employment and 70 per cent of country's exports.'[83] The timing of the flow of transboundary water is imperative because agriculture depends on the availability of water during the planting season, when it is most needed. Presently, half of Pakistan's population faces food insecurity.[84] If the existing tendency of Indian interference in disturbing natural river flows continues, the availability and accessibility of food may become difficult for over 60 per cent of the populace in the next ten years.[85] Besides, minimum environmental flows in river systems and deltas also require additional water.

Between India and Bangladesh

Bangladesh is a delta, formed by the Ganges-Brahmaputra-Meghna system. As the country only gets the leftover water flow after upstream consumption, the consequent water shortage during the arid season always raises grave concerns in water-sharing dialogues with India. The India-Bangladesh water clashes are about judicious allocation, flood control, and

[80] Ministry of Water & Power, "Annual Flood Report 2014" (Government of Pakistan, 2014), http://ffc.gov.pk/download/Annualpercent20Floodpercent20Reportper cent202014.pdf.
[81] Baig, "Implementation of Indus Water Treaty."
[82] Ahmer Bilal Soofi, "Water War with India?" *Dawn*, February 20, 2010.
[83] PILDAT, "Inter-Provincial Water Issues in Pakistan," final recommendations report (Islamabad: Pakistan Institute of Legislative Development and Transparency, 2011), http://www.pildat.org/Publications/publication/WaterR/Report-InterProvincialWaterIssuesinPakistan-FinalRecommendations.pdf.
[84] "Rapid Groundwater Depletion Threatens Pakistan Food Security," *Rakyat Post*, June 10, 2015, http://www.therakyatpost.com/world/2015/06/10/rapid-groundwater-depletion-threatens-pakistan-food-security/.
[85] Ibid.

famine mitigation in both countries, particularly Bangladesh. The first dispute is about constructing large dams in the basin to increase the dry season flow of the Ganges. The Indian proposal calls for building a canal across Bangladesh to link the Brahmaputra with the Ganges, at a site above the Farakka Barrage. Bangladesh's $20 billion counterproposal is the construction of reservoirs and dams in the Himalayan foothills in India and Nepal to store flood waters, for controlling salinity, and generating hydroelectricity in Nepal for domestic use and export purposes.[86] Bangladesh's proposal — which was more pragmatic as compared to the Indian proposal for addressing issues like floods, land formation at Bay of Bengal due to silt and sediment deposits, electricity shortages, salinity challenges etc. — could not be realised due to Indian interest in its own proposal. Therefore, Nepal and Bangladesh were not even brought to the table to discuss the matter.

The second dispute is about an ad-hoc water-sharing agreement over Teesta River, which was signed in 1983 between the two countries through which 39 per cent and 36 per cent water flow was allocated for India and Bangladesh, respectively.[87] It was anticipated that this ad-hoc treaty would be concluded in 2011 through which both countries were likely to get share of water on equal footing, but due to inappropriate opposition by Mamata Banerjee, Chief Minister of West Bengal, this could not fall through. She held that sharing water would not be in the interest of West Bengal's people and farmers.[88]

The third dispute is about India's decision of unilaterally building a dam at Tipaimukh, over the international river, Barak, while ignoring voices of the people of the lower riparian Bangladesh, who consider it a clear 'violation of UN Convention on the Law of Non-navigational Uses of International watercourses.'[89]

Between India-Nepal and India-Bhutan

Nepal-India water affairs reflect growing suspicion and reservations. Nepal faces a lot of challenges in building its water reservoirs owing to persistent Indian opposition. Nepal's mistrust has deepened due to the discriminatory

[86] Elhance, *Hydropolitics in the Third World*, 176.

[87] Arijit Mazumdar, *Indian Foreign Policy in Transition: Relations with South Asia* (London: Routledge, 2015), 95.

[88] R. Keerthana, "Teesta and its Woes," *Hindu*, March 8, 2013, http://www.thehindu.com/todays-paper/tp-in-school/teesta-and-its-woes/article4486357.ece.

[89] Zakir Kibria, "'Gaining Public Acceptance (GPA)' for Large Dams on International Rivers: The Case of Tipaimukh Dam in India and Concerns in Lower Riparian Bangladesh," International Rivers, October 2005, http://www.internationalrivers.org/node/3026.

treaties that were concluded with India from the Sharada Dam construction (1927), Treaty and Letters of Exchange of 1950 and 1965, Koshi Agreement (1954), Gandak Agreement (1959), Tanakpur Agreement (1991) to the Mahakali Treaty (1996).[90] The Koshi, Gandak and Mahakali projects were controlled through bilateral agreements. According to Clause 9 of the Gandak Agreement no project likely to cause reduction in the volume of water can be operated by Nepal.[91] Thus, attempts have been made to impose checks on the country's independence and its economic development aiming to obstruct projects put forth by Nepal or reached with the assistance of foreign countries through loan and grants. Invoking this clause, India, hampered construction of the Marshyandi-1 hydro project leading to a confrontation between King Birendra and Prime Minister Rajiv Gandhi.[92] The agreement signed was beneficial to India at the expense of more than one quarter of the Nepali population.

Another way of obtaining Nepal's water resources is by persecution at seaports and custom points, the illegal use of water resources by district and states of India and grazing in Nepali territories, especially in the eastern and western mountains and hill areas.[93] India capitalises upon Nepal's unstable political scene, its fragile administration and economic disorder to advance its interest over the county's water resources. Considering that 400 million people are settlers of Meghna, Brahmaputra and Ganges, India should help Nepal to fulfill its electricity requirements by optimal regulation of water.[94] This Indo-Nepal water dispute is critically important since it is adjacent to the Indo-China border.

India's approach towards Bhutan is similar to Nepal. However, in this case, India is tactfully able to persuade Bhutan for signing hydro-electric power agreements in its favour because the latter has no democratic political system. Their hydro-electric power cooperation started more than five decades ago. Initially, the cooperation was based on the development of small-scale hydro projects such as Tala, Chukha and Kurichu. Bhutan has the potential to generate 30,000 MW of hydro-power. [95] In 2006, both

[90] Malhotra, "Water Issues between Nepal, India and Bangladesh."
[91] Shastra Dutta Pant, "Nepal's Water Reserves and the Impact of Water Politics on the Country," in *Water Disputes in South Asia: Threats to Security*, Mahfuz Ullah ed. (Dhaka: Probe Printers, 2010), 120.
[92] Ibid., 121.
[93] Ibid.
[94] Malhotra, "Water Issues between Nepal, India and Bangladesh."
[95] "River Water Sharing: Disputes, Solution and the Future," *Test Current Affairs*, accessed January 18, 2016, http://www.testcurrentaffairs.com/2012/12/river-water-sharing-disputes-solution.html.

countries inked a Power Purchase Agreement for thirty five years[96] that would allow India to generate and import 5000 MW of hydro-power from Bhutan, the quantum of which increased to 10,000 MW in 2008.[97] On the other hand, the people of Bhutan raised objections by highlighting the issues that such projects are likely to cause in the long run. For instance, if Bhutan ever decides to construct storage projects, issues will get intense and more problematic when it comes to dealing with India.

Ineffective Mechanisms for Regional Water Cooperation

From the above discussion, it is clear that India prefers bilateral and project-by-project negotiations rather than an integrated holistic approach to cooperate with its neighbours over shared water resources. The existing regional water co-operative pacts are virtually ineffective, which ultimately affects the objective of water development owing to challenges raised by mismanagement of resources. This includes a number of water sub-sectors such as poor joint-basin management and watershed development, lack of water conservation as well as lack of awareness about protecting the glaciers and transboundary scientific coordination or sophisticated forecasting system techniques, inadequate or non-availability of real-time hydrology data sharing during flood season and ineffective environment impact assessment. These challenges call for effective regional co-operative systems at the multilateral level. Some specific recommendations are shared below:

Recommendations

- Removal of regional tensions and mistrust between riparian countries over unequal distribution of scarce water resources and twisting clauses or misinterpretations of treaties demand India's constructive engagement and fair cooperation with co-riparian countries. Likewise, there is also a need to give due consideration to co-riparian concerns and their interests by Indian policymakers while formulating domestic water policies.
- In order to avoid any possible water conflict in the region, there is a need to respect the bilateral treaties by India.
- India needs to stop unilateral diversion of transboundary rivers, rather it should act in accordance with the environmental norms for

[96] Sultan Hafeez Rahman, Priyantha, D. C. Wijayatunga, Herath Gunatilake and P. N. Fernando, *Energy Trade in South Asia: Opportunities and Challenges* (Mandaluyong: Asian Development Bank, 2012).

[97] "River Water Sharing: Disputes, Solution and the Future," *Test Current Affairs*.

protecting river life, which is necessary for saving the ecosystem and human security for all riparian states.

- The ad-hoc nature of Teesta Treaty, which was to be concluded in 2011 as per India's commitment, needs to be finalised on priority basis in view of the concerns of the people of the lower riparian Bangladesh for equitable utilisation of water resources. Challenges such as floods, land formation at Bay of Bengal due to silt and sediment deposits, electricity shortage and salinity need to be addressed on immediate bases while taking into account Bangladesh's concerns. In this context, India being a lower riparian of Nepal and upper riparian of Bangladesh, can play a productive role in settling matters that are common to India, Nepal and Bangladesh.
- In order to maintain territorial integrity and sovereignty of the two landlocked countries, i.e. Nepal and Bhutan, India ought to abandon its hegemonic posture of influencing and dictating them over construction of their hydro projects.
- For timely and effective measures to control the unseen natural disasters in low riparian countries such as Pakistan and Bangladesh, it is India's responsibility to provide correct satellite telemetry information about the Indus and Ganges-Brahmaputra-Meghna water system.
- The transparency issue pertaining to insufficient data-sharing about building of dams, barrages and storage need to be addressed according to the spirit of existing treaties.
- Keeping in view the limited natural flow of water, India can restrict its designs of constructing massive dams/run-of-the-river hydro projects in conformity with the UN convention of 'No Harm Rule.' Such hydro projects cause decrease in the natural flow of water, economic slowdown, energy crisis and damage the ecology of the riparian states.
- Religious and nationalist postures are hurdles in solving water disputes in the region that need to be addressed with the adoption of accommodative approach.
- IWT has a provision that if Pakistan and India fail to resolve their water dispute bilaterally, they can take their case to neutral experts for resolution in light of the IWT. The IWT, therefore, provides the best example for other South Asian countries to include such third party dispute resolution mechanisms in their water treaties, especially the ones with India.

- Transboundary integrated approach is imperative for water development and trust-building. Therefore, South Asian nations need to adopt such strategies that involve watershed development, glaciers protection, rain harvesting and the storage of seasonal flood waters. Moreover, formulation of policies and investments in support of infrastructure for water conservation and management are needed.
- A Himalayas Water Consultative Group of water experts comprising India, Pakistan, Nepal, Bangladesh, Sri Lanka, Afghanistan and China can be made to get input on supply capacity of the Himalayan basins, while taking into consideration climate change and impact on the environment.[98]
- Transboundary scientific coordination is indispensable in order to have a holistic approach on the existing and projected alterations in the transboundary river basins and changing behaviour of Himalayan glaciers.
- Besides technical paradigm, South Asian countries need to adopt a socio-centric outlook, i.e. water security for human beings.
- A forum comprising environmentalists, sociologists and water experts is needed for environment impact assessment at regional level. Non-governmental organisations, civil society groups, media and private enterprises can play effective role in spreading information regarding management of water resources and in developing communication at regional level.

Conclusion

Hydro politics is likely to be the top security issue for South Asia in the coming decades.[99] South Asian countries have concerns and want India to share its water in an equitable, judicious and sustainable manner. This is not only a moral obligation, but also a legal requirement in terms of numerous international and bilateral conventions, treaties and agreements, which prohibit unilateral withdrawal of water from rivers and diversion of flows, and call for water-sharing between and among upper and lower riparian countries in line with the principles of equity and justice causing no harm to each other.[100] Comprehensive political agreements are built on mutual trust, or at least the belief that one's opponent truly wants to find peaceful co-

[98] Shaheen Akhtar, "Quest for Re-Interpreting the Indus Waters Treaty: Pakistan's Dilemma," 31.

[99] Mahfuz Ullah ed., "Hydro Politics in South Asia," 34.

[100] Y. M. Bammi, *India Bangladesh Relations: The Way Ahead* (New Delhi: United Service Institute of India, 2010), 246.

existence. Working out solutions is not difficult; it only requires honest political will at the highest level, without hegemonic designs.[101] A sustainable supply of water is an indispensable requirement for guaranteeing socio-political stability in South Asia.■

[101] Mahfuz Ullah ed., "Hydro Politics in South Asia," 34.